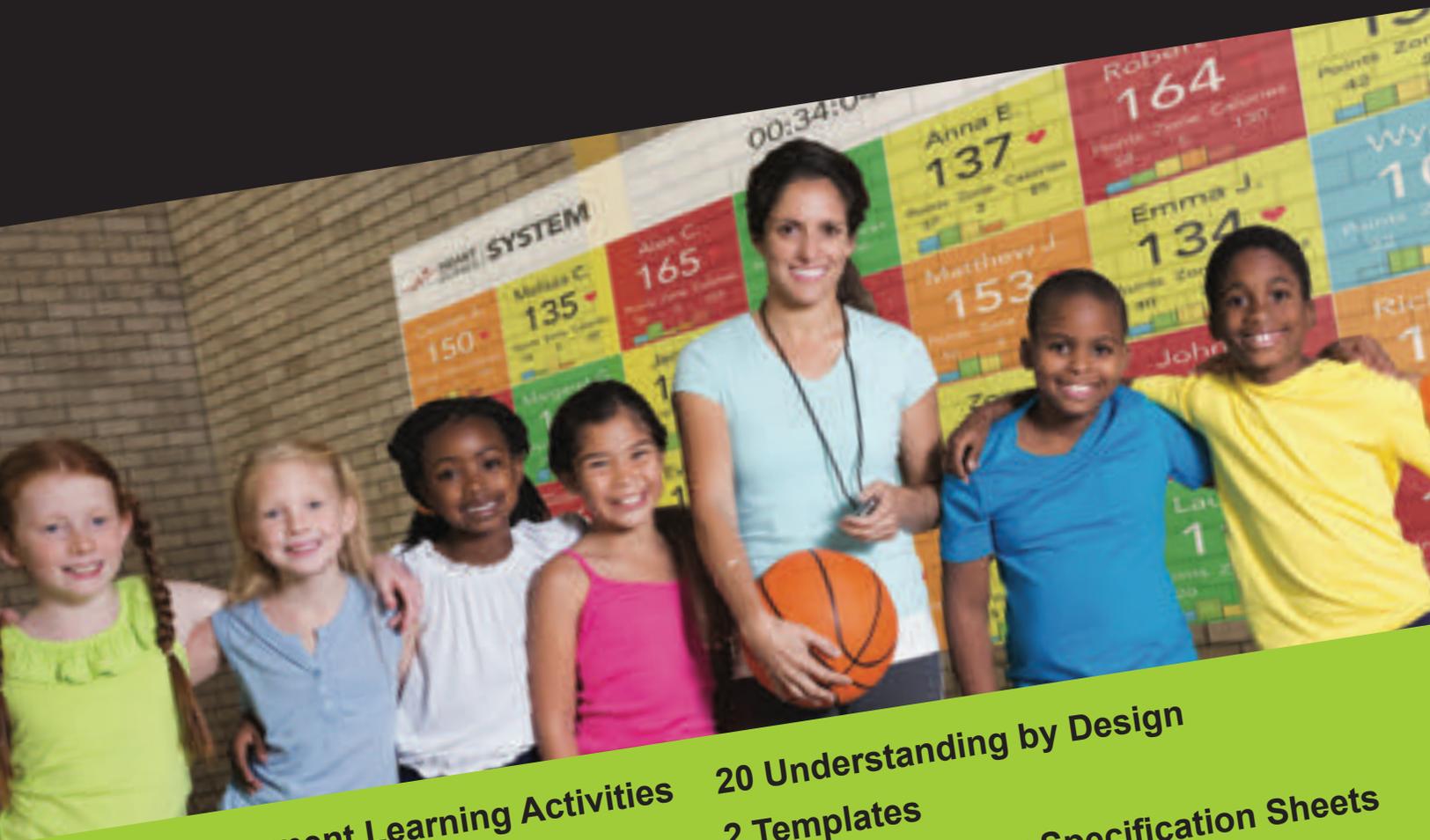


SMART PE

Lessons Using Heart Rate Monitors & Step Trackers for Physical Education



13 Movement Learning Activities
7 Fitness Tests
5 Student Worksheets
9 Articles

20 Understanding by Design
2 Templates
3 Different Sensor Specification Sheets
5-Page Comprehensive Glossary

Sally Edwards
Deb Van Klei

Forward to Smart PE

Matching curriculum to the equipment and objectives of lessons for physical education is essential for quality PE. Smart PE is a digital learning conversion that personalizes and individualizes the student's experience enhancing physical literacy. And, it's a way to prepare the brain to learn and cognitively perform.

One of the reasons that Sally Edwards and Deb Van Klei together wrote this book *Smart PE* is to make physical education instructors and programs more accountable to standards and benchmarks as the methods and technology provide a way for objective grading, motivating, and engaging students, well, and teachers themselves.

Using Smart PE, the 21st century learner can begin to fall in love with physical activity because the MLA, Movement Learning Activities meets today's student where they are — in the world of digital devices and data. Teaching Smart PE for the PE teacher is one way to transform your PE program using the fusion of technology and smart, data driven devices and curriculum. Data drives decisions especially for the health seeking student. With growing trends of childhood obesity and inactivity, Smart PE provides student accountability and self-management.

Read *Smart PE* because it makes physical education more relevant and integrates other disciplines like math and language arts in a way that you can collaborate better with other teachers. Read *Smart PE* because it is standards-based. Read *Smart PE* it is a way to take your program outside the walls of the gym and into the hearts of your stakeholders. Read *Smart PE* because it is written by two of America's most innovative and future forward PE and health teachers. Read *Smart PE* because you want to develop your physical education program to be the best it can be. Read *Smart PE* because it follows best practices. That's what I want for you - to provide you with the complete system not just the tools but the methods, the devices, and the understanding so that you can do your best. by Joe Gooden

Vice-President, Heart Zones, Inc.

Request to All Readers: Contribute and Earn

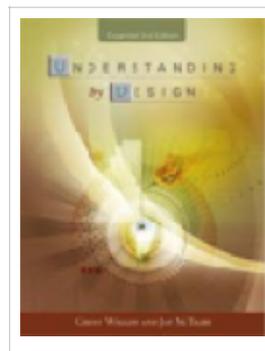
We encourage all Smart PE teachers to take this opportunity to contribute to their fellow instructors through this book. Please provide your UBD, Understanding by Design and MLA, Movement Learning Activities in the same format as the template herein. If selected you receive from Heart Zones, Inc. a compensation of \$100 for that contribution and credit for that effort.

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The Framework: Understanding by Design (UbD)

The framework known as Understanding by Design¹ developed by Grant Wiggins and Jay McTighe for the *Smart PE* book is the format of this work because it meets two requirements: (1) best practices for curriculum development and (2) the enhancement of the reader's capacity to create and engage effective learning for students of all ages.



This framework, Understanding by Design aka UBD is based on using educational standards as one of the best ways of helping students understand what they are learning, why they are learning, and how they know that they learned it. When unpacking grade level outcomes from within the standards, UbD is a comprehensive framework for Physical Education teachers to utilize because it leads to one of our primary goals - physical literacy. UbD is built with a backwards design starting with the end first — what you want the learner to understand.

UbD framework helps teachers uncover the content and the movement learning activities (MLA) that are found in the standards for each of the different grade level outcomes. One of UbD's main purpose is to align state and national PE standards, curriculum, assessments and guide a teacher's standards-based curriculum that leads to student understanding and achievement. The teacher's role becomes that of a facilitator of meaning as well as a coach of understanding as the teacher gives advice, assessments, and feedback for the physical literacy of the student.

Our choice of using the UbD framework design is to support understanding using the data, the hardware and software, report and other features of the Heart Zones System² to support the enhanced learning of the patented Heart Zones methodology. For the past 30-years, the application of this methodology, Heart Zones Training, has been used as a universal cardiovascular program by kindergarten students, those in medical rehabilitation, health club programs, and Olympic athletes.

There are three unique stages to using the UbD framework:

- **Stage One:** *Desired Results*. This first stage includes the goals, standards, understandings, essential questions that students will know and be able to do. This is called in the vernacular of UbD as "knowledge and skills".
- **Stage Two:** *Evidence of Learning*. This second stage demonstrates the range of assessments used to inform and confirm teacher and student learning. This proof of learning may include teacher observation, fitness log, think/pair/share activities, exit slip, checklist, demonstration, written response, test, holistic and analytical rubrics, formative and summative assessments.

¹ Wiggins, G and McTighe J. *Understanding By Design*. Upper Saddle River, New Jersey. Pearson Merrill Prentice Hall, 2006

² The Heart Zones System is the technology+methodology solution for motivation, engagement and assessment using wearable technology that empowers participants to pursue a safe and healthy active lifestyle. Subdomain: <http://schools.heartzones.com/>

- **Stage Three:** *The Learning Plan.* This third stage is aligned to Stage One and Stage Two. The Learning Plan contains the movement learning activities (MLA) and movement and other experiences to support students in making meaning of the lesson. Stage Three also includes the transfer of learning information and experience to the student's individualized and personalized fitness plan and if included, portfolio.

It is important in Physical Education to give students the time and opportunity to reflect on what they're learning. When the student understands in part because of the designs of the lesson, they are better able to do the following:

- Explain: Make insightful connections
- Interpret: Make it personal to them
- Apply: Make adaptations based on their current level of fitness
- Gain Perspective: See the BIG picture
- Empathize: Find value in others
- Have self-knowledge: Continual reflection on personal habits

Understanding by Design may be new to you and we welcome you to this new set of practices, ideas, and experiences. Or, you may already be experienced with developing lessons based on these principles, research, and pedagogy. Whichever, it is our goal to create engaging and effective learning.

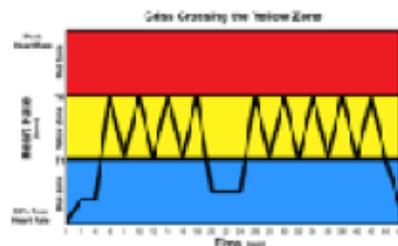
What is the Understanding by Design, UbD, Template?

The Understanding by Design (UbD) template is the companion to the Movement Learning Activities (MLA) framework and templates that the *Smart PE* book uses and recommends for each school or district to create their unique Physical Education program. Please feel free to modify the template to fit your needs and structure. The MLA allows both the flexibility and format to incorporate the key learning lessons that “starts with the end first” which begins with what is the big, hairy goal of the lesson and what do you want your students to understand after doing the MLA.

The UbD is based on incorporating the Heart Zones technology and methodology with the principles developed over two decades ago by Wiggins and McTighe together to provide students with compliance to the National PE Standards. See the article on “Understanding by Design the National PE Standards: Perspective” within this book for further information.

UbD Lesson # __	
Stage One Outcomes	
Lesson Goals:	
Standard 1. Benchmarks: Standard 2. Benchmarks: Standard 3. Benchmarks: Standard 4. Benchmarks: Standard 5. Benchmarks:	
Understandings The student will understand:	Essential Questions: <ul style="list-style-type: none"> • Why • How • What
Knowledge The students will know: <ul style="list-style-type: none"> • The benefits of • That • How to 	Student will be able to <ul style="list-style-type: none"> • Calculate • Change
Stage Two Assessment Evidence	
Performance Tasks: <ul style="list-style-type: none"> • Students will demonstrate • Students will perform 	Other Evidence: <ul style="list-style-type: none"> • Student will design • Students will explain

Self Assessments: <ul style="list-style-type: none">• Students will be able to• Students will be able to	Other Evidence Summarized: <ul style="list-style-type: none">• Student will reflect• Student will self-assess
Stage Three The Learning Plan	
Learning Activities: See the companion MLA, Movement Learning Activity	
Resources:	
Key Terms:	



What is the Movement Learning Activity: The MLA Template[©]

The Movement Learning Activity or MLA template is the companion to the UBD, Understanding by Design³ framework and templates that the *Smart PE* book uses and recommends for each school or district to create their unique Physical Education program. Please feel free to modify the template to fit your needs and structure. Formerly called a "Lesson Plan," this new MLA allows both the flexibility and format to incorporate the key learning lessons that "starts with the end first" and then backward develops the movement activities to meet the primary goal — the big picture.

The MLA is based on using the Heart Zones technology and methodology fused together to provide the individualization and the personalization of the activity time. See the article on "Foundation Principles of

MLA Lesson #		
Standards and Benchmarks Learning Targets Learner Outcomes		
Equipment and Material		
Notes	Activity	Debrief
Instant Activity	Quick movement or quiet activity	Teaching points
Learning Activity Instructions	Step by step instructions to tie the movement activity to the UbD lesson	
Modify Activity	Used for intervention/enrichment/ differentiate your lesson to meet the needs of ALL the students	
Check Understanding (Assessment)	Formative assessments Solo Taxonomy What connections are the students making?	

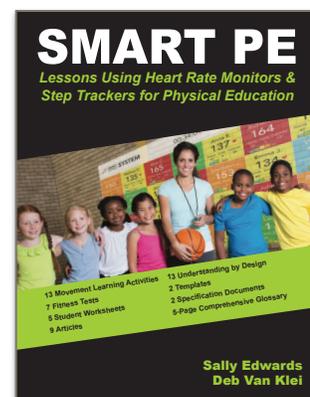
Heart Zones" within this book for further information.

³ Wiggin, G and McTighe J. Understanding By Design. Upper Saddle River, New Jersey. Pearson Merrill Prentice Hall, 2006

The Smart PE Movement

What is SMART PE?

- Smart PE is a digital physical learning conversion it is not a program.
- It is personalizing and individualizing fitness learning.
- It is a way to enhance physical literacy.
- It is a way to prepare the brain to learn and to cognitively perform.
- It is a way to make PE accountable to Physical Education standards.
- It is a way to grade students objectively and fairly.
- It is a way to quantify and qualify movement activities.
- It is a way to bring PE to the 21st Century learner.
- It is a way to transform the PE program using technology.
- It is best practices for PE.
- It is a way to make your school an “active school”.
- It is a way to market to your stakeholders that PE is the most important class in your school.
- It is a way to keep PE from being left behind other school subject matters.
- It is a smart way to fight the prevalence of childhood obesity.
- It is a way to engage students where they are — to hook them on fitness now.
- It is a way to make PE relevant.
- *Smart PE is a movement*



What SMART PE is Not?

- Smart PE is not a program it is a movement with activists, advocates, principles, and mission.
- It is not about the “old PE” versus “new PE”.
- It is not a way to “blow up PE” but rather to convert and blend it for the 21st Century student.
- It is not repositioning what we have done in the past.

Why SMART PE?

- Engages students in their PE activities.
- Leads to motivated students.
- Achieves fitness outcomes.
- Provides for objective and fair grading.
- Connects to the stakeholders by sharing outcomes to market the PE program.⁴
- Make student outcomes based on data and not observation.
- Saves teachers time.
- Provides for more MVPA during class time.⁵
- Measures and displays on the Heart Zones™ Big Board© individual students %MVPA.
- Personalizes the PE program for each and every student.

⁴ Smart PE through using the certain technologies allows for email communication of the workout to the stakeholder and student.

⁵ MVPA stands for moderate to vigorous physics activity. It is a percentage of the time spent in the moderate intensity Yellow Zone and vigorous intensity Red zone divided by total class time.

Part 2. Getting Started



- **How it Works: It Starts with the Technology**
- **How it Works: It Starts with the Methodology**

How it Works: It Starts with the Technology

There are several different parts to the Heart Zones System that are important to understand. Those three parts are in large part what makes the Heart Zones System different from any other group display, measurement and monitoring, or tracking system on the market today:

Unique Sensors: In selecting a technology there are certain features that are paramount. One of those is how the sensor broadcasts the signal data, what the range of transmission of that signal, and what is the device that ultimately receives the data. Currently the Heart Zones sensors are dual broadcast in both bluetooth (BLE) and at the same time ANT+ (pronounced ant plus). This allows the participant to use a personal mobile device for their individual tracking as well as a signal for the group data and display.

Bridges: A Heart Zones Bridge is a transceiver — which is the combination of two words — transmit and receive. The Bridge receives a signal from the sensor and transmits that signal to the iPad. There are three types of Bridges and the selection depends on mobility, connection to the internet, and number of devices that will be transmitting a signal at one time.

IOS Devices: The Heart Zones System has two different applications which run on two different devices — (1) the iPad for the group application called Heart Zones PE and (2) the iPhone, iPod Touch, iPad for the individual app called Heart Zones Training. The latter app is free for everyone and includes three different modes: cycling with speed, cadence, and power sensors; run/walk with stride tracking sensors, and heart rate with optical or EKG sensors.

Projection of the Group Data: Next, the iPad then can either be enabled to display the student data on the “Big Board” by projecting it with a projector or on a flat panel TV or not. The iPhone or iPod Touch or a second or Administrator different iPad that runs the Heart Zones Training individual app then stores the data in the app’s “History” which can then be shared, emailed, or text to the instructor or training partners.

Cloud Portal: Using the cloud portal is an intuitive web-based software application which allows the instructor or System Administrator to manage classes, manage students, manage sensors, create reports, and allows for communication functioning. There are three levels of permissions and dashboards for the administrator, the instructor, and the student participant.

Technology is never as simple as everyone tries to suggest. That’s why Heart Zones provides extensive manuals, guides, video tutorials, webinar and customer tech support to help the physical educator navigate new hardware, software, and web requirements that are ever changing. In fact, you want to select tech partners that have flexible software, provide frequent updates and enhancements. At Heart Zones, Inc. our commitment is to innovation, constant innovation, in a way that reduces costs and improves performance. Our mission is to get America fit and starting with students and meeting them where they are at today — technology — we believe that if we work together, we can accomplish a BHAG, a big, hairy, audacious goal.⁶

⁶ A **Big Hairy Audacious Goal** (BHAG) is a strategic business statement similar to a vision statement which is created to focus an organization on a single medium-long term organization-wide **goal** which is **audacious**, likely to be externally questionable, but not internally regarded as impossible. Wikipedia

How it Works: It Starts with the Technology

3 Heart Rate Zones Methods

(1) ZONING Method

- ZONING has no numbers on the chart.
- ZONING is simple to use.
- ZONING is three zones.
- ZONING is founded on three-principles of cardio-exercise.
- ZONING is anchored using the two thresholds.
- ZONING is the easy Blue zone, moderate Yellow zone, and the hard/vigorous Red zone.



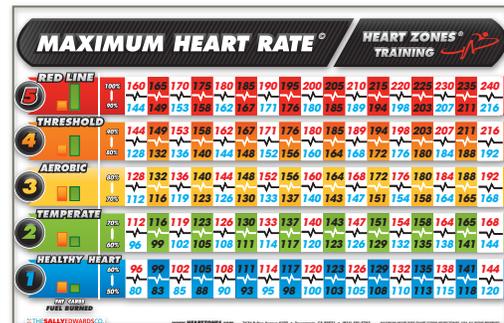
(2) Threshold Method

- Threshold training uses numbers.
- Threshold narrows the zones providing variety
- Threshold is anchored using the two metabolic thresholds
- Threshold does not use maximum heart rate.
- Threshold uses FIT Points = Frequency x Intensity x Time



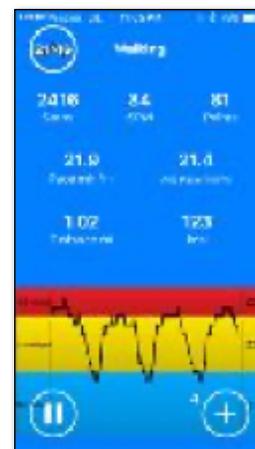
(3) Maximum Heart Rate Method

- Maximum heart rate anchored on peak heart rate.
- Maximum heart rate zones are fixed.
- Maximum heart rate varies by sport activity.
- Maximum heart rate cannot be accurately determined using any formula
- Maximum heart rate is not age-determined.



How it Works, It Starts with the Methodology: Step Intensity Zones

Dividing heart rate numbers into zones was first developed and later released using the zone training methodology with the publication of the *Heart Rate Monitor Book* by Sally Edwards in 1992. The purpose of zone training methodology is to take whole or absolute numbers and to put them into an intuitive context for ease of understanding. Temperature readings are divided into zones with cold being in the blue zone and severe heat being in the red zone. The same is true of stop lights, quality of food, emotional responses, real property, postal area codes, and other types of data. By putting absolute numbers into context, it is possible to create ranges of numbers, zones, that simply make sense.



Heart Zones Training iPhone App "Step Tracking"

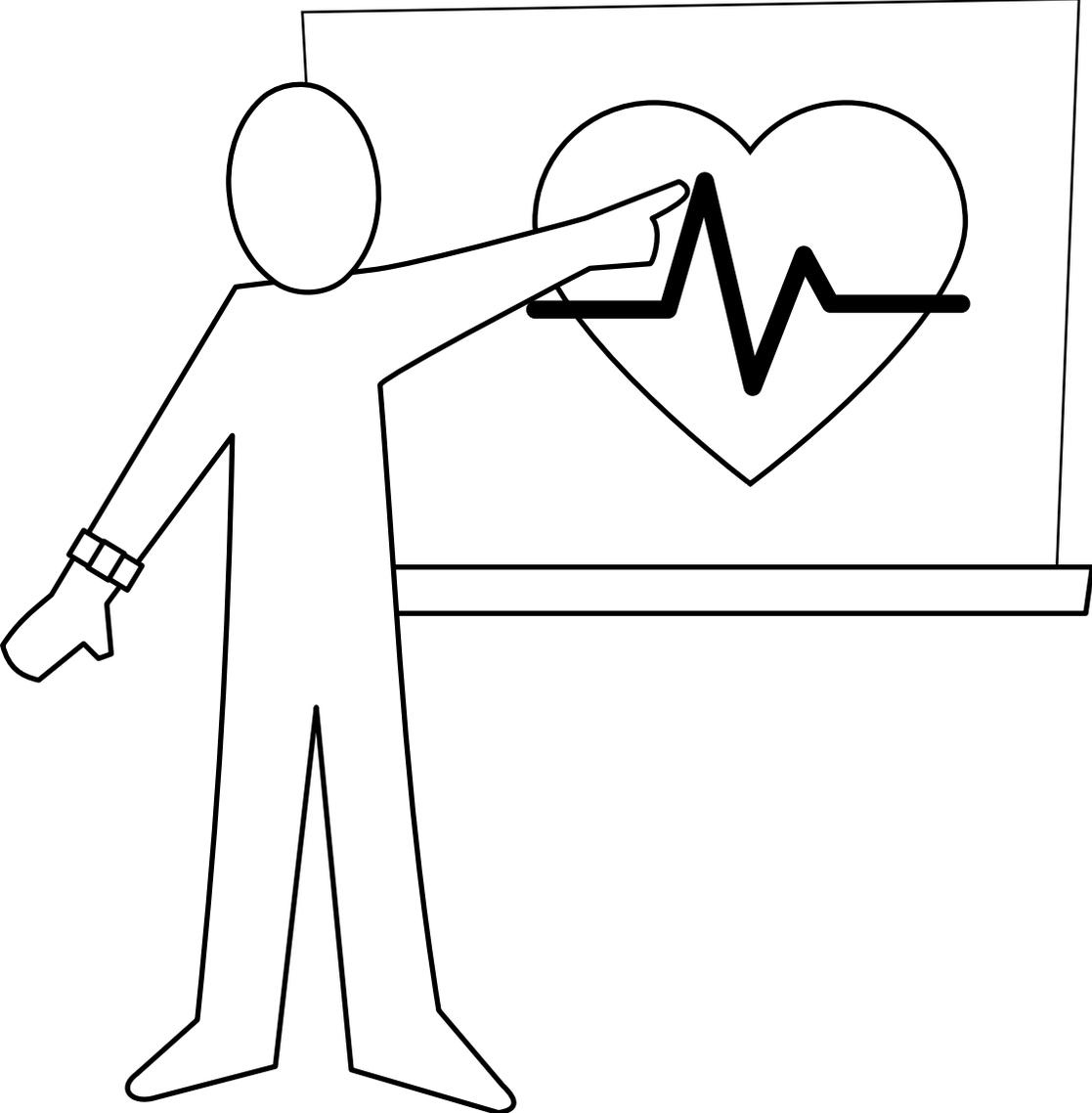
For the physical educator, it is important to measure movement: the quality and quantity of movement. The quantity of movement is the total step count. The quality of the movement is the step intensity or step zones or FIT Points using steps (see article on FIT Stars and FIT Points) Physical activities that use the pace or speed during an activity, step intensity, can also use the zone methodology which adds an important context to the measurement - how hard is the individual running or walking during their movement time. The three step-intensity zones of easy Blue zone, moderate Yellow zone, and the vigorous and hard Red zone are a way of accomplishing this.

Since each individual's step zones are unique to their running and walking characteristics, how do you individualize the participants step intensity? The answer is you have to assess their peak pace and then, just like with heart rate zones, set their delimiters. In this case, the dividing points between the zones is based on a percentage of their "peak" pace. In the Heart Zones System software this is setting for each participant is performed in their participant record.

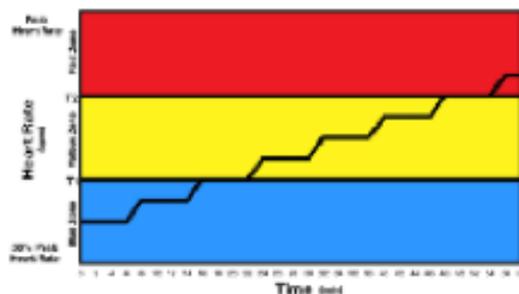


Heart Zones PE iPad App for Movement or Step Tracking

Part 3. The Lessons



UbD Lesson #1L. Find Your Peak



Stage One Outcomes

Lesson Goals: Assess the highest number of beats-per-minute (bpm) called peak heart rate doing an all-out effort.

Standard 1: The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.

Standard 2: Applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3: Demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness (S3.H2.L2, S3.H3.L2, S3.H8.L1, S3.H10.L1, S3.H10.L2)

Standard 4: Exhibits responsible personal and social behavior that respects self and others (S4.H1.L1, S4.H2.L1, S4.H3.L1, S4.H4.L1, S4.H4.L2, S4.H5.L1)

Standard 5: Recognizes the value of physical activity for health, enjoyment, challenge, self expression and/or social interaction (S5.H1.L1)

Understandings

The students will understand:

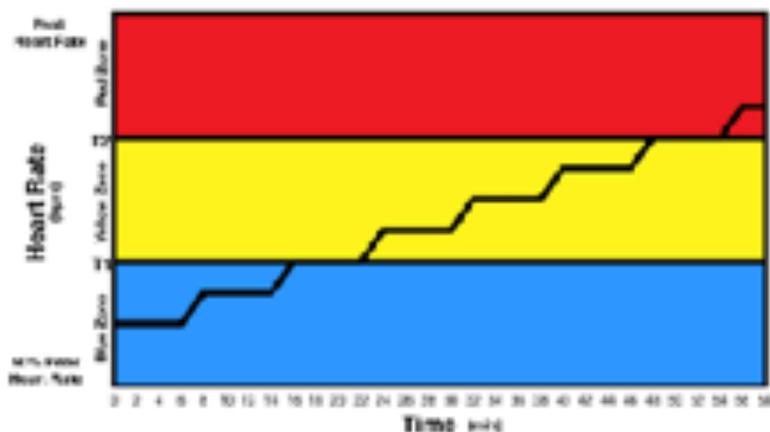
- that their highest all-out peak heart rate is their maximum heart rate.
- that their all-out peak heart rate is different for every individual.
- that their maximum heart rate is genetically determined.
- that maximum heart rate declines with age until puberty is reached.
- that their maximum heart rate cannot be determined by any mathematical formula but must be field tested for each individual.

Essential Questions:

- Why is each individual's all-out peak heart rate different?
- Why is it important to know your individual and personal peak heart rate?
- Why is the highest peak heart rate the same as their maximum heart rate?

<p>Knowledge The students will know:</p> <ul style="list-style-type: none"> • that peak heart becomes their maximum heart rate. • their peak heart rate is their maximum heart rate. • how peak heart rate is measured. • that they cannot change their maximum heart rate because it is genetically determined. 	<p>Student will be able to</p> <ul style="list-style-type: none"> • Complete a peak heart rate test. • Explain the meaning of peak heart rate. • Explain why an all-out peak heart rate effort is the same as your maximum heart rate.
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Students will take a peak heart rate test running. • Students will record their maximum heart rate into their Heart Zones Fitness Profile Sheet. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • Individual students print-out from the Heart Zones PE software application • Individual students report from the Heart Zones Training iPhone App.
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Ask the student "could they go faster during the test," with thumbs up "yes" and thumbs down "no". 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • The teacher can review a heart rate profile aka heart rate graph.
<p>Stage Three Learning Plan</p>	
<p>Learning Activities: See the MLA #1A, Movement Learning Activity.</p>	
<p>Resources: <i>This is also known as the 2-4 Minute Max Heart Rate Test. Details can be found in The Heart Rate Monitor Guidebook by Sally Edwards pages 62-64</i></p>	
<p>Key Terms:</p> <ul style="list-style-type: none"> • Peak Heart Rate: the highest number of beats-per-minute during any single workout. • All-Out Peak Heart Rate: the highest heart rate reaching in a 100% effort. • Maximum Heart Rate: the greatest number of beats-per-minute possible for your heart muscle. This number is highly individualized and mode-specific. 	

MLA Lesson #1L. Find Your Peak



Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.

Standard 2: Applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3: Demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness (S3.H2.L2, S3.H3.L2, S3.H8.L1, S3.H10.L1, S3.H10.L2)

Standard 4: Exhibits responsible personal and social behavior that respects self and others (S4.H1.L1, S4.H2.L1, 4.H3.L1, S4.H4.L1, S4.H4.L2, S4.H5.L1)

Standard 5: Recognizes the value of physical activity for health, enjoyment, challenge, self expression and/or social interaction (S5.H1.L1)

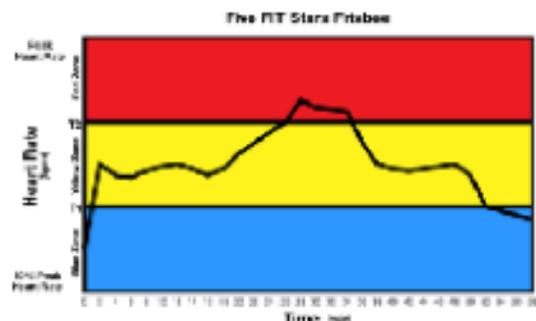
Equipment and Material	<ul style="list-style-type: none"> • The Heart Zones System with heart rate sensors. • Student Recording card and pen/pencil • Stopwatch or timer on the Big Board 	Suggestion: Partner activity with one partner recording the heart rate data for each 15-seconds while the other takes the test.
Notes	Activity	Debrief
Instant Activity	All student do an easy low zone warmup walking and talking of at least 5 minutes and a heart rate of 100-130 bpm.	Keep all students moving until the test begins in order that their heart rate does not drop low before the test starts.

<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • Explain that this is an all-out short duration effort. The goal is to achieve the highest heart rate number possible. The test stops when they hit their biggest number. • Designate one timer for the entire class. • All students partner with one as a recorder and the other as the test-taker. They then switch positions. • Prior to starting, make sure that the student knows their individual tile on the Big Board in order to see their heart rate numbers. • Start the test with all students showing an exercise heart rate at about 120 bpm. • Have all students accelerated their speed so that heart rate increases 5 bpm every 15 seconds. • Timer shouts out two numbers: (1) elapsed time and (2) heart rate number target. <i>Example: the test is at the end of the first minute. Timer yells out 1:00 minute heart rate 140 bpm.</i> • Test stops when the participant can no longer raise their heart rate even though they are running faster. 	<p>See the Attached Student Worksheet #1 Peak Heart Rate Challenge</p> <p>Note: Go to the Heart Zones PE app on the iPad and flip the switch to store the peak heart rate values: <i>Settings > Current Class > Save Peak Value During Session</i></p>
<p>Modify Activity</p>	<ul style="list-style-type: none"> • Can substitute running for cycling, exercise equipment such as rowers, ellipticals, etc., and swimming. See the <i>Heart Rate Monitor Book for Cyclists</i> by Sally Edwards and Sally Reed for details • Can use a set of stairs to climb at the near end of the test to further drive heart rate to the biggest or peak number. 	
<p>Check Understanding (Assessment)</p>	<p>Formative Assessment with a yes (thumbs up) or a no (thumbs down) as the answer: Is all-out peak heart rate the same as maximum heart rate?</p>	

Student Worksheet MLA # 2.0 Find Your Peak

Find Your Peak Worksheet		
Elapsed Time	Heart Rate Stage	Record Student's Heart Rate Number
00:00	120 bpm	bpm
00:15	125 bpm	bpm
00:30	130 bpm	bpm
00:45	135 bpm	bpm
00:60	140 bpm	bpm
01:15	145 bpm	bpm
01:30	150 bpm	bpm
01:45	155 bpm	bpm
02:00	160 bpm	bpm
02:15	165 bpm	bpm
02:30	170 bpm	bpm
02:45	175 bpm	bpm
03:00	180 bpm	bpm
03:15	185 bpm	bpm
03:30	190 bpm	bpm
03:45	195 bpm	bpm
04:00	200 bpm	bpm
04:15	205 bpm	bpm
04:30	210 bpm	bpm
04:45	215 bpm	bpm
05:00	220 bpm	bpm

UbD Lesson #2L. Five FIT Star Frisbee



Stage One Outcomes

Lesson Goals

To learn how to determine “how much exercise” a workout session is worth

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.(S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H2.L1, S3.H2.L2, S3.H6.L1, S3.H8.L1, S3.H10.L1, S3.H10.L2, S3.H11.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.(S4.H1.L1, S4.H2.L1,S4.H3.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

Understandings:

- Students will understand that exercise can be individualized and measured based on their effort or heart rate intensity.
- Students will understand every minute in Blue zone is worth 1 FIT point, Yellow zone is worth 3 FIT points, and Red one is worth 5 FIT points.
- Students will understand that different class activities lead to different number of FIT points.
- Students will understand that stars are a representation of FIT points - that the two are the same.

Essential Questions:

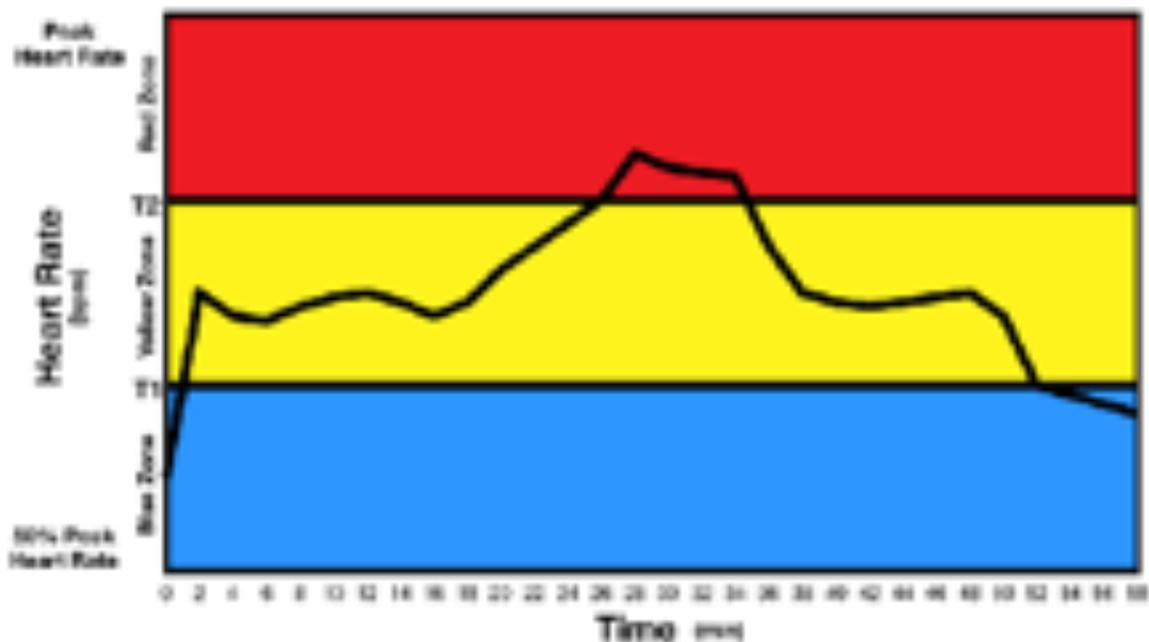
- What is the FIT formula?
- Why is measuring and assessing a workout using the FIT formula important?



<p>Knowledge</p> <ul style="list-style-type: none"> • Students will know that the goal for this class is to earn 5 Stars on the Big Board. • Students will know that they earn stars based on earning FIT points. • Students will know that they earn stars by moving in all of the heart zones. • Students will know that the Yellow zone and the Red zone earns them more FIT points and more Stars than the Blue zone 	<p>Student will be able to</p> <ul style="list-style-type: none"> • Earn 5 stars in most of their PE class sessions by working out more time in the moderate to vigorous zones than the easy zones. • Explain the meaning of a 5 Star performance • Understand the ZONING chart <table border="0"> <thead> <tr> <th>Zone Color and Name</th> <th>Points</th> </tr> </thead> <tbody> <tr> <td>Vigorous Red Zone</td> <td>5.0-5.9</td> </tr> <tr> <td>Moderate Yellow Zone</td> <td>3.0-4.9</td> </tr> <tr> <td>Easy Blue Zone</td> <td>1.0-2.9</td> </tr> </tbody> </table>	Zone Color and Name	Points	Vigorous Red Zone	5.0-5.9	Moderate Yellow Zone	3.0-4.9	Easy Blue Zone	1.0-2.9
Zone Color and Name	Points								
Vigorous Red Zone	5.0-5.9								
Moderate Yellow Zone	3.0-4.9								
Easy Blue Zone	1.0-2.9								
<p>Stage Two Assessment Evidence</p>									
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Provides a way to objectively grade or assess a student's effort for the lesson. • Students will record the number of stars earned each day into their PE journal. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • .Use the student's individual report from the Heart Zones PE app as proof of the number of stars earned. 								
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Explain if they did not earn 5 stars what the student could have done to accomplish this. 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Visual inspection of the individual student's tile and the number of stars attained in the Heart Zones PE Class Summary report. 								
<p>Stage 3 Learning Plan</p>									
<p>Learning Activities: See the Movement Learning Activity for this lesson</p>									
<p>Resources: See Appendix article titled "FIT Points, The Magic Sauce in the Heart Zones System."</p>									
<p>Key Terms:</p> <ul style="list-style-type: none"> • FIT Formula: An equation wherein frequency of workout sessions multiplied by the intensity of that workout (heart zones number) multiplied by the number of minutes:seconds of the workout equals training load. The FIT Formula is = Intensity (I) x Frequency (F) x Time (T) • Training Load: The amount of exercise stress. 									

MLA Lesson #2L: Five FIT Stars Frisbee

Five FIT Stars Frisbee



Equipment and Material

- Small side ultimate indoor frisbee
- Heart Zones System sensors and app

Suggestion: If a student drops into the Blue zone on the Big Board, they must be substituted by another player until on the sidelines they can do an activity to get back into the Yellow or Red zone.

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.(S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H2.L1, S3.H2.L2, S3.H6.L1, S3.H8.L1, S3.H10.L1, S3.H10.L2, S3.H11.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.(S4.H1.L1, S4.H2.L1,S4.H3.L1, S4.H5.L1)

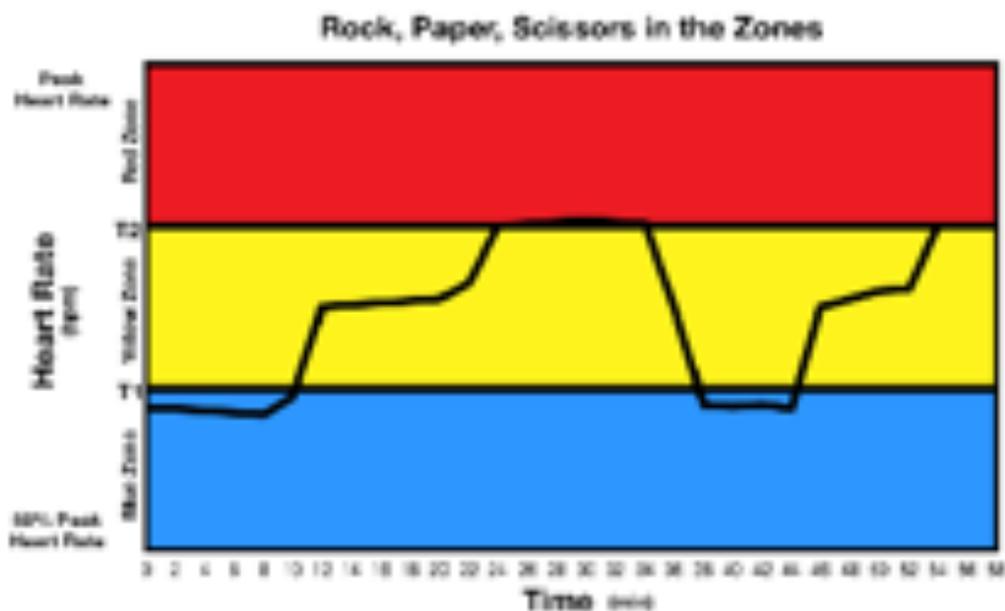
Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

Notes	Activity	Debrief
Instant Activity	Have all students quietly put on their heart rate sensor and lie down on the floor to get the lowest heart rate number they can attain.	Lying down heart rate is typically the lowest heart rate attainable during the school day.
Learning Activity Instructions	<ul style="list-style-type: none"> • Explain that the goal is for the team with the most stars, wins. Goals scored are not counted. • The game begins with timed quarters with the amount of time determined by the amount of class time. The reason to have quarters is to assess how many stars have been earned each quarter as students learn that they earn stars faster in the Red zone. • Stars count if the star is partially or completely filled. 	The emphasis in this lesson is not on scoring goals but staying in the moderate to vigorous zones. The teacher's goal is at least 50% of the time in the MVPA and this lesson should exceed that requirement.
Modify Activity	<ul style="list-style-type: none"> • Can substitute basketball or other similar team activity. 	
Check Understanding (Assessment)	Do you earn stars faster with time in the Blue zones (1 FIT Point per minute), the Yellow zone (3 FIT Points per minute), or the Red zone (5 FIT Points per minute)?	The reason that stars are important is to make numbers mean something rather than just plastering another number on a Big Board display. Rather, if the goal for each class is to earn 5 Stars, we have simplified understanding.

<p>UbD Lesson #3.</p> <p>Rock, Paper, Scissors in the Zones</p>	
<p>Stage 1. Outcomes</p>	
<p>Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns. (S1.H1.L1)</p> <p>Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)</p> <p>Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H2.L1, S3.H2.L2, S3.H5.L1, S3.H8.L1, S3.H10.L1, S3.H10.L2, S3.H12.L1)</p> <p>Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H1.L2, S4.H4.L1, S4.H5.L1)</p> <p>Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)</p>	
<p>Understandings and Goals:</p> <ul style="list-style-type: none"> • The student will understand that exercise effort is self-regulated • The student will understand that though their heart rate numbers are different, they can be in the same heart zone. 	<p>Essential Questions:</p> <ul style="list-style-type: none"> • Why is it important to be responsible and in charge of your own effort or intensity? • When do you use the concept of self-regulation in other parts of your life?
<p>Knowledge</p> <ul style="list-style-type: none"> • Students will know the rules of the game • Students will know how to increase or decrease their effort to match a heart zone. 	<p>Student will be able to</p> <ul style="list-style-type: none"> • Student will be able to play the game based on their individual heart zone matching the goal of the set.
<p>Stage 2. Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Can explain what they prefer to do for movement activity to raise or lower their heart rate into the appropriate zone. • Can apply their self-awareness of their effort to help to regulate their effort level. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • Use the Big Board display to match the zone color for that round of play. • Explain to others why they chose different types of activities to raise or lower their heart rate.

<p>Self Assessments:</p> <ul style="list-style-type: none"> • Compare their effort with that of other students playing the game 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Use the visual bio-feedback of the Big Board to make decisions if they are “in” the game or “out” of the game.
<p>Stage 3. The Learning Plan</p>	
<p>Learning Activities: See the MLA, Movement Learning Activity that is the companion to this game, Rock, Paper, Scissors in the Zones</p>	
<p>Resources: YouTube vide on how to play the game Rock, Paper, Scissors</p>	
<p>Key Terms:</p> <ul style="list-style-type: none"> • Self-regulation • Rock, Paper, Scissors • Heart zones 	<ul style="list-style-type: none"> • ZONING • Threshold • Games of luck

MLA Lesson #3. Rock, Paper, Scissors in the Zones



<p>Equipment and Material</p>	<ul style="list-style-type: none"> • The Heart Zones System including one heart rate sensor for each student • Markers to designate the area to play the game. 	<p>Rules of Rock, Paper, Scissors can be found here: http://www.wikihow.com/Play-Rock,-Paper,-Scissors</p>
<p>Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns. (S1.H1.L1)</p> <p>Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)</p> <p>Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H2.L1, S3.H2.L2, S3.H5.L1, S3.H8.L1, S3.H10.L1, S3.H10.L2, S3.H12.L1)</p> <p>Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H1.L2, S4.H4.L1, S4.H5.L1)</p> <p>Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)</p>		
<p>Notes</p>	<p>Activity</p>	<p>Debrief</p>
<p>Instant Activity</p>	<p>Each student chooses a partner and plays the game Rock, Paper, Scissors to see which of the two of them can get the lowest ambient heart rate. This also teaches students how to play the game and where to move to if they win or don't win.</p>	<p>Rock, Paper, Scissors is a game of luck. It is a simple hand game that is played around the world, with many different names and variations.</p>

<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • Create three different areas - circles or rectangles of the same size and name each "Gold" "Silver" "Bronze". Position the areas 10-100 yards apart depending on your area and effort goals. • Divide the class randomly into 3 different groups and assign them to either the Gold or the Bronze of the Silver playing area. • A round is 5 minutes and is designated one of the three effort zones: Blue zone, Yellow zone, or Red zone if using the ZONING method or Blue, Green, Yellow, Orange, Red zone if using the Threshold method. • Students may not enter the Rock, Paper, Scissor playing area until their heart rate zone matches the color of that round - either the three ZONING colors or the five Threshold or Max method colors. • First round is the Blue zone so students enter the playing area when their sensor or the Big Board displays show that they are in the low and easy Blue zone. If they are not in the Blue zone, the students must do an activity to get into their low-intensity Blue zone. The goal is to teach self-regulation of effort. • Students in the circle partner and challenge each other to a game of Rock, Paper, Scissors. • Winners move up to the next highest game area and those who don't win move down to one area lower. Example: A bronze winner moves up to the silver area and if a player in gold doesn't win, they move down to silver playing area. • Play continues for 5 minutes for the Blue round, 5 minutes for the Yellow round, and 5 minutes for the Red round. • Students may not move into the playing area until their heart rate tile on the Big Board display or the blinking light of their heart rate sensor armband matches the zone color of that round. 	<p>*MLA: Movement Learning activity</p>

<p>Modify Activity</p>	<ul style="list-style-type: none"> • If quantifying the activity using MVPA, have the students share in a formative assessment gesture if at least 50% of their time in the MVPA, moderate-to-vigorous physical activity (Yellow-Orange-Red zones). • Change the distance between the game areas for each round requiring students to modify their effort to stay in the designated zone but having to expand the distance to the game area. 	<ul style="list-style-type: none"> • You can designate that the students to stay in their zone color while they play versus getting into the game area. • If you have a large class, add the number of playing areas to five and use stars for their designation from 1 star to 5 stars.
<p>Check Understanding (Assessment)</p>	<p>Rock, Paper, Scissors is a game of luck. Explain why the excitement of playing a game of luck affects heart rate and how.</p>	

UbD Lesson #4L. Tour of the Zones



Stage One Outcomes

Lesson Goals: Identify individual heart rate and correlating zone (color)

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.(S2.H1.L1, 2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3H1. L1, S3.H1.L2, S3.H2.L1, S3.H2.L2, S3.H8.L1., S3.H8.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H2.L2)

Understandings

The students will understand:

- that each of the 3 heart rate zones in ZONING or 5 zones in Threshold require a different exertion level.
- that different things happen in different zones.

Essential Questions:

- Why do we train on different days in different zones?
- How do each of the different zones affect our metabolism differently?
- What type of activities do you need to do to change zones and why?

Knowledge

The students will know:

- the feeling of effort in each of the heart zones.
- how to explain the feeling in each of the zones.
- how to describe ways to change their exercise effort to increase or decrease their heart rate through each of the heart zones.

Student will be able to:

- demonstrate that they can cruise through and identify each of the heart zones by number, name, effort level, and color.
- share what happens to them in each of the heart zones in terms of length of time sustainable, number of calories burned, and other important zone benefits.

Stage Two Assessment Evidence	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Demonstrate that they can stay at the floor and the ceiling of each of the heart zones doing different types of cardio-activities like jump rope or skipping. • Each student will use the data of TIZ, time in zones and calculate an estimate of their FIT Points 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • Using the 5 Star reward system on the student's individual tiles, determine how many stars they earned and what they could have done to earn more less time.
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Show the effort required to stay for long periods of time in the Blue and Yellow zones. • Show how many FIT Points they can earn by increasing the about of the in the Red zone. 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Student will design a fitness lesson that allows the participants to spend time in each of the heart zones. • Students can draw the heart rate profile of this workout and compare with the profile from the Heart Zones System reports to show evidence of understanding.
Stage Three The Learning Plan	
<p>Learning Activities: Complete the workout activities for the Tour of the Zones in several different modalities</p>	
<p>Resources: <i>The book title ZONING, Fitness in a Blink</i></p>	
<p>Key Terms:</p> <ul style="list-style-type: none"> • Ceilings or Tops of a Heart Zone-The top of a single heart zone. The same as top of the zone • Floors or Bottoms of a Heart Zone- The bottom of an individual heart zone • Metabolism- The chemical changes in the body's cells by which energy is provided for vital processes. The sum of all energy used by the body • FIT Points-The letters stand for frequency, intensity, and time as they relate to a fitness workout. FF = Frequency—how often.I = Intensity—the percentage of maximum heart rate in which the workout falls. T = Time—how much time is spent. T=type-type of activity • FIT Stars- A representation of Fit Points • Ladders up and ladder intervals down 	
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Lesson #4L. The TOUR OF THE ZONES



Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.(S2.H1.L1, 2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3H1. L1, S3.H1.L2, S3.H2.L1, S3.H2.L2, S3.H8.L1., S3.H8.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1)

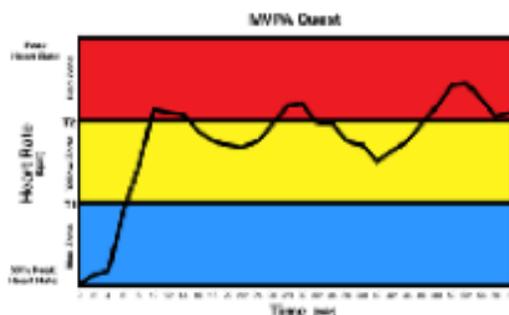
Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H2.L2)

<p>Equipment and Material</p>	<ul style="list-style-type: none"> • The Heart Zones System • Jump Ropes or other cardio-support equipment like rebounders or similar. 	
<p>Notes</p>	<p>Activity</p>	<p>Debrief</p>

<p>Instant Activity</p>	<p>Have all students run around a specified area until their heart rate reaches 150 bpm and then immediately sit quietly and calculate their 2 minute recovery heart rate number. The bigger the recovery heart rate number is better for the student.</p>	<p>See either wall chart titles:</p> <ul style="list-style-type: none"> • ZONING • Threshold Training System
<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • <i>This workout is an up and down-ladder with each stage lasting 2 minutes. The student should be able to increase from the bottom to the top of a zone within 30 seconds.</i> • <i>For this activity the instructor can choose one of the three training options: maximum heart rate, ZONING or Threshold heart rate method</i> • Have students increase their individualized heart rate number to the bottom of the Blue zone (choose maximum heart rate, ZONING, or Threshold heart rate method) for 2 minutes walking. • Using the Big Board display or the flashing lights on the Blink Armband, have students increase their pace to the top of the Blue zone which is the bottom of the Yellow zone in ZONING and hold that number for 2 minutes as they climb up towards the top of the heart rate number ladder. • Ask students to increase again their heart rate to the top of the Yellow zone and hold for a total of 2 minutes and then and all-out sustainable effort for 2-minutes toward the top of the Red zone. • Start down the ladder by reducing effort to the bottom of the Yellow zone for 2 minutes and the bottom of the Blue zone for 2 minutes. 	<ul style="list-style-type: none"> • One set consists of one up and down of the heart rate ladder which is approximately 14 minutes in duration. • Allow adequate rest between sets which is 3-5 minutes and then start the next set up and down the ladder for about 14 minutes. • Have students identify how individual heart rate correlates with which zone color.
<p>Modify Activity</p>	<ul style="list-style-type: none"> • Start with each interval at 3 minutes up and down the ladder and then decrease it to 2 minutes for each interval and then to 1 minute if time permits. • Change from 3-zone, 2 thresholds ZONING method to the 5-zone, 2 thresholds Threshold heart rate by flipping the switch in Menu > Classes in the software. • Use a different modality than walk/run such as bicycling or swimming. 	

Check Understanding (Assessment)	<ul style="list-style-type: none">• Ask the question “was it easier to increase heart rate in the lower zones or the upper zones?”• Why is each heart beat above the Top of Blue zone (T1) harder than the increases below T1?• Which is your favorite zone and why?• Why does the student get different benefits in different zones?• Why are all of the zones important and not the mythical “target zone”?	
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UbD Lesson #5L. MVPA QUEST



Stage One Outcomes

Lesson Goals: Students identify individual %MVPA and how it relates to personalized fitness plan

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H8.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H2.L1,S4.H4.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

Understandings

The student will understand:

- the importance of %MVPA in Physical Education
- how %MVPA is measured
- where to find on their individual tile on the Big Board and in their Heart Zones report this important data point.

Essential Questions:

- Why is %MVPA, the cumulative time in the Red zone and the Yellow zone divided by the total elapsed time important?
- How does a student measure and monitor their individual %MVPA?
- What are the different ways to achieve an activity that is 50% of more MVPA time?

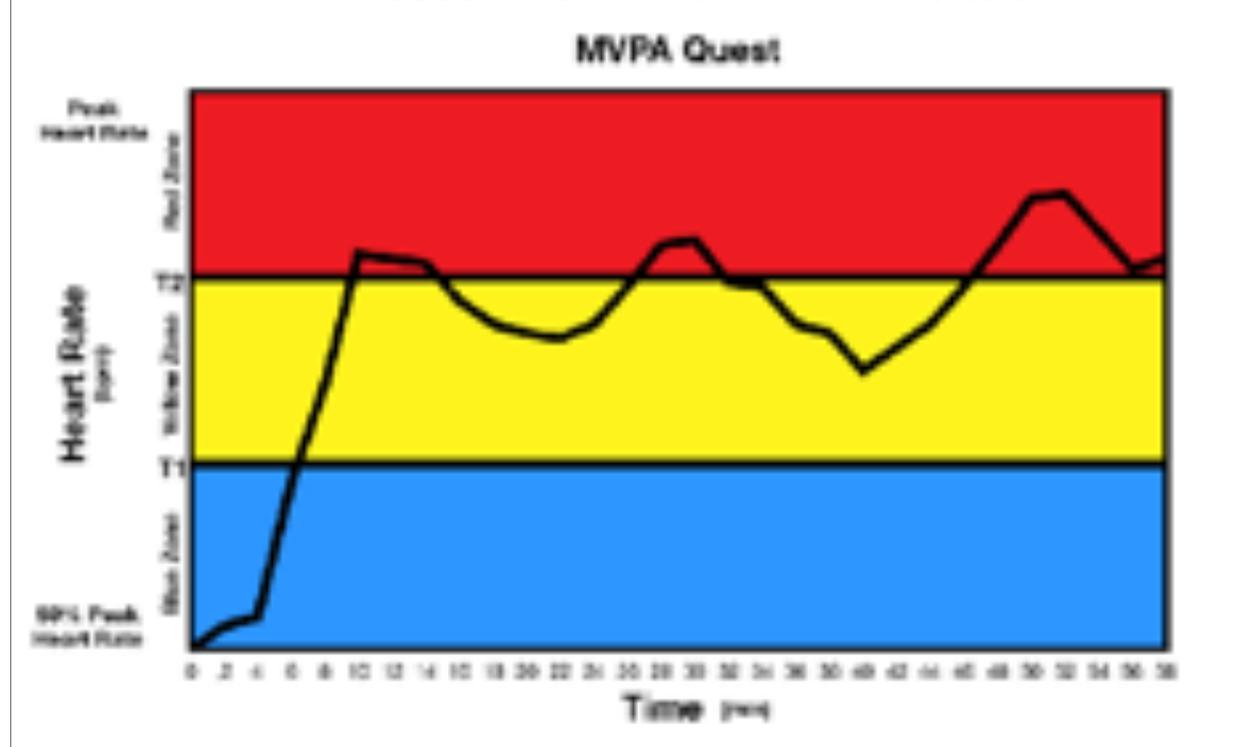
<p>Knowledge The students will know:</p> <ul style="list-style-type: none"> • that their individual goal is to exceed most days the 50% level of MVPA • the formula for %MVPA 	<p>Student will be able to:</p> <ul style="list-style-type: none"> • select their tile on the Big Board which shows the %MVPA • understand why above the T1 heart rate level is important for the collection of the %MVPA values. • explain to others that movement is key to achieving a score of 50% or more time in the MVPA zones
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Students will complete the Movement Learning Activity (MLA) with a score higher than 50% MVPA • Students will assess other student’s tiles and explain why some of the student’s had different %MVPA numbers than their own. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • Students will take their individual report from either the Heart Zones Training iPod/iPad/iPhone or the Heart Zones PE Report and journal their result (or include this data in their portfolio). • Students will share in one other discipline - language arts, math, science, etc they're understanding and application of the concept of %MVPA.
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Compare and contrast their %MVPA with that of the class average. • Track and graph their last 5 PE sessions to determine if the average of all those sessions is over the minimum standard of 50% MVPA. 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Students will demonstrate that they have achieved above the 50% MVPA effort level in any manner of their choice — journal, observation, reports. • Students will show their work of summing the TIZ, time in zone for Yellow and Red divided by the total time for the class and calculate their %MVPA without the use of the Big Board showing this value.
<p>Stage Three The Learning Plan</p>	
<p>Learning Activities: Complete the MLA, Movement Learning Activity called the MVPA Quest.</p>	
<p>Resources: What is MVPA: https://www.cdc.gov/cancer/dcpc/prevention/policies_practices/physical_activity/guidelines.htm</p>	

Key Terms:

- Easy physical activity
- Moderate physical activity
- Vigorous physical activity
- **Percent of MVPA-** The percent of moderate-to-vigorous physical activity. The CDC, Center for Disease Control, recommends that at least 50% of the time spent in physical education class be in the Yellow zone and the Red zone
- **TIZ or Time in Zone-**Time in zones (TIZ) which is the sum of the number of minutes distributed based on the intensity — the zone

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MLA Lesson #5L. The MVPA Quest



Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H2.L1, S3.H2.L2, S3.H8.L1, S3,H8.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H2.L1,S4.H4.L1)

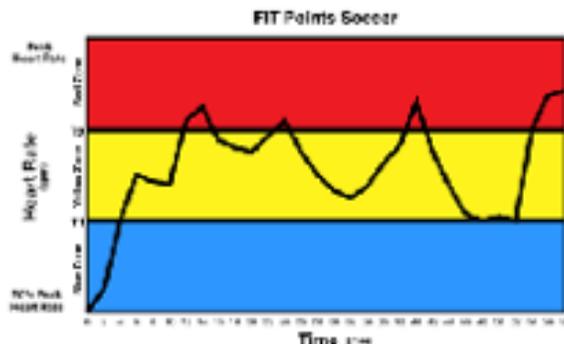
Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

<p>Equipment and Material</p>	<ul style="list-style-type: none"> • The Heart Zones System • One ball per student 	<p>Suggestion: To measure true %MVPA start the Heart Zones PE app timer when students arrive to use total class time not the time after roll or other administrative or lesson activities.</p>
<p>Notes</p>	<p>Activity</p>	<p>Debrief</p>

<p>Instant Activity</p>	<p>Each student has a ball and dribbles in the Blue and Yellow zones for a warm-up activity for the first 3-5 minutes of class.</p>	<p>Students grab a sensor and a ball, and start to immediately move when they enter the class area.</p>
<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • The goal is for all students is to attain the highest value for %MVPA. • Set up circuit stations by dividing the total number of students such that no more than 5 students will be active at each circuit station. • Prior to class beginning set up each of the stations with an instruction card for that station. • Ask the students after their “Instant Activity” to divide themselves so that no more than 5 students are standing by their circuit station. • Ask the students to get the highest %MVPA on the Big Board as they can achieve at each of the stations. • Explain that the minimum goal is 50% MVPA but the class with the highest average %MVPA will be recognized the next day with the posting of the best class results for compare and contrast. • Determine a fair amount of time for each station or allow students to randomly choose which stations they choose to spend most of their allotted time. 	<p>Circuit stations provide students with enough choices that they can find several different activities that they enjoy. If you prefer less than 5 students per station then add more stations allowing for more physical activity opportunities.</p>
<p>Modify Activity</p>	<p>Modify the activity for special needs students or those who prefer to do activities by themselves rather than with a group of students.</p>	<p>50% MVPA is typically an easy goal to achieve if the students immediately start movement activity when they arrive in class. Insure that there is adequate warm-up and cool-down time for the MVPA Quest.</p>

Check Understanding (Assessment)	<ul style="list-style-type: none">• Have students explain which of the circuit activities provided the greatest opportunity to exceed the minimum 50% MVPA standard.• Ask students if they felt that 50% of their time in the Yellow and Red time equates to 50% of their time in the Blue zones.• Using a formative assessment format, have students tell if they felt that they understand the reason that 50% MVPA is recommended by some state standards.	MLA means Movement Learning Activities
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UbD Lesson #6L. FIT Points Soccer



Stage One Outcomes

Lesson Goals: Understand how FIT points apply to the Personalized Fitness Plan, and various physical activities

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H8.L2,S3.H10.L1,S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.(S4.H1.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H4.L1)

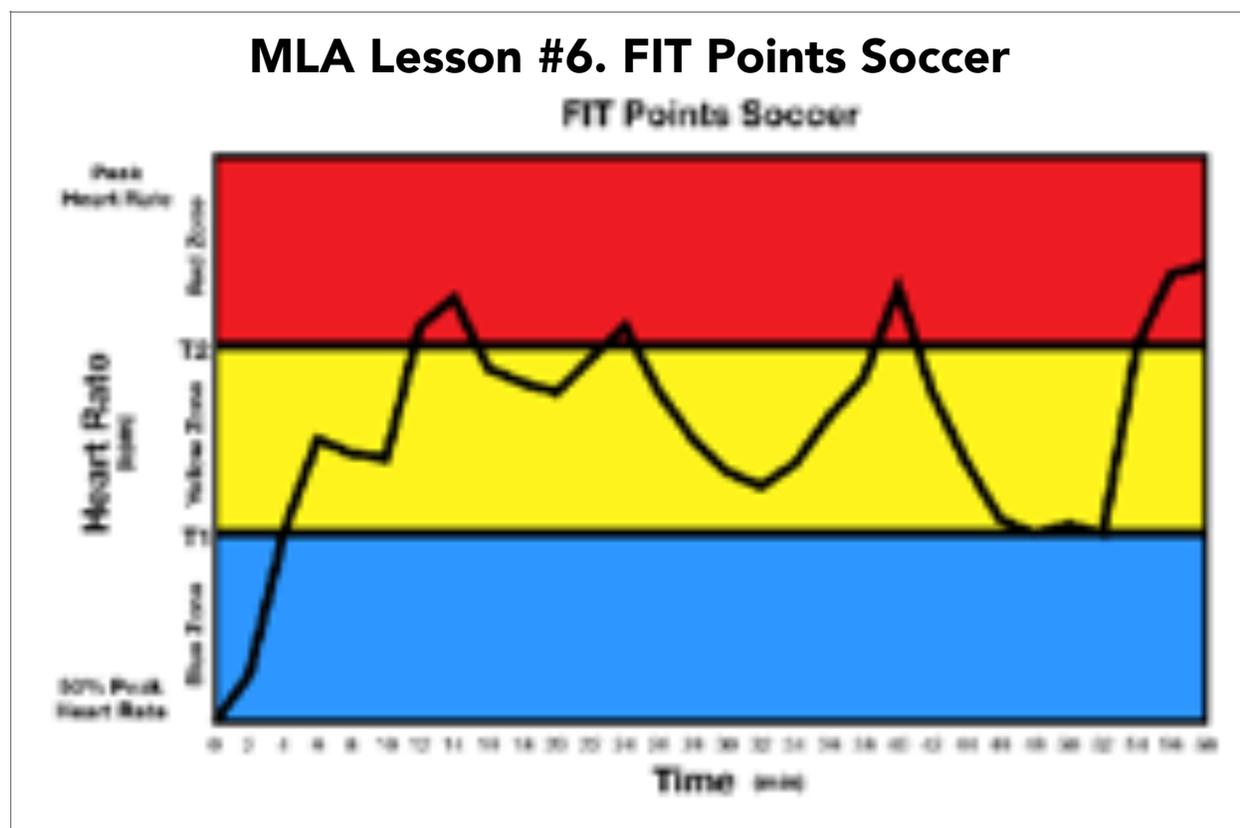


<p>Understanding The students will understand:</p> <ul style="list-style-type: none"> • that FIT Points are a measurement of the quantity of the exercise activity. • that FIT Points are the summation of time in each zones multiplied by the fractionalized zone number. • that FIT Formula is the multiplication of frequency times intensity times time. 	<p>Essential Questions:</p> <ul style="list-style-type: none"> • Why is it that the more FIT Points you have the more physical activity you earned? • How does the student increase the number of FIT Points? • When are fewer FIT Points better than more FIT Points? • Why is it important to measure training load (exercise stress) by using FIT Points?
<p>Knowledge The students will know:</p> <ul style="list-style-type: none"> • the relationship between Heart Zones 5 Stars and FIT Points. • how to calculate FIT Points • that everyone is different and needs different amounts of FIT Points to achieve their individual goals. 	<p>Student will be able to:</p> <ul style="list-style-type: none"> • get 50 FIT Points in 15 minutes, 100 FIT Points in 30 minutes, 150 FIT Points in 45 minutes, and so forth. • explain that FIT Points uses the number of minutes in the colored bar graph in Display #1, as part of the FIT formula of $F \times I \times T = \text{Fit Points}$
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Students will demonstrate that they can change the number of FIT Points that they earn based on the formula of $F \times I \times T = \text{FIT Points} = \text{training load}$ • Students will earn as many FIT Points as possible during a soccer game or drills or activity but the minimum is always 50 FIT Points every 15 minutes of PE class time to achieve 50% of the time in the MVPA. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • Student will design an activity, assign a certain number of FIT points, and then do the activity and show on the Big Board or their individual report that they achieved their goal. • Students will make a table that shows FIT Points for each of the three zones of ZONING or five zones of Threshold or Maximum heart rate.
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Complete FIT Point Soccer drills or a game by earning a minimum of 100 FIT Points for 30 minutes and demonstrating that each student achieves all 5 Star rewards on their tile. 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Student will reflect upon the fact that exercise can now for the first time be quantified using effort as the basis for the calculation of training load.
<p>Stage Three The Learning Plan</p>	
<p>Learning Activities: See the companion MLA, Movement Learning Activity</p>	
<p>Resources:</p> <ul style="list-style-type: none"> • <i>The Heart Rate Monitor GUIDEBOOK to Heart Zones Training</i> pages 141, 269 • <i>The Heart Zones Foundation Seminar Syllabus</i>, pages 25, 32, 33, 	

Key Terms:

- **FIT Formula:** Frequency x Intensity x Time—An algorithm for measuring training load (F) = Frequency—how often. (I) = Intensity—the percentage of maximum heart rate in which the workout falls. (T) = Time—how much time is spent
- **FIT Points**—The letters stand for frequency, intensity, and time as they relate to a fitness workout. F = Frequency—how often. I = Intensity—the percentage of maximum heart rate in which the workout falls. T = Time—how much time is spent. T=type-type of activity
- **FIT Star**— A representation of Fit Points
- **Training Load**— The amount of exercise applied to an individual's body measured as the frequency of the workouts times the intensity (zone) of the workout times the amount of time for the workout. Also called FIT Points and FIT Stars
- **% MVPA**—The percent of moderate-to-vigorous physical activity. The CDC, Center for Disease Control, recommends that at least 50% of the time spent in physical education class be in the Yellow zone and the Red zone
- **TIZ or Time in Zones**—Time in zones (TIZ) which is the sum of the number of minutes distributed based on the intensity — the zone

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Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

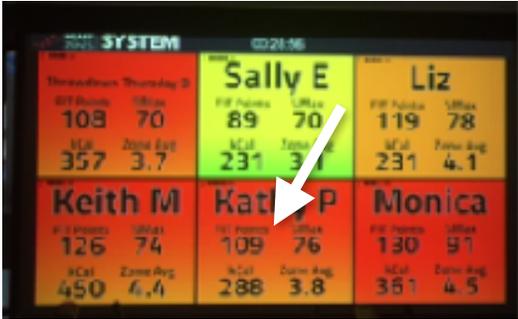
Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H8.L2,S3.H10.L1,S3.H10.L2)

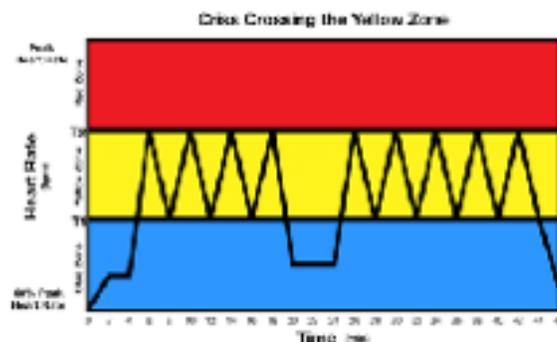
Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.(S4.H1.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H4.L1)

<p>Equipment and Material</p>	<ul style="list-style-type: none"> • Heart Zones System with sensors for each student (if possible) • A soccer field or area indoor or outdoors • The iPad should be set with the second tile display that shows FIT Points versus the front display tiles that show the 5 Star rewards. 	<p>Suggestion: If you have both Step Trackers and Blink Armbands, use both sensors and select the display that shows the data from both of these different sensors.</p>
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Notes	Activity	Debrief
Instant Activity	<ul style="list-style-type: none"> • Ask the students to walk one lap, jog one lap, and run one lap or length of the field for a warm up activity • Ask the students to sit and discuss how many FIT Points they earned doing this warm-up activity 	*MLA means Movement Learning Activity
Learning Activity Instructions	<ul style="list-style-type: none"> • The goal is for the students to get the highest number of FIT Points as they can during the allotted time in soccer drills or game according to the teacher's goals. • The harder the movement effort, the higher their zone number and color, the higher the FIT Point score. • Query the students in advance: " How many FIT points would you estimate for a soccer game [game of choice] of ____ minutes? 	
Modify Activity	<ul style="list-style-type: none"> • Demonstrate that different drills are of different efforts and earn on the Big Board different number of FIT Points • Give permission for students who do not want to achieve a high FIT score for their personal reason, to modify this lesson. 	
Check Understanding (Assessment)	<ul style="list-style-type: none"> • Ask students if the goalie can ever earn as many FIT Points as the forward and why. • Ask the students if the defensive player can earn as many FIT Points as the offensive players and why. • Ask the students if staying in motion earns more FIT Points when the ball is out of their zone than standing still waiting for the ball to come into their zone of play. • Ask what is an appropriate amount of FIT points for a certain amount of time. 	
		
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UbD Lesson #7. Criss Crossing the Yellow Zone Intervals



Stage One. Outcomes

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.(S2.H1.L1,S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H2.L1, S3.H2.L2,S3.H8.L1,S3.H3.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.(S4.H1.L1, S4.H4.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

Understandings and Goals:

- The student will understand what is a workout “type” in this case the type is called intervals.
- The student will understand the benefits of interval workouts versus endurance, combinations, and strength workouts.
- The student will understand “zone training” using wearables.

Essential Questions:

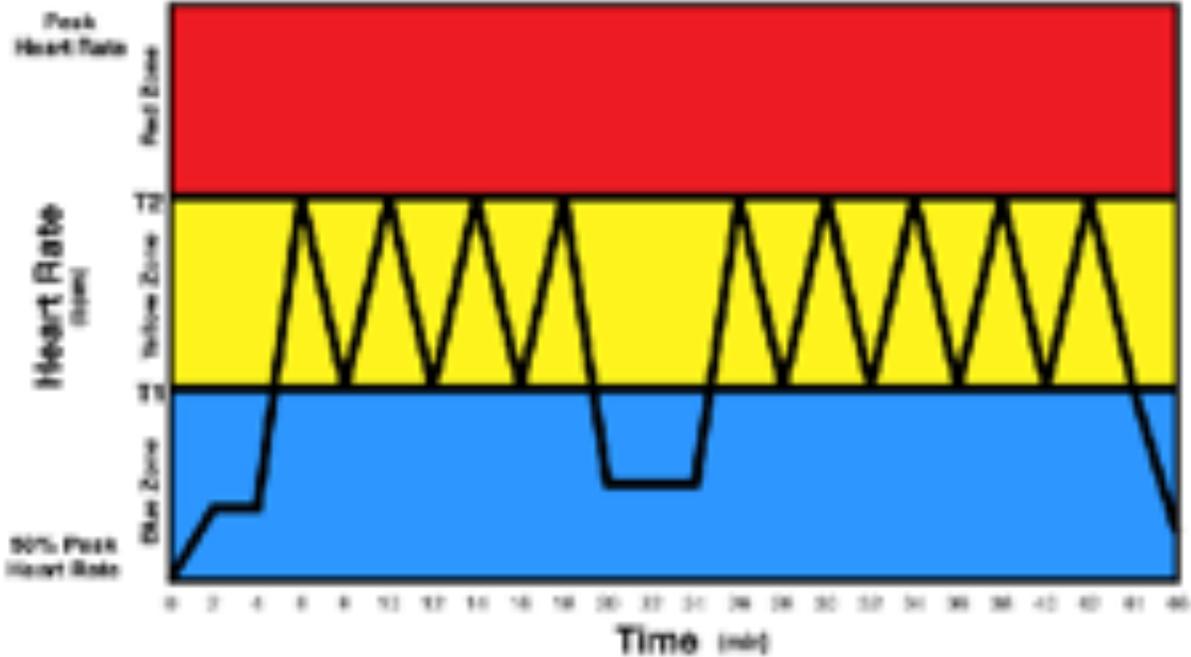
- Why is interval training different than other workout types or formats?
- Why in interval training is recovery so essential and proper recovery even more important?
- What are the two types of heart rate recovery types?
- What are the benefit of interval workouts or training?
- When should I do a HIIT workout?

<p>Knowledge</p> <ul style="list-style-type: none"> • Students will know that zone training is individualized and personalized to them and to their current level of fitness. • Students will know the differences between the four different cardiovascular workout types. • Students will understand the importance of variability training - using all four types versus “monotony” training - doing the same workout type for every session. 	<p>Student will be able to</p> <ul style="list-style-type: none"> • Students will be able to complete an interval session that is within their unique speed or heart rate zones. • Students will be able to share and contrast their data like averages, peaks, caloric expenditure, star rewards by repeating this assignment and downloading their reports.
<p>Stage Two. Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Students will demonstrate that they can complete an interval workout without teacher direction. • Students will accumulate TIZ, time in zones, in this activity it should be predominately in the Yellow zone, that matches the Lesson Plan goals. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • Student will design an interval session recovering in the Blue zone and pushing into the Red zone using different pieces of equipment: rebounders, line drills, cardio-pieces like ellipticals • Students will be required to make a graph showing a typical HIT versus HIIT workout
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Student can explain why the moderate Yellow Zone in ZONING and Zone 3 in ThresholdMax methods is beneficial for developing endurance and caloric expenditure. • Students can modify adjust their zone’s tops and bottoms if their T1 and T2 are depressed from fatigue, sleep, nutrition, stress, etc. 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Student will reflect upon the importance of stress and proper recovery in fitness and transfer this learning to the stress and recovery in their daily lives. • Student will self-assess their learning about the importance of adequate recovery as well as importance of positive exercise stress.
<p>Stage Three. The Learning Plan</p>	
<p>Learning Activities: See the companion MLA, Movement Learning Activity</p>	
<p>Resources:</p> <ul style="list-style-type: none"> • <i>ZONING, Fitness in a Blink</i> pages 155-156 • <i>Heart Zones Cycling</i> pages 189, 201, 213 • <i>The Heart Rate Monitor Workbook</i> pages 27, 48, 116 	
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MLA Lesson #7L.

Criss Crossing Yellow Zone Intervals

Criss Crossing the Yellow Zone



Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.(S2.H1.L1,S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H2.L1, S3.H2.L2,S3.H8.L1,S3.H3.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.(S4.H1.L1, S4.H4.L1)

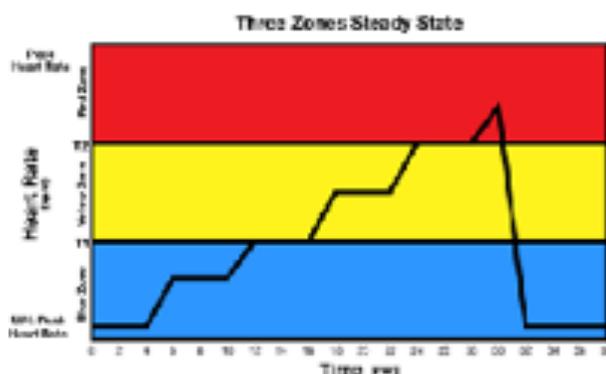
Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

<p>Equipment and Material</p>	<ul style="list-style-type: none"> • Heart Zones System with as many sensors as possible • Step trackers or heart rate sensors • Timer 	<p>Suggestion: This activity is appropriate for indoor or outdoor space.</p>
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Notes	Activity	Debrief
<p>Instant Activity</p>	<ul style="list-style-type: none"> • Proper warm-up activity of your choice. • This is a moderate intensity interval (HIIT not HIT) workout so an easy warmup even including stretching is appropriate. • Confirm that each student has their zones correctly set prior to starting the activity if you want student success. There are large differences between students and their step and heart rate zones. • Explain the goal: The student is to touch the top or ceiling of the Yellow zone and immediately begin an active not total recovery to the bottom of the Yellow zone as many times as possible in 10 minutes. • Give students several different choices of ways to Criss Cross the Yellow zone — different types of equipment like cycling, running, skipping, jump roping, etc. • Have all students Blink Armbands flashing in the Blue color for the Blue zone prior to starting. • Have all students in the Blue zone on their individual tile on the Big Board prior to starting. • Start the first 10 minute interval with the students quickly increasing their effort until they kiss the ceiling of the Yellow zone. 	<p>You can change this activity to criss crossing the Red zone with recovery down to the Blue zone.</p> <p><i>This activity can serve two purposes: (1) a measurement of the fitness level of the student and (2) terribly fun all at the same time.</i></p>

<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • After touching the top of the Yellow zone the student does an active recovery which means they must continue to move ever so slowly versus a total recovery when they stop in place • Each time the student reaches the bottom of the zone they shout the interval number so that all other participants can hear the number of intervals completed. Example: The student kisses the top of Yellow zone and recovers to the floor of the Yellow zone and they shout loudly: "One" and the next interval they shout "Two" and so forth. • Often a student can only accomplish 2-5 criss crosses in 10 minutes but with experience they learn how to "recover" which is the key to getting more criss crosses - the physiological ability for the heart muscle to be fit and functioning well enough to recover quickly is an assessment of current cardiovascular fitness. • Before starting the second 10 minute interval during active recovery has a discussion on what the student learned. • Allow the students to change modes if they would prefer to do a different cardiovascular activity. 	<p>See the specific lessons for the zone assessments for Threshold measurement of T1 (fist threshold and the top of the Blue zone) and T2 the top of the Yellow zone and for Step Tracking zones.</p>
<p>Modify Activity</p>	<ul style="list-style-type: none"> • Use the first 10 minute interval for the students to learn about heart rate "delay" which means that they start the recovery but heart rate number continues to increase. The body requires time to lower CO, cardiac output, and hence heart rate as an adjustment to quick transition to low intensity effort. • If using Threshold or Maximum heart rate methods you can criss cross two zones. Example: Intervals are the top of Zone 4, Orange zone with recovery down to the top of Zone 2 the Green zone. 	
<p>Check Understanding (Assessment)</p>	<ul style="list-style-type: none"> • Why did the student do better on the second 10 minute interval than the first? • Is the Yellow zone moderate or vigorous intensity? • What are the benefits of interval training versus strength, steady state, or combination workouts? • What are the two types of heart rate recovery types? 	<p>*MLA means Movement Learning Activity</p>
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UbD Lesson 8L. Three Zones Steady State



Stage One Outcomes

Lesson Goals: Using the Big Board, individuals will monitor a steady heart rate in each of the zones, and understand how to assess their effort and feeling to match their heart rate number

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.(S2.H1.L1,S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H1.L2, S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H3.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.(S4.H1.L1, S4.H4.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

Understanding

The student will understand:

- there is no “target zone” but that all zones provide benefit not just one zone.
- the feeling of effort in each of the three or 5 heart zones.

Essential Questions:

- Why is the target zone an incomplete concept when there are valuable health and fitness benefits from all of the heart zones?
- What is the best heart zone?
- How many minutes can you workout in the easy Blue zone, the moderate Yellow zone, and the vigorous Red zone?

<p>Knowledge The student will know:</p> <ul style="list-style-type: none"> • how to increase their exercise intensity to quickly change to any of the heart rate zones. • some basic zone training facts such as calorie expenditure or length of time that they can stay in that zone reasonably. • that every student's zone are unique to them and to their current level of fitness. 	<p>Student will be able to:</p> <ul style="list-style-type: none"> • hold a steady heart rate number by assessing their effort and energy expenditure by feeling and matching the feeling to a heart rate number. • hold the bottoms, mid points and tops of the zone for a steady state workout.
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Students will demonstrate the ability to hold a steady effort over a designated periods of time. • Students will manage their heart rate by holding steady their number given that it will adjust from 3-5 bpm above and below their bottom, mid-point, ceiling heart rate number. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • Student will design a workout activity that uses steady state heart rates during the exercise time. • Students will be required to make a graph or draw time in zones for a steady state workout.
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Change the workout such that the student estimates their heart rate without the visual cues on the Big Board. Do not display the iPad onto the Big Board display. Have students say their "guesstimate" of their heart rate subjectively. Turn on the Big Board display to see their objective data and have the students compare the differences. 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Student will reflect upon why there isn't one single zone, known as the target zone, but rather there are multiple zones that give different benefits to the participant. • Student will self-assess their learning by sharing with other students in other disciplines about the four different "types" of workouts: steady state, intervals, strength, and combinations.
<p>Stage Three The Learning Plan</p>	
<p>Learning Activities: See the companion MLA, Movement Learning Activity</p>	
<p>Resources:</p> <ul style="list-style-type: none"> • <i>ZONING, Fitness in a Blink</i> pages 156, 203 • <i>Heart Zones Cycling</i> pages 128, 181-182, 240-241 • <i>The Heart Rate Monitor Workbook</i> pages 35 	

Key Terms:

Interval Workouts Type - A workout session that consists predominantly of short bursts of different levels of intensity

Combination Workout Type - An exercise session that consists of different parts such as intervals, steady state, recovery and endurance efforts

Recovery Heart Rate - Active or Total -The number of beats per minute your heart rate drops after cessation of exercise. The higher your fitness level, the faster the drop in your heart rate. A common recovery heart rate measurement is one minute.

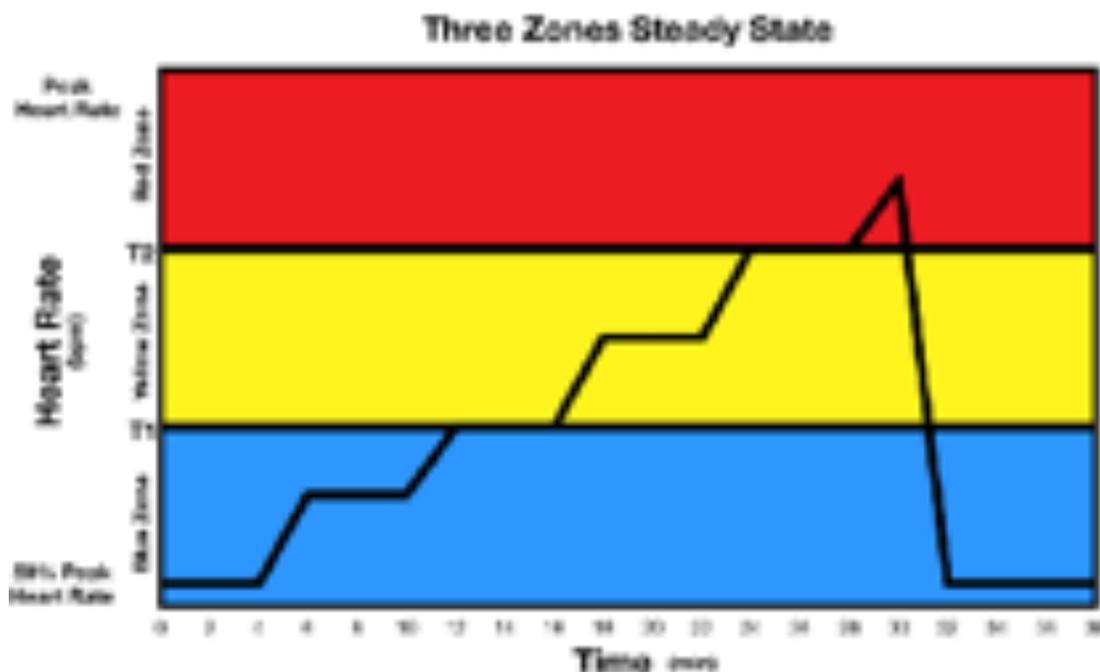
Endurance Workout Type - An exercise session that is of long duration that is typically at low heart rate intensity

Strength Workout Type - A type or classification of an exercise session in which the intensity or heart rate does not change

Steady State Workout Type - Maintaining during an exercise session a given heart rate over a period of time

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MLA Lesson #8. Three Zones Steady State



Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.(S2.H1.L1,S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H1.L2, S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H3.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.(S4.H1.L1, S4.H4.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

<p>Equipment and Material</p>	<ul style="list-style-type: none"> Heart Zones System with as many heart rate sensors as possible Timer (which is on the iPad within the Heart Zones PE app) or separate display of time 	<p>Suggestion: This activity is appropriate for indoor or outdoor space.</p>
<p>Notes</p>	<p style="text-align: center;">Activity</p>	<p style="text-align: center;">Debrief</p>
<p>Instant Activity</p>	<ul style="list-style-type: none"> Proper warm-up is not necessary - it is built into the lesson. Choose something fun to get students moving, looking at the data, and understanding what their individual tile data display means prior to starting the class. 	

<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • Explain the workout in advance or post the profile graph so students can visually see the workout in advance. • Hold that heart rate number which is 50% of Peak heart rate aka the bottom of the Blue zone for 5 minutes. Increase effort every 5 minutes to the midpoint, then the ceiling of the Blue zone, then the mid-point of the Yellow zone, followed by the ceiling of the Yellow zone, followed by the midpoint of the Red zone adjusting down from 5 minutes — possibly 1-3 minutes at the mid-point of the Red zone. • Allow students to recover down to the bottom of the Blue zone using total recovery not active recovery. • For Threshold Maximum heart rate methods, add the Green zone and the Orange zone to this sequence of floor, midpoint, ceiling, midpoint, ceiling. • Repeat this interval of holding a heart rate number steady for 5 minutes which for ZONING method is approximately 16-20 minutes. • Let student's choose any mode of cardiovascular equipment or activity of their choice such as cycling, running walking. 	
<p>Modify Activity</p>	<ul style="list-style-type: none"> • If some students cannot recover down to the bottom of the Blue zone in ZONING and Zone 1 in Max Threshold let them start where they are until the rest of the class hits that zone level. • The Red zone is the best for high caloric expenditure and for students to get fitter faster. However, a participant has limited time in that high, hard, effort so limiting the number of minutes should be based on the student's current fitness level. Allow students to choose how much time to spend in the Red zone. 	
<p>Check Understanding (Assessment)</p>	<ul style="list-style-type: none"> • Which workout type of the four does the student like the best? • Why is the Red zone such a hard, hot, high, vigorous zone? 	
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UbD Lesson #9L. Five by Two Endurance



Stage One Outcomes

Lesson Goals: Participate in a LIT workout and explain the value of an endurance workout to the personal fitness plan

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H8.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H2.L1,S4.H4.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

Understandings

The student will understand:

- burning the highest percentage of fat versus burning the highest amount of fat occurs in the lowest heart zones.
- the importance of endurance exercise to build stamina, avoid discomfort, and develop aerobic capacity while above the second threshold or T2 does not develop endurance capacity.

Essential Questions:

- Why is it important to burn the highest amount of fat?
- What is the value of having physical stamina?

<p>Knowledge</p> <p>The student will know:</p> <ul style="list-style-type: none"> • the differences between HIT, high intensity training, MIT, moderate intensity training and LIT, low intensity training by completing this LIT and MIT workout. • about the myth that LIT burns more fat than HIT. • the benefits of endurance workouts for health benefits. 	<p>Student will be able to:</p> <ul style="list-style-type: none"> • recognize the different benefits of each of the heart zones delimited using an individual assessment using a heart rate sensor. • measure the total caloric expenditure in endurance workouts versus HIT or higher intensity workouts.
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Students will demonstrate that they can stay in the low and moderate zones throughout the workout time. • Students will do a partner activity that keeps both involved in an activity that keeps them in the Blue zone 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • Students will design their own endurance workout using any cardiovascular activity of their choice. • Students will be required to make a graph or profile that keeps their heart rate in the low zones — a steady state, an interval, or a combination endurance workout.
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Students will share with another student the benefits of endurance, LIT and MIT workouts, and the value of workouts at or below T1, the first threshold for those doing ZONING or Threshold method. 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Student will reflect upon zone training and the different workout types: interval, steady state, and combination based on what you do during the workout not what muscle groups like strength and speed you are challenging.
<p>Stage Three The Learning Plan</p>	
<p>Learning Activities: See the companion MLA, Movement Learning Activity</p>	
<p>Resources:</p> <ul style="list-style-type: none"> • <i>The Heart Rate Monitor Workbook for Indoor Cyclists</i> pages 27 • <i>The Heart Rate Monitor GUIDEBOOK to Heart Zones Training</i> pages 87-95 	

Key Terms

- **Endurance and Stamina** - The fitness capacity to exercise for a long period of time
- **LIT** - Low Intensity Training is a low zone, the Blue zone
- **MIT** - Moderate Intensity training
- **HIT** - High Intensity Training is a high zone — Red zone and Orange zone — workout type.
- **T1** - The first threshold or the single heart rate number between Blue zone and the Yellow zone.
- **Fat Burning Zones** - A mythical non-existent zone where the most fat as a source of fuel to the body is metabolized or burned.
- **Percentage of Fat Burned** - As a ratio of fat to total calories burned
- **Workout Types** - The activity based on exercise intensity. There are 4 different heart rate and step workout types: (1) endurance type (2) steady-state type (3) interval type (4) combination of these three.
- **T2** - at or above the second or high threshold

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MLA Lesson #9L. Five by Two Endurance



Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns. (S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H1.L1, S3.H1.L2, S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H3.L2, S3.H10.L1, S3.H10.L2)

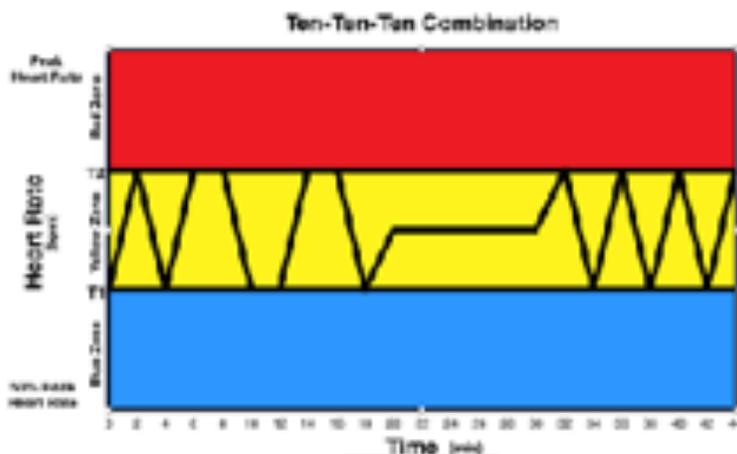
Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

<p>Equipment and Material</p>	<ul style="list-style-type: none"> • Heart Zones System with as many sensors as possible • Cardiovascular equipment 	<p>Suggestion: A complete write up of this workout is on pages 23-24 of <i>The Heart Rate Monitor Workbook for Indoor Cyclists</i></p>
<p>Notes</p>	<p>Activity</p>	<p>Debrief</p>
<p>Instant Activity</p>	<ul style="list-style-type: none"> • Have all students walk one or two laps, jog the same, run the same to insure that their sensors are working and displayed on the Big Board. 	

<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • Explain to the students that the goal of the workout is to “stay aerobic” which means to stay below T2 or the second and high threshold. Once they pass into the Red zone they have crossed over T2 and workout time is limited. • Students select any piece of cardio activity. • Teacher starts the timer and announces each 2 minutes encouraging students to increase their heart rate by 5 bpm. • When students touch the top of the Yellow zone they then drop their heart rate by 5 bpm. • Students will reach the top of the Yellow zone at different interval times because the number of bpm or beats-per-minute between the bottom of the Blue zone and the top of the Yellow zone is based on their individual heart rate zones. 	<ul style="list-style-type: none"> • This ladder workout climbs up and down from the bottom of the Blue zone to the top of the Yellow zone and then back down again with each interval lasting 2 minutes.
<p>Modify Activity</p>	<ul style="list-style-type: none"> • Change the number of minutes for each step on the ladder as heart rate decreases to 1 minute and the number of minutes up the ladder to 3-minutes. • If students are struggling to reach the top of their Yellow zones their individualized zones have not been assessed properly. 	
<p>Check Understanding (Assessment)</p>	<ul style="list-style-type: none"> • Are there more calories (Kcal) burned per minute at the top of the Blue zone or the top of the Yellow zone? • Is there a higher percentage of fat burned at the bottom of the Blue zone than at the top of the Yellow zone? • What is the difference between the percentage of fat burned and the total amount of fat burned (calories). • For fat to burn, oxygen must be present, so what zones are the “fat burning zones”? 	
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UbD Lesson #10L. Ten Ten Ten Combination



Stage One Outcomes

Lesson Goals: Through participation and effort, students will experience differences between types and modes of exercise

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns. (S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H1.L1, S3.H1.L2, S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H3.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

Understandings

The student will understand:

- the differences between three workout types: interval, steady state, and combinations.
- about cross training using different types of cardio equipment if possible alternating upper and lower body activities.
- that heart zones are mode specific; that heart rate zones for swimming are different from those for running.

Essential Questions:

- Why is cross training different from sport specific training?
- How does variability training lead to long term commitment as opposed to repetitive training?
- Why are heart rate zones different for different modes of activities?

<p>Knowledge The student will know:</p> <ul style="list-style-type: none"> • that workout modes - strength training, cardio-training, flexibility training, balance and coordination training are different than workout types — steady state, intervals, combinations. • how many FIT points they earned for each of the three different workout types. • how to earn the 5 Star reward goal for each class period. 	<p>Student will be able to:</p> <ul style="list-style-type: none"> • show using the profile on their heart rate graph from the Heart Zones PE app each 10-minute segment for each 10 minutes workout type. • Move from different modes and different workout types with ease.
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Students will demonstrate each of the three different workout types within one workout session. • Students will demonstrate that they can interpret the data on the Big Board display for them individually. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • Student will design a combination workout. • Students will be required to make a heart rate profile and suggest TIZ, time in zones, for that profile.
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Students will be able to interpret that data from the three different workout types looking at a student report. • Students will be able to share the benefits from interval training versus steady state training versus combination. 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Student will reflect upon which workout type and which intensity that they prefer and why. • Student will self-assess their learning by creating and sharing a workout that they create for themselves, that they complete, that they get a reports, and can share the data from that report.
<p>Stage Three The Learning Plan</p>	
<p>Learning Activities: See the companion MLA, Movement Learning Activity</p>	
<p>Resources:</p> <ul style="list-style-type: none"> • <i>The Heart Rate Monitor Guidebook to Heart Zones Training</i> • <i>ZONING, Fitness in a Blink</i> • <i>Heart Zones Cycling</i> 	

Key Terms

Interval Workout Type - A workout session that consists predominantly of short bursts of different levels of intensity

Steady State Workout Type - Maintaining during an exercise session a given heart rate over a period of time

Combinations Workout Type - An exercise session that consists of different parts such as intervals, steady state, recovery and endurance efforts

Workout Modes - This is the types of exercise activity based on the type of intensity or effort. There are four different workout modes: interval efforts based on time, steady-state effort at a fixed intensity, endurance effort which is generally low intensity, and combinations of the three previous modes.

Cross Training - This is a way of training that includes multiple activities or disciplines. It is the opposite of single sport training. Cross training is often associated with the sport of triathlon which requires swimming, biking, and running workout activities.

Mode-Specific - The type of workout activity such as swimming is a mode, running is a mode.

Heart Rate Profile or Graph -The graph of a workout that includes heart rate and time which is often included in the students post-workout report

Sport Specific Training - A type of training that uses only one discipline or mode of activity.

Variability training - A method or approach to training in which the intensity, modes, time, load and other specifications are sequenced with variety

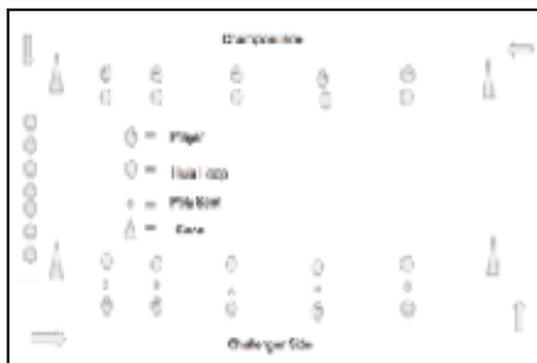
Monotony Training - A condition in which the exercise routine is always the same without diversity in any components such as frequency, intensity, time, mode, or type

FIT Points -The letters stand for frequency, intensity, and time as they relate to a fitness workout. F = Frequency—how often. I = Intensity—the percentage of maximum heart rate in which the workout falls. T = Time—how much time is spent. T=type-type of activity

5 Star Rewards on the Big Board - Using the Heart Zones PE app Display #1 earning 5 Stars is the goal of most workouts and is based on a calculation using FIT points.

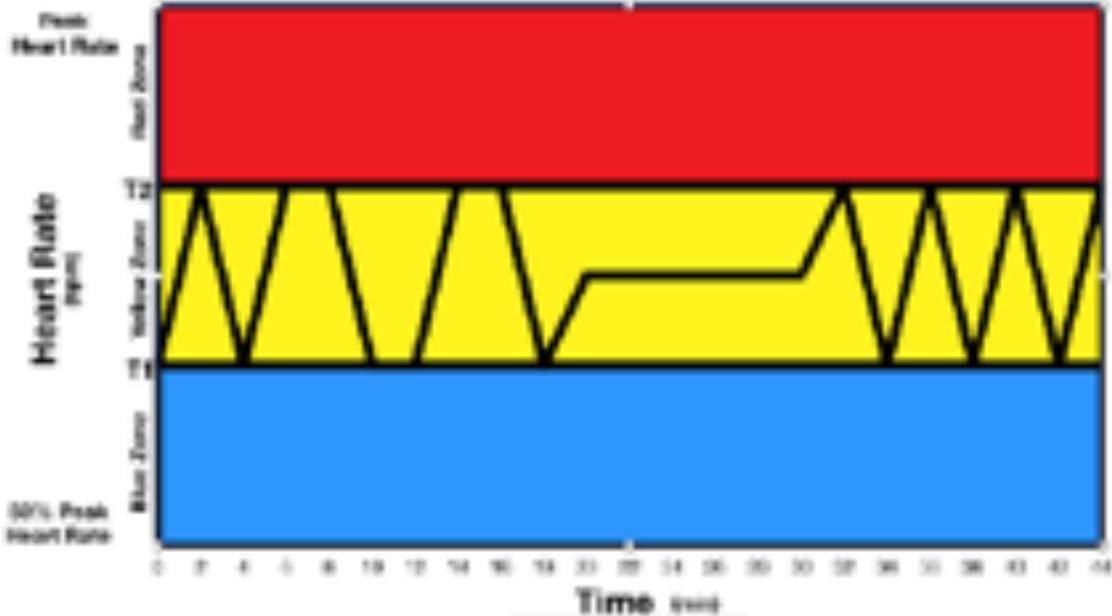
TIZ, Time in Zones -Time in zones (TIZ) which is the sum of the number of minutes distributed based on the intensity - —he zone

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MLA Lesson #10L. Ten-Ten-Ten Combination

Ten-Ten-Ten Combination



Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H1.L1, S3.H1.L2, S3.H2.L1, S3.H2.L2, S3.H8.L1,S3.H3.L2, S3.H10.L1, S3.H10.L2)

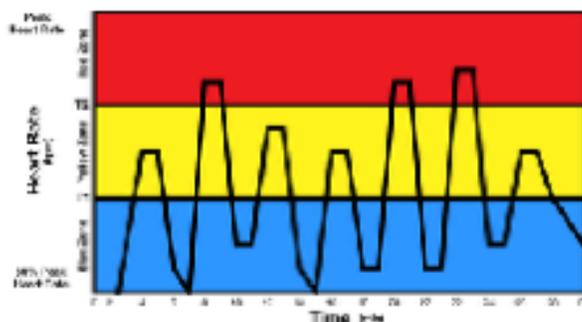
Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

<p>Equipment and Material</p>	<ul style="list-style-type: none"> • Heart Zones System with as many sensors as possible • A variety of cardio equipment including rowing machines, hand cranks, indoor bikes, treadmills, etc. 	<p>Suggestion: This is a summative workout which requires the previous lessons to gain the most understanding.</p>
<p>Notes</p>	<p>Activity</p>	<p>Debrief</p>

<p>Instant Activity</p>	<ul style="list-style-type: none"> • Have all students warm up adequately in a way of “their choice” which should be a minimum of 5-minutes. 	<ul style="list-style-type: none"> • Make sure that the student’s sensors display on the Big Board
<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • Design a workout course with three or more areas of cardiovascular activities that include both lower and upper body activities. • Explain the workout to the students including an explanation of the terms like cross training and the activities that include a variety to avoid monotony. • Explain that different modes of workouts require different zones but because of time restrictions, the students zones will not change. • Divide the class into equal number of students for each upper or lower body cardio activity. • Each student spends 10 minutes at one station doing intervals of your choice. Example: 1 minute hard into Red zone: 1 minute recovery down to the Blue zone • At the end of the 10 minutes students record the number of FIT Points • Allow one minute for transition time between the different cardio-activity areas. • Each student spends the next 10 minute doing a steady-state workout in a zone of their choice as long as their cumulative MVPA is greater than 50%. 	<ul style="list-style-type: none"> • Choose the Big Board display that provides the data that students need for success or ask that they “flip” their individual tiles to record the data: which consists of %MVPA, FIT Points, Star rewards. • Explain that the name of the workout (Ten Ten Ten) is the amount of time spent at each of the three areas for three different workout types.
	<ul style="list-style-type: none"> • Rotate after a 1-minute transition to the third station which is 5 minutes of intervals and 5 minutes of steady state. • For a cool-down period, look at several students’ individual data and discuss the results. 	<p>*MLA is Movement Learning Activity</p>
<p>Modify Activity</p>	<ul style="list-style-type: none"> • Change the length of time at each of the steady state station, the interval station, or the combination station to meet your class time. • Offer the students the choice of different modes for their workouts. 	
<p>Check Understanding (Assessment)</p>	<ul style="list-style-type: none"> • Do a formative assessment asking which of the three types of workouts: steady state, interval, combination does the student prefer and why. 	
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UbD Lesson #11L. Mirror Mirror on the Wall



Stage One Outcomes

Lesson Goals: While exploring the zones and analyzing heart rate students will be able to apply the learning to their personalized fitness plan

Standards:

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns. (S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H8.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

Understandings:

Students will understand that...

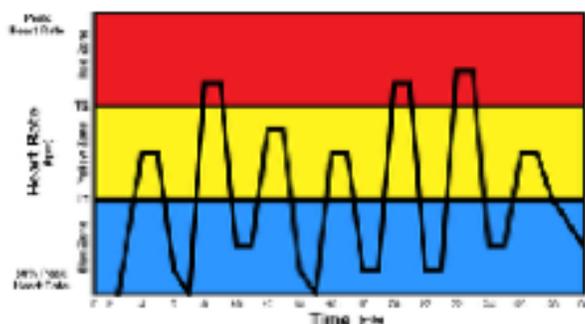
1. Discover which activities are easiest and hardest in effort
2. Different modes of physical activity elicit different heart rate zone results

Essential Questions:

Why do some movement activities more strenuous than other activities?

<p>Knowledge Student will know...</p> <ol style="list-style-type: none"> 1. What activity is easy, moderate and vigorous 2. What zone correlates to what color, and intensity 3. Learn strategies to increase or decrease their heart rate 	<p>Student will be able to</p> <ol style="list-style-type: none"> 1. Interpret data and what it means 2. Apply the learning to their fitness plan 3. Use the skill to measure future activities 4. Begin to self regulate- how they can sustain a level of moderate intensity 5. Take data from the tile on the big board and use it for their fitness plan
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks-</p> <ul style="list-style-type: none"> • Complete the circuit 	<p>Other Evidence-</p> <ul style="list-style-type: none"> • Worksheet,
<p>Self Assessments</p> <ul style="list-style-type: none"> • What heart rate correlates with which zone 	<p>Other Evidence Summarized</p>
<p>Stage 3 Learning Plan</p>	
<p>Learning Activities: Mirror, Mirror MLA</p>	
<p>Key Terms:</p>	

MLA Lesson #11. Mirror, Mirror on the Wall



Standards:

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns. (S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H8.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

<p>Equipment and Material</p>	<ul style="list-style-type: none"> • Heart Zones System • Jump Rope • Hoola Hoops • Cones • Worksheet/pencil/pen • 7 different circuit cards 	<p>Divide the students evenly between the stations (each station is a minute)</p>
<p>Notes</p>	<p>Activity</p>	<p>Debrief</p>
<p>Instant Activity</p>		

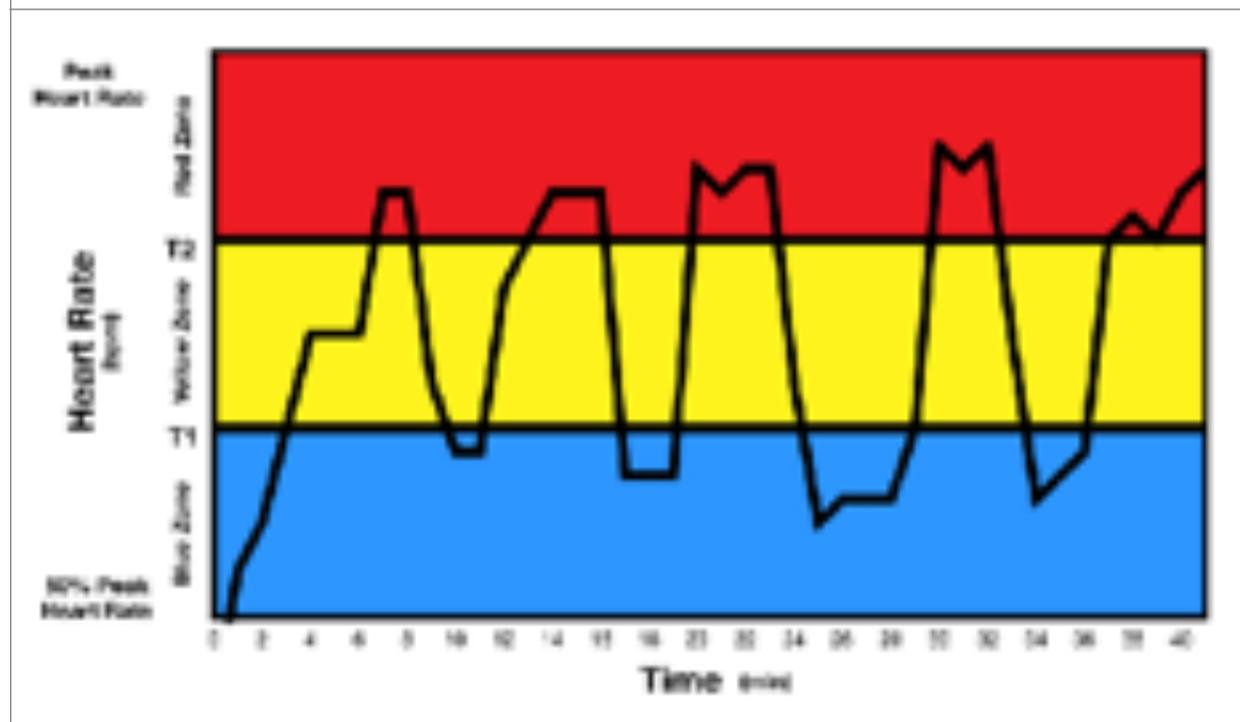
Learning Activity Instructions	Set up 8 different timed circuit stations with explanations: 1.jump rope 2.jumping jacks 3.push up plank shoulder touches 4.jumping back and forth over a line 5.skipping 6.high knee marching 7.hula-hooping Use the attached student worksheet for students to record their data	
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Student Worksheet Mirror Mirror on the Wall:

Whose the Highest Zone of Each Station of them All? Whose the Fastest Recovery Heart Rate of them All?

	Activity:	Blue Zone Heart Rate Number	Yellow Zone Heart Rate Number	Red Zone Heart Rate Number
1	Jump Rope	_____ bpm	_____ bpm	_____ bpm
	Recovery heart rate after 60 seconds	_____ bpm	_____ bpm	_____ bpm
2	Jumping Jacks	_____ bpm	_____ bpm	_____ bpm
	Recovery heart rate after 60 seconds	_____ bpm	_____ bpm	_____ bpm
3	Push Up Plank Shoulder Touches	_____ bpm	_____ bpm	_____ bpm
	Recovery heart rate after 60 seconds	_____ bpm	_____ bpm	_____ bpm
4	Jumping Back and Forth Over the Line	_____ bpm	_____ bpm	_____ bpm
	Recovery heart rate after 60 seconds	_____ bpm	_____ bpm	_____ bpm
5	Skipping	_____ bpm	_____ bpm	_____ bpm
	Recovery heart rate after 60 seconds	_____ bpm	_____ bpm	_____ bpm
6	High Knee Marching	_____ bpm	_____ bpm	_____ bpm
	Recovery heart rate after 60 seconds	_____ bpm	_____ bpm	_____ bpm
7	Hula Hooping	_____ bpm	_____ bpm	_____ bpm
	Recovery heart rate after 60 seconds	_____ bpm	_____ bpm	_____ bpm

UbD Lesson #12. Champions and Challengers



Stage One Outcomes

Lesson Goals: Participants will use the step trackers and identify how to move through the zones by managing their pace and intensity

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns. (S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H2.L1, S3.H2.L2, S3.H3.L2, S3.H8.L1, S3.H8.L2, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

<p>Understandings The student will understand:</p> <ul style="list-style-type: none"> • to manage their exercise intensity using a step tracker. • how to collect movement data and make meaning of it. 	<p>Essential Questions:</p> <ul style="list-style-type: none"> • Why is it important for participants to learn the power of data in personal fitness management? • How do the participants change the game to make it more fun for them? • Why are step zones important for student learning?
<p>Knowledge The students will know:</p> <ul style="list-style-type: none"> • How to change step zones based on pace (steps-per-minute) SPMs • When they are standing waiting for their turn to take this time to move in place to increase their FIT Stars. • How to use the Big Board data to change their Step FIT Points. 	<p>Student will be able to</p> <ul style="list-style-type: none"> • have fun and challenge themselves to increase the amount of movement. • go from each of the three zones based on their determination.
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Students will demonstrate that they know the data on their individual Big Board tile. • Students will demonstrate that they can change zones based on different patterns of movement. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • Student will suggest ways to change the game activity to increase or decrease the total steps. • Students will be asked to write about their experience and share with their other teachers.
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Students will be able to interpret data on the Big Board. • Students will be able to share their most important step tracking data and explain why they like that information. 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Student will reflect upon if taking short steps gets more Step FIT Points or taking longer stride lengths. • Student will self-assess their learning by drawing a step tracking chart showing the different data points for them as well as for the entire class.
<p>Stage Three The Learning Plan</p>	
<p>Learning Activities: See the companion MLA, Movement Learning Activity</p>	
<p>Resources:</p> <ul style="list-style-type: none"> • This document at this point in time. 	

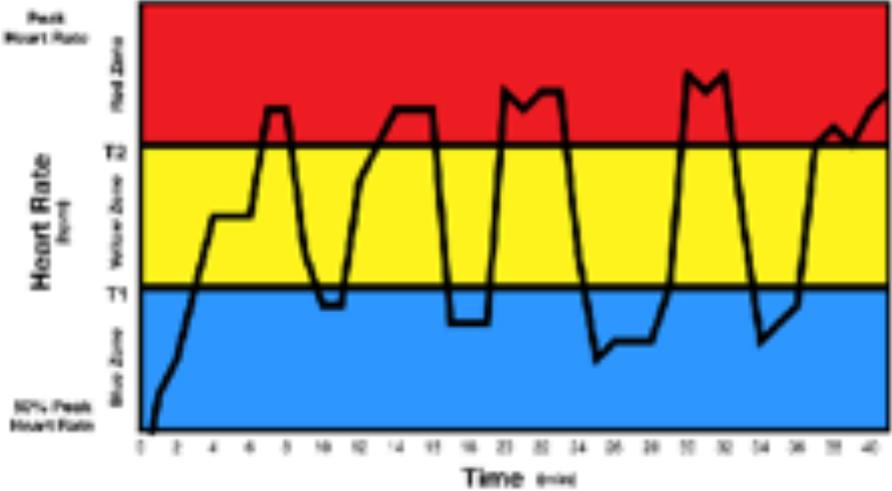
Key Terms

- **Total Steps** - The sum of the number of foot plants with each foot representing one step while a stride is two steps.
- **SPM or Steps per Minute** - Steps per minute is the same as running cadence
- **Step (Pace) Zones** - A way of taking the SPM or steps-per-minute and dividing them into ranges of steps that equate to step intensity: the easy Blue step zone, the moderate Yellow step zone, the hard/vigorous Red step zone.
- **Individual Tile** - The individual participants individual display on the iPad of the Big Board.
- **Pace** - The number of minutes it takes to walk or run in either miles or kilometers.
- **Step FIT Points** - The same as FIT points but using step zones in the FIT formula.

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MLA Lesson # 12. Champions and Challengers Striders*



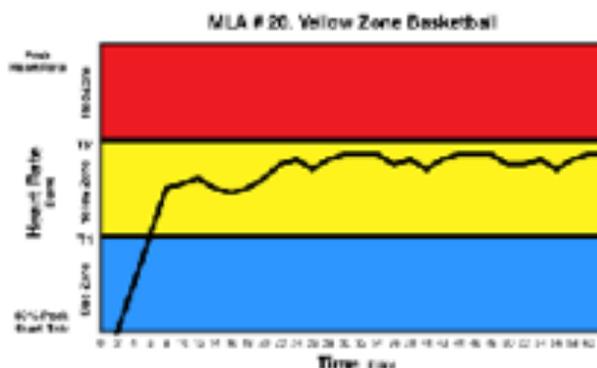
- Standard 1.** The physically literate individual demonstrates competency in a variety of motor skills and movement patterns. (S1.H1.L1)
- Standard 2.** The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)
- Standard 3.** The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H2.L1, S3.H2.L2, S3.H3.L2, S3.H8.L1, S3.H8.L2, S3.H10.L2)
- Standard 4.** The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1, S4.H5.L1)
- Standard 5.** The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

<p>Equipment and Material</p>	<ul style="list-style-type: none"> • Heart Zones System with as many Strider sensors as possible • Hula Hoops • Koosh balls • Polyspots 	<p>Suggestion: If you move outside for the game, set up the iPad on a tripod and ask the students to look at the data when they are on the out line.</p>
<p>Notes</p>	<p>Activity</p>	<p>Debrief</p>
<p>Instant Activity</p>	<ul style="list-style-type: none"> • Ask the students to set up the game area • Have the students run or walk until they earn 100 steps as a warm-up activity. 	

<p>Movement Learning Activity</p> <p>Instructions</p>	<ul style="list-style-type: none"> • Set up the area for the Challengers as follows: Create a rectangular playing area using 4 big cones. In the rectangular playing area, place 4-5 sets of 2 hula hoops. The hula hoops should be paired with one on each sideline of the playing area. Place a poly spot near each hula hoop on one side of the rectangle. The spots should be in a row. Place a koosh ball on each polyspot. • Set up the area for the Champions the same without the koosh ball. • Have one student go to each hula hoop. The remaining students should stand next to one of the outside big cones. • Outside the big cones is the out line. • The game begins when the Challenger takes the koosh off of the poly spot and tries to underhand throw the koosh into the Champion's hoop. 	 <p>Koosh Ball</p>
<p>Movement Learning Activity</p> <p>Instructions</p>	<ul style="list-style-type: none"> • If the koosh lands in the hoop, the Challenger is now the Champion crossing over to the Champion's side of the playing area. • The Champion who lost must take the koosh and put it back on the poly spot and jog around the playing area to the out line. • The first participant in the out line watches to see when a koosh is placed on a poly spot and enters the playing area to that spot as a Challenger. • If the Challenger's throw does not go in the Champion's hoop, the Champion gets to throw at the Challenger's hoop. Throwing continues until somebody wins - the koosh lands in the hula hoop. • If the Champion wins, s/he stays at their hoop and the Challenger places the koosh on the poly spot, jogs around the 4 big cones, and waits for their next turn standing in the out line. Play the game for time and ask students how many Step Points they earned. • Gamification: If using Strider step trackers, you could add the goal of earning a certain number of total steps as especially while students wait standing in the out line. 	 <p>Polyspots</p>

<p>Modify Activity</p>	<ul style="list-style-type: none"> • Use different data points for gamification of the activity • Have all students stay in the Yellow zone and if they drop out they must leave the playing area. • Play the game in 3-different sets as follows: 5 minutes in the Blue zone, 5 minutes in the Yellow zone, and 5 minutes in the Red zone with breaks between each set. 	
<p>Check Understanding (Assessment)</p>	<ul style="list-style-type: none"> • Why does using a Big Board for biofeedback provide you with a different experience during the game? • Why is the Yellow zone, moderate intensity, so important versus the Blue zone or the Red zone? 	
<p>Thanks to Rod Holler for contributing Challengers and Champions and for taking the Heart Zones System and adapting it to one of his favorite MLAs, Movement Learning Activities using the sensors to motivate and engage his students in Physical Education. For more information: Rod Holler, Elementary Physical Educator, Arboretum Elementary School, Waunakee, WI 53597 rholler@waunakee.k12.wi.us</p>		
<p>This Lesson was designed using the concepts and framework of UbD, Understanding by Design</p>		<p>Copyright Heart Zones, Inc.</p>

UbD Lesson #13. Yellow Zone Basketball



Stage One Outcomes

Lesson Goals: Upon completion of the activity, participants will be able to compare and contrast duration of activity in the blue, yellow and red zones

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns. (S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H8.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

Understandings

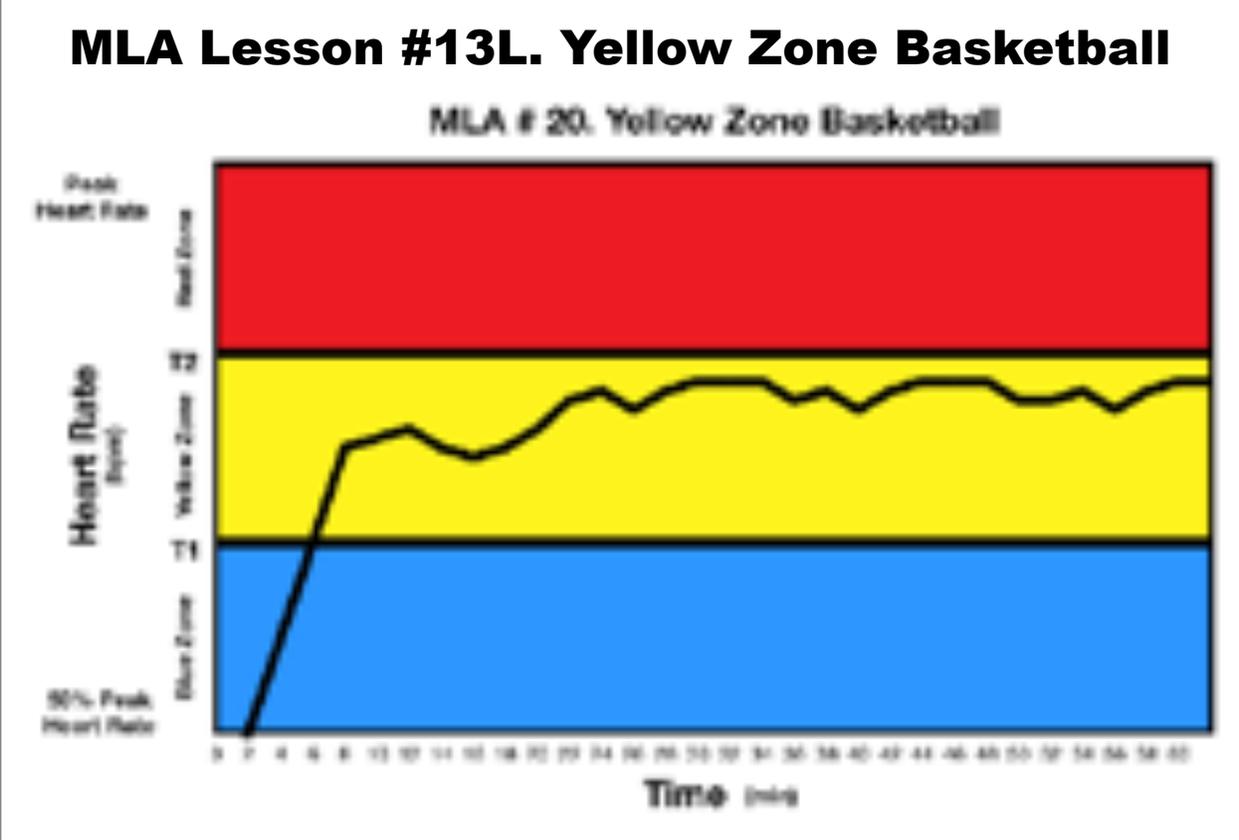
The student will understand:

- what it feels like to exert a “moderate” level of activity.
- that in games that require skill, often, moderate intensity or Yellow Zone effort results in enhanced motor coordination.

Essential Questions:

- Why is the Yellow zone at an effort level that it is possible to exercise for longer periods of time than the Red zone?
- How does one stay in the Yellow zone during an intense activity like basketball?

<p>Knowledge The students will know:</p> <ul style="list-style-type: none"> • the benefits of doing physical activity in the mellow and moderate Yellow zone. • that the Yellow zone is sustainable for longer than the Red zone. • how to manage their effort to remain in the Yellow zone even when play stops. 	<p>Student will be able to</p> <ul style="list-style-type: none"> • calculate the sum of time of everyone on their team in the Yellow zone. • change from counting baskets to counting minutes in the Yellow zone.
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Students will demonstrate that they can using the strategy of pacing to manage their effort by achieving time in the Yellow zone. • Students will demonstrate that they can score the game based on TIZ, time in zones. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • Student will design ways when there is a time out or other change in the flow of the game to maintain their effort in the Yellow zone. • Students will be required explain why playing in the Yellow zone results in improved motor coordination.
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Students will be able to interpret why the Yellow zone might be the best zone for success in basketball. • Students will be able to share their personal experience to discover if they prefer the game played with TIZ versus baskets. 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Student will reflect upon the differences in playing based on self-management of their effort. • Student will self-assess their learning by explaining to others in an essay or in a math class the differences between points earned by TIZ versus number of baskets made.
<p>Stage Three The Learning Plan</p>	
<p>Learning Activities: See the companion MLA, Movement Learning Activity</p>	
<p>Resources:</p> <ul style="list-style-type: none"> • ZONING, <i>Fitness in a Blink</i> 	
<p>Key Terms Pacing - managing in a controlled manner the number of minutes it takes to walk or run in either miles or kilometers. TIZ, Time in Zone-Time in zones (TIZ) which is the sum of the number of minutes distributed based on the intensity - the zone</p>	
<p>This Lesson Plan was designed using the concepts and framework of UbD, Understanding by Design</p>	



Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns. (S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H8.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

Equipment and Material	<ul style="list-style-type: none"> Heart Zones System with as many sensors as possible 	Suggestion:
Notes	Activity	Debrief

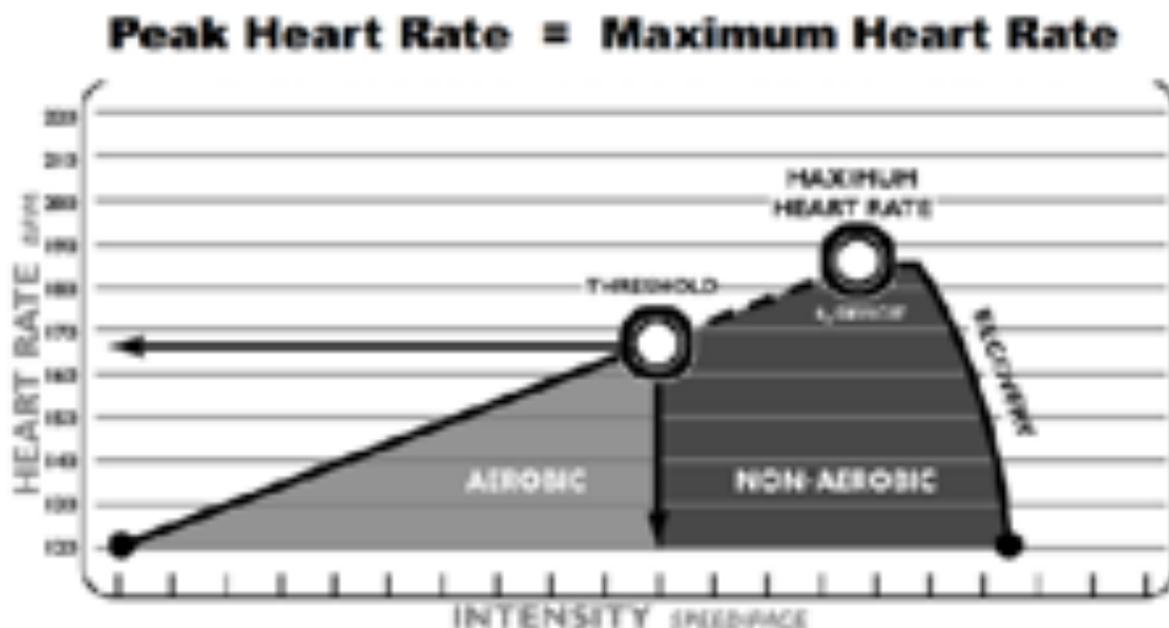
<p>Instant Activity</p>	<ul style="list-style-type: none"> • Stretching is specific to basketball activity • During the stretching time explain the new rules for scoring based on TIZ, time in zones rather than baskets scored is what determines the winning team. 	
<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • Four different time quarters that are each 5-8 minutes in duration. • Baskets don't count in the score. • Teams score based on time in the Yellow zone or TIZ not the number of points scored • Add together the number of elapsed minutes in the Yellow zone of all players. • All other rules for basketball are the same but the focus on the game is "moderate" effort even during time outs or other events like jump balls. • The winning team has the highest TIZ in Yellow zone. 	<p>The purpose is to teach students to pace themselves at a moderate effort versus playing with a focus on scoring points.</p>
<p>Modify Activity</p>	<ul style="list-style-type: none"> • Change the TIZ from the Yellow zone to Blue or Red zones • Combine baskets and TIZ together into a formula for scoring. 	
<p>Check Understanding (Assessment)</p>	<ul style="list-style-type: none"> • Ask students why the Yellow zone is so best for accuracy or precision play. 	<p>Answer - when effort is high, hot, hard motor coordination becomes less precise.</p>

Part 4. Testing



ASSESSMENT

UbD Lesson #1L. Save the Peak Heart Rate Assessment



Stage One Outcomes

Lesson Goals: Identify peak heart rate and how it is personalized to individuals

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H2.L1, S3.H2.L2, S3.H6.L1,S3.H8.L1, S3.H10.L1, S3.H10.L2, S3.H11.L2,S3.H12.L1)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1. L1, S4.H1.L2, S4.H2.L1, S4.H3.L1, S4.H3.L2, S4.H4.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1, S5.H2.L2)

<p>Understandings The student will understand:</p> <ul style="list-style-type: none"> • their personal peak heart rate during an all-out effort. • that all participants heart rate response to HIT, high intensity intervals is different • that heart rate zones can be set based on peak heart rate results. 	<p>Essential Questions:</p> <ul style="list-style-type: none"> • Why doesn't everyone have the same peak heart rate number? • Why is it important to individualize heart rate zones based on each person's peak heart rate?
<p>Knowledge The students will know:</p> <ul style="list-style-type: none"> • how to do a Touch and Go Line Drill. • that as they get fitter the elapsed time of a Touch and Go will drop because their speed will increase. • that peak heart rate does not change with age or fitness level but rather is determined by genetics and willingness of the student to go all-out. 	<p>Student will be able to</p> <ul style="list-style-type: none"> • perform a Touch and Go Line Drill both inside a gymnasium or outside on the field. • explain the meaning and importance of peak heart rate and heart rate zones. • look at the Heart Zones Big Board or their individual report and identify their peak heart rate and explain what factors may cause that number to vary from day to day.
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Can explain several ways to reach their peak heart rate number. • Can interpret what the peak heart rate number is and how it can be applied to setting heart rate zones. • Can apply the understanding of peak heart rate to other physical activities. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • .Share with other students their peak heart rate number and compare that with others. • Explain that the individuals with higher peak heart rates are not fitter or faster than those with lower peak heart rates.
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Compare their individual peak heart rate inside the gym or outside on a field or court. • Compare their peak heart rate when the ambient temperature changes. 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Using the student's individual heart rate report, compare the variation over time of peak heart rate. • Student should look at the heart rate profile (graph) and use that to determine their peak heart rate.
<p>Stage Three The Learning Plan</p>	
<p>Learning Activities: See the MLA, Movement Learning Activity that is the companion to this UbD</p>	

Resources:

- You Tube video's of different ways to do Line Drills - for example kicking a soccer ball or dribbling during a line drill.

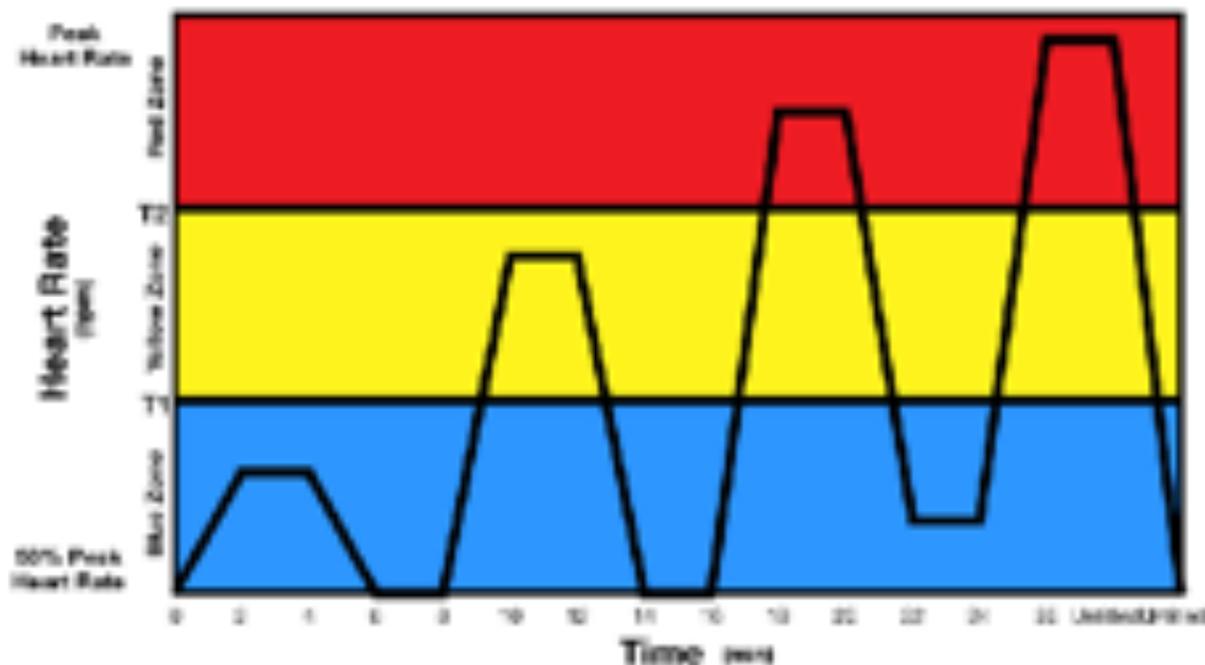
Key Terms:

- | | |
|--|--|
| <ul style="list-style-type: none">• Heart Rate Zones• Peak Heart Rate | <ul style="list-style-type: none">• Individualization of fitness versus "one-size-fits-all" fitness• All-out effort |
|--|--|

ASSESSMENT

MLA Lesson #1A. Save the Peak Heart Rate Assessment

Touch and Go Line Drills



Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.(S3.H2.L1, S3.H2.L2, S3.H6.L1,S3.H8.L1, S3.H10.L1, S3.H10.L2, S3.H11.L2,S3.H12.L1)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1. L1, S4.H1.L2, S4.H2.L1, S4.H3.L1, S4.H3.L2, S4.H4.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1, S5.H2.L2)

Equipment and Material

- The Heart Zones System
- Markers of your choice

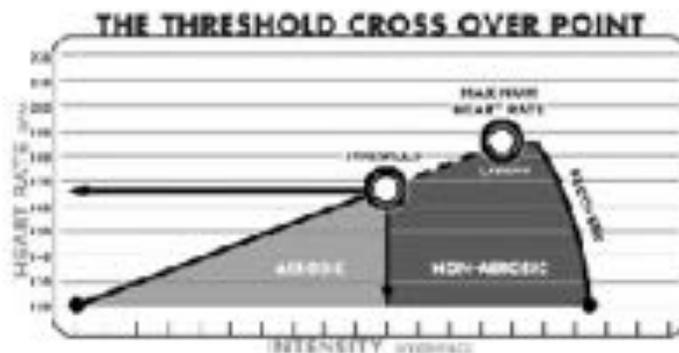
Suggestion: This drill can be completed inside or outside with no equipment required.

Notes	Activity	Debrief
<p>Instant Activity</p>	<p>All students warm up adequately for at least 5 minutes. All students confirm that their data displays on either the iPad or the Big Board.</p>	<p>There is a switch in the Heart Zones PE app that can store the peak heart rate data automatically. Note: This resets their zones based on this peak heart rate as the anchor heart rate number.</p>
<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • A high-intensity sprinting drill. This line drill consist of starting with a walk and increasing speed after each completed set. • Set up markers if you are running drills at an area that does not have marked lines. Place three to six markers about 6 yards apart, with an additional marker serving as your start/finish line. • Begin at the starting line and walk to the first line or marker. Touch the marker with your hand or foot and then walk back to the starting line. Walk to the second line or marker immediately; touch the second marker and walk back to the starting line. • Begin at the second time but change from a walk to a “jog” starting line and jog to the first line or marker. Touch the marker with your hand or foot and then jog back to the starting line. Jog to the second line or marker immediately; touch the second marker and jog back to the starting line. • Continue this pattern with the next time “running” to the lines. • Continue this pattern with the next time “all-out sprint” to the lines. • Recover from each set until the student drops into the Yellow zone. • As soon as participant has crossed into the Yellow zone, begin a second set. • After completing a number of sets based your class time, allow students to stretch for 5 minutes as part of their cool-down. 	<ul style="list-style-type: none"> • Recovery heart rate. Some participants recover faster than others so by allowing recovery based on heart rate rather than time, the lesson is individualized. • This is an assessment of speed, endurance and agility as well as progressive exercise intensity. This is another way to assess Peak heart rate number. • This is similar but different from the Pacer Test.

Modify Activity	<ul style="list-style-type: none">• Change the distance between the markers for those who request it or are new to this activity.• Make it more fun by working with a partner.• Add a skill component like dribbling a basketball or soccer ball.	
Check Understanding (Assessment)	<ul style="list-style-type: none">• How many FIT Points did the student earn doing Touch and Go Drills?• How many FIT Stars did the student receive for their effort today?• What is the term for your highest heart rate in any one workout session?	

ASSESSMENT

UbD Lesson #2A. T1, The First Threshold Assessment



Stage One Outcomes

Lesson Goals: Apply field testing to determine T1, the first threshold heart rate number) and T2, the second threshold heart rate number.

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns. (S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H8.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

Understandings:

Students will understand that...

- why measuring T1 & T2 is important
- threshold heart rates are the anchor points for setting threshold heart rate zones
- threshold heart rates are highly trainable heart rate numbers

Essential Questions:

- What is it important to measure T1 and T2?
- Why use the Threshold training system versus ZONING or Maximum heart rate systems?
- How does this measurement of low and high threshold fit into the student's fitness plan?

<p>Knowledge Student will know...</p> <ul style="list-style-type: none"> • Threshold occurs at two points: Low Threshold, T1 and High Threshold, T2 • how to measure or estimate the two thresholds • that threshold heart rates are dynamic and sport specific. • threshold numbers do not predict of athletic performance • improvement of threshold numbers results in improvement in aerobic fitness • that threshold anchor points do not decline with age, they do decline with cardio-fitness levels. • T1 and T2 cannot be accurately predicted by any mathematical formula • values for T1 and T2 change with overtraining and under training. • that these two biomarkers - T1 and T2 are most accurately measured using metabolic testing (VO2 measurements) and measuring lactate levels in an exercise lab. 	<p>Student will be able to</p> <ul style="list-style-type: none"> • Identify that T1 is about 70% of peak rate • T1 is the top of feeling easy and bottom of feeling moderate. • Identify that T2 is about 80-90% of maximum heart rate = peak heart rate • T2 is the top of Zone 4, the Orange zone in Threshold Training System or in ZONING, the top of the Yellow zone. • T2 is the governor, boundary line, and signal light= your time at that intensity is limited and you no longer want to talk because it is too difficult to carry on a conversation and exercise at this level of effort
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • “Can you speak comfortably Foster Threshold Field Test?” 	<p>Other Evidence:</p>
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Can students define T1, First Threshold • Why is knowing T1 useful • Why is it important to set your T1 • How is peak heart rate, maximum heart rate and threshold heart rate different? 	<p>Other Evidence Summarized:</p>
<p>Stage 3 Learning Plan</p>	
<p>Learning Activities: See the MLA, Movement Learning Activity.</p>	

Resources:

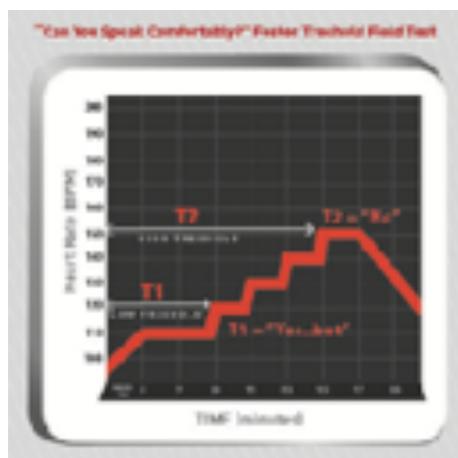
- "Can You Speak Comfortably Foster Threshold Field Test Card
- "Can You Speak Comfortably Foster Threshold Field Test Score Card
- Pledge of Allegiance posted
- Calculators
- What do we know about threshold heart rate worksheet

Key Terms:

- **Low Threshold (T1)** - the exercise intensity when effort first become difficult. The low of two different biomarkers in exercise metabolism measured by the first metabolic change with increased exercise effort in the use of lactate production or oxygen consumption.
- **High Threshold or (T2)** — the exercise intensity when effort first becomes to hard to speak comfortably.

ASSESSMENT

MLA Lesson #2A. T1, The First Threshold Assessment



Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns. (S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H8.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1, S4.H5.L1)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

Equipment and Material	<ul style="list-style-type: none"> • Marked running area • Any piece of cardiovascular equipment like rowers, elliptical machine, bikes, treadmills. 	
Notes	Activity	Debrief
Instant Activity	Warm-up activity of your choice.	

**Learning Activity
Instructions**

- | | | |
|--|--|---|
| | <ol style="list-style-type: none"> 1. Explain to the students that the first threshold T1 heart rate numbers is the top of the easy Blue zone. The effort level for this test is quite easy. The first time that speaking becomes a wee-bit more difficult when reciting a verse like the Pledge of Allegiance. 2. Review the “What We Know About Threshold Heart Rates” worksheet with students. Tell them that there are two tests to assess their first and their second threshold heart rate numbers. 3. Have the students select a partner and go to a circular running area like a track or inside a basketball court or multipurpose room. Follow the instructions for the “Can You Speak Comfortably?” assessment with one partner (A) testing and wearing the heart rate sensors and the other partner (B) reading the Big Board, recording the data. 4. Have the students record their data from the “Can You Speak Comfortably” Foster Threshold Field Test for the T1. 5. We recommend that in 2-4 weeks, you repeat this assessment because anytime there is an assessment there is some error due to learning the protocol and experiencing the test. | <ul style="list-style-type: none"> • The low threshold, T1, is the first shift in speaking. T1 is a difficult number to assess because it is a subtle shift in the ability to speak evenly and smoothly. The student also need to learn the ability to notice this slight shift in respiratory rate and depth — the need to breathe in because the effort now requires more oxygen. • Typically but not always, students discover that T1 occurs in the heart rate range of 110-150 bpm. • If you choose, you can give both the T1 and the T2 test during one session. Often, it is easier for the student learn how to detect and measure T1 and T2 if they are tested on two different days or workouts. • The saying of the Pledge of Allegiance is often the best because students often have memorized this verse, but almost any verse will suit the purpose. • It is important that the participant speak, this aloud verse and that they notice changes in their speaking patterns. • Participants should not sing but speak the verse. After student A has finished, repeat the process for student B. |
|--|--|---|

<p>Modify Activity</p>	<ul style="list-style-type: none"> • Add more stations to the circuit if time allows • Consider modifications to the activity 	
<p>Check Understanding (Assessment)</p>	<ul style="list-style-type: none"> • Why is it important to know your low or first threshold T1? • What is the heart rate number that divides the zones based on T1 and T2? • What happens metabolically between the Top of the Blue zone and the bottom of the Yellow zone? 	

ZONING TRAINING "Can You Speak Comfortably?" Foster Threshold Field Test

Objective: The purpose of this field test is to determine the T1 and T2 threshold heart rate numbers to use during the Z1 Heart Zones training method.

Procedure: The participant has approximately 10-15 minutes to complete this test. The test is performed in a field setting. The participant is instructed to walk for 10 minutes at a pace that is comfortable. The test is performed in a field setting. The participant is instructed to walk for 10 minutes at a pace that is comfortable.

Instructions:

1. Warm up for 10 minutes at a comfortable pace.
2. Starting at approximately 100 ppm, progress through a series of 10-minute stages, increasing your heart rate by 10 ppm each stage.
3. During each stage, you must be able to speak comfortably for a portion of the stage length. After each stage, you must be able to speak comfortably for a portion of the stage length.
4. When you are unable to speak comfortably, you have reached your T1 threshold. Record the heart rate number at this stage.
5. Continue to increase your heart rate by 10 ppm until you can no longer speak comfortably. Record the heart rate number at this stage.
6. When you are unable to speak comfortably, you have reached your T2 threshold. Record the heart rate number at this stage.

Graph: A line graph showing heart rate (ppm) on the y-axis and time on the x-axis. The heart rate starts at 100 ppm and increases in 10 ppm increments until it reaches 190 ppm, where it levels off.

ZONING TRAINING SCORECARD "Can You Speak Comfortably?" Foster Threshold Field Test

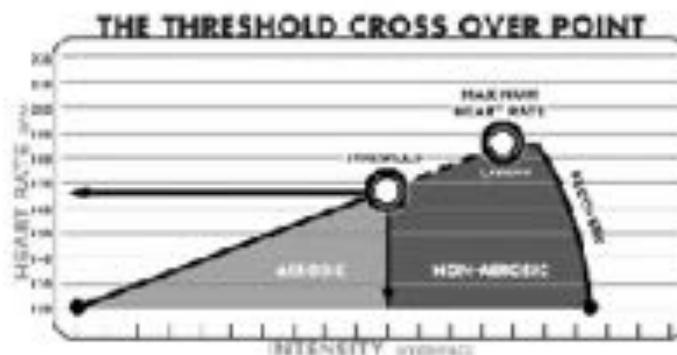
Objective: The purpose of this field test is to determine the T1 and T2 threshold heart rate numbers to use during the Z1 Heart Zones training method.

Stage	Heart Rate (ppm)	Time (min)	"Can You Speak Comfortably?" (Y/N)		
Warm Up	100 ppm	10:00 min	Yes	Yes	Yes
1	110 ppm	11:00 min	Yes	Yes	Yes
2	120 ppm	12:00 min	Yes	Yes	Yes
3	130 ppm	13:00 min	Yes	Yes	Yes
4	140 ppm	14:00 min	Yes	Yes	Yes
5	150 ppm	15:00 min	Yes	Yes	Yes
6	160 ppm	16:00 min	Yes	Yes	Yes
7	170 ppm	17:00 min	Yes	Yes	Yes
8	180 ppm	18:00 min	Yes	Yes	Yes

Notes: The participant should be able to speak comfortably for a portion of the stage length. The test is performed in a field setting. The participant is instructed to walk for 10 minutes at a pace that is comfortable.

ASSESSMENT

UbD Lesson #3A. T2, The Second Threshold



Stage One Outcomes

Lesson Goals: How to use the T2 data for personalized fitness plan

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction.

Understandings:

Students will understand:

- how to apply the results from the threshold field test to determine their second or high threshold, T2 heart rate number
- that T2 has many names associate with it: anaerobic threshold, lactate threshold (LT2), Onset of Blood Lactate Accumulation (OBLA)

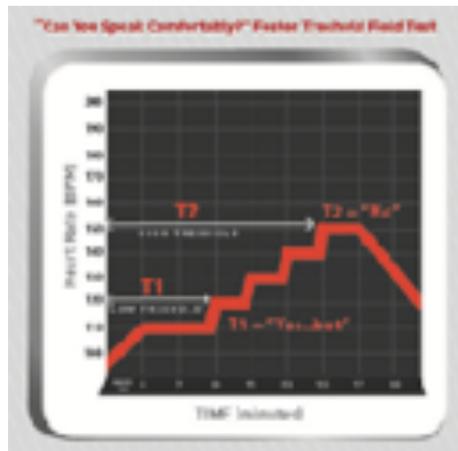
Essential Questions:

- How can I use T2 heart rate number to set SMART goals in a fitness plan?

<p>Student will know...</p> <p>Thresholds are</p> <ul style="list-style-type: none"> • based on current level of aerobic fitness • dynamic, moving with changes in fitness • able to be increased with training. • drugs and medication can affect threshold numbers. • high threshold does NOT predict better athletic performance • low thresholds do not predict worse athletic performance • have great variability amongst people of the same age • able to be accurately predicted by any mathematical formula. • sport specific. • used to anchor the heart rate zones in the ZONING and the Threshold methodologies. 	<p>Student will be able to</p> <ol style="list-style-type: none"> 1. Identify that T1 is top of the Blue zone 2. Identify that T2 is top of the Yellow zone
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks: Complete and understand the “Can You Speak Comfortably?” Foster Threshold Field Test</p>	<p>Other Evidence:</p>
<p>Self Assessments: Define T1 and why that knowledge is useful Define T2 and why that knowledge is useful</p>	<p>Other Evidence Summarized:</p>
<p>Stage 3 Learning Plan</p>	
<p>Learning Activities: See the MLA, Movement Learning Activity.</p>	
<p>Resources: Foster, C, Porcari, JP, Anderson, J, Paulson, M, Smaczny, D, Webber, H, Doberstein, S, and Udermann B., <i>The talk test as a marker of exercise training intensity. J Cardiopulm Rehabil</i> 28: 24–30, 2008.</p>	
<p>Key Terms: T1- the first threshold heart rate number, also called T1 or low threshold. T2 - the second threshold heart rate number, also called high threshold.</p>	

ASSESSMENT

MLA Lesson #3A. T2, The Second Threshold



Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns. (S1.H1.L1)

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H2.L1, S3.H2.L2, S3.H8.L1, S3.H8.L2, S3.H10.L1, S3.H10.L2)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1, S4.H4.L1, S4.H5.L1)

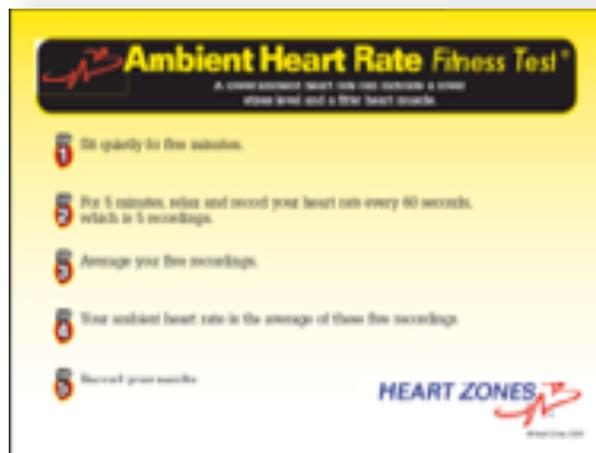
Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

<p>Equipment and Material</p>	<ul style="list-style-type: none"> • Heart Zones System • Calculators • "What about Threshold Heart Rate" worksheet • 4 workout score cards 	
<p>Notes</p>	<p>Activity</p>	<p>Debrief</p>
<p>Instant Activity</p>		

<p>Learning Activity Instructions</p>	<ol style="list-style-type: none"> 1. Explain to the class that they will be assessing their T2 heart rate number using "The Can You Speak Comfortably? Foster Threshold Field Test" 2. Have the students select partners. Follow the instructions for the "Can You Speak Comfortably? Foster Threshold Field Test" assessment with one partner (A) testing and wearing the heart rate sensor while the other partner (B) is recording the heart rate data from the Big Board display. 3. After student A finishes, repeat the process for student B. 4. Have the students record their heart rate data from the "Can You Speak Comfortably? Foster Threshold Field Test" for T2, the second threshold. 	<p>Explain to the students that the second threshold, T2 heart rate numbers is the first time speaking aloud becomes uncomfortable.</p> <p>We recommend reciting the Pledge of Allegiance because many students have this verse memorized and it consists of 52 words which is long enough to detect a shift in ventilation.</p> <p>It is important that the participant speaks aloud and that they pay close attention to the changes in their speaking patterns.</p>
<p>Modify Activity</p>		
<p>Check Understanding (Assessment)</p>	<p>Students record their T2 numbers in preparation of their fitness plans. Students can reflect on the "Can You Speak Comfortably? Foster Threshold Field Test" to determine how to apply it to SMART goals.</p>	

ASSESSMENT

UbD Lesson #4 Ambient Heart Rate Assessment



Stage One: Outcomes

Lesson Goals

Understand how to assess Ambient Heart Rate and identify internal and external influences

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H8.L1)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.(S4.H1.L1)

Understandings:

Students will understand that:

- a lower ambient heart rate is better than a higher one when compared to just themselves.
- every student ambient heart rate is different and there are ranges.

Essential Questions:

- What controls the beat of your heart?

Knowledge

Student will know...

- definition of ambient heart rate.
- what kinds of things contribute to different heart rates.
- healthy norms range between 50-80 bpm.

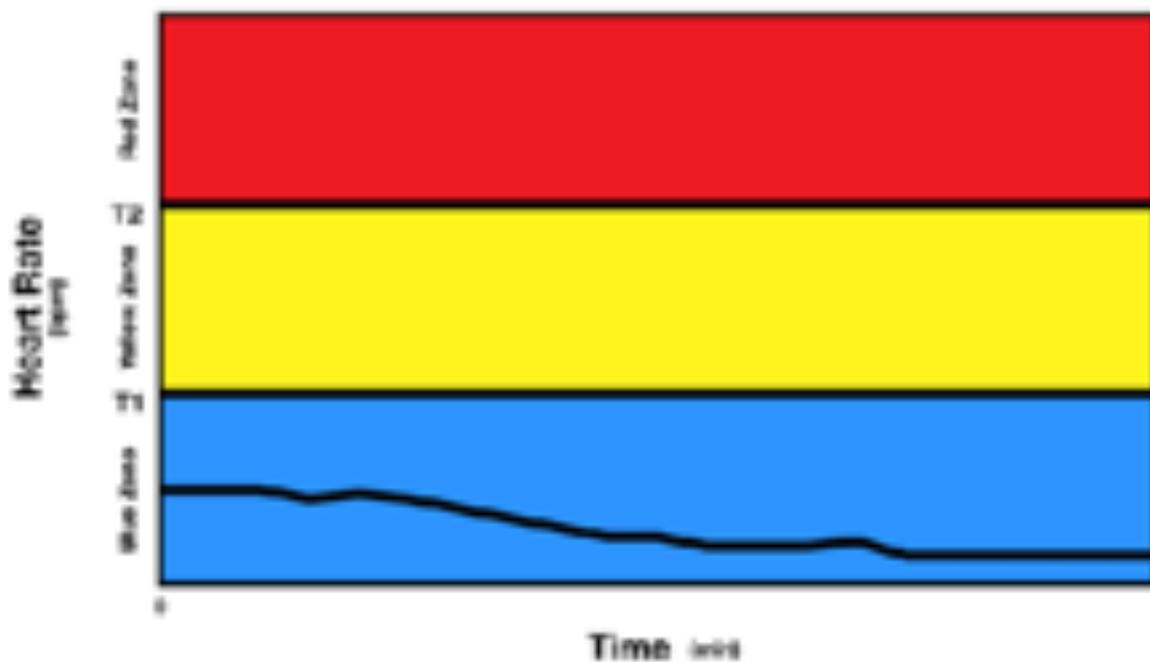
Student will be able to

- determine their average ambient heart rate.
- find their ambient number on the Big Board

Stage Two: Assessment Evidence	
<p>Performance Tasks: Record Ambient Heart Rate in training log</p>	<p>Other Evidence:</p>
<p>Self Assessments: Self monitor ambient heart rate throughout the day to indicate whether or not body is under stress</p>	<p>Other Evidence Summarized:</p>
Stage Three: Learning Plan	
<p>Learning Activities: See the MLA, Movement Learning Activity: Ambient Heart Rate</p>	
<p>Resources:</p> <ul style="list-style-type: none"> • <i>The Heart Rate Monitor Guidebook</i> • <i>The Heart Rate Monitor Book</i> 	
<p>Key Terms:</p> <ul style="list-style-type: none"> • Ambient Heart Rate • Internal Influencers of Ambient Heart Rate • External Influencers of Ambient Heart Rate • Stress and Types of Stress 	
<p>Ambient Heart Rate Scorecard</p>	
<p>40-60 bpm Excellent</p> <p>60-70 bpm Very healthy</p> <p>70-80 bpm Normal</p> <p>80-90 bpm Early indication of high stress load</p> <p>> 90 bpm STAT! Very, very high stress</p>	

ASSESSMENT

MLA Lesson #4A HR: Ambient Heart Rate



Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H8.L1)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others. (S4.H1.L1)

Equipment and Material	<ul style="list-style-type: none"> • Heart Zones System • Student Worksheet: Ambient Heart Rate Assessment 	
Notes	Activity	Debrief
Instant Activity	<p>This is the one of the few times when we ask the students to put on their heart rate sensors and sit quietly.</p> <p>This MLA takes about 5 minutes to complete.</p>	<p>Prepare additional activities after completion of this assessment.</p>

<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • While you are sitting, look at the Big Board and record your ambient heart rate in bpm. • Wait 60 seconds and record a second reading. • Wait 60 seconds and record a third reading. • Find your average ambient heart rate between the three. • Record your ambient heart rate on the student worksheet. 	
<p>Modify Activity</p>	<ul style="list-style-type: none"> • Checking student’s ambient heart rate could be done every day for a week. • This assessment helps the the student to identify factors to support their stress management skills. 	
<p>Check Understanding (Assessment)</p>	<ul style="list-style-type: none"> • What are some things that contribute to daily fluctuations in ambient heart rates? • How can a student lower their ambient heart rate? • Is a higher number better or a lower heart rate number for a better ambient heart rate result? 	<ul style="list-style-type: none"> • Some of the factors that affect ambient heart rate: hunger, sleepiness, fatigue, anger, joy, temperature, medication, hydration-levels, stress, level of individual fitness.

Student Worksheet Lesson 1. Ambient Heart Rate

Using the Blink Armband Heart Rate Monitor to Measure Ambient Heart Rate

Name _____ Date _____

- Right now, my ambient heart rate is _____(A). Wait in a sitting position quietly for 60 seconds and take a second reading.
- Right now, my ambient heart rate is _____(B). Wait in a sitting position quietly for 60 seconds and take a third reading.
- Right now, my ambient heart rate is _____(c).

To find your average ambient heart rate:

$$A + B + C = \text{Sum of the heartbeats}$$

Average = (sum of the heartbeats) divided by 3 (the number of readings) = Average Ambient Heart Rate in bpm =

Show Your Work here:

My average ambient heart rate right now is _____ bpm

Compare your ambient heart rate with norms for this metric:

Ambient Heart Rate Norms	
>90 bpm	High Stress Level
80-90 bpm	Higher than Normal
70-80 bpm	Normal
> 70 bpm	Healthy

According to the Norms listed above I am at a _____ level today.

ASSESSMENT

UbD Lesson #5A. Delta Heart Rate Assessment



Stage One Outcomes

Lesson Goals: Participants will analyze the differences of Delta, Resting and Ambient heart rate

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H8.L1)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.(S4.H1.L1)

Understandings

The student will understand:

- the meaning of an orthostatic test.
- that there's more cardiac stress standing with the body pumping blood against gravity to the head than lying down.

Essential Questions:

- Why is standing heart rate number higher than sitting or lying down heart rate number?
- How does the student take their Delta heart rate and use that number to make decisions about their current level of stress?
- Why are there differences on different days in the Delta heart rate score?

<p>Knowledge The students will know:</p> <ul style="list-style-type: none"> • that we best manage our lives when we measure and monitor our stress. • that the heart responds to stress in different ways. • how to measure their Delta heart rate, interpret the data, score their results and be able to explain what it means 	<p>Student will be able to</p> <ul style="list-style-type: none"> • do a Delta heart rate assessment. • interpret the data. • know how to score the results from a Delta heart rate assessment. • explain the score to others.
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Students will demonstrate that they can complete a Delta Heart Rate Scorecard. • Students will demonstrate that they can make adjustments in their day's activities based on the results of a Delta heart rate test. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • Student will design a program to change their activities and thoughts to reduce stress. • Students will write a list of stressors in their day and share if those stressors are positive or negative on their physiological response to them.
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Students will be able to interpret the Delta heart rate data. • Students will be able to share solutions and strategies for change to lower their Delta heart rate. 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Student will observe events and thoughts in their day that lead to increased stress. • Student will self-assess their learning by completing the Delta Heart Rate Scorecard for 14 days.
<p>Stage Three The Learning Plan</p>	
<p>Learning Activities: See the companion MLA, Movement Learning Activity</p>	
<p>Resources:</p> <ul style="list-style-type: none"> • <i>The Heart Rate Monitor Guidebook to Heart Zones Training</i> by Sally Edwards • <i>ZONING, Fitness in a Blink</i> by Sally Edwards 	
<p>Key Terms</p> <ul style="list-style-type: none"> • Positive and negative stress - Nonspecific response of the body to any demands made on it. There is internal and external stress that applies load on the body's physiological response. There's positive which is health stress and negative which is unhealthy stress. • Orthostatic assessment - The measure of your heart rate response measured in beats-per-minute from a change in body position also known as the Delta (Greek for change) Test. • Factors that affect stress - External or internal activities that result in the body's adjusting to compensate for it. 	
<p>This Lesson Plan was designed using the concepts and framework of UbD, Understanding by Design</p>	

ASSESSMENT

MLA Lesson #5A. Delta Heart Rate Assessment

Delta Heart Rate Fitness Test[®]
 Your heart rate is best interpreted as a relative and range of zones: 1.00 Restless, 1.20 Relax, 2.00 Higher than normal, 3.00 Enduring. Generally, the lower the Delta Heart Rate number the less the total relative stress.

- 1 Lie down on your back and totally relax for two minutes.
- 2 Note your heart rate in a prone position.
- 3 Slowly stand up in place.
- 4 After two minutes, again note your standing heart rate number.
- 5 Subtract your lying down from your standing heart rate number, this is your delta number.
- 6 Record your results.

The graph shows heart rate (b/min) on the y-axis (0-100) and time (minutes) on the x-axis (0-7). A horizontal line at approximately 60 b/min is labeled 'From heart rate 20 test'. A curve starts at 60, rises to a peak of about 90 at 3 minutes, and then gradually declines to about 75 at 7 minutes. A horizontal line at the peak is labeled 'Standing heart rate 20 test'.

HEART ZONES

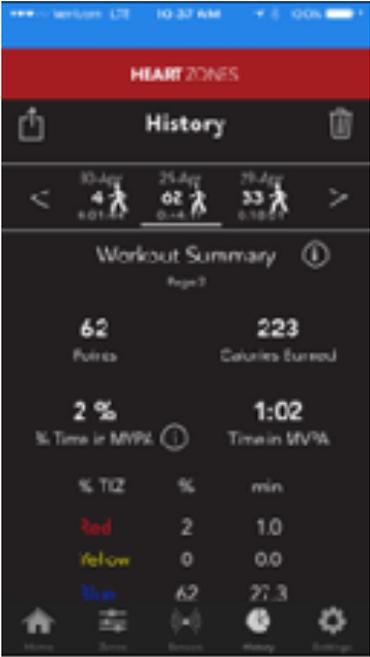
Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. (S3.H8.L1)

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.(S4.H1.L1)

Equipment and Material	<ul style="list-style-type: none"> • Heart Zones System with as many sensors as possible • Delta Heart Rate Worksheet 	
Notes	Activity	Debrief
Instant Activity	<ul style="list-style-type: none"> • Have all students put on their heart rate sensor and sit quietly. • Ask all students to record on the Delta Heart Rate Worksheet their sitting still and quiet heart rate. 	

<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • Speak to the class in a manner that relaxes them and clearly explains what is expected. • Ask students to lie flat on the floor to start the activity. Students should not cross or elevate their feet. Either supine or prone position is fine. • Start a 2-minute timer. At the end of one minute ask students to look at their data on the Big Board. • At the end of 2-minutes of lying down, student's stand in place moving slowly to stand. • At the end of 2-minutes students record their data and calculate their Delta Heart Rate Worksheet. 	
<p>Modify Activity</p>		
<p>Check Understanding (Assessment)</p>	<p>How does the Delta heart rate differ from Ambient heart rate and Resting Heart Rate</p>	

ASSESSMENT	
<p>UbD Lesson #6A. Stride Length Calibration Assessment</p>	 <p>The screenshot shows a mobile app interface for heart rate monitoring. At the top, it says 'HEART ZONES' in a red header. Below that is a 'History' section with a date filter for '10-Apr' showing 4 steps and 4:01. The main section is 'Workout Summary' for 'Page 2', displaying: 62 Paces, 223 Calories Burned, 2% % Time in MVPA, and 1:02 Time in MVPA. A table below shows heart rate zones: Red (2, 1.0 min), Yellow (0, 0.0 min), and Blue (62, 27.3 min).</p>
Stage One Outcomes	
<p>Lesson Goals: Using a step tracker, participants will correlate stride length to pace and determine SPM that best fit a personalized fitness plan</p>	
<p>Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)</p> <p>Standard 2 Applies knowledge of concepts, principles, strategies, and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)</p> <p>Standard 3 Demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness (S3.H2.L1, S3.H3.L1, S3.H3.L2, S3.H8.L1)</p> <p>Standard 4 Exhibits responsible personal and social behavior that respects self and others (S4.H1.L1, S4.H1.L2)</p> <p>Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)</p>	

<p>Understandings The student will understand:</p> <ul style="list-style-type: none"> • that step tracker is measuring movement and not heart rate. • movement calculated as steps is important because it measures the student moving their feet at a certain intensity - SPMs - also called pace. 	<p>Essential Questions:</p> <ul style="list-style-type: none"> • Why is it important for students to move? • How does the participant change their movement intensity? • Why does the participant earn more calories burned in the Red step zone than the Blue step zone?
<p>Knowledge The student will know:</p> <ul style="list-style-type: none"> • step intensity or pace. • the relationship between stride (step) length and distance moved. 	<p>Student will be able to:</p> <ul style="list-style-type: none"> • measure their steps, distance, and all other metrics using their step tracker. • store the data and share with others.
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Students will demonstrate that they can successfully do a movement activity and measure their personal data. • Students will demonstrate that they can share their step data with others. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • Student will design a step tracking activity using a different mode of activity. • Students will be required to write this step tracking activity into a workout template of their choice.
<p>Self Assessments:</p> <ul style="list-style-type: none"> • Students will be able to interpret the data and share with others what it means. • Students will be able achieve a certain step goal for a class session. 	<p>Other Evidence Summarized:</p> <ul style="list-style-type: none"> • Student will reflect upon why burning more calories is helpful to their health. • Student will self-assess their learning by starting, running, stopping, and going back into history to see their workouts and progress.
<p>Stage Three The Learning Plan</p>	
<p>Learning Activities: See the companion MLA, Movement Learning Activity</p>	
<p>Resources:</p> <ul style="list-style-type: none"> • Heart Zones website resources 	

Key Terms

Steps per Minute or SPM - Steps per minute which is the same as running cadence FIT Points for Steps

Paused Time - Stopping the timer during a workout

Active Time - Time participant has the timer started

Time in the MVPA - the overall number of accumulated minutes in the moderate (Yellow/Orange zones) plus the vigorous (Red zone).

TIZ or Time in Zones-Time in zones (TIZ) which is the sum of the number of minutes distributed based on the intensity - the zone

Avg SPM or Average Steps per Minute - The average strides per minute during a step tracking activity

Peak SPM: the highest number of steps per minute during the session.

This Lesson Plan was designed using the concepts and framework of UbD, Understanding by Design
Zones, Inc.

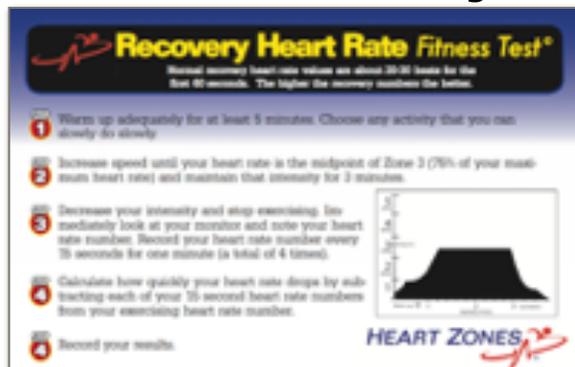
Copyright Heart

ASSESSMENT		
<h2 style="margin: 0;">MLA Lesson #6A.</h2> <h3 style="margin: 0;">Stride Length Calibration Assessment</h3>		
<p>Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)</p> <p>Standard 2 Applies knowledge of concepts, principles, strategies, and tactics related to movement and performance. (S2.H1.L1, S2.H2.L1)</p> <p>Standard 3 Demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness (S3.H2.L1, S3.H3.L1, S3.H3.L2, S3.H8.L1)</p> <p>Standard 4 Exhibits responsible personal and social behavior that respects self and others (S4.H1.L1, S4.H1.L2)</p> <p>Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)</p>		
<p>Equipment and Material</p>	<ul style="list-style-type: none"> • Heart Zones System with the Stride Step Tracker • Apple devices: iPhone, iPad, Ipod Touch 	<p>Suggestion: A free Android version will be available sometime in the 2018 school year.</p>
Notes	Activity	Debrief
<p>Instant Activity</p>	<ul style="list-style-type: none"> • Snag an iPod, iPad, iPhone and download the free Heart Zones Training iPhone App from the iTunes store: http://tinyurl.com/HZTiPhoneApp • Open the app. Tap on "Settings" to enter your data. • On top of screen, tap "Stride" under words My Zones. • Tap "Set My Zones" and enter the data, if available. • Tap "Sensors" • Tap "Step Tracking" • Tap "Unpair" • Tap "Search" • Wait for sensors to appear or pull down on the screen to refresh. • Tap on the Foot pod BOLT with the lowest negative number: Example (-42). Wait for sensor to connect. • Tap Done • Tap on the bottom menu bar "Home" 	 <p>The screenshot shows the Heart Zones app interface. At the top, it says 'HEART ZONES' with a refresh icon. Below that, it says 'HEART RATE ZONE WORKOUT' and shows three zones: 'EUPHIC' (blue), 'MODERATE' (yellow), and 'VOORQUE' (red). Below these are icons for 'WALK', 'RUN', and 'BIKE'. At the bottom, there is a 'CALIBRATE' button with a red arrow pointing to it, and another red arrow pointing to the 'BIKE' icon. The bottom of the screen shows the standard iOS home indicator bar.</p>

<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • From the instruction above, confirm that your Apple device has zones and sensor connected process completed • Set out cones that mark a distance of 25 yards. • Calibrate Walk: Measure the number of steps you walk at a brisk but normal walk pace. The app counts this for you by tapping on the Home display, tap on WALK, start walking and stop at the end line of the 25 yard markers. • Read how many steps you completed. • Go to the apps Home screen and tap on the red display “Calibrate”. • Enter the data for Distance. Enter the data for Step Count. • The app calculates “Step Length” and enters that into the formula for “distance” needed to calculate how far you move during the workout session. 	
<p>Modify Activity</p>	<ul style="list-style-type: none"> • Change the length of the run-walk distance from 25 yards to 100-400 yards to determine if stride length changes with distance. • Is a longer stride better with a slower turn-over rate (steps per minute or SPM) or is a shorter stride better with higher turn-over rate? 	
<p>Check Understanding (Assessment)</p>	<ul style="list-style-type: none"> • Why do you take fewer steps running than walking? • How can you improve your stride length? 	
<p>This Lesson was designed using the concepts and framework of UbD, Understanding by Design Copyright Heart Zones, Inc.</p>		

ASSESSMENT

UbD Lesson #7A. Recovery Heart Rate



Stage One Outcomes

Lesson Goals: Participants will identify individual recovery heart rate and determine whether or not one's fitness levels are improving. If not, one may need to alter the intensity of the workout

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2. Applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1, S2.H2)

Standard 3. Demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness (S3.H2, S3.H3.L1 S3.H3.L2, S3.H8, S3.H10, S3.H10.L2,S3.H5)

Standard 4. Exhibits responsible personal and social behavior that respects self and others (S4.H1, S4.H1.L2)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

<p>Understandings: Students will understand:</p> <ul style="list-style-type: none"> • how to calculate their recovery heart rate • improved recovery heart rate comes with improved cardiovascular fitness • higher recovery number means higher aerobic fitness or improvement in training status • a high recovery heart rate number indicates readiness for a harder workout • a low or lower recovery heart rate number may indicate incomplete recovery from recent training stresses, emotional stresses, and other negative influences 	<p>Essential Questions:</p> <ul style="list-style-type: none"> • Why is it important to understand my recovery heart rate? • What can recovery heart rate tell you about my current level of fitness? • How does recovery heart rate apply to my individualized fitness plan? • What is our body trying to tell you from the data about your recovery heart rate?
<p>Knowledge Student will know...</p> <ul style="list-style-type: none"> • how to use mindful recovery to impact recovery heart rate. • the differences between two types of recovery: active recovery (continue moving) and total recovery (stop moving). 	<p>Student will be able to</p> <ul style="list-style-type: none"> • Adjust their recovery process in the future on their own • Perform a Recovery Heart Rate assessment at the end of the workout
<p>Stage Two Assessment Evidence</p>	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Record ambient heart rate • Identify and record peak heart rate 	<p>Other Evidence:</p>
<p>Self Assessments: Brainstorm a list of strategies used to improve Recovery heart rate Exit slips for the following questions:</p> <ol style="list-style-type: none"> 1. What does a high recovery heart rate mean? 2. What does a low recovery heart rate number mean? 3. What can you do to improve your recovery heart rate numbers? 	<p>Other Evidence Summarized:</p>
<p>Stage Three Learning Plan</p>	
<p>Learning Activities: Recovery Heart Rate MLA</p>	
<p>Resources: Recovery Heart Rate worksheet</p>	

Key Terms:

Ambient heart rate -The number of beats per minute your heart contracts when you are awake but in a sedentary and stationary position. Healthy range between 60 and 70 (bpm) beats per minute and normal range is 70-80 bpm

Recovery Heart Rate - The number of beats-per-minute that your heart rate drops in one minute and additionally sometimes measured in two-minutes. There are two types of recovery heart rate:

- **Total Recovery** - complete cessation of movement
- **Active Recovery** - continue to move but at a very low and slow effort

ASSESSMENT

MLA #7 A. Recovery Heart Rate



Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.(S1.H1.L1)

Standard 2 Applies knowledge of concepts, principles, strategies and tactics related to movement and performance. (S2.H1, S2.H2)

Standard 3 Demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness (S3.H2.L1, S3.H3.L1 S3.H3.L2, S3.H8,.L1, S3.H10.L1,S3.H10.L2,S3.H5)

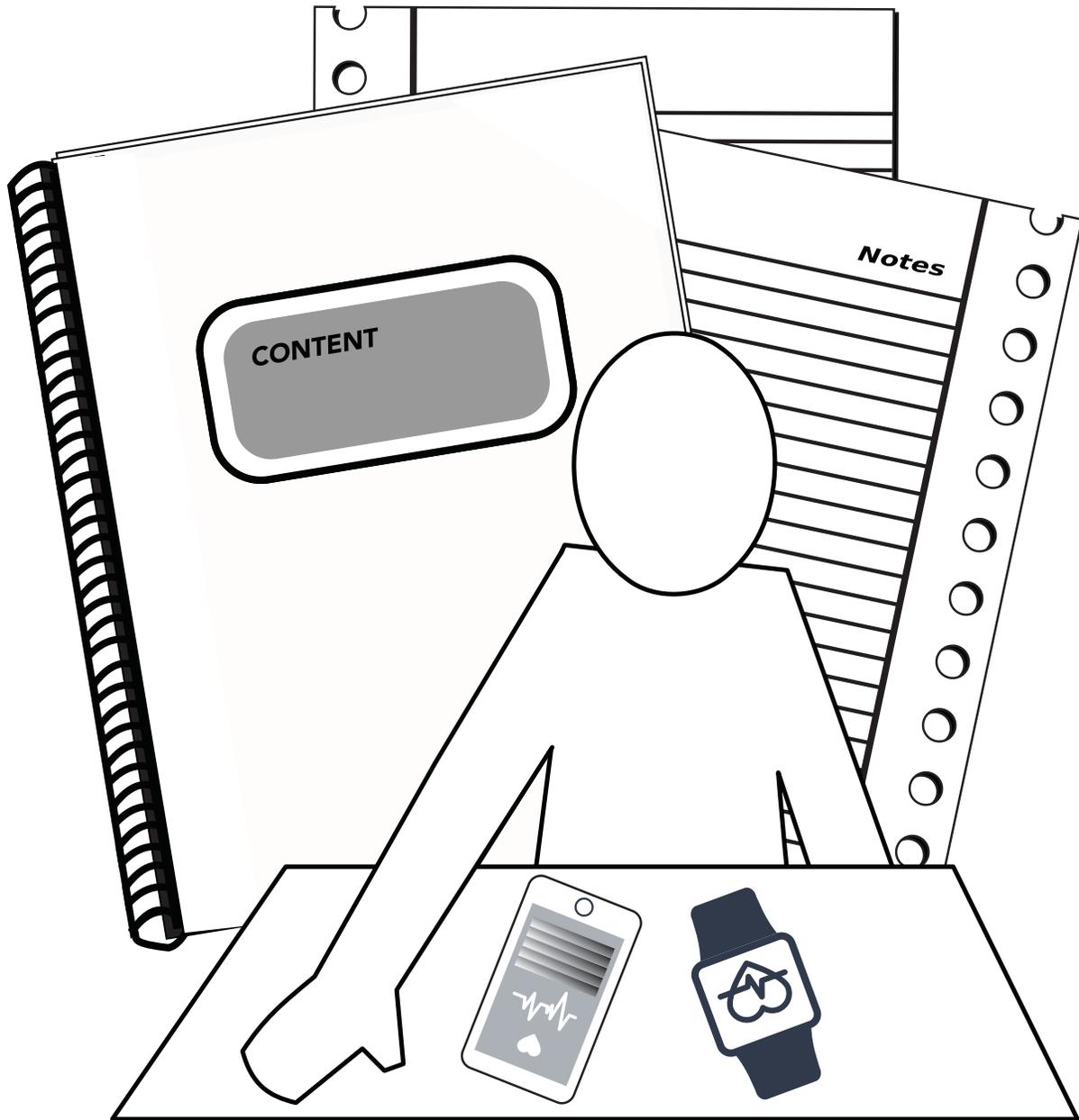
Standard 4 Exhibits responsible personal and social behavior that respects self and others (S4.H1.L1, S4.H1.L2)

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (S5.H1.L1)

Equipment and Material	<ul style="list-style-type: none"> • Heart Zones System • Recovery Heart Rate worksheet 	
Notes	Activity	Debrief

<p>Instant Activity</p>		<p>Lead this lesson with one time assessing your Active recovery number and one time doing Total Recovery assessment</p>
<p>Learning Activity Instructions</p>	<ul style="list-style-type: none"> • Have the students record their ambient heart rate on their worksheet. There are two types of post-exercise recovery: total and active. • Instruct or lead students in an aerobic activity that raises their heart rate 60 to 100 beats above their ambient heart rate for five minutes • Record the peak heart rate, the highest heart rate in any one exercise session. • Now that the students are familiar with the procedure, repeat the activity again. At the end of the five minutes of activity, students record their exercise heart rate • Ask them to begin a mindful recovery by sitting quietly and comfortably. • After one minute, have students record their heart rate again. • Instruct the students to subtract their one-minute post-exercise heart rate from their exercise heart rate number they recorded at the end of the five-minute exercise period. The difference is their recovery heart rate. 	<p>Tell student they are going to see how their heart rate drops after exercising, recovery heart rate number</p> <p>Encourage them to breathe deeply. Give them specific instruction that you want them to lower their heart rate. Encourage them to focus on mindful recovery</p> <p>Explain to students that the higher the recovery heart rate number, the better. Their goal is to improve their recovery heart rate with improved cardiovascular fitness levels over time.</p>
<p>Modify Activity</p>	<p>Instructor can select the peak heart rate for this assessment. If possible, choose the middle of the Yellow Zone as the target peak heart rate number.</p>	
<p>Check Understanding (Assessment)</p>	<ol style="list-style-type: none"> 1. Students record their data on the Heart Zones Training Log sheet 2. Attach recovery heart rate worksheet 	<p><10 Extreme Caution 11-20 Low 21-40 Good 41-50 Excellent >50 Fit Athlete</p>

PART 5. ARTICLES



 Smart PE Lessons CALENDAR of MLA Lessons						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4 Lesson #6 Tour of the Zones	5 Lesson #2 Peak Heart Rate Challenge	6 Lesson #5 Rock, Paper, Scissors	7 Lesson #8 FIT Points Soccer	8 Lesson #1 Ambient Heart Rate	9
10	11 Lesson #7 MVPA Quest	12 Lesson #9 Criss Crossing the Yellow Zone	13 Lesson #4 Touch and Go Line Drills Threshold Assessment	14 Lesson # 19 Delta Heart Rate Assessment	15 Lesson #20 Yellow Zone Basketball	16
17	18 Lesson #10 Three Zones Steady State	19 Lesson #12 Ten, Ten, Ten Combinations	20 Lesson #13 Recovery Heart Rate Assessment	21 Lesson #11 Five by Two Endurance	22 Lesson #15 Mirror Mirror on the Wall Who is the Fairest Zones of them All?	23
24	25 Lesson #16 T1, the Low Threshold Assessment	26 Lesson #18 T2, the High Threshold Assessment	27 Lesson # 3 Five Stars Frisbee	28 Lesson #14 Length Assessment	29 Lesson # 17 Champions and Challengers	30

FIT Points = FIT Stars

THE MAGIC SAUCE IN HEART ZONES TRAINING

How to Measure Your Workouts Using FIT Points and FIT Stars

FIT Points are a simple way to quantify how hard and how long you are working out. For the first time, you can now measure the quantity of your effort versus the volume (distance or time) of your workout. And FIT Stars is a visual way to represent the number of FIT Points. Why is this important?

FIT Points are effort points, physical stress points, or training load points — it is all the same. Tracking your points is one of the best ways to measure the amount of exercise or the quantity and the quality of exercise. Are you working out hard enough or too hard? For example, runners like to quantify their training volume which is how far they run in miles/meters or how many minutes they run. Cyclist like to quantify their training by hours or miles riding the bike. But, neither of these metrics include how hard, the intensity of the workout

More Behind the Science of Training

FIT Points, however, are different from measuring training only by distance or time, which doesn't include the one and key metric — intensity. FIT Points quantify the amount of exercise plus your exercise intensity during a workout session which is the holy grail of fitness workouts using intensity or in Heart Zones Training, your heart rate zone number.

Training load points or FIT Points are measured using a simple arithmetic formula that is easy to calculate but even easier when calculated using our software and apps: the Heart Zones PE app for groups (fee app) and the Heart Zones Training iPhone app for individuals (free app). Both Apple iOS apps do all the calculations for you behind the scenes and then displays the results on your iPhone or if you train with a group, the Heart Zones PE Big Board.

THE FIT Points Formula

If you are familiar with the exercise principle called the FIT Principle then FIT Points are the sum of the three letters in the FIT principle. The word FIT stands for frequency (F), intensity (I), and time (T). Training load is the sum of the frequency of workouts, multiplied by the intensity of the workout and time. When these three measurements are multiplied together they equal FIT Points .

$$\text{FIT Points} = \text{Frequency (F)} \times \text{Intensity (I)} \times \text{Time (T)} = \text{Fit Stars}$$

If you multiply these three components of an exercise workout, you have a measure of total workload also called "exercise dosage or prescription."⁷

Each heart zone has a different number associated with it which represents the amount of weight, load, stress for each zone. As exercise intensity gets more strenuous, the weight or the numerical value for a

⁷ Points or the quantification of training load is so important that we patented it. Heart Zones, Inc. was awarded the only US federal patent ever awarded to a cardiovascular training system: Threshold Training System.

zone increases to match the intensity of that zone. If you follow the three zone ZONING program, then the easy Blue zone is worth 1 point, the higher intensity moderate Yellow zone is worth 3 points and the hot, hard, high Red zone is worth 5 training load or FIT Points . If you use the five zone Threshold or Maximum heart rate system, then the following chart shows the numerical value of each.

Zone Number	Zone Color and Name	FIT Points
Zone 5	Vigorous Red Zone	5.0-5.9
Zone 4	Hard Orange Zone	4.0-4.9
Zone 3	Moderate Yellow Zone	3.0-3.9
Zone 2	Green Zone	2.0-2.9
Zone 1	Easy Blue Zone	1.0-1.9

Calculating FIT Points

Here's an example of how to calculate FIT Points . You're doing one workout activity a day (frequency) and the level of intensity for that workout is the bottom of the Yellow Zone 3 (worth 3 points per minute) and the total exercise time is 30 minutes. The simple calculation is as follows:

Calculating FIT Points

$$1 \times 3 \times 30 = 90 \text{ FIT Points}$$

Frequency (F) time Intensity (I) or bottom of the Yellow Zone x Minutes (T) = Training Load Points

FIT POINTS ARE FRACTIONALIZED

Easy. Intuitive. Yet, there's one more thing. Zones are a range of heart beats and vary in size. Since a single zone could be as many as 10-30 heartbeats in range, the top of a zone awarded earns more training load points than the bottom of that same zone. That's because the range of heart beats inside one heart zone varies between individuals. This range depends on the individual and on their individual thresholds or if using maximum heart rate to anchor the heart zones, then that value. To accommodate for the fact that the top of the Yellow zone 3 is much more strenuous than the bottom or the middle zone of that golden Zone 3, the system "fractionalizes" each zone to give you the proper calculation. Another way is to say it, is the middle of Zone 3 is worth 3.5 points and the very top of Zone 3 is worth 3.9 points in the calculation. This fractionalization makes the calculation more accurate and appropriate.

Until the advent of one of the greatest fitness inventions of the 20th century, the heart rate monitor and the step tracker⁸, it was impossible to objectively measure exercise stress — training load. The missing

⁸ A [step trackers](#) is a body worn wearable that uses an accelerometer to measure a number of metrics principally the number of strides that you move.

and important data point in the FIT Points formula, is a measurement of effort or how hard is your workout. Measuring effort or intensity is precisely what a heart rate monitor and a step tracking sensor can provide — a measurement of exercise intensity using the zone training method first developed in the early 1990s and later patented by Heart Zones, Inc. Only now, with the use of new body worn sensors can you properly measure training load — the amount of exercise that we get from our workout or FIT Points .

HOW MANY FIT POINTS ARE RECOMMENDED FOR A WORKOUT?

The golden zone, or Zone 3 if you are like many time crunched workout enthusiast, is the moderate Yellow zone. Zone 3 provides you with enormous aerobic benefits like burning lots of calories, especially calories from fat while at the same time increasing your endurance capacity. In other words, the Yellow zone of moderate intensity activity might well be the biggest bang for your investment of exercise time.

30 Minutes Equals 100 FIT Points

30 Minutes Equals 100 Points					
Blue Zone 1	added to	Yellow Zone 3	added to	Red Zone	= Total FIT Points
(5 min x 1.4)	+	(20 min x 3.4)	+	(5 min x 5.1)	= Total FIT Points
7 points	+	68 points	+	25.5 points	= 100.5 FIT Points = 5 FIT Stars

Heart Zones recommends achieving 100 or more FIT Points in a 30-minute workout because all workouts should consist of a warm up time at the beginning of the session, a cool down time at the end with a “main set” of time in zones, in this case Heart Zones 3 through 5 which are moderate to vigorous effort.

45 Minutes Equals 150 FIT Points

The more time in your workout at the higher zones the more FIT Points you earn. And, if it is your goal to provide these same benefits — weight loss, endurance capacity and no-pain enjoyment of the workout — then by extending your exercise time by 15 minutes in the Yellow zone and then adding more Zone 5, the Red Zone, you can easily earn 150 FIT Points.

45 Minutes Equals 150 Fit Points					
One Interval Basketball Game					
Mid-Blue Zone 1	(+)	mid-Yellow Zone 3	(+)	Red Zone 5	= ___FIT Points
15 min x 1.5	+	15 min x 3.5	+	15 min x 5.0	= ___FIT Points
22.5 points	+	52.5 points	+	75 points	= 150 FIT Points = 5 FIT Stars

HOW MANY FIT STARS ARE RECOMMENDED?

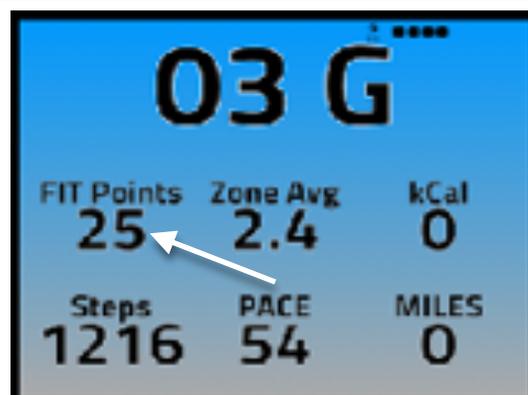
The participant's goal is to achieve 5 FIT Stars for most workout sessions. A participant can earn stars by spending most of their exercise time in Zone 3 and higher. FIT Stars are only a part of the Heart Zones PE group software application.

SUMMARY

FIT Points and FIT Stars are the magic sauce within the Heart Zones System and no other software uses them together. Unique to Heart Zones Training, FIT Points and FIT Stars are one of the most important heart rate derived numbers you can use to motivate, challenge, and progressively increase to achieve greater fitness benefits as your fitness improves. Track your FIT Points. Make sure that you earn 5 FIT Stars for most workouts. Plan your training using your FIT Points. Make FIT Points which equal FIT Stars part of a challenge, a contest at your school or club or as an individual. And remember, the more FIT Points and the more FIT Stars you earn, the fitter and healthier you may be and may become. FIT Points and FIT Stars make you the star.



FIT Stars are earned based on the number of minutes in the class . You set them in the Heart Zones PE iPad app in the menu item "Current Class".



FIT Points on the individual participants workout tile on the Step Tracker Big Board Display #2. FIT Points are based on time in zones multiplied by the fractionalized zone number.

UNPACKING: Integration of the National PE Standards with Smart PE

During my three-year tenure as the Carol M White PEP grant coordinator, our team updated our physical education curriculum as we implemented the 2014 National Physical Education Standards⁹, benchmarks and grade level outcomes. This process was invaluable for our staff in understanding the importance of linking standards to our new and refreshed PE curriculum. For us, it was the first time in our educational history that the Physical Education standards were on the same level playing field with other content areas.

The National Standards introduce the term, physical literacy, which is defined as the ability to move with competence and confidence in a wide variety of physical activities in multiple environments that benefit the healthy development of the whole person¹⁰. By using the National PE Standards our community administrators, boards of education, parents and policymakers have a framework for understanding what students should be able to know and do as a result of physical education. The benchmarks that are part of the National Standards are identified by each individual grade level and grade level outcomes. These were developed to facilitate skills and deliver appropriate progressions across the different grade levels. These standards and benchmark developments increase the opportunities that students will be physically active for a lifetime.

Of the many goals of the National Physical Education Standards, one of the primary ones is to graduate students ready to participate in lifelong physical activities with the cognitive skills to maintain their own health-related fitness. We believe we have accomplished this goal.

In addition to developing a new standards-based curriculum and sharing our work locally, regionally and nationally, the PE teachers in the Stillwater school district are committed to educating the community and our administration and other instructors on the difference between athletics and Physical Education. We often are challenged by the misconception that

⁹ National PE Standards information: <https://portal.shapeamerica.org/standards/pe/>

¹⁰ Mandigo, J., Francis, N., Lodewyk, K., & Lopez, R. (2012). Physical literacy for educators. *Physical Education and Health Journal*, 75(3), 27–30.

Physical Education is a time to play when in fact quality Physical Education promotes motor skill competence and knowledge growth skills that can be transferred to other parts of a student's life. It is this competence and understanding that can introduce a person to an intrinsic love of being physically active. Throughout our district, I observe students that may not like PE for a variety of reasons but through the understanding of the lessons and curriculum and with the combined use of the Heart Zones System¹¹, our District has transformed their respect of physical education as our students become more engaged learners loving movement in the form of personalized learning.

That's the beauty of utilizing the Heart Zones System and Heart Zones Training methodology. By it our students are now ready to participate in lifelong physical activities and have the cognitive skills to maintain their own health-related fitness for a lifetime. I am happy that we linked them together - we unpacked the National Standards and put them into our program.

Deb Van Klei, iHealthy MOVES, Carol M. White PEP Grant Manager, Stillwater School District

National PE Standards

SHAPE America's National Standards & Grade-Level Outcomes for K-12 Physical Education define what a student should know and be able to do as result of a highly effective physical education program. States and local school districts across the country use the National Standards to develop or revise existing standards, frameworks and curricula.

Standard 1: The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.

Standard 2: The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.

Standard 3: The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.

Standard 4: The physically literate individual exhibits responsible personal and social behavior that respects self and others.

Standard 5: The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction.

¹¹ For more information go to subdomain URL: <http://schools.heartzones.com/>

How to Set Your Student's Individual Heart Rate Zones: SAVE THE PEAK

Saving time for the physical educator is important. Measuring your students fitness improvements is important. Teaching using principles of physical literacy is important. That's why our team at Heart Zones makes every effort to design ways in our technology and methods to accomplish these objectives. Meet the new feature in the Heart Zones PE iPad software that individually sets your students heart rate zones hands free and within a single lesson with no manual typing data entry by you into the student's profile. This time saving and improved accuracy of measurements feature is called "Save the Peak Value".

Save the Peak value is more than a switch that you can throw within the Heart Zones PE iPad application. It is a powerful way for you to individualize your PE program in a large class setting quickly and accurately. Each of your students is different. Each of your students has their own individual heart rate zones. Setting those heart rate zone can be assessed in a number of different ways.¹² One of the best ways to individualize the heart zones is to use the Heart Zones PE app in one more powerful way - auto setting within any of the three zone methodologies within the application their heart rate zones. These are the three methods that are provided to you within the Heart Zones PE iPad software app:

- **ZONING** heart rate method of 3 colored-zones and two threshold biomarkers
- **Threshold** heart rate method: 5 heart zones and two thresholds
- **Maximum** heart rate: the highest heart rate that each student that is unique to them

The new software feature, Save the Peak Value, auto-sets the heart zones from within all three of these methods based on the highest heart rate that your student can achieve in one individual movement session. There are several different assessments that can achieve peak heart rate such as the Pacer Test, an all out effort such as 400 yard run or sprinting on a piece of exercise equipment¹³ after an adequate warm-up, or the lesson in book Smart PE titled "Save the Peak" which we recommend.

Peak heart rate is the same as maximum heart rate in any of these assessments. The definition of maximum heart rate¹⁴ is the highest achievable heart rate for any individual. Maximum heart rate is genetically determined. When the switch is turned in the Heart Zones PE app, the software automatically stores the peak heart rate in the column heading maximum heart rate and auto sets maximum heart rate using different formulas and different heart rate anchor points for this calculations:

ZONING and Threshold heart rate method:

- Maximum heart rate = peak heart rate value of the activity session

¹² Different ways of setting heart zones can be based on one of a dozen formula such as the Fox formula of 220-age (see White Paper titled The One-Size-Fits-All Age Adjusted Maximum Heart Rate Equation Fits No One <https://heartzones.com/wp-content/uploads/2016/03/hz-white-paper-1.pdf>) or by following recommendations for organizations such as the American College of Sports Medicine or the American Heart Association.

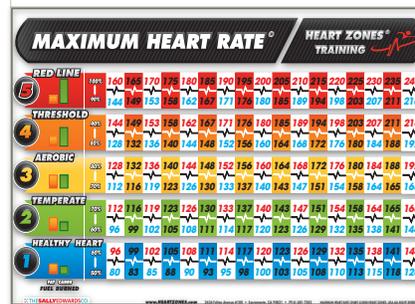
¹³ More detail in the Heart Rate Guidebook to Heart Zones Training. Sally Edwards. Heart Zones Publishing. 2010

¹⁴ See the Glossary of the book Smart PE for more details

- T2¹⁵ = 80% of peak heart rate number
- T1¹⁶ = 70% of peak heart rate number
- SHR¹⁷, starting heart rate = 50% of peak heart rate number

Maximum heart rate method:

- Maximum heart rate = peak heart rate value
- Zone 5, the Red zone = 90% - 100% of maximum heart rate
- Zone 4, the Orange zone = 80% of maximum heart rate
- Zone 3, the Yellow zone = 70% of maximum heart rate
- Zone 2, the Green zone = 60% of maximum heart rate
- Zone 1, the Blue zone = 50% of maximum heart rate

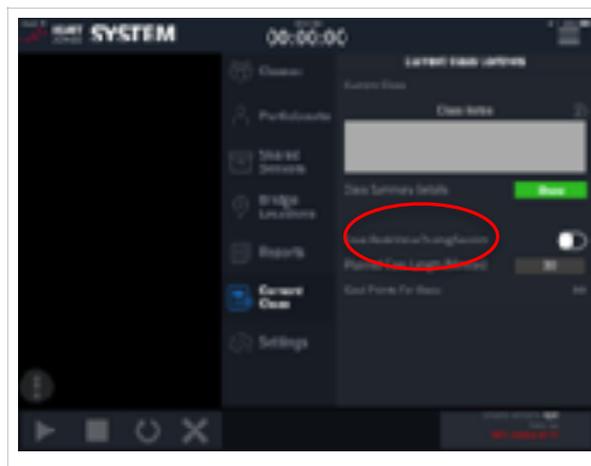


How do You Use "Save Peak Value During the Session" Feature?

Completing a Save Peak Value movement learning activity¹⁸ early in the school year is important because it provides each student with their own individual zones, auto calculates the zones using an algorithm, completes the task for the entire class during one lesson, and sets their maximum heart rate number using their peak heart rate number. The Save the Peak heart rate lesson from Smart PE accompanies this article.

Here's the instructions on how to access this switch in the Heart Zones PE software for the iPad:

- Launch the application
- Tap on the Menu bar in the upper right corner.
- Tap on the Current Class menu item.
- Find the "Save Peak Value During Session" switch.
- Slide the switch to the right and it turns green.
- Complete the activity and save the session in the iPad at the completion of the activity.
- Return to the "Save Peak Value During Session" and turn the switch to the off position.



¹⁵ T2 is also known as the second or high threshold and is the same as VT2, the second ventilatory turn point and VT1, the first shift in ventilation.

¹⁶T1 is also known as the first or low threshold and is the same as what exercise scientist refer to as VT1, the second ventilatory turn point and VT2, the first shift in ventilation.

¹⁷ SHR or starting heart rate is that heart rate when the first improvements to aerobic capacity can be measured and is typically 50% of the maximum heart rate.

¹⁸ A movement learning activity or MLA is part of each of the lessons in Smart PE book and provides the plan for each lesson.

Understanding

It is well known¹⁹ that when the student understands why they are doing an activity, they do better at the activity and learn more. Understanding Peak heart rate is an important learning lesson because it levels the playing field in a way that all students can workout individually using their maximum heart rate that has been tested and not derived from a formula that has for decades been challenged for lack of research validation. One of the best way to improve your physical education program and one of the foundation principles of the Smart PE lessons is that each student, as well as adult, is unique. Just as we assess in other disciplines the student's individual levels, we should do the same in physical education. That is what the Save the Peak provides for you for the first time, a way to personalize and individualize the physical education student for objective grading, enhanced student engagement, and as motivational tool for you to provide them with one more key component — physical literacy.

¹⁹ Grant Wiggins and Jay McTighe, *Understanding-by-Design Expanded 2nd Edition*. ASCD, Danvers, MA. 2005

Using Smart Measurement and Assessment Tools with the Physical Education National Standards

In Physical Education we are provided National Standards with benchmarks and outcomes to assess students in our classes. Elementary teachers (K-5) are asked to assess 48 benchmarks, middle school teachers (6-8) 68 benchmarks and high school (9-12) 29 benchmarks. This often can be a daunting task depending on how much time students have physical education per week. Although all standards are essential to ensure physically literate students some schools have had to scale back the number of essential movements even more which can make it difficult to assess students let alone give them a grade.



With that being the case one might then ask “why do we assess?” The answer is that administering assessments can increase student engagement and teacher engagement. Teachers are asked to create an environment that promotes student learning and motivate them to want to improve in the benchmark that has been identified; rather than creating a gotcha environment in which students and their parents strongly dislike physical education.

What’s the challenge to assessment for quality Physical Education? As physical educator’s, we are responsible for assessing multiple domains of learning, instructing class sizes ranging anywhere from 25-50 students, and teaching on a schedule that requires up to four preps a day. Considering all of these how does one assess objectively, effectively, authentically and efficiently? A physical educator’s philosophy may influence what gets assessed objectively and what doesn’t. I would dare to say, as physical educator’s, we have not done a very good job of assessing our students other than by what we observe which is subjective in nature. So does this subjective view a valid measurement of a student’s growth in their physical literacy?

We can use a student’s individualized instruction to plan curriculum, pacing guides, daily lessons, communication with parents, identify student’s special needs and evaluate the program’s effectiveness. If we truly want our students to be physically literate and value moving for a lifetime we must provide feedback to them that will allow them to be critical thinkers with skills that can be used outside of our classrooms and the gym and continue to grow their mindset.

We are challenged to create physically literate students through SHAPE's²⁰ National Standards. What does physically literate mean? Physical literacy means students will participate regularly in physical activity and student value physical activity and how it contributes to a healthy lifestyle.

SHAPE recommends that appropriate instruction will include all students, maximize practice opportunities for students during class that facilitate learning, not use physical activity as punishment, and incorporate regular assessment to monitor, reinforce and plan for student and teacher learning.

SHAPE America's five National Standards defines what a student should know and be able to do as result of a quality physical education program. They are listed as follows:

Standard 1 - The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.

Standard 2 - The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.

Standard 3 - The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.

Standard 4 - The physically literate individual exhibits responsible personal and social behavior that respects self and others.

Standard 5 - The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction.

Because so much of what we do in physical education is performance based when we assess we consider the following domain:

c. Affective-development of acceptable social and personal behaviors in physical activity settings that allow for a productive learning environment with students working responsibly both individually and as members of a group.

Standard 4 & 5

As we use more assessments in our curriculum which currently is primarily performance based, student growth can be measured according to each individual and their ability to show growth in the three learning domains of cognitive, affective and the psychomotor.

²⁰ Society of Health and Physical Education

SHAPE's National Standard #1 address the psychomotor domain which is the heart of physical education to *develop* competent motor skill abilities and life long movers. The psychomotor domain uses the outcomes and benchmarks in National Standard 1, and includes physical movement, coordination, and use of the motor-skill areas. Development of these skills requires practice and is measured in terms of speed, precision, effort, distance, procedures, or techniques in execution.

SHAPE's National Standard 2 & 3 address the cognitive domain in which students are asked to have an understanding of movement concepts and principals that allow them to become more efficient movers and learners through movement.²¹

SHAPE's National Standards 4 & 5 address the affective domain which focuses on feelings, values, social behavior, and attitudes as they relate to human movement. Learning in the affective domain in physical education means that students learn such concepts as sportsmanship, "fair play," respect for others, respect for equipment, self-control, responsibility, and motivation. Many physical education teachers have been criticized for grading based on participation (an affective behavior), but grading in the affective domain is not limited solely to participation and should not be based on just one affective behavior.

All of this leads us to the question of how can one use the Heart Zones system for assessment? I would like to share the following stories on how a couple of PE teachers have been using the BIG board for student and teacher engagement.

Using FIT Points and the Movement Sensor in PE Class

"Every fall we run the mile with our elementary student's. This fall wasn't any different. One student in particular that was enrolled in our Gifted and Talented education program started his run and quit after two laps and "just couldn't go any more". About two weeks later we implemented the Heart Zones step trackers to measure movement into our physical education classrooms and this same student was able to jog over 25 minutes. The bio feedback he received from the Big Board display motivated him to move like he had never before! By the end of the week he was asking to run in my annual 5K run, and his mother thanked me for making a physical and emotional difference for her son.

²¹ Some possible resources for teachers would be SOLO taxonomy, Bloom's taxonomy and TGFU (teaching games for understanding).

This particular day in class we were participating in circuit stations activities and I was working with possible ways to motivate students to reach goals. When I first started using Heart Zones technology, we established that in a 40 minute PE period students should earn 40 FIT Points using step trackers. One of the elementary boys typically would earn 25 FIT Points so I decided to “individualize” his step zones. What I noticed was a boy totally engulfed in being able to compete with the “top” kids in my class. He left the class being one of the top FIT Point achievers that day and left class getting high fives from his classmates and a smile that reached ear to ear. The student’s success extended into his classroom. One of his other teachers approached me later in the day and said he was flying high the rest of the day.

Which leads me to the next point. Using Heart Zones methods and technology in my PE classroom has re-energized me as a teacher and providing quality physical education for my students. The Heart Zones System is truly a game changer for me and more importantly all of my students.”

Mike Mustar, Stillwater School District elementary PE teacher.

How I Became a Better PE Teacher

“Prior to using the Heart Zones System, I had a middle-school unfit male student. He had a great attitude and really seemed to enjoy coming to my classroom. Every day we start the class with a dynamic warm-up and I noticed that by the end of the workout time he seemed to fizzle out. So I would encourage him verbally to give a little more effort. The first-time he put on a Blink heart rate sensor, I noticed that he was automatically in the Red zone, the vigorous zone. Here I was pushing him verbally to increase his intensity and he was already giving the most he could. Heart Zones methodology has helped me to be a better teacher, and understand that I had a tool in which I didn’t need to be subjective when assessing students. The data was there, right in front of me on the Big Boards display and on my iPad showing me the cardiovascular effort levels for each individual student.

The Heart Zones System gives student’s individual bio-feedback and teacher data feedback. It allows me to objectively grade students and create lesson plans to improve teacher effectiveness. The class summary allows the teacher to create the lesson to attach it to whatever state or national standard which for me is the essential learning outcome for the lesson. Certain heart or step zones lend to achieving levels of fitness and personalized learning for our students.”

Darrel Salmi, Middle-school PE teacher, Stillwater School District²²

²² Darrel volunteered to be the first PE teacher in the nation to adopt, beta-test, apply the Heart Zones System and has been teaching everyday with the technology since that time.

After reading these two stories on of the next question is how do we assess in physical education using wearable sensors that provide individualized student data. Gone are the days of guessing a students efforts and giving them a grade. The Heart Zones methods — Smart PE — now levels the playing field for all of our students and all of our teachers.

Think about Darrell and Mike and when they could apply the technology to the assessment the results help students realize their own physical literacy. If we as educators want to help our students reach their own aha moments we need to focus on the importance of feedback, specifically bio feedback, and how it can be used to improve the participants health and fitness. The Big Board display has been a game changer for our students in the Stillwater School District. Using Heart Zones changes the relationship between the student and the teacher. Each Big Board display individual students “tile” is specific to the student and now the teacher is able to coach each individual student in a way they have never been able to do before. There is accountability for the student and there is accountability for the teacher, especially using the %MVPA Bursts. The BiG board allows us:

1. To gauge and improve student learning
2. Ways to communicate learning differently, eg, what is being learned, how progress is being measured, type of instruction being received
3. Evaluate the program determining with formative assessments if the student understood the lesson and analyzing how the %MVPA matches the goal of the particular lesson
4. Use objective assessments in order that administrators can use the data from student improvement and teacher accountability
5. Motivate students to move more as they learn that they are competing with themselves and no one else
6. Motivate teachers using the movement data to be a reflective learner

Deb Van Klei, iHealthy MOVES, Carol M. White PEP Grant Manager
Stillwater School District

Safety Using Heart Zones Assessments

Using a Heart Rate Monitor to Screen for Heart Health in Physical Education®

“One of the reasons I first became interested in the Heart Zones System was for its ability to ‘screen’ students for potential heart health challenges. A number of years ago, I had a 4th grade student go down in my PE class with chest pain. This student was struggling to breathe and unable to walk. After an ambulance ride to the hospital and further examinations, it was discovered he had a blood supply issue to his heart which surgery later corrected. I was told that this student could have died if his issue was not discovered/ corrected. I could not have predicted that this student was the one who had a heart ailment in my classes. If I had the use of a heart rate sensor at that time, maybe it would have allowed me to discover this student's heart health issue. Personally speaking, it was because of the onset of heart rate monitor technology years ago that led to my discovery of my own heart health issue — cardiomyopathy. The Heart Zones System has many uses in a PE class one of which is to ‘screen’ our students for healthy heart functionality.”

Rod Holler, Elementary Physical Educator Arboretum Elementary School, Waunakee, WI

What are Abnormal Heart Rate Numbers

For the first time, the PE teacher is able to see live biofeedback on a student’s response to different exercise intensities. But, what if the numbers on the Big Board are unusual? What if the heart rate numbers appear abnormally high or low?

- ★ Above 100 bpm for ambient heart rate.
- ★ Delta heart rate assessment above 30 bpm
- ★ Exercise heart rate that do not increase with increase effort.
- ★ HRV, Heart Rate Variability²³ trends downward.
- ★ Recovery Heart Rate less than 12 bpm (for adults and children are different).²⁴
- ★ Erratic numbers that change without changes in effort or intensity.

The four steps to verify the data you’re looking at and might lead you to take responsible and professional action are:

- Repeat the physical activity to verify that the heart rate data is accurate and not a one-time anomaly.
- Verify that the abnormal numbers are real and not a sensor or software abnormality.
- Print the individual student report for validation.
- Find out if the student is on medication that might affect heart rate numbers.

²³ HRV means heart rate variability. HRV is the time between heart beats or the beat-to-beat time variation.

²⁴ Christopher R. Cole, M.D., Eugene H. Blackstone, M.D., Fredric J. Pashkow, M.D., Claire E. Snader, M.A., and Michael S. Lauer, M.D. N Engl J Med 1999; 341:1351-1357 October 28, 1999 DOI: 10.1056/NEJM199910283411804

What Should You Do If You Observe Abnormal Heart Rate Numbers in Your Physical Education Classes?

The questions to consider are, *Is it possible to diagnose some of the underlying conditions that can lead to heart abnormalities such as Sudden Cardiac Death, SCD particularly in school environment before a cardiac incident occurs? Are there any simple non-invasive tests that could be administered by a school nurse or physical education teacher that might indicate some heart or health irregularity that could be used as early warning sign?*

Several simple tests using a heart rate sensor might provide you with the following:

- Low cost way to screen students
- Early detection signs
- Increased student safety

One heart abnormality leading to nearly 200 deaths per year²⁵ in the USA is called Sudden Cardiac Death or SCD. It cannot be diagnosed in advance. That's because anyone who experiences SCD is already dead. Possibly there's a way to prevent such deaths by using heart rate sensors and Smart PE assessments to provide a way for early detection.

This author recommends that you consult with your school nurse or other health professional in your district to start the conversation about using the Heart Zones System assessments to support early detection or other signs. If you have a student with unusual heart rate data, print several reports and provide them to your school nurse along with your insights.

The Statistics

Statistically about 100-150 students per year die from SCD. Identification of abnormal heart rate responses to physical activity as a screening tool might lead to prevention and diagnosis of an unhealthy heart rate response prior to an incident occurring. The statistics are as follows:²⁶:

- 1 student in the USA dies from SCD every 3 days
- Most common cause of death in athletes is SCD
- 65% of athlete deaths are from SCD
- 514 out of 4.2 million college athletes died from all causes last year
- 5 to 10 college athletes die per year from SCD²⁷

These statistics have to be cushioned in the fact that there are about 80 million students in school in the USA²⁸ today. The risk of SCD is statistically extremely low. However, as a young

²⁵ <http://circ.ahajournals.org/content/132/1/10/tab-article-info>

²⁶ <http://circ.ahajournals.org/content/early/2015/05/14/CIRCULATIONAHA.115.015431.abstract>

²⁷ <http://circ.ahajournals.org/content/123/17/1911.full>

²⁸ https://en.wikipedia.org/wiki/Education_in_the_United_States

Physical Education teacher, I lost one of my 13-year old student to SCD. She was playing basketball collapsed on the court and I immediately started CPR. I tried to revive my student, but failed. She died as I tried to revive her. As would anyone, I was deeply affected by this tragedy. The incident has led me to believe there is something that we can do about SCD.

Being Smart about Heart Health

Safety is the number one priority during the school day. Heart health is part of providing a safe and healthy environment for students to learn. A simple screening protocol using a heart rate sensor that provides ranges of healthy and unhealthy responses provides you with one more tool to create a healthy school environment for both athletes and students.

Heart Health Assessments Using a Heart Rate Device:

For the past 40 years, I have been giving heart rate tests to all ages and all fitness levels. I have administered literally tens of thousands of these different heart health tests. During those four decades, I have discovered that there are six heart rate tests that provide cardiac beats-per-minute data²⁹ on the current physical status of the individual:

1. *Recovery Heart Rate*: A one-minute recovery heart rate test or assessment of rate of recovery – the percentage of recovery heart rate.
2. *Ambient Heart Rate*: Sitting quietly heart rate number.
3. *Delta Heart Rate*: Sometimes called orthostatic, this is the difference in heart rate number in beats-per-minute from lying down to standing up.
4. *Resting Heart Rate*: Heart rate when you first wake up in the morning
5. *Heart Rate Variability (HRV)*: Assessment of the status of the autonomic nervous system using time between heartbeat analysis.
6. *Stable Exercise Heart Rate*: The ability to exercise within normal heart rate ranges with stable, non-erratic heart rate numbers.

These six tests can be administered using simple heart rate tests that any credentialed Physical Education teacher can administer using the wearable tool of a heart rate sensor in small or large group situations. All six tests combined can be conducted in less than an hour. All of the data can be captured by the Heart Zones PE software platform. You can then analyze the results using accurate data that might provide insight about those individual students whose heart rate numbers are outside the healthy and normal ranges.

The heart rate tests I am suggesting do not require expensive EKG equipment. They do not require a physician to be present. They do not require specialized training. These heart rate tests require that physical educators and school health practitioners learn how to administer the tests, understand the heart rate data, and have the knowledge to respond to the test results professionally.

²⁹ This is not the EKG or electrocardiogram data but the simple heart rate numbers.

It has not been demonstrated that simple heart rate tests can be early indicators of cardiac conditions such as these:

- Chronotropic Incompetence: The inability of the heart to increase its heart rate commensurate with increased activity or demand.
- Wolff Parkinson-White Syndrome (WPW): A student with WPW has an extra electrical pathway between their heart's upper and lower chambers which causes a rapid heartbeat. The extra pathway is present at birth and fairly rare. Although WPW pattern is often harmless, students who participate in high-intensity sports with WPW might want a doctor's further evaluation before participating.

According to the recent report titled "Screening for Sudden Cardiac Death in the Young" from the National Heart, Lung, and Blood Institute Working Group, "Sudden cardiac death in the young is a critical public health issue."³⁰ I believe that it is time for us to address this life and death issue. I believe that if there's a way to save even one student or faculty member's life it is worth the challenges posed in this article. I believe it is time for a change that leads to safer and healthier schools.

Additional Resources and Research:

- Atkins DL, et al. Epidemiology and outcomes from out-of-hospital cardiac arrest in children. *Circulation* 2009. (<https://www.ncbi.nlm.nih.gov/pubmed/19273724>)
- Nick of Time, a Seattle, Washington non-profit organization to prevent SCD: <https://www.youtube.com/watch?v=ZBi5ms97maY>
- Roberts, William O., MD MS, FACSM. Pre participation Cardiovascular Screening – Finding the Middle Ground. *Current Sports Medicine Reports*: March/April 2016 - Volume 15 - Issue 2
- Edwards, Sally. *The Heart Rate Monitor Guidebook*, 2010 (includes most of the assessments listed in this article)

³⁰ <http://circ.ahajournals.org/content/123/17/1911.full>

Foundation Principles

Heart Zones Training Method and Smart PE

The 5 Heart Zones Training Foundation and Guiding Principles	
Principle #1 Heart Zones is an	Individualized and Personalized Program
Principle #2 Heart Zones uses	3 M's: Manage, Monitor, and Measure
Principle #3 Heart Zones follows	Multiple Zones for Multiple Benefits Principle
Principle #4 Heart Zones is a	The Wellness Continuum: Health-Fitness-Performance
Principle #5 Heart Zones is	Universal Application: Physical, Emotional, and Metabolic

The 7 Foundation and Guiding Principles of Smart PE	
Principle #1 Smart PE uses	The Framework of Understanding by Design and Movement Learning Activities
Principle #2 Smart PE uses	Both Definitions of Smart: Smart Students, and Smart Wearable Devices
Principle #3 Smart PE is	Based on Using Data and Understanding for Success
Principle #4 Smart PE is	Leads to Engaged and Motivated Students
Principle #5 Smart PE is	Movement in Physical Education - the Smart PE Movement
Principle #6 Smart PE is	Using Quality and Quantity of Movement and Skills
Principle #7 Smart PE is	Based on Physical Literacy

Grading Using the Heart Zones System

Observational methods have been a primary methodology used by physical educators for assessing and grading in school physical education (PE) classes for over 30 years³¹. Using the methods of Smart PE combined with the National PE Standards and objective assessments, for the first time, grading can now be fair for all students of all skill and developmental levels. Recently national PE recommendations have been promoted to encourage practitioners to achieve $\geq 50\%$ of PE class in moderate to vigorous physical activity (MVPA). With the Heart Zones System, the percent of MVPA based on individual effort zones, heart rate, cycling, and step zones, can be quantified. Using wearables as measurement tools, students can track their movement (step tracking sensors) and their effort (heart rate sensors) with individual and personal data that should be incorporated in the grading strategies to create a fair and just grading system.

For heart rate activities, the data provided includes time in zone, FIT Points, FIT Stars, heart rate profiles (graphs), calories burned, and other metrics. For movement activities, the important data includes total steps, step intensity zones, average number of steps, step rates, FIT Points | FIT Stars, and energy expended in calories. Additionally, using physical literacy and numeracy of your students, you can create your own grading system. We've provided some examples for you later in this article. Now there is a way to communicate directly with parents/guardians by providing PE workout data to them via the Heart Zones PE email capability of their student's performance.

Every school, department, and teacher grades differently. Developing a grading system that converts assessment scores to numeric value like points, then to a letter grade has been common practice. The grading scale might also reflect and incorporate the teacher's educational philosophy whether it includes points for attire, in-class behavior, rubrics, completing student worksheets, fitness test scores, student's portfolio, attendance, active participation, and attitude.

As for fitness assessments, SPARK³² recommends assessments be utilized for much more than grading. Various forms of assessment can guide instruction, document learning, monitor performance and improvement, denote achievement, enhance motivation, group students, promote physical education, garner resources for program development, and more.³³

Trailblazer in the field of Physical Education, Beth Kirkpatrick³⁴ recommends keeping your grading system simple. Her suggestion is to weight the grading points system that you follow using the data from the Heart Zones System as follows:

- 50% grade based on their achieving 50% of the time in the MVPA each day
- 50% of student grade on other criteria like physical literacy, formative and summative assessment, and participation.

As part of their grading protocols, other Smart PE teachers are using fitness improvements that can be measured with the data from the Heart Zones System. Examples to assess improvement in fitness

³¹ <http://digitalcommons.wku.edu/cgi/viewcontent.cgi?article=1322&context=ijes>

³² <http://www.sparkpe.org/>

³³ <http://www.sparkpe.org/physical-education/high-school/curriculum/student-assessment/#sthash.8qR7mjxY.dpuf>

³⁴ <https://heartzones.com/about-heart-zones-inc/our-team/beth-kirkpatrick/>

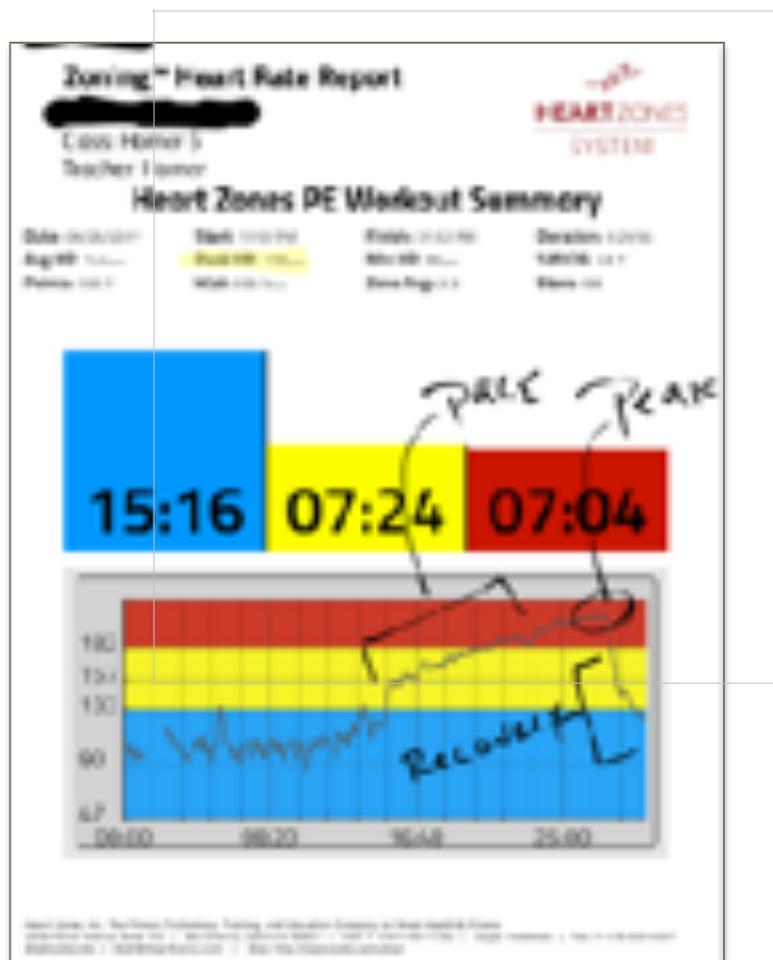
scores include positive changes in Pacer test scores, recovery heart rate, ambient heart rate, delta heart rate and other heart rate tests. For movement activities, grading can be based on FIT Points and FIT Stars, total steps accumulated, comparison with the class average, and other movement data.

Tom Horner, Physical Education Teacher at Lincoln High School in Lake City, MN grades in part based on each student's physical literacy. An example of how Horner uses physical literacy in his program is best shown during a recent Pacer Test activity. The assignment was to take the ZONING heart rate report from the Heart Zones PE software and respond to several specific questions by marking on the report the answers:

- Highlight your Peak heart rate number
 - Label 'Pace' where your graph shows the start and finish of the Pacer test.
 - Define the moment that you reached your Peak heart rate number
 - Show on the graph your recovery heart rate.
 - Reflection: What did you notice about your recovery after the Pacer test? What information shows you your current level of cardiorespiratory fitness?
- 1.

Using movement sensors like step trackers, Mike Mustar, Stillwater School District, developed his own unique grading system comparing students with the average in their class. He included in his grading an explanation of how grading points were awarded. See the following report card he used for his elementary students:

Often grades are given in Physical Education that make little sense. According to *Understanding by Design* authors Wiggins and McTighe, "They [teachers] often give grades to each piece of work without making clear the criteria and the appropriate weighting of each criterion."³⁵ PE teachers can now establish a clear criterium (or change it to "establish a clear criteria") for grading and a weighting of each part of those requirements. With a data-driven grading system, for the first-time, physical education



³⁵ Wiggin, G and McTighe J. *Understanding By Design*. Upper Saddle River, New Jersey. Pearson Merrill Prentice Hall, 2006

instructors have solid ground to give grades based on objective data and personalized and individualized performance.

Oak Park Elementary



Name: John Jones

Teacher: Johnson

Grade: 6

Your Scores

HEZ Points 43.2

Zone 1 6:16

Zone 2 0:19

Zone 3 2:01

Total Steps 2028

Grade Level Avg Scores

HEZ Points 43.2

Zone 1 5:32

Zone 2 0:06

Zone 3 1:22

Total Steps 2197

These are your child's average Step Tracker scores for the first semester of physical education. They are compared with the average scores of all 6th graders at Oak Park Elementary.

Your child's HEZ (Heart Zone) Points are calculated by step intensity. A student receives 1 point for every minute in zone 1 (blue), 3 points for every minute in zone 2 (yellow), and 6 points for every minute in zone 3 (red). Your child's avg. steps per class are listed below as well.

Not only is your student benefiting from skill-work, cooperation, and game play, but a more intense cardio-work out is incorporated into their physical education experience as well. All of this is trying to be provided in a FUN, SAFE environment.



physical education

Get Real Standing P.E. 

Grades 9-12 Physical Education National Standards

The goal of physical education is to develop physically literate individuals who have the knowledge, skills and confidence to enjoy a lifetime of healthful physical activity. To pursue a lifetime of healthful physical activity, **a physically literate individual**³⁶:

- Has learned the skills necessary to participate in a variety of physical activities.
- Knows the implications and the benefits of involvement in various types of physical activities.
- Participates regularly in physical activity.
- Is physically fit.

Values physical activity and its contributions to a healthful lifestyle.

Standards

Standard 1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.

Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.

Standard 3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.

Standard 4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.

Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction.

Standard 1 Grade 9-12	Demonstrates competency in a variety of motor skills and movement patterns.		
<p>S1.H1 Level 1 Lifetime Activities</p>	<p>Demonstrates competency and/or refines activity-specific movement skills in two or more lifetime activities (outdoor pursuits, individual-performance activities, aquatics, net/wall games or target games).</p>	<p>S1.H1 Level 2 Lifetime Activities</p>	<p>Refines activity-specific movement skills in one or more lifetime activities (outdoor pursuits, individual-performance activities, aquatics, net/wall games or target games).</p>

³⁶ Adapted from NASPE. (2004). *Moving into the future: National standards for physical education* (2nd ed.). Reston, VA: Author, and Mandigo, J., Francis, N., Lodewyk, K., & Lopez, R. (2012). Physical literacy for physical educators. *Physical Education and Health Journal*, 75 (3), 27 - 30

<p>S1.H2 Level 1</p> <p>Dance & Rhythms</p>	<p>Demonstrates competency in dance forms used in cultural and social occasions (e.g., weddings, parties).</p> <p>... or ...</p> <p>Demonstrates competence in one form of dance (e.g., ballet, modern, hip hop, tap).</p>	<p>S1.H2 Level 2</p> <p>Dance & Rhythms</p>	<p>Demonstrates competence in a form of dance by choreographing a dance or by giving a performance.</p>
<p>S1.H3 Level 1</p> <p>Fitness Activities</p>	<p>Demonstrates competency in one or more specialized skills in health-related fitness activities.</p>	<p>S1.H3 Level 2</p> <p>Fitness Activities</p>	<p>Demonstrates competency in two or more specialized skills in health-related fitness activities.</p>

<p>Standard 2 Grade 9-12</p>	<p>Applies knowledge of concepts, principles, strategies and tactics related to movement and performance.</p>		
<p>S2.H1 Level 1</p> <p>Movement concepts, principles & knowledge</p>	<p>Applies the terminology associated with exercise and participation in selected individual-performance activities, dance net/wall games, target games, aquatics and/or outdoor pursuits appropriately.</p>	<p>S2.H1 Level 2</p> <p>Movement concepts, principles & knowledge</p>	<p>Identifies and discusses the historical and cultural roles of games, sports and dance in a society.</p>
<p>S2.H2 Level 1</p> <p>Movement concepts, principles & knowledge</p>	<p>Uses movement concepts and principles (e.g., force, motion, rotation) to analyze and improve performance of self and/or others in a selected skill.</p>	<p>S2.H2 Level 2</p> <p>Movement concepts, principles & knowledge</p>	<p>Describes the speed/accuracy trade-off in throwing and striking skills.</p>

S2.H3 Level 1 Movement concepts, principles & knowledge	Creates a practice plan to improve performance for a self-selected skill.	S2.H3 Level 2 Movement concepts, principles & knowledge	Identifies the stages of learning a motor skill.
S2.H4 Level 1 Movement concepts, principles & knowledge	Identifies examples of social and technical dance forms.	S2.H4 Level 2 Movement concepts, principles & knowledge	Compares similarities and differences in various dance forms.

Standard 3 Grade 9-12	Demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.		
S3.H1 Level 1 Physical activity knowledge	Discusses the benefits of a physically active lifestyle as it relates to college/career productivity.	S3.H1 Level 2 Physical activity knowledge	Investigates the relationships among physical activity, nutrition and body composition.
S3.H2 Level 1 Physical activity knowledge	Evaluates the validity of claims made by commercial products and programs pertaining to fitness and a healthy, active lifestyle.	S3.H2 Level 2 Physical activity knowledge	Analyzes and applies technology and social media as tools to support a healthy, active lifestyle.
S3.H3 Level 1 Physical activity knowledge	Identifies issues associated with exercising in heat, humidity and cold.	S3.H3 Level 2 Physical activity knowledge	Applies rates of perceived exertion and pacing.
S3.H4 Level 1 Physical activity knowledge	Evaluates--according to their benefits, social support network, and participation requirements--activities that can be pursued in the local environment.	S3.H4 Level 2 Physical activity knowledge	N/A

<p>S3.H5 Level 1 Physical activity knowledge</p>	<p>Evaluates risks and safety factors that might affect physical activity preferences throughout the life cycle.</p>	<p>S3.H5 Level 2 Physical activity knowledge</p>	<p>Analyzes the impact of life choices, economics, motivation and accessibility on exercise adherence and participation in physical activity in college or career settings.</p>
<p>S3.H6 Level 1 Engages in physical activity</p>	<p>Participates several times a week in a self-selected lifetime activity, dance or fitness activity outside of the school day.</p>	<p>S3.H6 Level 2 Engages in physical activity</p>	<p>Creates a plan, trains for and participates in a community event with a focus on physical activity (e.g., 5K, triathlon, tournament, dance performance, cycling event).</p>
<p>S3.H7 Level 1 Fitness knowledge</p>	<p>Demonstrate appropriate technique in resistance-training machines and free weights.</p>	<p>S3.H7 Level 2 Fitness knowledge</p>	<p>Designs and implements a strength and conditioning program that develops balance in opposing muscle groups (agonist/antagonist) and supports a healthy, active lifestyle.</p>
<p>S3.H8 Level 1 Fitness knowledge</p>	<p>Relates physiological responses to individual levels of fitness and nutritional balance.</p>	<p>S3.H8 Level 2 Fitness knowledge</p>	<p>Identifies the different energy systems used in a selected physical activity (e.g., ATP-PC, anaerobic/glycolysis, aerobic).</p>
<p>S3.H9 Level 1 Fitness knowledge</p>	<p>Identifies types of strength exercises (isometric, concentric, eccentric) and stretching exercises (static, PNF, dynamic) for personal fitness development (e.g., strength, endurance, range of motion).</p>	<p>S3.H9 Level 2 Fitness knowledge</p>	<p>Identifies the structure of skeletal muscle and fiber types as they relate to muscle development.</p>

<p>S3.H10 Level 1 Fitness knowledge</p>	<p>Calculates target heart rate and applies HR information to personal fitness plan.</p>	<p>S3.H10 Level 2 Fitness knowledge</p>	<p>Adjusts pacing to keep heart rate in the target zone, using available technology (e.g., pedometer, heart rate monitor), to self-monitor aerobic intensity.</p>
<p>S3.H11 Level 1 Assessment & program planning</p>	<p>Creates and implements a behavior-modification plan that enhances a healthy, active lifestyle in college or career settings.</p>	<p>S3.H11 Level 2 Assessment & program planning</p>	<p>Develops and maintains a fitness portfolio (e.g., assessment scores, goals for improvement, plan of activities for improvement, log of activities being done to reach goals, timeline for improvement).</p>
<p>S3.H12 Level 1 Assessment & program planning</p>	<p>Designs a fitness program, including all components of health-related fitness, for a college student and an employee in the learner's chosen field of work.</p>	<p>S3.H12 Level 2 Assessment & program planning</p>	<p>Analyzes the components of skill-related fitness in relation to life and career goals, and designs and appropriate fitness program for those goals.</p>
<p>S3.H13 Level 1 Nutrition</p>	<p>Designs and implements a nutrition plan to maintain an appropriate energy balance for a healthy, active lifestyle.</p>	<p>S3.H13 Level 2 Nutrition</p>	<p>Creates a snack plan for before, during and after exercise that addresses nutrition needs for each phase.</p>
<p>S3.H14 Level 1 Stress Management</p>	<p>Identifies stress-management strategies (e.g., mental imagery, relaxation techniques, deep breathing, aerobic exercise, meditation) to reduce stress.</p>	<p>S3.H14 Level 2 Stress Management</p>	<p>Applies stress-management strategies (e.g., mental imagery, relaxation techniques, deep breathing, aerobic exercise, meditation) to reduce stress.</p>
<p>Standard 4 Grade 9-12</p>		<p>Exhibits responsible personal and social behavior that respects self and others.</p>	

S4.H1 Level 1 Personal responsibility	Employs effective self-management skills to analyze barriers and modify physical activity patterns appropriately, as needed.	S4.H1 Level 2 Personal responsibility	Accepts differences between personal characteristics and the idealized body images and elite performance levels portrayed in various media.
S4.H2 Level 1 Rules & etiquette	Exhibits proper etiquette, respect for others and teamwork while engaging in physical activity and/or social dance.	S4.H2 Level 2 Rules & etiquette	Examines moral and ethical conduct in specific competitive situations (e.g., intentional fouls, performance-enhancing substances, gambling, current events in sport).
S4.H3 Level 1 Working with others	Uses communication skills and strategies that promote team/group dynamics.	S4.H3 Level 2 Working with others	Assumes a leadership role (e.g., task or group leader, referee, coach) in a physical activity setting.
S4.H4 Level 1 Working with others	Solves problems and thinks critically in physical activity and/or dance settings, both as an individual and in groups.	S4.H4 Level 2 Working with others	Accepts others' ideas, cultural diversity and body types by engaging in cooperative and collaborative movement projects.
S4.H5 Level 1 Safety	Applies best practices for participating safely in physical activity, exercise and dance (e.g., injury prevention, proper alignment, hydration, use of equipment, implementation of rules, sun protection).	S4.H5 Level 2 Safety	N/A

Standard 5 Grade 9-12	Recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction.		
S5.H1 Level 1 Health	Analyzes the health benefits of a self-selected physical activity.	S5.H1 Level 2 Health	N/A

<p>S5.H2 Level 1 Challenge</p>	<p>N/A</p>	<p>S5.H2 Level 2 Challenge</p>	<p>Chooses an appropriate level of challenge to experience success and desire to participate in a self-selected physical activity.</p>
<p>S5.H3 Level 1 Self-expression/ enjoyment</p>	<p>Selects and participates in physical activities or dance that meet the need for self-expression and enjoyment.</p>	<p>S5.H3 Level 2 Self-expression/ enjoyment</p>	<p>Identifies the uniqueness of creative dance as a means of self-expression.</p>
<p>S5.H4 Level 1 Social interaction</p>	<p>Identifies the opportunity for social support in a self-selected physical activity or dance.</p>	<p>S5.H4 Level 2 Social interaction</p>	<p>Evaluates the opportunity for social interaction and social support in a self-selected physical activity or dance.</p>

Part 6. Tech and Sensors





schools.heartzones.com



FREE ITUNES APP

The Heart Zones Training free iPhone app displays live heart rate and heart rate profile while you workout. Ideal for the home-school student and for class make-ups.

INCLUDES

Battery charging unit
Elastic armbands by size
ZONING workout card

ARMBAND INFO

Wash in soapy water | air dry
Between Classes: non-bleach wipe
Sizes:
Small/Medium: 8" length | Blue
Medium/Large: 15" length | Red
Suggested Sizes by Grade or Age:
Elementary: 90% S/M | 10% M/L
Middle: : 80% S/M | 20% M/L
High School: : 30% S/M | 70% M/L

PROGRAMS and METHODS

ZONING, Fitness in a Blink
Maximum Heart Rate Zones
Threshold Heart Rate Training (patented)

SPECIFICATION SHEET

Heart Zones Blink 3.0 S Armband

The Heart Zones Blink 3.0 S Armband is the most accurate optical sensor wearable on the market today. This workout tool measures heart rate, calories burned, total steps, distance, speed, pace, bike cadence or RPM, zones, threshold, FIT points, MVPA (moderate-to-vigorous physical activity) and more.

Features:

- No chest strap, armband is worn on the arm
- One button for ease of use
- Flashing zone lights - 3 zone color
- Accurate heart rate (bpm)
- Lithium Ion rechargeable batteries
- 900 cycles, 8 hours of battery charge
- Swimming and water activities dependable
- Accurate on all skin tones
- Colored zone workouts to burn more calories
- Dual signal broadcast: ANT+ and Bluetooth
- Three-in-one monitor if ANT+: heart rate, steps, cycling
- Comfortable for all-day wear
- 100' or more workout range
- Out of range on board accumulated data
- Armband comfort
- Ankleband for bike cadence & step tracking (ANT+ only)
- Adjustable & breathable velcro stretch fabric
- Wireless data transfer
- Choice of colored elastic arm or ankleband
- Connects to the Big Board group display
- Free iPhone App
- Accumulated data storage in sensor
- Two-way communication through Heart Zones PE app



Description:

The new Heart Zones Blink 3.0 S Armband is unique with a programmable one-button sensor, one elastic armband, and one USB charger. It works seamlessly with any iPhone or android mobile app. It's faster and easier to put on and more comfortable than bulky chest strap models, and it works with a wide array of devices from smartphones to tablets, fitness equipment to smart watches and other devices that support Bluetooth Smart or ANT+. The Blink armband is great for swimmers — it is sweat proof and water proof. People friendly, the Blink 3.0 S model has two optical sensor lights – green for pale skin color and yellow for darker skin color for enhanced accuracy – the only one of its kind that allows superior measurement with all skin tones. For the iPhone/iPod touch/iPad download our FREE mobile app — Heart Zones Training from the iTunes store.

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Revised 12/129/2016



schools.heartzones.com

SPECIFICATION SHEET

The STRIDER Step Sensor

The First Dual Signal Wearable Step Tracker Ankleband

The Heart Zones STRIDER powered by Bolt simultaneously tracks and measures movement activity and movement intensity. The most advanced step movement tracking tool for walking and running, it captures forward running and walking metrics and analyzes the data using a mobile app and a group app. This sophisticated accelerometer measures pace, distance, calories burned, total steps, step intensity zones, distance, time in step zones, MVPA - moderate to vigorous physical activity and more.

FREE ITUNES APP

coming soon - other apps available now

The Heart Zones Training free iPhone app displays live step and movement data during your workout.

PARTS TO THE STRIDER

- Strider Step Sensor
- Elastic ankleband fits all sizes
- Shoelace clip
- Instructions

EDUCATIONAL MATERIALS

- Strider Data Wallchart
- Programs & Curriculum Materials

BATTERY INFO

Details on how to replace the lithium CR 2032 battery is posted on the Heart Zones, Inc. website.



FEATURES

- Measures steps: realtime and total steps
- 3-axis smart accelerometer *not* a pedometer
- No strapping to shoelace and risk of losing it
- Dual transmission: ANT+ and Bluetooth
- No buttons to push, move and it wakes up
- Measures distance traveled
- Instantaneous stride cadence (steps/minute)
- Speed: current, average, max speed
- Cadence: current, average and max cadence
- Average stride length
- Calories burned
- Stride acceleration
- Running economy
- Workout efficiency
- Motion analysis capabilities
- Wireless data transfer
- Replaceable CR 2032 lithium watch battery
- Battery life: 5 months assuming 1 hour per day
- Memory on board for up to 7 hours
- Accurate
- Small & lightweight: weighs less than 1 ounce
- Range is 8 feet between sensor and device
- Several different mobile apps
- Dual signal: ANT+ and BLE compatible
- Comfortable for all-day wear
- Fits all sizes adjustable elastic ankleband
- Wireless connection to the Heart Zones Big Board

Differences between a Step Trackers and Pedometers

The Heart Zones STRIDER by Bolt is a step tracking sensor that uses a sophisticated signal processing chip with Garmin's patented algorithms to identify steps, foot acceleration, and the individual stride profile verifying each step with a digital signature preventing gaming the sensor by shaking. The 3-D MEMS accelerometer signal allows for the calculation of each individual step length and gait change leading to increased accuracy.

	Activity Tracker	Pedometer	Step Tracking Sensor
No. of Footsteps	✓	✓	✓
Distance (km)		✓	✓
Realtime Speed		✓	✓
Realtime Cadence			✓
Stride Sensing			✓
Sports Tracking			✓

Most pedometers use a mechanical counters that trigger on foot impact a stride count. Participants can trick a pedometer by shaking it which counts as a step. Distance is estimated based on number of steps taken regardless of stride length.



Heart Zones Big Board Group Display

Heart Zones, Inc. | 2636 Fulton Avenue Suite 100 | Sacramento, California 95821 | USA | +1 (916) 481-7283
www.HeartZones.com | Contact: staff@heartzones.com

V01252017

Sensors for Cycling: Power Meters, Cadence Sensors, and Heart Rate

The Heart Zones System integrates three technologies which collect data, displays that data in real time, and stores these results on the iPad for the group³⁷ and on the iPhone/iPod Touch for the individual application - Heart Zones Training³⁸. This technology makes meaning out of live data like heart rate, power, RPMs that participants — riders — use to improve their cycling and fitness.

For cycling, there are two types of sensors that are the essential devices: embedded and retrofit sensors. Embedded sensors are built into the equipment. They either directly broadcast via ANT+ or Bluetooth (BLE) or the sensors are hardwired or wireless to the bike console subsequently broadcasting packets of data to the Bridge transceiver. Retrofit sensors are those that are added to a bike without any sensors. An example would be a power meter that is put onto the pedal or a speed and cadence sensor that is added to the crank arm of the bike. The power meter broadcasts watts data and the cadence sensor sends RPM, revolutions per minute data.

There are literally dozens of companies that make bike sensors as well indoor or outdoor bike companies that build the sensors into their bikes. A list of indoor bikes that have embedded sensors is on the Heart Zones website.³⁹ Easy and quick to install individual cadence sensors are readily available as well.



Keiser M3i Web connected bike with embedded sensors for power (watts), cadence, and speed.



Garmin Speed and Cadence sensor retrofitted onto the crank arm of an indoor or outdoor bike.

³⁷ <https://itunes.apple.com/us/app/heart-zones-pe/id899256296?mt=8>

³⁸ <https://itunes.apple.com/us/app/heart-zones-training/id846768885?mt=8>

³⁹ <http://cycling.heartzones.com/indoor-bike-compatibility/>

Heart Zones System Video Tutorials

The Heart Zones System “Video Tutorials” are short and user friendly videos allowing for easy setup of your Heart Zones System. These videos are created and updated by Mike Mustar and Darrell Salmi, Heart Zones Showcase PE Teachers and Coaches. They are both Physical Education teachers in Stillwater, Minnesota and hold the distinction of being some of the first PE Teachers to use the Heart Zones System to teach Smart PE circa 2013. This library of videos are a step-by-step approach to using most of the features of the hardware, software, and sensors that together make up the Heart Zones System.

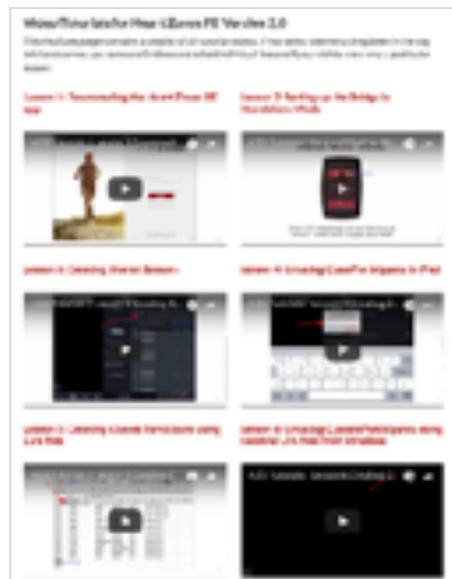
The videos are categorized for easy reference allowing for a concise and time saving learning opportunity. The video tutorials include:

1. Introduction to the Heart Zones System and Smart PE
2. Downloading the Heart Zones PE version 2.0 App
3. Setting up your Mobile Bridge in Stand Alone Mode
4. Creating Shared Sensors
5. A. Creating Classes and Participants on iPad
B. Creating Classes and Participants Using .csv Files
C. Creating Classes and Participants Using Existing .csv Files from Dropbox
6. Setting up your Mobile Bridge in WiFi Mode
7. Connecting Multiple Bridges
8. Starting a Class
9. Reports
10. The 8 Taps Guide to Starting a Class

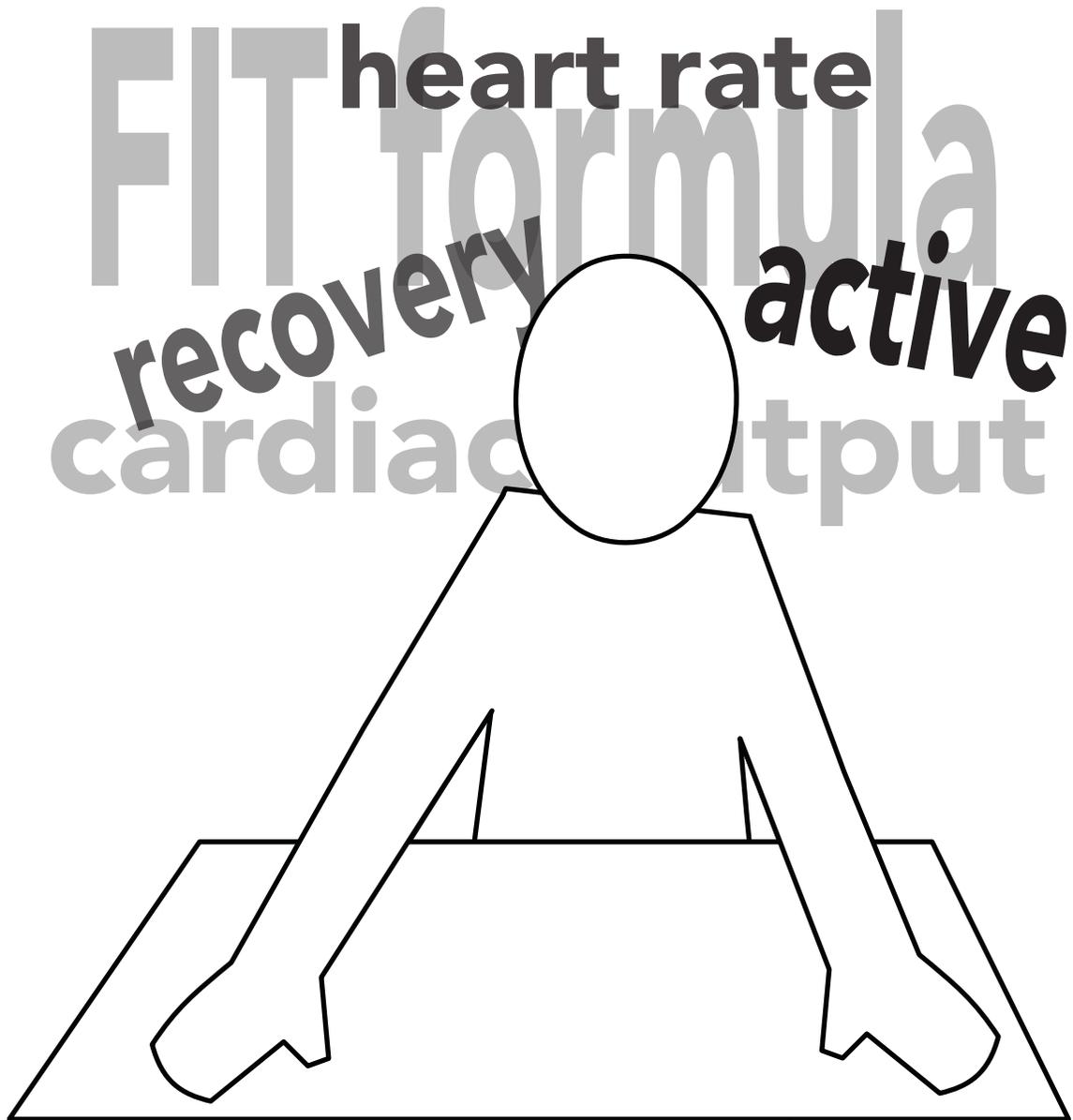
If you are a new user of the Heart Zones System, watch the tutorials in sequence, in the order listed above. These documents are designed both as a refresher for those who might not have used the technology for a while as well as a way to support the new PE and health teacher setting up and using the components of the Heart Zones System for the first time.

Before watching, organize your equipment which you will need: a computer, iPad, Mobile or POE Bridge(s), Blink Armband sensors or Step Trackers, your student class lists, and your school network password. That’s it! You are now ready to start your trek into Smart PE using the Heart Zones System and supported by the Video Tutorials.

Darrell Salmi & Mike Mustar, Stillwater School District PE Teachers and Coaches, Stillwater, MN
co-Founders, the Stillwater PE Institute



Part 7. Appendix



Comprehensive Glossary of Terms for Smart PE

active recovery heart rate — the number of beats per minute your heart rate drops after cessation of exercise if you slow your movement down to barely moving at all. The higher your fitness level, the faster the drop in your heart rate

activity tracker- a wearable device that measures the quantity of your activity. Quality, the intensity of the activity, and quantity are both valuable metrics of activity

aerobic exercise— an exercise program easy enough to keep you from getting out of breath; literally, your muscles and muscle cells are kept “in the presence of oxygen”

aerobic — breath; literally, your muscles are kept “in the presence of oxygen”

alarm— standard clock alarm feature on wrist top monitors

all-out-effort — an effort of maximum intensity

ambient heart rate— the number of beats per minute your heart contracts when you are awake but in a sedentary and stationary position. Healthy range between 60 and 70 (bpm) beats per minute and normal range is 70-80 bpm

average SPM — the average strides per minute during a step tracking activity

anchor points — the heart rate number used to set zones

biofeedback — data an individual receives from a heart rate sensor or activity tracker

blue zone — the lowest of the three heart zones and is low intensity heart rate numbers. This zone is the heart rate between the starting heart rate number (SHR) and low threshold, T1

bpm — beats per minute. This refers to heartbeat

carbohydrates— organic compounds that, when broken down, become a main energy source for muscular work

cardiac— pertaining to the heart

cardiac output— based on how often the heart beats per minute(HR) and how much blood there is being pumped- stroke volume

cardiovascular — literally means of the heart and the vessels. It is commonly used as a term for activities that challenge the heart and lungs

carotid artery— major blood vessels in the neck that supply blood to the brain, neck, and face

ceilings— the top of a single heart zone. The same as top of the zone

combination workout type — an exercise session that consists of different parts such as intervals, steady state, recovery and endurance efforts

cross training — a way of training that includes multiple activities or disciplines. It is the opposite of single sport training. Cross training is often associated with the sport of triathlon which requires swimming, biking, and running workout activities

delta heart rate test— the measure of your heart rate response from a change in body position also known as the Orthostatic Test

dosage—the amount and the intensity of the workout, the training load usually expressed as FIT points

download/upload—The sending or receiving of data to a location

endurance workouts — an exercise session that is of long duration that is typically at the same or low heart rate intensity

exercise prescription— the recommendation of the amount (points) and type of exercise based on the student's goals, fitness level, and interests

external stress— forces applied to the body that can be either or both physical or emotional or psychological which are exerted from outside versus inside the body

fats— concentrated sources of energy for muscular work. They are compounds containing glycerol and fatty acids and may be saturated or unsaturated

fat burning— using fat as one of the principal sources of fuel during exercise exertion

fat burning rate— the amount of fat per minute that is burning such as 3 kcal per minute of fat, the rate at which fat is utilized at rest or during activity

fat burning zone — this is the zone which burns the highest amount (not percentage) of fat as the substrate or the source of energy that is being used. There is no one fat burning zone for everyone because "it depends" on how fit an individual is what zone burns the most fat as the source of energy

FIT Formula — an algorithm for measuring training load (F) = Frequency — how often. (I) = Intensity — the percentage of maximum heart rate in which the workout falls. (T) = Time — how much time is spent

FIT Points — the letters stand for frequency, intensity, and time as they relate to a fitness workout. F = Frequency—how often. I = Intensity—the percentage of maximum heart rate in which the workout falls. T = Time—how much time is spent. T=type-type of activity

FIT Stars — a representation of Fit Points

floor — the bottom of an individual heart zone

fuel burning— utilizing the three fuels of fat, carbohydrates, and protein, fuel substrates, for the source of energy

heartbeat— a single, complete contraction of the heart

heart rate— the number of heartbeats per minute that your heart contracts

heart rate functions— the different features that the heart monitor watch provides, such as the ability to display current heart rate

heart rate monitor— an electronic device that measures the electrical activity of the heart and displays it

heart rate profiles— the graph of a workout that includes heart rate and time which is often included in the students post-workout report

heart rate sensor— the same as a heart rate monitor. Sometimes "sensors" are only the part of a heart rate monitor that has a chip or that connects to the internet

heart rate reserve (HRR)— the total number of beats (the specific heart rate range) that you have between your resting heart rate and your maximum heart rate is the maximum heart rate reserve, and it is sometimes called the "working heart rate"

heart rate watch— an electronic device that combines a time-of-day watch with the features of a heart rate monitor in one unit. The same as heart rate monitor

heart zones— a range of heart rates that represents different benefits that occur from exercising or training within their numeric limits

high threshold — the second threshold heart rate number, also called T2 or second threshold

HIT — High Intensity Training is a high zone — Red zone and Orange zone — workout type

HIIT — High Intensity Interval Training which is a type of interval workout which includes high zone time followed by a short recovery down to a lower zone which is repeated throughout that portion of the workout time

intensity— the degree of energy, difficulty, or effort, as relates to a workout

internal stress— psychological and physiological forces which are exerted from inside the body

interval — the duration of a given intensity of training

interval workout type — a workout session that consists predominantly of short bursts of different levels of intensity

lactate threshold— the second or high threshold also known as ventilatory threshold, respiratory compensation threshold, or T2 the second threshold

ladder up and down — a workout which consists of increasing the effort sequentially to a peak point and then lowering intensity during an interval of time

limits— the dividing lines of a heart zone; the top of a limit is the ceiling and the bottom of a limit is its floor

LIT — stands for low intensity training which is low Blue zone workouts versus HIT which is high intensity training or MIT which is moderate intensity training

low threshold — the first threshold heart rate number, also called T1 or low threshold

maximum heart rate— the highest number of times your heart can contract in one minute. It can be measured by taking an all-out stress test or estimated by using a variety of sub-maximum assessments. This value is NOT required for ZONING.

metabolism— the chemical changes in the body's cells by which energy is provided for vital processes. The sum of all energy used by the body

metabolic assessment— precision data, performed in a laboratory measuring either blood lactate or the ratio of oxygen to carbon dioxide

MIT — stands for moderate intensity training which is mostly Yellow zone effort

mindful recovery— a practiced process for consciously reducing your heart rate using techniques such as quiet breathing

mode specific — the type of workout activity such as swimming is a mode, running is a mode. Exercise that is a particular mode of activity

monotony training — a condition in which the exercise routine is always the same without diversity in any components such as frequency, intensity, time, mode, or type

MVPA — Moderate to Vigorous Physical Activity. Moderate physical activity is the Yellow and Orange zones and Vigorous is the Red zone

% MVPA — the ratio of time in the Moderate to Vigorous zones (Yellow-Red zones) divided by the total elapsed time

negative emotions— feelings such as fear, depression, and anxiety that may lead to unhealthy living

orthostatic test — the measure of your heart rate response measured in beats-per-minute from a change in body position also known as the Delta (Greek for change) Test

pace — the number of minutes it takes to walk or run in either miles or kilometers

spacing — the ability to manage or control the number of minutes it takes to walk or run in either miles or kilometers

palpitation— manually measuring heart rate via biomechanical blood flow by pressing gently with your fingers on an artery

parasympathetic nerve response— part of the autonomic nervous system, this is the “flight-or-fight” response that can be measured by increases in heart rate

peak heart rate— the highest heart rate number within a workout — it is not the maximum heart rate

peak SPM— The highest number of steps per minute during a walk, run, or other step activity

percentage of fat burned — fat is burned in all of the heart zones as is protein and carbohydrates which are the three primary sources of energy for muscle contraction. The ratio of these three is the percentage of each one which depends on a number of factors such as the type of diet, exercise, intensity, genetics

periodization— varying the amount of training load, FIT points, over time to force adaptation

positive emotions—Feelings such as happiness, gratitude, enjoyment, relaxation that lead to enhanced feelings of well-being

points— the numerical representation or calculation to quantify training load. See FIT points

preseason conditioning program— training that is the beginning of a sports season

progressive overload— changes in the amount of training over time to produce positive adaptation and increased levels of cardio-fitness

psychoneuroimmunology— the branch of medicine that deals with the influences of different nervous system activities and emotional states that affect the immune system and immune function

pulse — the rhythmical throbbing of arteries produced by the regular contractions of the heart, especially as palpated at the wrist or in the neck. Pulse rate is different from heart rate with the former being the frequency of the heart’s contraction measured by mechanical blood flow measurements

pulse rate— taken manually, this refers to the measurable rate of the bio-mechanical blood flow through your arteries

rating of perceived exertion — a measurement of effort or exercise intensity paced on perception

recall— the playback mode for the recorded data of a heart rate monitor

recovery heart rate— the number of beats per minute your heart rate drops after cessation of exercise. The higher your fitness level, the faster the drop in your heart rate. A common recovery heart rate measurement is one minute

red zone— the highest of the three heart zones and is the high, hot, hard or vigorous intensity heart rate numbers. This zone is the heart rate above the high threshold, T2 and is not sustainable for long periods of workout time

relaxation response— typically a lowering of heart rate in response to a general state of calm or contentment

resting heart rate— the number of beats your heart contracts in 60 seconds when you first wake up, before you lift your head off the pillow and sit up in bed. You can come close to a resting heart rate if you lie down and are relatively still for five to 10 minutes

safety heart rate— the heart rate prescribed for beginning exercisers in any aerobic activity. This range is usually 60 percent or less of the maximum heart rate or below the first threshold, T1

self-regulation — control by oneself or itself

smart PE — like smart watches, smart phones, smart appliances, the term “smart” has a new meaning - any device or tool that has a chip or can connect to the internet

SPM — Steps per minute which is the same as running cadence

sport specific — a type of training that uses only one discipline or mode of activity

steady state workout type — maintaining during an exercise session a given heart rate over a period of time

step intensity — the rate of steps taken per minute or the amount of effort put into taking steps

step points — the same as FIT points but using step zones in the FIT formula

step zones — a way of take the SPM or steps-per-minute and dividing them into ranges of steps that equate to step intensity: the easy Blue step zone, the moderate Yellow step zone, the hard/vigorous Red step zone

stopwatch— a watch that can be started and stopped to time activities

strength— maximum force or tension that a muscle can produce against resistance

strength workout type — a type or classification of an exercise session in which the intensity or heart rate does not change

stress— nonspecific response of the body to any demands made on it. There is internal and external stress that applies load on the body's physiological response

stress response— physical reaction to a stimulus (stressor)

stressor— any physical, psychological, or environmental event or condition that initiates the stress response

stroke volume— amount of blood ejected by the heart in one beat (contraction)

sub-maximum heart rate test— an assessment below your maximum heart rate to predict (estimate) your maximum heart rate. This test is NOT required for the ZONING method

training zones— a way to put absolute heart rate numbers into a context of ranges of heart beats. In the ZONING method the three training zones are as follows:

- Blue zone: for easy and low intensity workouts
- Yellow zone: for moderate efforts
- Red zone: for strenuous and vigorous hard training sessions

T1 or first threshold — the low of two different biomarkers in exercise metabolism measured by the first metabolic change with increased exercise effort in the use of lactate production or oxygen consumption. Also called “low threshold”

T2 or second threshold — the high of two different biomarkers in exercise metabolism measured by the second metabolic change with increased exercise effort in the use of lactate production or oxygen consumption. Also called “high threshold”

target zone— a single training zone that is specified as the focus of the session

threshold— a biomarker in exercise metabolism measured by changes in lactate production or oxygen consumption

time functions— the different type of timing features that a watch provides, such as the ability to display time of day or the ability to serve as a stopwatch

time in the MVPA — the overall number of accumulated minutes in the moderate (Yellow/Orange zones) plus the vigorous (Red zone)

timers— some monitor models allow you to set an audible timer that will beep or “chirp” at a specific time in your workout. For example, you can set a timer to sound off every 30 minutes

time in zones — time in zones (TIZ) which is the sum of the number of minutes distributed based on the intensity — the zone

total recovery heart rate — the number of beats per minute your heart rate drops after cessation of exercise if you stop moving completely

total steps — the sum of the number of foot plants with each foot representing one step while a stride is two steps

training— any sustained cardiovascular exercise at a heart rate or intensity level sufficient to result in metabolic adaptation. The commonly accepted lower threshold or floor for training is considered to be 50 percent of maximum heart rate or the start of the low Blue zone

training tree— a type of training model based on progressively increasing or decreasing training load

training zone(s)— this feature allows you to set a ceiling or a high and a floor or a low limits for a range of heartbeats called a heart zone. Sometimes called the target zone

training load — the amount of exercise applied to an individual's body measured as the frequency of the workouts times the intensity (zone) of the workout times the amount of time for the workout. Also called FIT Points and FIT Stars

UDID — stands for Unique Device Identification number which is typically an alphanumeric code placed on a component to distinguish it for identification purposes. The UDID is often printed on the backside of a device like the newer models (3.0 and higher) of the Blink Armband

variability training — a method or approach to training in which the intensity, modes, time, load and other specifications are sequenced with variety. See monotony training

ventilation— the ratio of inhaled oxygen to exhaled carbon dioxide

wellness— engaging in attitudes and behaviors that enhance quality of life and maximize personal potential

workout mode — this is the types of exercise activity based on the type of intensity or effort. There are four different workout modes: interval efforts based on time, steady-state effort at a fixed intensity, endurance effort which is generally low intensity, and combinations of the three previous modes

yellow zone — this is the middle of the three heart zones and is moderate intensity heart rate numbers. This zone is the heart rate between the low threshold, T1 and the high or second threshold (T2)

5 Star Workout — using the Heart Zones PE app Display #1 earning 5 Stars is the goal of most workouts and is based on a calculation using FIT points

Glossary of Smart PE Key Terms

assessments — the process of documenting knowledge, skills, attitudes and beliefs. A test is an assessment intended to measure respondent's knowledge content, understanding, or other abilities.

formative assessments — focus on the process of increasing knowledge and improving professional practice. They are geared toward informing instruction, recognizing how students are understanding the content.

%MVPA — the percent of moderate-to-vigorous physical activity. The CDC, Center for Disease Control, recommends that at least 50% of the time spent in physical education class be in the Yellow zone and the Red zone.

summative assessments — a test that focuses on the outcome of a task or course of study and summarize learning at a particular point in time.

Glossary of Heart Zones Systems Components

Big Board— the display that shows individual student tiles on a flat panel screen or displayed on the wall with a projector

Bridge Device— a small electronic component that receives the data from almost any smart fitness sensor and sends a signal to the Apple iPad that connects to the Heart Zones PE application on the tablet. Multiple Bridges can be connected to increase the range of transmission

Mobile Bridge — about the size of a half a deck of cards, this small piece of hardware can move with the iPad. It is a transceiver and if within approximately 40 yards of the sensors relays the signal to the iPad

POE Bridge — this is a Bridge device but it is permanently fixed in place and is powered over ethernet (POE) cable, it is hardwired to the internet and is always turned on

Flipping Tiles — an individual's display which can be rotated or flipped by a push on the Blink Armband button

iPad— at this time, the only tablet that can collect the sensor data from the Bridge and display it onto the Big Board. iPads are only made by Apple and only run the Apple iOS platform or software

Pairing Pod — an electronic device that detects and communicates the unique UDID of a device. The scanner is used to detect a sensor that is being used but that is not registered in the HZ PE software and registering that sensor so that it can be used during the class

Sensors—small electronic devices used to detect certain activities such as a heart rate sensor, a body weight scale sensor, a cycling power meter sensor

Software Application— a set of one or more programs designed to carry out operations for a specific application. Example, Heart Zones PE iPad application is the software program used for Smart PE or Heart Zones Training iPhone app

Strider — a sensor that is a foot pod and replaces the outdated pedometer because it is a smart and wearable device

Tiles — the individual participants' individual display on the iPad of the Big Board

USB Port Charger — sometimes called a hub, this is a piece of equipment that has multiple USB sockets to plug different devices like a Bridge to charge the battery.

Dedication: This Book is Dedicated to Rick Gibbs

This work is dedicated to Rick Gibbs in appreciate for his work. His stye is to challenge himself and others to think thoroughly and completely. He has taught us a great deal over the years that we have worked together and that is deeply appreciated.

Thank you Rick Gibbs from the bottom and the top and all parts of the heart.

Contributors to This Book

Thank You to Those Who Contributed		
Joe Gooden	Vice President, Heart Zones, Inc. Buford, GA	Contributed the Forwards
Rod Holler	Waunakee School District, Waunakee, WI	Contributed Movement Learning Activity “Challengers
Mike Mustar	PE Teacher, Stillwater School District, Stillwater, MN	Contributed his Heart Zones tech experiences with grading
Darrell Salmi	PE Teacher, Stillwater School District, Stillwater, MN	Contributed his experiences using the Heart Zones methods and technology in teaching
Tom Horner	Lake City School District, Lake City, Minnesota	Pacer Test lesson information

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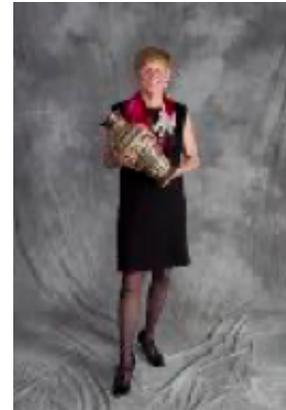
MSRP: \$49.95 printed in binder or \$39.95 PDF electronic format

MEET THE AUTHORS

Sally Edwards, MA, MBA

One of America's leading experts in business as the CEO of Heart Zones Inc., in exercise science as a prolific author, as a physical educator developing the first curriculum in America using heart rate monitors, and as a professional triathlete and Hall of Fame member, Sally is driven to get America fit. She founded and franchised America's largest chain of retail sports shops, Fleet Feet Sports. Her love of applied technology drove her to launch the Smart PE movement that features the Heart Zones System.

- Author of 24 books and 500 articles on health and fitness
- Developer of the Heart Zones System and Blink line of heart rate monitors
- Serial entrepreneur
- Ultra-marathoner and ultra cyclist winning running races of 100 miles and racing bikes across the USA.



Triathlon Hall of Fame
Recipient Sally Edwards

Deb Van Klei, MA, BA, BS

For the past 30 years, Deb Van Klei has been a leader and award-winner in designing and implementing innovative curriculums and programs for school health and fitness. As a collegiate basketball player, she developed a love for sports that lead her into the field of physical education. In 2015, she was selected to be the manager for the \$2.1 million PEP Grant that was successfully awarded to the Stillwater School District. Her accolades are as follows:

- Carol M. White PEP Grant Manager
- Co-founder, Stillwater PE Institute
- M.A. Teaching and Learning, St. Mary's University, Winona, MN
- BA, Health Education, Augsburg College, Minneapolis MN
- B.S. Physical Education & Coaching, South Dakota State University, SD
- Jackrabbit Sports Hall of Fame at South Dakota State University
- Paul Schmidt Award for outstanding services and contributions in health and physical education.
- Collegiate Basketball Player



College Basketball Hall
of Fame
Deb Van Klei

Quotes from PE Experts about Smart PE

“The power of teaching PE the smart way with Smart PE is achieved by the fusion of technology and methodology into one.”

Rick Gibbs

“Without changing the experience of the learner you don’t change the outcomes.”

Jim Rickabaugh, Ph. D. Executive Director,
The Institute for Personalized Learning | a division of CESA #1

“When we know best practices and choose to do anything else, it can result in malpractice.”

Rick Schupbach, Retired 32 Year-Veteran PE Teacher
Former PE4life Academy Director, Grundy Center, Iowa

A relevant and engaging physical education program today will provide five outcomes:

1. Provide students real-time feedback on fitness level and effort.
2. Deepen students’ intrinsic motivation versus participating out of compliance.
3. Allow students to track their fitness progress.
4. Measure individual student growth, not class averages.
5. Help students make a strong connection between their level of effort and their fitness level.”

Mark Femrite, Assistant Superintendent of Teaching and Learning
Westonka Public Schools, Minnetrista, MN 55364

“Smart PE with the Heart Zones System will amazingly change the way you and your students look at and approach Physical Education every day!”

Mike Mustar, Physical Education Teacher and Coach, Stillwater Area Schools, Minnesota

“Its time for PE teachers to view learning as a joint effort. For the first time in the history of Physical Education, if teachers use Smart PE strategies with the Heart Zones System, students become self-directed learners. That is transformational and we should all be incorporating Smart PE into our programs.”

Darrell Salmi, Physical Education Teacher and Coach, Stillwater Area Schools, Minnesota

Books by Sally Edwards				
	Title	Co-Author	Publisher	Date
1	Triathlon: A Triple Fitness Sport, Contemporary Books		Contemporary Books	1982
2	Triathlon Training and Racing Book		Contemporary Books	1985
3	The Equilibrium Plan: Balancing Diet and Exercise for Lifetime Fitness		Arbor House	1987
4	The Triathlon Log The Heart Rate Monitor Log Revised 2012		Heart Zones Press	1991
5	Triathlons for Women Revised 2010		Velo Press	1992
6	Triathlons for Fun		Velo Press	1992
7	Triathlons for Kids		Velo Press	1992
8	The Heart Rate Monitor Book		Polar Electro	1993
9	Snowshoeing	Melissa McKenzie	Human Kinetics	1995
10	Heart Zone Training		Adams Media	1996
11	Caterpillars to Butterflies	Maggie Sullivan	Heart Zones Press	1997
12	The Heart Rate Monitor Guidebook Revised 2010		Heart Zones Press	1997
13	The Complete Book of Triathlons		<i>Prima/Random House</i>	2001
14	Middle Schools Healthy Heart in the Zones	Deve Swaim	Human Kinetics	2001
15	High Schools Healthy Heart in the Zones	Deve Swaim	Human Kinetics	2001
16	The Heart Rate Monitor Workbook for Cyclists: A Heart Zones Program	Sally Reed	Velo Press	2001
17	Fit and Fat: The 8-Week Heart Zones Program	Lordaine Brown	Alpha Publishing	2003
18	Health in a Heart Beat, a 6 Week Emotional Fitness Training Program	Dan Rudd	Heart Zones Press	2004
19	Heart Zones Cycling: The Avid Cyclist's Guide to Riding Faster and Farther	Sally Reed	Velo Press	2006
20	Be a Better Runner: Real-World, Scientifically Proven Training Techniques That Will Dramatically Improve Your Speed, Endurance, and Injury Resistance.	Carl Foster	Rockport Press	2010
21	Smart PE: Lessons Using Heart Rate Monitors and Step Trackers for Physical Education	Deb Van Klei, MA	Heart Zones Press	2018

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SMART PE

Lessons Using Heart Rate Monitors & Step Trackers for Physical Education

Benefits to K-12 Physical Education

Whether you are teaching kindergarten or 8th grade, the Heart Zones System transforms the way that you teach Physical Education. For the teacher, the Heart Zones System is the tool for motivation, engagement and assessment using wearable technology that empowers students to pursue safe and healthy active lifestyles. Here are some of the key benefits regardless of grade-level:

- 1. Easy to use with only 4 taps on your mobile device to start the program and only one button to push for your students and their individualized zones.**
- 2. Objective assessment for each student based on student's effort not their behavior**
- 3. Seamlessly communicates student's results to parents and guardians**

The Heart Zones System is so easy to use that younger grade levels don't struggle and sophisticated and "techy" enough that the older students are motivated and engaged.

Technology Infusion

Technology is quickly changing the way we pursue a HAL, healthy activity living, lifestyle. Smart PE uses the word smart because it has two meanings: smart students using smart devices. That's what we want for you. To develop physically literate students through living a healthy active lifestyle. Heart Zones, Inc. is dedicated to being a leader in the Smart PE Movement to educate and empower students on how to own their own fitness in a way that develops healthy habits and a love for physical education now and into their futures.

Sally Edwards, MA, MBA

One of America's leading experts in business as the CEO of Heart Zones Inc., in exercise science as a prolific author, as a physical educator developing the first curriculum in America using heart rate monitors, and as a professional triathlete and Hall of Fame member, Sally is driven to get America fit.



Deb Van Klei, MA, BA, BS

A leader and award-winner in designing and implementing innovative curriculums and programs for school health and fitness. In 2015, she was selected to be the manager for the \$2.1 million PEP Grant that was successfully awarded to the Stillwater School District.



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