



Softball

Grade Nine

Welcome to this Grade 9 Softball Unit Plan presented by a research team at George Mason University! Our goal with this plan is to present lesson activities for physical education instruction while integrating STEM content. Using Virginia Standards of Learning, we sought to combine relevant science topics for ninth graders with games to develop softball skills. This plan is flexible, so feel free to use this unit plan in its entirety, or use lesson activities and games as you see fit.

We have found that integrating STEM topics is extremely beneficial for students. Students can get extra time exploring their classroom content. This integration can also pique interest in activities for those who may not usually be as engaged during PE. Some of our lesson plans already include science concepts, but we encourage you to reach out to science teachers at your school to not only get some new ideas, but to make your curriculum custom to your students!

Good luck in your unit and lesson planning! We hope the activities presented are useful to you.

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Block Plan

Softball Grade 9 Block Plan			
Day	Objectives	PE Skills & STEM Content	Assessments
1	<p>SWBAT analyze the correlation between Newton's laws of motion and how a softball travels. VA SOL PH.3 a - b</p> <p>SWBAT analyze and investigate how work, force and motion are used to throw and hit a softball. VA SOL PS.8 a - b</p>	<p>Lead Up Game : Toss It Up & Fielding 4 Square</p> <p>STEM : Newton's 1st & 3rd Laws of Motion</p> <p>Activity : Introduction to Softball & Fielding</p> <p>STEM : Newton's Laws of Motion & Anatomical Planes</p> <p>Skills : Throwing, Catching & Fielding</p>	<u>EXIT SLIP</u> (Catching, Throwing & Fielding)
2	<p>SWBAT identify the difference in longitude/latitude. VA SOL ES.1 d</p> <p>SWBAT analyze the correlation between Newton's laws of motion and how a softball travels. VA SOL PH.3 a - b</p> <p>SWBAT explain the difference between fat and water soluble vitamins. VA SOL HEA 9.1 b</p> <p>SWBAT meet the pitching requirements and display the cues for pitching 80% of the time while being assessed by a checklist. VA SOL 9.1a</p>	<p>Lead Up Game : Pitch Golf</p> <p>STEM : Newton's 2nd Law of Motion</p> <p>Activity : Pitching & Base Running</p> <p>STEM : Geographic Coordinates & Vitamins</p> <p>Skills : Pitching & Base Running</p>	<u>CHECKLIST</u> (Pitching) <u>EXIT SLIP</u> (Pitching) <u>CHECK FOR UNDERSTANDING</u> (Base Running) Introduce and explain presentations and put students into groups for Day 4 (See Below)
3	<p>SWBAT analyze the ways in which energy is stored, transferred and transformed. VA SOL PS.5 a - c</p> <p>SWBAT analyzes simple biomechanics of softball such as torque, force and motions</p>	<p>Lead Up Game : Catch and Throw Scramble</p> <p>STEM : Newton's Laws of Motion</p> <p>Activity : Batting</p> <p>STEM : Biomechanics</p> <p>Skills : Throwing, Catching &</p>	<u>CHECKLIST</u> (Catching) <u>CLASS DISCUSSION</u> (Accuracy vs. Power)

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	<p>SWBAT analyze the correlation between Newton's laws of motion and how a softball travels. VA SOL PH.3 a - b</p> <p>SWBAT display the cues and accurately catch the ball when the ball has been thrown or hit (fly balls) 80% of the time when being assessed by a checklist. VA SOL 9.1a</p>	<p>Batting / Striking</p>	<p>Encourage students to continue to work on presentations</p>
4	<p>SWBAT use and identify the anatomical planes of the body by leading the class through a warm-up or lead up game. VA SOL 9.2a</p> <p>SWBAT analyze the correlation between Newton's laws of motion and how a softball travels. VA SOL PH.3 a - b</p> <p>SWBAT analyze the ways in which energy is stored, transferred and transformed. VA SOL PS.5 a - c</p> <p>SWBAT will be able to score at least 14 points on the base running rubric while running around the bases during drills.</p> <p>VA SOL 9.1a</p> <p>SWBAT utilize feedback in order to improve movement performance for self and/or peers using technology. VA SOL 9.2f</p>	<p>Lead Up Game : Group Presentations & Toss and Hit STEM : Anatomical Planes & Kinetic Energy</p> <p>Activity : Softball Stations STEM : Newton's Laws of Motion</p> <p>Skills : Running, Batting, Catching & Fielding</p>	<p>RUBRIC (Batting)</p> <p>RUBRIC (Base Running)</p>
5	<p>SWBAT analyze simple biomechanics of softball such as torque, force and motions.</p> <p>SWBAT explain the ways in which alcohol and drugs increase risks of injury. VA SOL HEA 9.1 h</p>	<p>Lead Up Game : Group Presentations & Swing & Sprint STEM : Biomechanics</p> <p>Activity : Whacky Baseball STEM : Alcohol & Drug Injury Risks</p>	<p>THINK, PAIR, SHARE (Whacky Baseball)</p>

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		Skills : Running, Batting, Catching, Fielding & Pitching	
6	<p>SWBAT analyze the ways in which energy is stored, transferred and transformed. VA SOL PS.5 a - c</p> <p>SWBAT explain the difference in longitude/latitude. VA SOL ES.1 d</p> <p>SWBAT demonstrate proficiency with the overhand throw by scoring a 4 or higher across three throws while being assessed by a rating scale. VA SOL 9.1a</p> <p>SWBAT demonstrate proficiency and give refinement feedback fielding ground balls in the outfield and infield during small-sided games while being assessed by a checklist. VA SOL 9.1a</p>	<p>Lead Up Game : Group Presentations & Partner Throws</p> <p>STEM : Latitude & Longitude</p> <p>Activity : Small-Sided Games</p> <p>STEM : Energy Speed</p> <p>Skills : Running, Batting, Catching, Fielding & Pitching</p>	RATING SCALE (Throwing) CHECKLIST (Fielding)
7	<p>SWBAT analyze the correlation between Newton's laws of motion and how a softball travels. VA SOL PH.3 a - b</p> <p>SWBAT analyze the ways in which energy is stored, transferred and transformed. VA SOL PS.5 a - c</p> <p>SWBAT identify a willingness to help others by encouraging teammates and peers by providing positive comments consistently throughout the softball unit when graded by the game play rubric during softball games. VA SOL 9.4a</p>	<p>Lead Up Game : Line Run</p> <p>STEM : Energy Transference</p> <p>Activity : Softball Games</p> <p>Team 1 vs Team 4 Team 2 vs Team 3</p> <p>STEM : Newton's Laws of Motions</p> <p>Skills : Running, Batting, Catching, Fielding & Pitching</p>	GAME PLAY RUBRIC
8	SWBAT identify safety tips and injury prevention in softball. VA SOL HEA 9.2 k	<p>Lead Up Game : Jog, Sprint, Jack</p> <p>STEM : Vitamins</p>	GAME PLAY RUBRIC

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	<p>SWBAT explain the difference between fat and water soluble vitamins. VA SOL HEA 9.1 b</p> <p>SWBAT analyze the correlation between Newton's laws of motion and how a softball travels. VA SOL PH.3 a - b</p> <p>SWBAT identify a willingness to help others by encouraging teammates and peers by providing positive comments consistently throughout the softball unit when graded by the game play rubric during softball games. VA SOL 9.4a</p>	<p>Activity : Softball Games</p> <p>Team 1 vs Team 3 Team 2 vs Team 4</p> <p>STEM : Newton's Laws of Motion</p> <p>Skills : Running, Batting, Catching, Fielding & Pitching</p>	
9	<p>SWBAT identify safety tips and injury prevention in softball. VA SOL HEA 9.2 k</p> <p>SWBAT explain the ways in which alcohol and drugs increase risks of injury. VA SOL HEA 9.1 h</p> <p>SWBAT analyze the correlation between Newton's laws of motion and how a softball travels. VA SOL PH.3 a - b</p> <p>SWBAT identify a willingness to help others by encouraging teammates and peers by providing positive comments consistently throughout the softball unit when graded by the game play rubric during softball games. VA SOL 9.4a</p>	<p>Lead Up Game : Race the Base</p> <p>STEM : Alcohol & Drug Injury Risk</p> <p>Activity : Softball Games</p> <p>Team 1 vs Team 2 Team 3 vs Team 4</p> <p>STEM : Newton's Laws of Motion</p> <p>Skills : Running, Batting, Catching, Fielding & Pitching</p>	GAME PLAY RUBRIC
10	<p>SWBAT identify safety tips and injury prevention in softball. VA SOL HEA 9.2 k</p>	<p>Lead Up Game : Strike Zone Test Review</p> <p>Activity : Softball Test</p> <p>STEM : All STEM content mentioned throughout Unit</p>	ANSWER KEY

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		Skills : Reading, Writing, Critical Thinking Skills	
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Virginia Standards of Learning

Physical Education SOL's

- ***Motor Skill Development***
 - **9.1** The student will perform all basic movement skills and demonstrate movement and biomechanical principles in a variety of activities that may include outdoor pursuits, fitness activities, dance and rhythmic activities, aquatics, individual performance activities, and games and sports (net/wall, striking/fielding, and goal/target(s)).
 - **a)** Demonstrate proficiency and refinement in locomotor, non-locomotor, and manipulative skills through appropriate activities (e.g., outdoor pursuits, fitness activities, dance and rhythmic activities, aquatics, individual performance activities, games and sports [net/wall, striking/fielding, and goal/target]).
- ***Anatomical Basis of Movement***
 - **9.2** The student will explain the structures and functions of the body and how they relate to and are affected by human movement.
 - **a)** Explain and apply selected scientific principles, to include physiological (warm-up, cool down, overload, specificity, and progression) and biomechanical (levers, types of muscle contractions, and force) that aid in the improvement of movement skills.
 - **f)** Analyze movement performance, and utilize feedback to learn or to improve the movement skills of self and others.
- ***Social Development***
 - **9.4** The student will explain and demonstrate the skills needed to be safe, responsible, and respectful in all physical activity settings.
 - **a)** Identify and demonstrate proper etiquette, respect for others, integrity, and teamwork while engaging in a variety of activities

Physical Science SOL's

- ***PS.5***
 - The student will investigate and understand that energy is conserved.
 - **a)** energy can be stored in different ways;
 - **b)** energy is transferred and transformed;
 - **c)** and energy can be transformed to meet societal needs.
- ***PS.8***
 - The student will investigate and understand that work, force, and motion are related.
 - **a)** motion can be described using position and time;
 - **b)** motion is described by Newton's laws.

Physics SOL's

- ***PH.3***
 - The student will investigate and understand, through mathematical and experimental processes, that there are relationships among force, mass, and acceleration.
 - **a)** Newton's laws of motion;

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- **b)** Newton's law of universal gravitation.

Health SOL's

- **Nutrition**
 - **9.1** The student will apply health knowledge and skills to achieve and maintain long-term health and wellness.
 - **b)** Explain the differences between fat-soluble and water-soluble vitamins, food and non-food sources of vitamins, the role of vitamin and mineral supplements, and associated dietary reference intakes (DRIs) to maintain health.
- **Substance Abuse Prevention**
 - **9.1** The student will apply health knowledge and skills to achieve and maintain long-term health and wellness.
 - **h)** Explain how alcohol and other drugs increase the risk of injury.

Earth Science SOL's

- **ES.1**
 - The student will plan and conduct investigations in which
 - **d)**maps and globes are read and interpreted, including location by latitude and longitude

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Objectives

Physical Education Objectives

Psychomotor Skills

- SWBAT demonstrate proficiency and give refinement feedback fielding ground balls in the outfield and infield during small-sided while being assessed by a checklist. **VA SOL 9.1a**
- SWBAT demonstrate proficiency with the overhand throw by scoring a 4 or higher across three throws while being assessed by a rating scale. **VA SOL 9.1a**
- SWBAT display the cues and accurately catch the ball when the ball has been thrown or hit (fly balls) 80% of the time when being assessed by a checklist. **VA SOL 9.1a**
- SWBAT meet the pitching requirements and display the cues for pitching 80% of the time while pitching the ball underhand using the pitching checklist. **VA SOL 9.1a**
- SWBAT will be able to score at least 14 points on the base running rubric while running around the bases during drills. **VA SOL 9.1a**

Cognitive Skills

- SWBAT use and identify the anatomical planes of the body by leading the class through a warm-up or lead up game. **VA SOL 9.2a**
- SWBAT utilize feedback in order to improve movement performance for self and/or peers using technology. **VA SOL 9.2f**

Affective

- SWBAT identify a willingness to help others by encouraging teammates and peers by providing positive comments consistently throughout the softball unit when graded by the game play rubric during softball games. **VA SOL 9.4a**

STEM Objectives

- SWBAT analyze the correlation between Newton's laws of motion and how a softball travels. **VA SOL PH.3 a - b**
- SWBAT analyze the ways in which energy is stored, transferred and transformed. **VA SOL PS.5 a - c**
- SWBAT analyze and investigate how work, force and motion are used to throw and hit a softball. **VA SOL PS.8 a - b**
- SWBAT analyze simple biomechanics of softball such as torque, force and motions.
- SWBAT explain the difference in longitude/latitude. **VA SOL ES.1 d**
- SWBAT explain the difference between fat and water soluble vitamins. **VA SOL HEA 9.1 b**
- SWBAT explain the ways in which alcohol and drugs increase risks of injury. **VA SOL HEA 9.1 h**

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Organization

Time

35 students, 75-90 minute classes, 10 lessons

Space Needed

1 or 2 softball fields, or an open field, gymnasium

Equipment and Supplies

- Baseball gloves for every student
- Softballs for every student
- 12 wiffle balls
- 12 tennis balls
- 5 gator balls
- 4 bases per field
- 30 polys spots
- Bats for half the class
- Tees for half the class
- 10 large cones

Basic Grouping of Students

Some activities require students to be in pairs and groups from 4-8 people.

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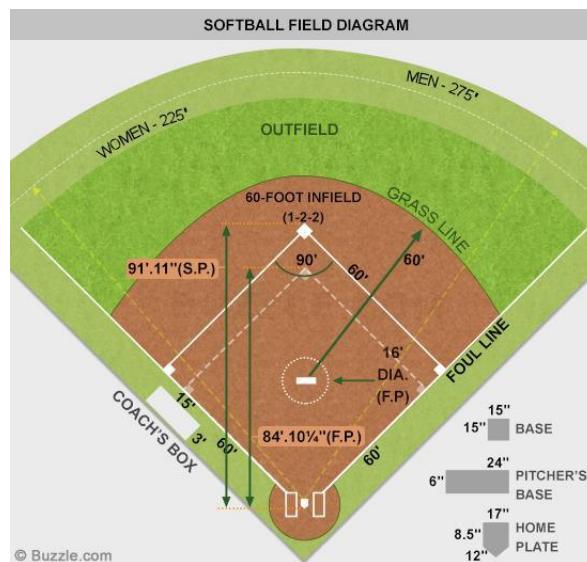
Content

Introduction to Softball

History :

In 1887, George Hancock developed an indoor version of baseball. In this revision, he used larger and softer balls along with smaller field dimensions. Throughout history this game has transformed to an outdoor sport and became popular. It has been known by various names such as Kitten Ball, Diamond Ball and Softball. It was officially declared the name of "Softball" in 1926 by Walter Hakanson at a YMCA meeting. By 1934 the Joint Rules Committee on Softball created a standardized set of rules for the sport. Softball was first introduced to the Olympics in 1996 during the summer games in Atlanta then removed after the 2008 Olympics. Softball returned to the Olympics in summer 2021 in Tokyo. It is now popularly enjoyed by men and women at youth, high school, and collegiate levels and is commonly played at backyards, parks, schools, churches, and sponsored recreation leagues. There are now various versions of softball played across the world including slowpitch, fastpitch, and modified, which follow the same overall game with slightly different rules.

Rules :



An Overview

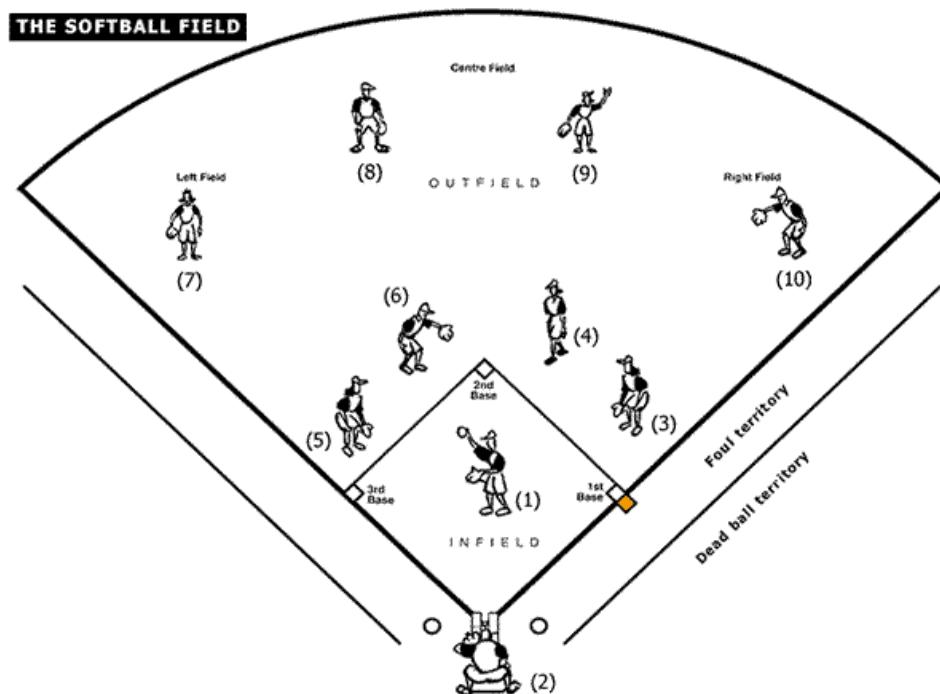
- How to win
 - Score the most runs
 - Runs are scored when a runner can safely touch first, second, third AND home base before his or her team gets three outs
- Game is 7 innings
 - Batting team = Offense
 - Fielding team = Defense
 - After three outs, teams switch

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- 6 outs per innings; 3 per team
 - Top of Inning = Away Team is batting
 - Bottom of Inning = Home Team is batting
 - After six outs, new inning begins
- 10 players on defense
 - (1) pitcher, (2) catcher, (3) first baseman, (4) second baseman, (5) third baseman, (6) shortstop, (7) left field, (8) left center field, (9) right center field, and (10) right field



Batting



- Batters must stay in batting order
- Batter starts at 1-1 count

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- 1 strike and 1 ball
 - 3 strikes = OUT
 - 4 Balls = WALK
 - Batter takes first base with no penalty
- If a foul ball is caught before the ball hits the ground, the batter is OUT
- If the ball is not caught, the batter bats again, unless the batter already has two strikes (OUT)

Pitching



- Ball is pitched underhand with a 6-12 ft arc
- 1 foot in contact with the pitching rubber at all times
- Both hands must be on ball at start of pitch
 - If any part of the pitch does not meet these prerequisites then it is the umpire's responsibility to call "top" or "flat" as soon as it is noticeable
- If a batter swings and misses an illegal pitch it is still a strike
- Pitcher cannot pitch until the batter is set in the batter's box
- 2 pitched strikes = OUT
 - A foul ball on a 2 strike count = OUT
 - Batter steps out of batter's box while making contact with pitch = OUT
- 3 pitched balls = WALK
 - Pitcher can announce intentions to walk player at any time and batter will be awarded a trip to first base

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Base Running



- Bases must be touched in order
- Runners can over run 1st base only
 - Base runners may be tagged OUT on all other bases if off base
- Occupied bases must be tagged by base runner on a fly ball has been caught
- Sliding is highly encouraged but not mandatory
 - Feet first only
- Base runners cannot pass each other
- NO bunting, stealing bases, leading off bases or bat flips / throws
 - Automatic OUT
 - Some bat flips/ throws may result in a warning depending on severity
 - Base runners cannot leave his or her base until the pitched ball has crossed home plate or the pitched ball has been hit into fair play
- NO contact shall be made between base runner and fielders outside of tagging
 - Runners will be called OUT, if the umpire thinks that the runner fails to to avoid contact and / or also makes contact with defensive player fielding the ball
 - Any unnecessary force used to tag a base runner, or to cause a fielder to drop the ball, could result in an ejection from the game/class

Fielding



- Fielders have the right to go into the base path on the following instances:
 - A) when the ball is in his or her possession
 - B) when he or she is fielding the batted ball
 - C) when he or she is fielding the thrown ball

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- In the chance of accidental contact, the umpire will decide if the runner will be granted the next base
- Batter or base runner will be given an extra base on the following instances:
 - A) when a defensive player wrongfully obstructs a batter or base runner
 - B) when a fake tag is used to get the runner to slide in to a base
- Runners can advance to as many bases as he or she wants when a ball is overthrown
 - Base runners can still be tagged out because the ball is still in play
- Runners will be able to advance 2 bases if a ball is thrown into dead ball territory
- Once a batted ball enters the dead ball territory and hasn't been touched by a fielder, the ball will be called dead by the umpire
 - The batter/runner and baserunners will be allowed one base from the last base touched when the ball went out of bounds
 - Balls deflected by a fielder shall be treated the same as overthrown balls
 - Runners advance 2 bases from the last base touched
- Infield Fly Rule
 - A batter is instantly called OUT when ALL these instances occur:
 - When there are less than two outs
 - When a pop fly is caught by a defensive player in the infield
 - When there are runners on first and second base or the bases are loaded
 - Base runners can advance on their own risk once the ball has been touched by a defensive player
 - Umpire should say "infield fly, the batter is out" right away. If in doubt the umpire should call out "infield fly, if fair"

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Skills

- THROWING:
 - Pitches
 - How work, force and motion can work together to throw a softball
 - Partner Throwing
 - Working as a cohesive unit to throw and catch the ball
- CATCHING:
 - Throws from teammates or partners
 - Pop Ups
 - Ground Balls
- HITTING:
 - From a Pitch
 - Use hand-eye coordination to hit a moving ball with a bat
 - Off a Tee
 - Use hand-eye coordination to hit a stationary ball with a bat in preparation for a moving ball
- RUNNING:
 - From Base to Base
 - Associate heart rate with running and recognize the differences between running one base, multiple bases or standing still
 - Sprints
 - Run quickly with 75 - 100% energy to get from one place to another in as little time as possible

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Lead Up Games

1. TOSS IT UP - Newton's Third Law of Motion

- a. **INSTRUCTIONS:** Students will choose a ball for themselves from a variety of balls. After students each have 1 ball, they need to find their own personal space in the gym or outside. When prompted, students will walk around the gym tossing the ball upward (above one's head) and catching it. If at any point the student misses his or her catch, he or she must lay down on his or her back and complete 1 throw and catch to resume walking around the gym or field. Students can change their ball at their own risk. To incorporate STEM, use cues such as “apply the force up” when throwing and/or “apply an equal force” when catching the ball.
 - i. See GMU PETES Youtube channel for an instructional/demonstrational video for this activity.
<https://www.youtube.com/channel/UC5Z2bp3eSh74hn1RFinhxeg>
- b. **SAFETY:** Students must communicate any loose or rolling balls. Students must be aware of personal space when tossing up their ball. Students must be aware of other students lying down as well.
- c. **MODIFICATIONS:** Students can stand in one spot while tossing and catching. Students may choose/stick with a lighter ball throughout the activity. Instead of laying on their back, students can kneel or squat.
- d. **EXTENSIONS:** Students can work their way up to heavier or bigger balls to toss and catch. Teachers can change the mode of transportation from walking to jogging or skipping or hopping even walking backwards. Students can toss and catch with a non-dominant hand, toss with one hand and catch with the other, clap hands before catch, spin before catch, etc. Allow students to overhand catch, if comfortable.
- e. **STEM:** Newton's Third Law of Motion
 - i. Newton's third law states that for every action there is an equal and opposite reaction. As the ball enters the student's mitt and contacts the leather, it stops. In that instant, the hand exhibits a force equal to that which the ball imparts on the glove. The force you exhibit is equal and opposite to the motion of the ball. The result is that the ball stops. To incorporate STEM use cues such as “apply the force up” when throwing or “apply an equal force” when catching the ball.

2. FIELDING 4 SQUARE - Newton's First Law of Motion

- a. **INSTRUCTIONS:** Students will be put into groups of four. Groups of 3 or 5 will also work if the numbers are not perfect. Students will make a 20x20 square, so there is enough space between each person in the group. Each group will have 1 ball. Students will roll and field ground balls to each other. You can also do this with fly balls or pop ups, tossed by students. To incorporate STEM, describe the content throughout the activity. As the ball is on the ground, say “an object at rest will stay at rest” when students pick up the ball or throw it, explain that the object is now in motion and will stay in motion until a force (their hand) stops it.
- b. **SAFETY:** Students will be told when to start and stop. Balls should remain on the ground or floor, no fly balls. Students should all be facing inwards toward each other.

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Students will communicate loose or break away balls. Students' eyes should remain on the ball no matter who in his or her group has possession. Students should call out the receiving person's name before the ball is thrown.

- c. **MODIFICATIONS:** Teacher can decrease distance within the 4 square. Softer or bigger balls can be used. Students can just use their hands. Ball path goes in one direction, or a teacher led pattern.
- d. **EXTENSIONS:** Teachers can increase the distance within the 4 square. Students can use gloves. Students can work their way up to an actual softball. Multiple balls can be added. Students can roll to whoever within the group.
- e. **STEM:** Newton's First Law of Motion
 - i. An object at rest will stay at rest and an object in motion will stay in motion at the same speed and going the same direction until acted upon by some outside force. Newton's first law is evidenced constantly in softball, when the student picks up a ball and rolls it, changing its motion with force. See instructions to incorporate STEM.

3. PITCH GOLF - Newton's Second Law of Motion

- a. **INSTRUCTIONS:** Teacher creates a variety of "golf holes" around the court or field using buckets, hula hoops or poly spots. Each hole will have a par. Cones will be used to mark the tee off spot. Students will be split into four to six teams. Each team will decide on their pitching order and will have to abide by it. Each team will be placed at a hole, starting at the tee. Students will have to pitch underhand to the golf hole. The objective is to make the pitch in par or under par. Students will alternate pitches with the people on their team in the appropriate order. If a pitch or toss misses, the next student will make his or her toss from where the ball has landed. Students should try to follow the pitching requirement for game-like experience.
 - i. To incorporate STEM, have students keep their score on a scorecard. After pitching, students will answer a question pertaining to Newton's 2nd Law of Motion. Since the 2nd law of Motion states that an object's force is equal to its mass multiplied by its acceleration, students have to complete a math problem after every pitch or every other pitch. Link to Quizlet with example questions is linked here : <https://quizlet.com/a10kfd?x=1qqt&i=mqrk>
- b. **SAFETY:** Students should stay out of the way of the person who is pitching. Students will not stand in between the pitcher and the golf hole. Students should wait until the ball is no longer in motion before the pitch is made. Students should communicate any loose or break away balls.
- c. **MODIFICATIONS:** The golf hole can be made to be bigger or lower to the ground. Heavier or bigger balls. Decrease the amount of holes. The distance between tee and hole can be decreased. Students can toss the ball at a lower arc than the pitching requirement. Par can be increased.
- d. **EXTENSIONS:** Distance can be increased between tee and hole and be increased. The holes can be made to be smaller. Par can be decreased. Lighter or smaller balls. Throw with a non-dominant hand.
- e. **STEM:** Newton's Second Law of Motion

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- i. The second law of motion, an object's change in motion is equal to the sum of the forces acting upon it, is demonstrated by the high arc of a slow softball pitch. When the ball leaves the pitcher's hand, the greatest force acting on it is the player, pushing and throwing the ball into the air. As soon as the ball is airborne, it comes under other constant forces that gradually overcome the initial force of the player's arm. Air resistance slows the ball down and gravity begins to pull the ball towards the earth. The transfer of these forces onto the ball results in the arcing motion of a slow pitch ball. When the ball reaches the bat, the force of the bat becomes the largest force and dictates the ball's new motion, out into the field. The 2nd law of motion can also be summarized by an object's force is equal to its mass multiplied by its acceleration.
-

4. CATCH & THROW SCRAMBLE - Newton's Laws of Motion Combined

- a. INSTRUCTIONS: All students need a glove. Half of the students need a ball. Students should spread out and find a personal spot in the gym or field. On a start signal, students will jog around holding the ball and/or glove. On a stop signal, the teacher will yell out a number and a type of throw (ex: 10 underhand, 5 ground balls, 8 overhand). Students with a ball will find the closest student without a ball and will become partners. Partners will complete the task then continue to jog around the gym on the start signal. Student's should try to find a different partner each time.
 - i. To incorporate STEM use cues to describe when each law of motion is being used. The first law of motion : as the ball is on the ground, say “an object at rest will stay at rest” when students pick up the ball or throw it, explain that the object is now in motion and will stay in motion until a force (their hand) stops it. The second law of motion : when the ball is thrown, ask or describe to students the factors affecting it such as the high arc, air, thrower, etc. The third law of motion : use cues such as “apply the force up” when throwing or “apply an equal force” when catching the ball.
- b. SAFETY: Students may not begin throwing until everyone has a partner. If a student does not have a partner, he or she will raise his or her hand. Students may not start jogging until the start signal has been given. Students' throwing path may not cross or interfere with another group's path. Eye contact should be made before every throw. Students will count each attempt so both parties can be on the same page. Students will communicate any loose or stray balls. Students should be aligned in a way so they will not run into another group's throwing path in order to retrieve his or her ball.
- c. MODIFICATIONS: Students can shorten the throwing distance. Students can use lighter balls.
- d. EXTENSIONS: Students can increase throwing distance. Students can choose a heavier ball. Once completing each set of throws, students can perform a fitness exercise such as pushups, situps, jumping jacks etc..
- e. STEM: Newton's Laws of Motion Combined
 - i. The first law of motion, an object at rest will stay at rest and an object in motion will stay in motion, is demonstrated by a stationary softball. When a

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- softball is picked up and thrown the individual is changing the ball's motion by force
- ii. The second law of motion, an object's change in motion is equal to the sum of the forces acting upon it, is demonstrated by the high arc of a slow softball pitch. When the ball leaves the pitcher's hand, the greatest force acting on it is the player, pushing and throwing the ball into the air. As soon as the ball is airborne, it comes under other constant forces that gradually overcome the initial force of the player's arm. Air resistance slows the ball down and gravity begins to pull the ball towards the earth. The transfer of these forces onto the ball results in the arcing motion of a slow pitch ball. When the ball reaches the bat, the force of the bat becomes the largest force and dictates the ball's new motion, out into the field.
 - iii. The third law of motion, that for every action there is an equal and opposite reaction, is demonstrated by catching the ball. As the ball enters your mitt and contacts the leather, it stops. In that instant, your hand exhibits a force equal to that which the ball imparts on the glove. The force you exhibit is equal and opposite to the motion of the ball. The result is that the ball stops.
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5. GROUP PRESENTATIONS - Anatomical Planes

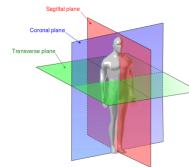
- a. **INSTRUCTIONS:** Students will be placed into groups of 4 to 6. Groups will put the rest of the class through a warm-up. Students will have to include exercises or activities involving all three anatomical planes (sagittal, transverse and frontal); as all three planes are used in the game of softball. If time is an issue or if there are a lot of groups, the teacher can assign multiple warm-ups in the same class with different groups. This activity can be done over multiple classes to give each group an opportunity to display their warm-up (no more than 3 days).
 - i. Requirements:
 - 1. Each student within the group must have a speaking part.
 - 2. All three planes must clearly be demonstrated
 - a. Sagittal - divides the body into left and right sides
 - b. Frontal - divides body into front and back
 - c. Transverse - divides body into top and bottom
 - 3. The warm-up or lead up games must be purposeful and meaningful to the game of softball.
 - 4. Presentation should last at least 5 minutes and no more than 10.
 - 5. At least 1 modification and 1 extension must be included in the presentation.
 - ii. Example:
 - 1. 20s Each. Repeat 3x.
 - a. Sagittal - Air Squats
 - b. Frontal - Side Shuffle
 - c. Transverse - Arm Hugs
 - 2. 20s Each. Repeat 2x.
 - a. Jumping Jacks
 - b. Frankensteins

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- c. Quad Pulls
- b. SAFETY: TBD by the group in charge
- c. MODIFICATIONS: TBD by the group in charge
- d. EXTENSIONS: TBD by the group in charge
- e. STEM: Anatomical Planes
 - i. STEM concepts that students can use include the anatomical planes of the human body. Planes are anatomical references that allow people to specify movements and their range of motion.
 - 1. The sagittal plane is side to side and includes skills such as hitting, moving to the side to field a ball and arm and leg movements in doing a jumping jack.
 - 2. The coronal or frontal plane divides the front and back of the body and includes softball skills such as throwing, running or hitting.
 - 3. The transverse plane divides the top and bottom half of the body, approximately at the waist. Softball skills used in this plane include the up/down motion of pitching, jumping to catch a ball, and lifting the hands to catch a ball.
 - 4. There are skills that move through multiple planes at the same time like hitting, moving to and catching a ball. Many skills will move through more than one plane.



6. TOSS & HIT - Kinetic Energy

- a. INSTRUCTIONS: Activity is best for outside so it is safe for all students to participate. Teachers will put students into groups of 3, no more than 5. Each student will be given a role: 1 batter, 1 fielder and 1 catcher. Any extra students will be fielders. Each group will need a bat, and a ball that bounces. Tees and gloves are optional. Each group needs to have their own space and all groups should be batting in the same direction. Fielders will take their positions in the outfield. Catcher will be behind home plate and possibly off to the side opposite of the batter. Once everyone is ready the batter tosses the ball up in the air, lets the ball bounce once and attempts to strike the ball with the bat. The fielder(s) retrieves the ball and throws it back to the batter. Rotation is as follows: batter to catcher, catcher to fielder, fielder to batter. Students will be responsible for assessing each other using the batting rubric. The catcher is responsible for recording and providing feedback to the batter. For the assessment all bats and balls should be the same for everyone.
- b. SAFETY: Each group will have their own “batting lane”. Catcher is not in the way of batter. Students should communicate any loose, break away, or foul balls. Groups should not cross over into another “batting lane” while a person is a bat. All players must be aware of batters at all times.

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- c. **MODIFICATIONS:** Softer or lighter balls. Bigger or lighter bats/implements. Ball can bounce more than once if possible.
 - d. **EXTENSIONS:** If there is extra time or groups finish up, students can try: heavier or harder balls. Heavier bats or implements. Toss the ball up and hit it without letting it bounce. Toss the ball up higher. The higher the toss, the more difficult it is to hit it. This is due to the momentum caused by gravity. Attempt to hit the ball in a certain direction. students can try hitting a line drive (hit middle section of the ball), or grounder (hit upper section of ball), or fly ball(lower section of the ball).
 - e. **STEM:** Kinetic Energy
 - i. Swinging a bat takes Kinetic Energy or the energy of motion. Because energy is conserved it is the potential energy of the hitter and the bat is translated to kinetic energy. In order to create this energy, the student should properly “load” by transitioning their weight from evenly on both legs to more weight on the back leg. If the technology is available, have students peer record themselves and then create a video self-assessing their use of kinetic energy. If technology is not available have students paired and watch their partner swing, have students assess their partner and then describe kinetic energy. Explain how they did or did not load their weight properly and how that may have affected their swing.
-

7. SWING & SPRINT - Biomechanics : Using Torque

- a. **INSTRUCTIONS:** Class should be split into teams of three or four groups. Each group should have 1 or 2 bats. Each group should have a home plate and first base as well. One student will step up to home plate and take a swing. After a student has taken their swing, he or she is to NOT flip or throw the bat and then run towards first base. The objective is to help students explode out of the batter’s box to make it towards first base. Emphasizing the first three steps are most important. After the first student has taken his or her at bat, the next student can go. The student on first base can either advance to second and so on or clear first base and return to the line within his or her group. Students should also be aware of proper batting technique.
- b. **SAFETY:** Students will be safely out of the way as the batter takes his or her swing. NO bat flips or throws.
- c. **MODIFICATIONS:** Shorten the distance between home plate and first base. Use a lighter bat. Use shadow swings.
- d. **EXTENSIONS:** Increase distance between home and first base. Use a heavier bat.
- e. **STEM:** Biomechanics ; Using Torque
 - i. Teachers can explain Torque at the beginning of the lesson when students are learning how to swing. Throughout the lesson teachers should monitor and help students while also asking them how they are applying torque when swinging. Torque is applying rotation to an object. Creating torque creates a tension that allows the body to work in a more efficient and safe way. Creating torque with your back foot is something that every hitter can accomplish. The swing starts from the ground and works up through your body. As a hitter who is trying to create more force, it all starts with you preparing your body to do so. Such as loading into the back hip. When

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creating torque with your back foot, it creates tension through the inside of the foot, leg and up to the back hip. This allows hitters to feel the rotation unto the back hip. As a result, torque helps to gain hip stability while swinging and have better body control.

8. PARTNER THROWS - Latitude & Longitude

- a. **INSTRUCTIONS:** Students will be put into pairs. Each student will have a glove. Each pair will have a ball. Partners will line up across from each other about 15-20 feet apart, making sure there is enough space from the next team. Pair will play catch from standing positions. To incorporate STEM, change the type of throw used. Students will throw pop ups to demonstrate the vertical position of the latitude line and students will throw ground balls to their left and right to show the horizontal positions of longitude lines. Instruct with cues such as “throw along the latitude lines” or “throw along the longitude lines”.
 - i. See GMU PETES Youtube channel for an instructional/demonstrational video for this activity.
<https://www.youtube.com/channel/UC5Z2bp3eSh74hn1RFnhxeg>
- b. **SAFETY:** Students will communicate any loose or break away balls. One team throwing path may not cross or interfere with another team’s throwing path. Eye contact must be made between partners.
- c. **MODIFICATIONS:** Shorten the distance. Use lighter or bigger balls. Have students use hands, no gloves.
- d. **EXTENSIONS:** Increase the distance between partners. Throw with non-dominant hand and catch with dominant hand. Use more of a game realistic kind of ball.
- e. **STEM:** Latitude & Longitude
 - i. Latitude is a geographic coordinate that specifies the north–south position of a point on the Earth's surface. These lines run from east to west. Students will throw pop ups to demonstrate the vertical position of latitude lines.
 - ii. Longitude is a geographic coordinate that specifies the east–west position of a point on the Earth's surface. These lines run from north to south. Students will throw ground balls to their left and right to show the horizontal positions of longitude lines.

9. LINE RUN - Energy Transference

- a. **INSTRUCTIONS:** Students should be put in groups of 6 to 8. Each group will have a softball. Students will be instructed to jog around the field, court, or teacher-made-course as a group in a single file line. The last person (the caboose) in line will hold the ball as group jogs. Each group should be close enough to where they can stay together without tripping over each other. When the caboose is ready, he or she will hand the ball to the person in front of them and then sprint to the front of the line (passing everyone in the group). There should be a new line leader and caboose. The new caboose will hand the ball to the person in front of them and then sprint ahead. The process repeats until the teacher sends a stop signal. To

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incorporate STEM, have the ball represent energy being transferred throughout the line, see below for more information.

- i. See GMU PETES Youtube channel for an instructional/demonstrational video for this activity.
<https://www.youtube.com/channel/UC5Z2bp3eSh74hn1RFinhxeg>
- b. **SAFETY:** Softball shall be handed, not thrown or tossed. If the ball is dropped, the whole group stops as caboose retrieves the ball. All shoes must be tied. Students should start arms length away from each other.
- c. **MODIFICATIONS:** Students can walk. The amount of students in the group can be reduced. Distance covered can be shortened. Get rid of the ball.
- d. **EXTENSIONS:** Change the mode of locomotion: skipping, $\frac{3}{4}$ jog, etc.
- e. **STEM:** Energy Transference
 - i. Energy is the ability to do work. There are many different kinds of energy, such as light, sound, and heat. *Energy transfer* takes place when energy moves from one place to another. Energy can move from one object to another, like when the energy from your moving foot is transferred to a soccer ball, or energy can change from one form to another. In this activity the ball is representing the energy that is transferred throughout the line.
 - ii. Light energy is the only form of energy we can see. Light from the sun helps plants grow and makes food for us to enjoy. Students will pass the ball slowly to demonstrate the time it takes for plants to grow and transform the sunlight into energy.
 - iii. Sound energy is transferred when a sound wave travels from its source, like a drum, to another object. If the sound is loud enough, the waves will create very intense vibrations that you can feel in your chest. Students will pass the ball and then shout their name to demonstrate sound energy.
 - iv. Heat can move from warm objects to cool objects which then makes the cool objects warm. This is heat energy. Students will pass the ball fast to demonstrate the speed in which heat energy can travel.

10. JOG, SPRINT, JACK - Types of Vitamins

- a. **INSTRUCTIONS:** Students will jog around the bases, field or court. The teacher will say “jog like a fat-soluble vitamin” students will jog around the bases, field or court. On the next signal, the teacher will say “sprint like a water-soluble vitamin” students will sprint or go as fast as they feel comfortable. On the third signal, the teacher will yell “jumping jacks to digest vitamins” and students are to perform jumping jacks. The fourth signal restarts the jog, sprint, jack. The goal is to increase the distance while continuing to keep jogging or sprinting. The students may need to walk some. Signals can be shortened to “fat, water and digest” to see if students can remember.
 - i. See GMU PETES Youtube channel for an instructional/demonstrational video for this activity.
<https://www.youtube.com/channel/UC5Z2bp3eSh74hn1RFinhxeg>
- b. **SAFETY:** Have students spread out while running or stagger their starts. All shoes must be tied. Students shall pass on the outside of the person.

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- c. **MODIFICATIONS:** Modified jumping jacks, or walking instead of jumping jacks. $\frac{3}{4}$ sprint instead of a full sprint. Decrease the time students sprint and or jack.
 - d. **EXTENSIONS:** Increase the time students have to sprint or jack. Saying signals out of water.
 - i. An extension of STEM content, teachers can name different vitamins and students will jog, sprint or jack to identify if the vitamin is fat-soluble, water-soluble or digested. This is an opportunity to assess students' knowledge of vitamins.
 - e. **STEM:** Vitamins
 - i. Jogging / Fat Soluble Vitamins : Vitamins A, D, K, and E are all fat-soluble vitamins. Fat-soluble vitamins are happy to stay stored in the body for a while, some stay for a few days, some for up to 6 months! Then, when it's time for them to be used, special carriers in your body take them to where they're needed. Students jog slowly to show vitamins moving throughout the body over time.
 - ii. Sprinting / Water Soluble Vitamins : Water-soluble vitamins are different. When you eat foods that have water-soluble vitamins, the vitamins don't get stored as much in your body. Instead, they travel through your bloodstream. Whatever your body doesn't use comes out when you urinate (pee). So these kinds of vitamins need to be replaced often because they don't stick around! This crowd of vitamins includes vitamin C and the big group of B vitamins ; B1 (thiamin), B2 (riboflavin), niacin, B6 (pyridoxine), folic acid, B12 (cobalamin), biotin, and pantothenic acid. Students are sprinting to show how quickly the vitamins are processed throughout the body and leave the body.
 - iii. Jumping Jacks / Vitamins Digested : Students will perform jumping jacks to show the vitamins being digested throughout the body and being used to function.
-

11. RACE THE BASE - Alcohol/Drug Injury Risk

- a. **INSTRUCTIONS:** The class is split into two teams. One team will line up behind home base and the other team will line up behind 2nd. Both teams should be facing each other while standing in a single file line. Teams will race to see which team gets all of their team members back to their base first. Base runners need to run the bases in order from where they start. The team at home base will each spin around a bat 5-10 (teacher can decide) times before running to the bases. They are "under the influence" of drugs or alcohol. The next person in line can begin to spin once the current base runner touches 3rd base. The team at second base is "sober" and just runs the bases normally. The first team to finish wins, each base must be touched. Next runner cannot start until the "home" base is touched by the current base runner.
 - i. See GMU PETES Youtube channel for an instructional/demonstrational video for this activity.
<https://www.youtube.com/channel/UC5Z2bp3eSh74hn1RFinhxeg>

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- b. **SAFETY:** Teammates cannot pass each other. Shoes must be tied. Students not running must be clear of the base path. Students that are finished running must sit or kneel out of the way of base runners. Students have to touch each base. Students should all run in the same direction. Opponents cannot interfere with each other.
 - c. **MODIFICATIONS:** Students can jog and do a $\frac{3}{4}$ sprint or jog. Shorten distance to base by one or two bases, etc.
 - d. **EXTENSIONS:** Change mode of locomotor skill. Have students run multiple laps.
 - e. **STEM:** Alcohol & Drug Injury Risks
 - i. The team that spins around the bat before running the bases represents people who have taken drugs/alcohol while the other team represents people without these substances. Team 1 (home base) will have a harder time regaining their balance after spinning around the bat and will find it more difficult to run the bases as fast as their non-dizzy peers. This will represent how alcohol and drugs can impair the senses and cause a greater risk of injury. Have students think about how their senses of judgment, vision and coordination were impacted after spinning around the bat and then running.
-

12. SOFTBALL/STEM TEST - Strike Zone Test Review

- a. End of unit review game.
- b. **INSTRUCTIONS:** Teacher will set up targets all over the playing area. Every target will have a starting point that a student has to throw from. On each target will be a flash card with information from the softball unit. Students will have one ball each and will be free to throw at any target they want. If a student hits a target, he or she will be allowed to flip the flash card over and read it. After a student reads the flash card, he or she has to put the flash card back on target. Students are to wait in a single file line if the target is popular. Students cannot share answers from flash cards. Students can throw overhand, underhand or roll the ball. Students can yell “STTTTTTRIKKKKEEE” if the target is hit just like umpires during baseball and softball games. <https://youtu.be/aZS3Hv2M4Y4>
- c. **SAFETY:** Students are to communicate with their peers regarding any loose or stray balls. Shoes must be tied. Students can walk or lightly jog.
- d. **MODIFICATIONS:** Closer starting point to targets.
- e. **EXTENSIONS:** none
- f. **FLASHCARDS:**

FRONT SIDE	BACK SIDE
year softball was created	1887
the creator of softball	George Hancock
pitching arc requirement	6-12ft
the count when a batter enters the box	1-1
how many positions	10

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base runners can pass each other	false
how to figure out a batting average	divide player's hits by total number of at-bats
name the positions	pitcher, catcher, 1st base, 2nd base, 3rd base, short stop, left field, left center, right center, right field
fat soluble vitamins	A , D , K , E
water soluble vitamins	vitamin C and the big group of B vitamins ; B1 (thiamin), B2 (riboflavin), niacin, B6 (pyridoxine), folic acid, B12 (cobalamin), biotin, and pantothenic acid
Newton's 2nd Law of Motion	an object's change in motion is equal to the sum of the forces acting upon it
60 ft	distance between bases have a good rest of your day :)
full count	3 balls and 2 strikes good luck on the test

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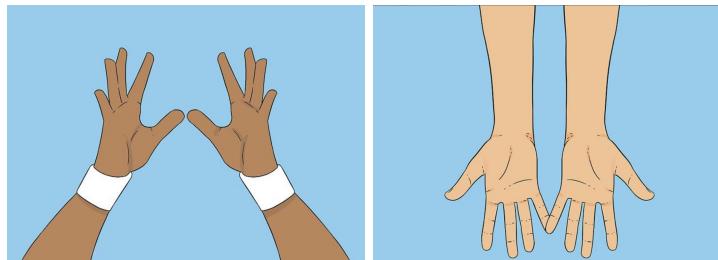
Activities to Develop Skills

1. INTRODUCTION TO SOFTBALL & Newton's Laws of Motion

- a. History of Softball YouTube Video - <https://youtu.be/3p4yyJ6-pDA>
 - i. Stop at 2:15
- b. Explain "An Overview" from the beginning of the unit plan
- c. **LESSON:** Students will know how to grip the ball. With 3 or 4 fingers. Teacher will review and demonstrate the cues for how to throw and catch a ball (with and without a glove).
 - i. Throwing - Non-throwing shoulder should be facing the target. Bring back the throwing arm to make letter "L" with arm and elbow at shoulder height. Wrist should be cocked and hand should be behind and slightly above the head. Step with non-throwing foot towards target. Release at target with a wrist snap and follow through across the body.



- ii. Catching - When the ball is thrown or hit above the waist, turn hand/fingers upward. When the ball is thrown or hit below the waist, turn hand/fingers downward. Always track the ball with your eyes.



d. ACTIVITY:

- i. Partner Throwing: Students will find a partner and stand about 15ft feet away from each other. Partner 1 will be throwing and the second partner will be responsible for catching and rolling the ball back to partner 1. Partner 1 will throw for ten throws and then roles will switch. After each pair has thrown once, teacher can modify or extend activity.
- e. **MODIFICATIONS:** Softer balls and closer distances between partners. Remove the glove.
- f. **EXTENSIONS:** Harder or heavier balls. Increase distance between partners. Add the glove. Throw with the non-dominant hand. Switch partners.
- g. **STEM:** Newton's Laws of Motion

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- i. The first law of motion, an object at rest will stay at rest and an object in motion will stay in motion, is demonstrated by a stationary softball. When a softball is picked up and thrown the individual is changing the ball's motion by force
- ii. The second law of motion, an object's change in motion is equal to the sum of the forces acting upon it, is demonstrated by the high arc of a slow softball pitch. When the ball leaves the pitcher's hand, the greatest force acting on it is the player, pushing and throwing the ball into the air. As soon as the ball is airborne, it comes under other constant forces that gradually overcome the initial force of the player's arm. Air resistance slows the ball down and gravity begins to pull the ball towards the earth. The transfer of these forces onto the ball results in the arcing motion of a slow pitch ball. When the ball reaches the bat, the force of the bat becomes the largest force and dictates the ball's new motion, out into the field.
- iii. The third law of motion, that for every action there is an equal and opposite reaction, is demonstrated by catching the ball. As the ball enters your mitt and contacts the leather, it stops. In that instant, your hand exhibits a force equal to that which the ball imparts on the glove. The force you exhibit is equal and opposite to the motion of the ball. The result is that the ball stops
- iv. Helpful video to explain Newton's Laws of Motion :
<https://www.youtube.com/watch?v=kKKM8Y-u7ds>

2. FIELDING RULES AND POSITIONS, FLY BALLS, INFIELD AND OUTFIELD GROUNDERS with Anatomical Planes

- a. Explain Fielding Rules and Positions
- b. LESSON: Students will learn how to catch fly balls using two hands and with a glove and field grounders when playing in the outfield and infield. Consider stations.
 - i. Fly Balls: When catching a fly ball turn sideways and drop-step to prevent back peddling. Move the glove on the throwing side of the body when catching the ball. Glove hand and throwing hand move up towards the ball. Squeeze the ball after the ball is caught in the glove and secure with the other hand.
 - ii. Infield Grounders: Feet wider than shoulder width. Seat down towards the ground with weight on balls of feet. Knees should be bent with hands low to ground. Move sideways by sliding feet and field ball in the middle of the body. Throwing hand should be on top to help trap the ball in the glove.
 - iii. Outfield Grounders: Quickly, move in the direction of the ball. Get behind the ball and put the knee down when fielding. Glove is in the middle of the body to prevent the ball from going through the legs.
- c. ACTIVITY:
 - i. Three Fly Drill: Students will be placed into pairs. Each pair needs 3 balls. On a start signal, partner 1 will throw a fly ball directly to his or her partner. A 2nd fly ball will be thrown so partner 2 has to drop-step and run backward without back peddling, The 3rd fly ball should be thrown so partner 2 has to sprint forward to catch the ball. Switch roles after 5 tries.

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- ii. Get Up and Catch: Students will remain with the same partners. Partner 2 says “go” and throws a fly ball while partner 1 lies on his or her stomach on the grass and gets up, locates and catches the fly ball. Repeat 3 x. Rotate.
- iii. Grounders: Partner 2 will roll softball to partner 1 5x with and without a glove. Students will practice moving to the right and left and put one knee down to block the ball. Increase distance between partners.
- d. MODIFICATIONS: Softer and lighter balls. Decrease distance between balls. Play without gloves. Throw balls with a higher arc. Decrease the amount of balls being thrown.
- e. EXTENSIONS: Increase distance between partners. Gloves can be used.
- f. STEM: Anatomical Planes
 - i. STEM concepts that students can use include the anatomical planes of the human body. Planes are anatomical references that allow people to specify movements and their range of motion.
 - 1. The sagittal plane is side to side and includes skills such as hitting, moving to the side to field a ball and arm and leg movements in doing a jumping jack. During this activity the sagittal plane will be demonstrated through the “Grounder” portion in the activity, specifically the left/right movement.
 - 2. The coronal or frontal plane divides the front and back of the body and includes softball skills such as throwing, running or hitting. During this activity the frontal plane will be demonstrated through the “Three Fly Drill” portion in the activity, specifically the forwards/backwards motion.
 - 3. The transverse plane divides the top and bottom half of the body, approximately at the waist. Softball skills used in this plane include the up/down motion of pitching, jumping to catch a ball, and lifting the hands to catch a ball. During this activity the transverse plane will be demonstrated through the “Get Up and Catch” portion in the activity, specifically the up/down movement.
 - 4. There are skills that move through multiple planes at the same time like hitting, moving to and catching a ball. Many skills will move through more than one plane.

3. PITCHING RULES, UNDERHAND PITCHING with Geographic Coordinates

- a. Explain pitching rules
- b. LESSON: Students will learn the technique to underhand pitch and be able to pitch with a 6-12ft arc.
 - i. Pitching: Both feet start together, no more than shoulder-width apart. Both hands also start on the ball. Step with the opposite foot of the pitching hand towards the target. Pitching hand comes back behind the body and then the ball is released in upward outward motion toward the target. Follow through upward.
- c. ACTIVITY:
 - i. Slow Pitch Softball: Teacher sets up volleyball nets and puts a hoop on the floor on one side of the net by the service line. Students will stand on the other side of the net, as pitchers. Pitchers’ will stand on the baseline. Hoops

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are to be a safe distance away from each other. Students will be paired off as partners. Each student will underhand pitch so the ball goes over the net but lands inside the hoop. Nets should be set up to a height around 8' to 10' to allow the pitcher the feel of slow pitching height. Students will then take turns pitching after 5 throws. One student could act as the catcher and either rolls or throws the ball back to the pitcher. Teacher will assess 5 pitches from each student. To showcase latitude lines have students pitch to a hoop straight in front of them. Emphasize that they are throwing “vertically” at this point. To showcase longitude lines have students pitch towards hoops to their left and their right. Emphasize that they are throwing horizontally now. To increase the STEM concept of latitude and longitude lines include pop ups and ground balls as described in the STEM heading below.

- d. **MODIFICATIONS:** Decrease the distance between pitching mound and hoop. Softer or lighter balls. Lower the net.
- e. **EXTENSIONS:** Use heavier or regulation balls. Use poly spots instead of hula hoops.
- f. **STEM:** Geographic Coordinates
 - i. Latitude is a geographic coordinate that specifies the north–south position of a point on the Earth's surface. These lines run from east to west. Students will throw pop ups to demonstrate the vertical position of latitude lines.
 - ii. Longitude is a geographic coordinate that specifies the east–west position of a point on the Earth's surface. These lines run from north to south. Students will throw ground balls to their left and right to show the horizontal positions of longitude lines.

4. BASE RUNNING RULES, BASE RUNNING with Vitamins

- a. Explain base running rules
- b. **LESSON:** Students will know when to run in softball and the proper way to run the bases.
- c. **ACTIVITY:**
 - i. Race Ball: Split the class into three teams. Hopefully teams have no more than 6. If so, use two fields or playing areas. Team 1 lines up at home plate and will be baserunners. Team 2 and Team 3 will be fielders. Team 2 lines up behind first base. Team 3 lines up behind third base. Students from Team 1 will take a knee and underhand pitch from 12-15 feet away from home plate. The first player on Team 1 steps up to the plate with a bat. Batter will attempt to strike the ball after it is pitched. After contact was made, the batter began to sprint around the bases. The first player on both Teams 2 and 3 immediately runs to retrieve the ball. Once both fielders touch the ball, the baserunner is to stop running. Team 1 earns one point for every base the baserunner manages to reach. Repeat with the next player in the baserunning line. After all players have had a turn, rotate the teams to a new position. Teacher will assess each base runner. Pitcher becomes the batter. Next person in line becomes the pitcher.
 - ii. Have students do this first walking to demonstrate fat soluble vitamins then next have them sprint to demonstrate water soluble vitamins. This way they have a visual representation of the difference in vitamins.

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- d. **MODIFICATIONS:** Softer or lighter balls. Have players bat off tee.
- e. **EXTENSIONS:** Pitchers can pitch from the mound with game-like requirements. Have the fielder throw to the pitcher to stop base runners.
- f. **STEM:** Vitamins
 - 1. Walking / Fat Soluble Vitamins : Vitamins A, D, K, and E are all fat-soluble vitamins. Fat-soluble vitamins are happy to stay stored in the body for a while, some stay for a few days, some for up to 6 months! Then, when it's time for them to be used, special carriers in your body take them to where they're needed. Students jog slowly to show vitamins moving throughout the body over time.
 - 2. Sprinting / Water Soluble Vitamins : Water-soluble vitamins are different. When you eat foods that have water-soluble vitamins, the vitamins don't get stored as much in your body. Instead, they travel through your bloodstream. Whatever your body doesn't use comes out when you urinate (pee). So these kinds of vitamins need to be replaced often because they don't stick around! This crowd of vitamins includes vitamin C and the big group of B vitamins ; B1 (thiamin), B2 (riboflavin), niacin, B6 (pyridoxine), folic acid, B12 (cobalamin), biotin, and pantothenic acid. Students are sprinting to show how quickly the vitamins are processed throughout the body and leave the body.

5. BATTING RULES, BATTING with Biomechanics

- a. Explain batting rules
- b. **LESSON:** Students will learn the proper way to grip a bat and hit a softball correctly. As the drill goes on the teacher will explain to the students that the ball is traveling its slowest when it is at the peak of the arc (when the ball is about to start its downward descent). The ball is easiest to hit when it is traveling slowly. The objective is to get students to experiment with tosses, so they will learn how high they need to toss the ball for the ball to bounce and be at its slowest speed, which is belt level (optimal hitting zone).
 - i. Batting: Feet shoulder width apart with weight evenly distributed. Hands are held away from the body at shoulder height. Front elbow is slightly up and the back elbow is up. Bat is off the back shoulder and tilted back with hands. Have middle knuckles lined up on the bat. Transfer weight from back foot and step with front foot towards target. Rotate upper torso/hips and on swing. Hands extend to the ball out in front of home plate with a follow through of the bat. NO BAT FLIPS!
- c. **ACTIVITY:**
 - i. Striking - Accuracy vs. Power: Plenty of space is needed for this activity for safety reasons. It is also preferred that students already should be able to use various implements (rackets, bats, clubs, etc.) and make contact with various objects (tennis balls, badminton shuttles, softballs, golf balls, etc.). Teacher is to set up numerous stations using the equipment available. Students need to be in groups of no more than 4. Some stations can be duplicated and or changed to whatever equipment is available. Targets can be hula hoops, poly spots, cones, etc.

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1. STATION 1 - includes plastic golf drivers, and 9-irons, golf balls, golf tees and some targets set up far away from the tees (driver) and some targets close to the tee (9-iron).
 2. STATION 2 - includes hockey sticks, pucks, and some targets set up close to the starting point.
 3. STATION 3 - includes long softball bats, softballs, batting tees and targets set up far away from the tees.
 4. STATION 4 - includes short softball bats, softballs, batting tees and targets set up close to the tees.
 5. STATION 5 - includes badminton rackets, birdies and targets over the net.
- ii. Rotate the students through each station (5-7 minutes). Students are to still focus on cues and form when swinging softball bats. Students are to aim for the targets. Students are to take note of how close they get to the targets at each station. You can have them record this on paper and pencil if you wish. If you really want to be specific, you can set up a scoring system. If everything was done properly, the students should come closer to the close targets than the far targets. Stations can be set up for two people to go at once for time's sake.
 - iii. To make sure the students gain an understanding of the concept of accuracy and power as it relates to the length of striking implements used. Longer implements allow you to get more power and distance and a shorter implement will allow you to get more accuracy.
- d. MODIFICATIONS: Closer targets and/or starting point, lighter implements and/or balls.
 - e. EXTENSIONS: More games like implements and/or balls. Further targets and/or starting points.
 - f. STEM: Biomechanics of Batting
 - i. Torque is applying rotation to an object. Creating torque creates a tension that allows the body to work in a more efficient and safe way. Creating torque with your back foot is something that every hitter can accomplish. The swing starts from the ground and works up through your body. As a hitter who is trying to create more force, it all starts with you preparing your body to do so. Such as loading into the back hip. When creating torque with your back foot, it creates tension through the inside of the foot, leg and up to the back hip. This allows hitters to feel the rotation unto the back hip. As a result, torque helps to gain hip stability while swinging and have better body control.

6. SOFTBALL STATIONS

- a. Explain and demonstrate each station
- b. LESSON: Students will work on various softball skills like: Fielding Ground Balls, Batting, Base Running, Throwing, and Catching Fly Balls. Group students into no more than 6 per station. Stations should last about 5-7 minutes. Depending on the class size some stations need to be duplicated. Before rotating to the next station, students should set up equipment so that it is ready for the next group. While

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explaining each station at the beginning, teachers will also describe the STEM content at each station.

c. **ACTIVITY:**

- i. STATION 1 - *Fielding Ground Balls*: Students will find a partner and will roll the ball back and forth at 5 yards. Students have the option to roll straight, to the right or to the left. Students will increase distance up to 20 yards as they feel comfortable. As the ball is on the ground, say “an object at rest will stay at rest” when students pick up the ball or throw it, explain that the object is now in motion and will stay in motion until a force (their hand) stops it. Have students say these things as they roll and receive the ball.
 - ii. STATION 2 - *Batting*: Each group decides on a batter and catcher. The rest of the students are fielding. Batter hits five balls then becomes a fielder. Catcher becomes batter. A fielder becomes the new catcher. Catcher is responsible for putting the ball on the tee if one is being used. Similar to the other stations, students identify the actions placed upon the ball when batting. When the batter is ready to bat, have them say “the force of the bat will now change the motion of the ball”.
 - iii. STATION 3 - *Base Running*: Run the bases using a circle technique. A partner will time you. As the student is stationary, say “an object at rest will stay at rest” when students run the bases, explain that the object is now in motion and will stay in motion until a force stops it. Have students say these things as they begin and stop running.
 - iv. STATION 4 - *Throwing*: One person stands at a base and will throw around to other fielders at different bases. Rotate to different bases after three throws. Practice throws from the outfield to the bases should also occur. To incorporate STEM use cues such as “apply the force up” when throwing or “apply an equal force” when catching the ball. Have students repeat these as they throw and catch the ball.
 - v. STATION 5 - *Fly Balls*: Partners will throw balls back and forth at various heights and different directions. Students should be able to practice moving backward and forward to catch the ball. To incorporate STEM use cues such as “apply the force up” when throwing or “apply an equal force” when catching the ball. Have students repeat these as they throw and catch the ball.
- d. **MODIFICATIONS:** Decrease distance between partners, use a tee or whiffle ball, jog instead of run, use lighter ball or throw from shorter distance, throw ball at lower arc.
- e. **EXTENSIONS:** Increase distance between partners, use self toss or partner throw, race a buddy, throw from longer distance, throw ball at higher arc.
- f. **STEM:** Review of Newton’s Laws of Motion
 - i. **Fielding & Base Running** : The first law of motion, an object at rest will stay at rest and an object in motion will stay in motion, is demonstrated by a stationary softball. When a softball is picked up and thrown the individual is changing the ball’s motion by force
 - ii. **Batting** : The second law of motion, an object's change in motion is equal to the sum of the forces acting upon it, is demonstrated by the high arc of a slow softball pitch. When the ball leaves the pitcher's hand, the greatest force

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acting on it is the player, pushing and throwing the ball into the air. As soon as the ball is airborne, it comes under other constant forces that gradually overcome the initial force of the player's arm. Air resistance slows the ball down and gravity begins to pull the ball towards the earth. The transfer of these forces onto the ball results in the arcing motion of a slow pitch ball. When the ball reaches the bat, the force of the bat becomes the largest force and dictates the ball's new motion, out into the field.

- iii. Throwing & Fly Balls : The third law of motion, that for every action there is an equal and opposite reaction, is demonstrated by catching the ball. As the ball enters your mitt and contacts the leather, it stops. In that instant, your hand exhibits a force equal to that which the ball imparts on the glove. The force you exhibit is equal and opposite to the motion of the ball. The result is that the ball stops.

7. WHACKY BASEBALL with Alcohol & Drug Injury Risks

- a. Explain any rules or terminology that haven't been covered or review rules for clarification
- b. LESSON: Students will get more practice with fielding, striking and baserunning in this build up game of Whacky Baseball. There are four phases so plan accordingly.
- c. ACTIVITY:

- i. Video Explanation:

<https://thephysicaleducator.com/game/whacky-baseball/>

The Set-Up: The teacher sets up a large playing area that involves two large sets of bases. Bases should be in a concentric circle formation. Please note: the amount of bases per set should be equal to the size of the teams created. For this game there should be two teams, if numbers are too large consider setting up two or more playing areas. The inner bases are to be used by the fielding team and the outer bases will be used by the batting team. The fielding team needs a player on each fielding (inside) base. The batting team lines up behind home plate. The home bases are inverted so the catcher is on the outside of the circle. order.

1. PHASE 1 - *Runner & Relayers*: The first player from the batting team steps onto their home plate (inside) and the catcher is given a ball. On the teacher's signal, the offensive player will run counter clockwise around the bases, making sure that each base is touched. As soon as the runner is in motion, the fielding team attempts to pass the ball clockwise around the bases, starting with the catcher. The fielding team players need to be on their base before relaying the ball to the next base. The batting team player is trying to make their way around their bases and cross home before the fielding team relays the ball around their bases and back to the catcher. If the batting team player gets there first, they earn a point for their team. If the ball gets their first, the fielding team earns a point. In between each turn, the fielding team players all have to switch bases. Once each player on the batting team has had a turn to run around the bases, the two teams switch roles.

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2. PHASE 2 - *Whacky Throwdown*: Batting team will have the opportunity to change their batting order. Those not batting will have to wait in the “dug out.” The teacher will select four of the fielding team bases that will be assigned as “stop spots” with one having to be the catcher’s base. The fielding team then sets themselves up on their team’s bases. The first player from the batting team steps up to home plate with the ball in his or her hand. He or she throws the ball so that it lands within the bases. As soon as the batting team player throws the ball, he or she begins to make their way around the bases. In order to stop the batting team’s run, the fielding team needs to field the ball to one of the “stop spots.” Once the player at the stop spot has possession of the ball and on their base, he or she yells STOP and the batting team player has to return to the last base they touched. After each time STOP is called, the fielding team needs to rotate clockwise. Next batter is up and is given the ball. Batter throws the ball into play then all the batting team players on bases begin running around the bases as the fielding team tries to get the ball to a stop spot. If ever a batting team player throws the ball outside of the base circles, it is considered a foul ball and all batting team players must return to the base they were at before the throw took place. It is okay that the batting team players have multiple players on the same base at any given time. If a batting team player makes it around the bases and touches home plate, it is a point for their team. The two teams switch roles after each player on the batting team has had a turn throwing the ball
3. PHASE 3 - *Whacky Baseball*: Teacher will create a foul line that is contiguous to the base circles at the home plate. The class now continues to play with the same rules from the previous day. The only change is that the batting team must strike the ball with a bat in order to put the ball into play. The ball will be pitched by the next player in their team’s batting order. For the ball to be considered in play, it must land beyond the foul line. Scoring and fielding is still the same, batting players must score by making their way around the bases and fielding players attempt to prevent the other team from scoring by fielding the ball to one of the stop spots. Teams switch roles once each player on the batting teams has had a turn to pitch. If a batter fails to hit the ball within four pitches, he or she goes to first base but no other batting team player can move. That player becomes locked at first base and cannot move until they wait 1 whole turn at first base.
4. PHASE 4 - *Cross-Country Whacky Baseball*: This Phase of Whacky Ball is best played if outside. Teachers should decrease the amount of bases and increase the playing area to a huge space. Every fielding team base is now considered stop bases. The fielding team can decide who plays on base and who plays out in the field. Scoring rules are the same from the previous phase. Fielders are still working to get the ball to a stop spot. Once each player on the batting team has had a

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turn throwing the ball, the teams switch. If a batter fails to hit the ball within four pitches, he or she goes to first base but no other batting team player can move. That player becomes locked at first base and cannot move until they wait 1 whole turn at first base.

- d. MODIFICATIONS: Decrease playing area or amount of bases.
- e. EXTENSIONS: The phases are extensions. Students could wear gloves.
- f. STEM: Alcohol & Drug Injury Risks
 - i. To add STEM, have students spin around the bat 5-10 times before running the bases to represent people who have taken drugs/alcohol while the other team represents people without these substances. Students will have a harder time regaining their balance after spinning around the bat and will find it more difficult to run the bases as fast as their non-dizzy peers. This will represent how alcohol and drugs can impair the senses and cause a greater risk of injury. Have students think about how their senses of judgment, vision and coordination were impacted after spinning around the bat and then running.

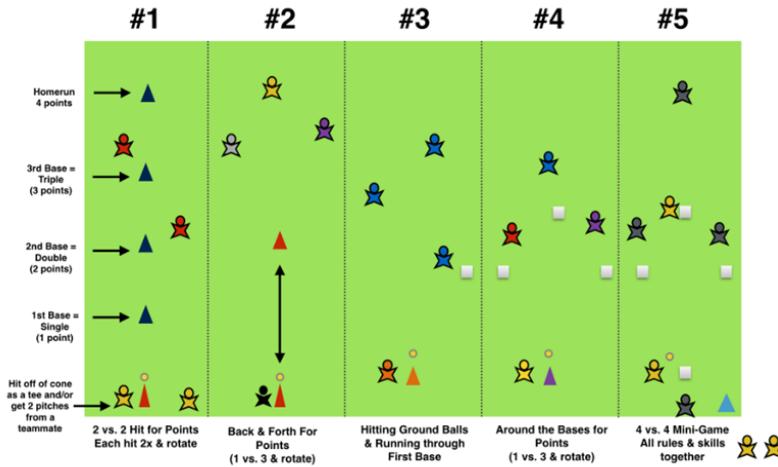
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8. SMALL-SIDED SOFTBALL GAMES & Energy Speed

Softball Small-Sided Games: Teams of 4



- Explain all five small-sided games.
- LESSON:** Split class into 5 groups. Each group will be assigned to play a small-sided game. Small-sided games should last about 5-7 minutes. Before rotating to the next game, students should set up equipment so that it is ready for the next group. (Graphic says teams of 4 but do what's best for your class, could even duplicate games.)
- ACTIVITY:**
 - To incorporate STEM in each small-sided game students will use different paces to demonstrate the different energy speeds. Light energy is the only form of energy we can see. Light from the sun helps plants grow and makes food for us to enjoy. Batters will run slowly to demonstrate the time it takes for plants to grow and transform the sunlight into energy. Sound energy is transferred when a sound wave travels from its source, like a drum, to another object. If the sound is loud enough, the waves will create very intense vibrations that you can feel in your chest. Batters will shuffle and then shout their name to demonstrate sound energy. Heat can move from warm objects to cool objects which then makes the cool objects warm. This is heat energy. Batters will sprint to demonstrate the speed in which heat energy can travel. To change paces use cues such as “change to light energy speed”. Changes in speed can be done to all stations at once or one at a time.
 - #1 - Hit for Points:** Students focus on hitting and fielding the ball cleanly. Each person on offense (yellow) bats twice. Whichever cone the ball is hit past, you score those points. Defense (red) can earn points by fielding the ball cleanly. 1 point for grounders and 3 points for fly balls. Hit twice and then rotate offense/defense. Each team should keep track of their own points.
 - #2 - Back & Forth for Points:** Batter (black) hits the ball into play. Once the ball is hit into play, the batter runs and has to touch the opposite cone in front of them. Batters will continue to run back and forth between cones until the defenders (yellow, purple, white) field the ball and complete a throw between

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- each fielder. The last person to catch a throw runs it to the big cone to stop the play. The runner/batter will receive 1-point for each touch on a cone.
- iv. #3 - *Run Through First*: Batter (orange) will focus on hitting grounders and running towards/through first base. Once a grounder is hit the defense (blue) fields the ball and makes a throw to first. If the batter reaches first before the ball, they get a point. Defense gets a point when the ball beats the runner to first. Rotate hitters.
 - v. #4 - *Around the Bases*: The batter (yellow) hits the ball and then runs around the bases. Batter will keep running until the defense (red, purple, blue) has fielded the ball and thrown it to each person. The last person to catch has to run the ball home to stop the runner. Batters score 1 point for each base touched. It's possible that some students could get in two rounds around the bases (8 points)!
 - vi. #5 - *4v4 Softball*: Mini softball game on a smaller field. May have more than 4 players to a team.
- d. **MODIFICATIONS**: Use tees or cones to hit off of. Lighter or softer balls. No gloves.
- e. **EXTENSIONS**: Self toss or partner pitch. Use gloves. More game-like balls.
- f. **STEM**: Energy Speed
 - i. Energy is the ability to do work. There are many different kinds of energy, such as light, sound, and heat. *Energy transfer* takes place when energy moves from one place to another. Energy can move from one object to another, like when the energy from your moving foot is transferred to a soccer ball, or energy can change from one form to another.
 - ii. Light energy is the only form of energy we can see. Light from the sun helps plants grow and makes food for us to enjoy. Batters will run slowly to demonstrate the time it takes for plants to grow and transform the sunlight into energy.
 - iii. Sound energy is transferred when a sound wave travels from its source, like a drum, to another object. If the sound is loud enough, the waves will create very intense vibrations that you can feel in your chest. Batters will shuffle and then shout their name to demonstrate sound energy.
 - iv. Heat can move from warm objects to cool objects which then makes the cool objects warm. This is heat energy. Batters will sprint to demonstrate the speed in which heat energy can travel.

9. SOFTBALL GAMES

- a. Students will be split into 4 teams with at least 10 players on each team. Once teams have been decided, give students some time to figure out batting order and fielding positions. If there are any problems, the teacher can step in. Students can pick their own team names if they want. Team names have to include adjective, color, and noun (in that order).
- b. Students should have opportunities to play different positions. Remind students that batting order cannot be changed. No bat flips or throws. Students are to encourage each other. If teams have more than 10 players the extras can be umpires. Pitching substitutions can be made 3 times per game.

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- c. STEM : Have students review previous STEM concepts and how they apply to the game as a whole.

10. SOFTBALL TEST - SEE NEXT PAGE

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Name:

Date:

Period:

SOFTBALL UNIT TEST

Please read each question carefully. This test is worth 30 points.

Multiple Choice - 1pt each

Please circle the correct answer.

1. What year did George Hancock develop an indoor version of baseball?
 - a. 1993
 - b. 1683
 - c. 1887
 - d. 1907

2. The game of softball has been called by another name(s). What are they?
 - a. Baseball
 - b. Kitten Ball
 - c. Diamond Ball
 - d. B and C

3. The very first game of softball used what item as a ball?
 - a. Softball
 - b. Ball of socks
 - c. Boxing glove
 - d. None of thee above

4. When a batter first steps into the batter's box, what is the count?
 - a. 1-1
 - b. 3-2
 - c. 0-0
 - d. 1-0

5. In softball, the ball is pitched underhand and has to meet an arc requirement. What is the arc requirement?
 - a. 8-10 ft
 - b. 6-12 ft
 - c. 3 ft and up
 - d. There is no arc requirement

True or False - 1pt each

Please circle "true" or "false"

If the answer is false please write the correct response in the space provided below.

6. True or False: A regulation game of softball has 7 innings.

7. True or False: There are 12 players on defense in a softball game.

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8. True or False: Base runners are allowed to pass each other if you announce it first.
9. True or False: When throwing, you should step with the opposite foot moving toward the direction of your target.
10. True or False: In slow pitch, if a batter has two strikes and he or she hits the ball foul on the third strike, he or she is out.

Short Answer - 2pts each

11. What is the distance between each base? Answer in ft.

12. Explain how to figure out a batting average in softball?

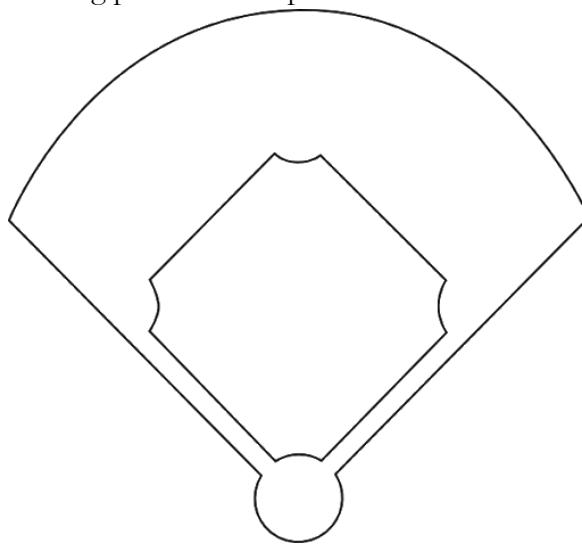
13. What are the cues for an overhand throw?

14. Explain how to play Whacky Baseball.

15. Give an example of good sportsmanship.

Fill in the Blank - 10 pts, 1pt each position; position and placement both have to be correct for full credit.

16. Please name all the fielding positions and place them in the correct spot. Hint: there are 10.



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Extra Credit - 2 points each

1. Sir Issac Newton has three laws of motion. Pick one law and explain it then provide an example using softball.

2. Define one of the following:
 - a. Force -
 - b. Torque -
 - c. Energy -

3. What was your favorite part about this softball unit?

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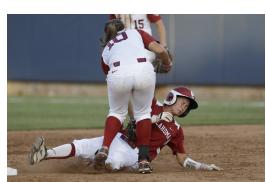
Assessment Tools

insert text here - PE and STEM assessments (performance and knowledge) - have a title for each assessment (rubric, check list, reflection, Kahoot, etc.)

1. Catching, Throwing & Fielding - EXIT SLIP

Name: _____ Date: _____

1. Please circle the best picture(s) that correspond to fielding.



2. Name at least one other sport that includes an overhand throw and catching.

3. Are there any mechanics that are similar between the sport(s) above and softball?
-

2. Slow Pitch Softball - CHECKLIST

PITCHING

Name: _____ Date: _____

5 throws per student. Assessor can make tallies in the corresponding boxes.

	Yes	No
Both feet start together with both hands on ball		
Steps with opposite foot of pitching hand; towards target		
Pitching hand swings backward		
Ball is released in an upward and outward motion		
Follow through is upward		
One foot remains in contact with pitching rubber at all times		

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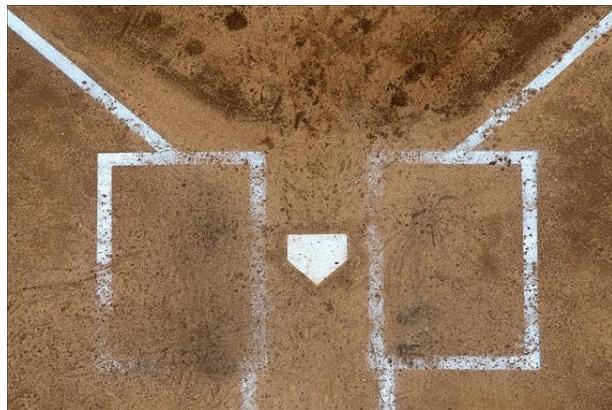
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3. Pitching - EXIT SLIP

Name:

Date:

Draw two strikes and three balls using o's and x's. Use x's for strikes and o's for balls. The marks will represent where the ball lands after it is pitched.



Define what a strike is?

What happens when 4 balls are pitched to the same batter?

Extra Credit:

Above there should be 2 strikes and 3 balls... what is that called?

4. Base Running - CHECK FOR UNDERSTANDING

Teacher will ask a question pertaining to base running rules and techniques. Students will put a "thumbs up" if they agree or if the statement is true. For false statements, students will hold up a "thumbs down".

1. In softball, you can steal the bases. *Thumbs down*
 2. Teammates can pass each other while baserunning. *Thumbs down*
 3. It is okay for the batter to overrun first base and first base only. *Thumbs up*
 4. Baserunning can interfere with fielders in order to advance to the next base. *Thumbs down*
 5. Occupied bases must be tagged by the baserunner when a fly ball has been caught. *Thumbs up*
-

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5. Catch & Throw Scramble - CHECKLIST
CATCHING

Name:

Date:

Teacher use only. 5 trials per student. Use a check mark when a student displays the corresponding cue.

	The	Names	of	Each	Student
Feet shoulder width apart?					
Glove in appropriate catching technique (webbing up for thrown balls above midriff) (webbing down for thrown balls below midriff)?					
Glove hand gives as the ball enters into the glove.					
Dominant hand follows ball into glove to ensure catch?					

<https://www.pcentral.org/assessment/pdf/softballskillssassess.pdf>

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6. Striking: Accuracy vs. Power - CLASS DISCUSSION

Students will all have a seat facing the teacher. Teacher will ask questions below and then students will raise their hand to answer. Encourage everyone to participate. Multiple students can answer the same question.

1. Why is a 9-Iron so much smaller than a driver?
 2. Why were the targets closer for the smaller implements?
 3. What is accuracy? Which stations allowed success for accuracy?
 4. Define power? What stations required you to use power?
 5. True or False... Longer implements allow for more power and short implements allow for more accuracy. *True*
-

7. Toss and Hit - RUBRIC

Name:

Assessed By:

Date:

Students will be assessing their peers on batting. Catcher is responsible for recording and assessing the batter. Students will swing the bat 3 times while being recorded. Catcher will show the recording and give feedback. Batter will swing 3 more times, hopefully making adjustments.

	Poor - 1pt	Fair - 2pts	Good - 3pts	Excellent - 4pts
Batting	Demonstrates poor hitting cues and rarely attempts to swing through the ball. Makes most contact with tee(s) or misses completely.	Demonstrates some ability to use proper hitting cues and often swings thoroughly. Makes little contact with balls. Swing is not level.	Demonstrates proper body stance, dominant hand is on top, keeps bat off shoulder, keeps eye on ball, and swings through the ball most of the time. Both balls are hits but not cleanly.	Demonstrates proper body stance, dominant hand is on top, keeps bat off shoulder, keeps eye on ball, and swings through the ball almost all of the time. Both balls are hit cleanly.
Trail 1				
Trail 2				
Trail 3				
What feedback did you give?				
Trail 4				
Trail 5				
Trail 6				

<https://www.rcampus.com/rubricshowc.cfm?code=NX84CCX&sp=yes&>

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8. Base Running Station - RUBRIC

Name: Assessed By: Date:

Students will be required to run around the bases twice for this assessment. Student's may rest or take turns in between trials. Record time in MM:SS:NN format.

Base Running	Poor - 1pt	Fair - 2pts	Good - 3pts
Baseline	Runner is out of the baseline, and there was no defensive player making a play on the ball.	Runner leaves the baseline and some points, but mostly stays in a straight path.	Runner stays in the baseline and runs in a straight path.
Angle	Runner does not take a good angle or does not touch the base at all.	Runner takes a good angle, but touches the middle of the base.	Runner takes a good angle on the base and touches the corner of the base only.
Effort	Runner displays lack of urgency when rounding bases.	Runner display some energy. He or she is trying.	Runner gives full energy and sprints around all 4 bases.

Trail 1 Time:

Trail 2 Time:

<https://www.rcampus.com/rubricshowc.cfm?code=NX84CCX&sp=yes&>

9. Whacky Baseball - THINK, PAIR, SHARE

Students will walk around the playing area all in the same direction. Teacher asks a question from below and gives the students time to think of an answer. On the teacher's signal students will stop and find a partner to walk with. Partner's will discuss and answer questions on how whacky baseball is similar to softball and what skills were used that day that will transfer over a real softball game. New partner for each question.

1. What skills from this unit were used to play Whacky Baseball?
2. What skill did you find the most important?
3. How did each phase change? Did the phases become harder or easier?
4. How is Whacky Baseball similar to softball?
5. How is Whacky Baseball different from softball?
6. What was your favorite phase of Whacky Baseball?

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10. Partner Throws - RATING SCALE

THROWING

Name:

Date:

Carefully observe each student for three throws. Use the 1-5 scale for the assessment.

1 = did not try

2 = none of the time

3 = some of the time

4 = most of the time

5 = all of the time

	Weight on back foot at beginning of throw?	Elbow at 90 degrees, elbow abducted from trunk, as arm circumducts in shoulder joint?	Weight shifts to the front foot as the ball is released?	Follow through is observed?
Names				
of				
Each				
Student				

<https://www.pcentral.org/assessment/pdf/softballsillsassess.pdf>

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11. Small-Sided Games - CHECKLIST

FIELDING

Name:

Date:

5 throws per student. Assessor can make tallies in the corresponding boxes.

Ready position: There is both a bend at the knees and the waist?	Yes	No
Person move their body in front of the moving ball?	Yes	No
Ball scooped correctly and brought to the body as the person readies itself for proper throw?	Yes	No
Does student give advice on adjustments/refinements to partner or group ?	Yes	No

<https://www.pcentral.org/assessment/pdf/softballsksassess.pdf>

12. Softball Games - GAME PLAY RUBRIC

Circle whichever category corresponds with the behavior.

Name:

Teams:

Date:

	Poor - 1pt	Fair - 2pts	Good - 3pts	Excellent - 4pts
Cooperation	Player doesn't listen, doesn't follow directions, rules aren't followed correctly	Player listens to others at times, somewhat follows directions and rules correctly.	Player listens, follows directions at times, and follows some of the rules.	Player listens well, follows directions, and carries out directions correctly.
Attitude	Player is very negative, doesn't make eye contact with coaches or teammates. Makes excuses	Player isn't very positive, doesn't make much eye contact and not very encouraging.	Player is positive and keeps eye contact at times and is encouraging sometimes.	Player is very positive and up-beat. Have good eye contact and listening skills. Very encouraging.
Team Support	Player is not at all encouraging to others and never helps with team duties. Only cares about themselves	Player is not very encouraging to others and doesn't help much with team duties.	Player is somewhat encouraging and helps with team duties every once and awhile	Player is very encouraging towards teammates and is open to giving advice and helping others out with team duties. They play for their team and not for themselves
Effort	Player doesn't participate with much effort, doesn't socialize with teammates. Doesn't offer any ideas or help	Player puts minimal amount of effort while participating and only offers some ideas and help.	Player tries with some effort and suggests some ideas and help the team. Gives max effort in the softball games.	Player participates in every related activity recommends a lot of advice and ideas to help team. Gives 120% effort in practice as well as games.
Accountability	Player does not take responsibility for their own actions/ mistakes. Blames it on their teammates.	Player shows some accountability. Rarely is honest when owning up to one's mistake.	Player shows accountability most of the time. Is mostly honest when taking the blame	Player always demonstrates accountability. Always takes the accountability for the mistake.

<https://www.rcampus.com/rubricshowc.cfm?code=JX5628C&sp=yes&>

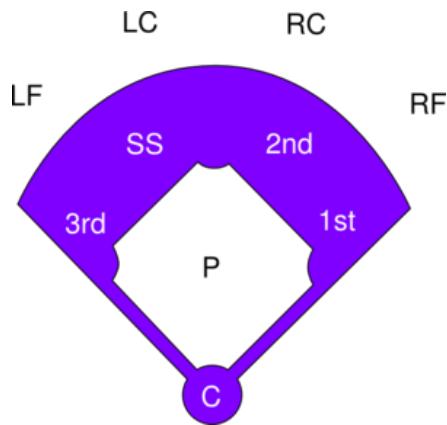
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13. SOFTBALL UNIT TEST - ANSWER KEY

1. 1887
2. B and C
3. Boxing glove
4. 1-1
5. 6-12 ft
6. True
7. False: There are **10** players on defense in a softball game.
8. False: Base runners **are not** allowed to pass each other **at any point during the game.**
9. True
10. True
11. 60 ft
12. To figure out a batting average in softball, divide a player's hits by the total number of at-bats.
13. Stand sideways to your target, throwing arm back with elbow inline with shoulder, step with opposite (non-throwing) foot, rotate hips and spine, follow through to your target.
14. Whacky Baseball - one batting team and one fielding team. Batter steps up to home plate and attempts to strike a ball that is pitched. Batting team is trying to score a point by running around and touching each base before returning to home plate. The fielding team must field the ball to a player on a stop spot base. Teams switch after everyone has batted.
15. Any example of fairness or respect for one's opponent.
- 16.



Extra Credit

1. Sir Issac Newton has three laws of motion. Pick one law and explain it then provide an example using softball.
 - a. 1st Law of Motion : An object at rest will stay at rest and an object in motion will stay in motion at the same speed and going the same direction until acted upon by some outside force.
 - i. When you pick up a stationary ball and throw it, changing its motion with force, or when a ball is hit by the bat, changing the ball's direction initially dictated by the throw from the pitcher.

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- b. 2nd Law of Motion : An object's change in motion is equal to the sum of the forces acting upon it.
 - i. The high arc of a softball pitch and the many forces acting upon it. The pitcher's arm pushes and forces the ball forward, gravity pulls the ball toward the earth, air resistance pushes against the ball as it moves through the air and the ball's spin during a pitch creates a lifting force.
 - c. 3rd Law of Motion : For every action there is an equal and opposite reaction.
 - i. One example of Newton's third law is when you catch a ball. As the ball enters your mitt and contacts the leather, it stops. In that instant, your hand exhibits a force equal to that which the ball imparts on the glove. The force you exhibit is equal and opposite to the motion of the ball. The result is that the ball stops.
2. Define one of the following:
 - a. Force - strength or influence that will cause the motion of an object to change.
 - b. Torque - force that causes rotation
 - c. Energy - ability to do work

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Glossary of Softball Terms

<https://sites.google.com/site/othspeddept/softball>

<https://sites.google.com/a/moundsviewschools.org/mounds-view-pe-page/softball>

Ball – a pitch which is not within the strike zone of the batter.

Base – the 4 stations on the ball field which runners on the offensive team must touch in succession before scoring. Only one runner may be on each base.

Baseline – a more or less imaginary space 6ft. wide in which a runner must stay while running the bases.

Bases Loaded – there is a runner on 1st, 2nd, and 3rd base at the same time.

Batter's Box – area in which the batter must stand when batting.

Batting Average – the number of hits divided by the number of times up to bat. This is to find the percentage of time you got on base versus how many times you got out.(the higher the number the better the batter).

Batting Order – order in which the players take their turn batting.

Choking Up – moving your hands up the handle of the bat for more control.

Count – the number of balls and strikes on a batter.

Dead Ball – the ball is not in play until the pitcher has pitched the ball.

Dead Ball Territory – area where the ball is announced out of play..

Defensive Team – the team positioned in the field.

Double – a hit where the batter safely reaches second base without an error occurring.

Double Play – a defensive play which results in 2 outs.

Error – a misplayed ball in the field allowing a runner or batter an extra base.

Fair Ball – any legally batted ball which is touched or which stops in fair territory.

Fly Ball – any ball batted high into the air.

Fly Out – any ball hit into the air and caught before it touches the ground.

Force Out – when the runner has to run on a ground ball because there are no open bases. The runner may be tagged or the fielder with the ball may step on the base.

Foul Ball – any ball settling outside the fair area, or touching in the fair area and then rolling out, without being touched by a fielder before going past 1st or 3rd base.

Full Count – the batter has 3 balls and 2 strikes.

Grand Slam – when the batter hits a home run with the bases loaded.

Homerun – a hit where the batter safely reaches home plate without an error occurring.

Inning – the portion of a game in which the teams both are on defense and offense once.

Line Drive – a low sharp fly ball hit into the playing field

Offensive Team – the team at bat.

On Deck – the next person in the batting order, after the person who is hitting.

RBI – stands for run batted in.

Run – the term for a score in softball, when a runner safely touches home after touching all three other bases.

Single – also known as a base hit is when the batter safely reaches first base without an error occurring.

Strike – a pitched ball which is within the strike zone of the batter, or when the batter swings at and misses the ball, or fouls off.

Strike Zone – the space over any part of the home plate which is between the batter's armpits and knees. The ball must also be thrown in an arc 6-12ft.high.

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Tagging-Up – if there are less than two outs and a fly ball is hit, a base runner must tag the base he/she was on or remain on the base until the ball is caught before advancing to the next base.
Triple – hit where the batter safely reaches third base without an error occurring.

Glossary of STEM Terms

STEM - Science, Technology, Engineering & Math

Force - an influence that, when unopposed, will change the motion of an object
Power - the amount of energy transferred
Torque - application of rotation to an object
Anatomical Planes - references to the human body that allow people to specify movements and their range of motion
Latitude - geographic coordinate that specifies the north–south position of a point on the Earth's surface. These lines run from east to west.
Longitude - geographic coordinate that specifies the east–west position of a point on the Earth's surface. These lines run from north to south.
Motion - phenomenon in which an object changes its position over time
Sagittal Plane - an anatomical plane that divides the body into left and right parts
Frontal/Coronal Plane - a vertical anatomical plane that divides the body into front and back sections
Transverse Plane - an anatomical plane which divides the body into superior (top) and inferior (bottom) section
Energy - quantitative property that must be transferred to a body or physical system to perform work on the body, or to heat it
Kinetic Energy - energy an object possesses due to its motion
Potential Energy - energy that is stored in an object
Biomechanics - study of the structure, function and motion of the mechanical aspects of biological systems
Energy Transference - process by which energy is relocated from one system to another
Light Energy - kind of kinetic energy with the ability to make types of light visible to human eyes. An example is sunlight.
Sound Energy - movement of vibrations through matter
Heat Energy - result of the movement of tiny particles called atoms, molecules or ions in solids, liquids and gases
Vitamins - substances our bodies need to develop and function properly
Fat-Soluble Vitamins - Fat-soluble vitamins are vitamins A, D, E, and K. They are present in foods containing fats. The body absorbs these vitamins as it does dietary fats. They do not dissolve in water.
Water-Soluble Vitamins - A vitamin that can dissolve in water. Vitamins are nutrients that the body needs in small amounts to stay healthy and work the way it should. Water-soluble vitamins are carried to the body's tissues but are not stored in the body.
Digestion - the process of breaking down food by mechanical and chemical action in the body
Frontal Lobe - Lobe of the brain affected by drugs and alcohol. It is responsible for cognition, thought, memory and judgement.

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Resources

Title - insert links to videos and other resources that could be helpful (Title of resource, link/title hyperlinked, short blurb about what it is)

GMU PETES Youtube Channel

<https://www.youtube.com/channel/UC5Z2bp3eSh74hnRFinhxeg>

History of Softball

<https://youtu.be/3p4yyJ6-pDA>

How to Base Run

<https://youtu.be/k2k24ZaStW8>

How to Catch a Ball

<https://youtu.be/EsXdjsM9gCo>

How to Catch a Pop-Up

<https://youtu.be/1kLwkivjyD8>

How to Field a Ground Ball

<https://youtu.be/aCK07u5fIU>

How to Grip a Bat

<https://youtu.be/e4C2kLbkzZg>

How to Hit a Softball

https://youtu.be/R2S_uh20nvc

How to Overhand Throw

<https://youtu.be/o5W8v4R2ZPA>

How to Pitch Underhand

<https://youtu.be/f6b5olvYB6o>

Funny Umpires Calling Strike

<https://youtu.be/aZS3Hv2M4Y4>

Whacky Baseball Explanation

<https://thephysicaleducator.com/game/whacky-baseball/>

Newton's Laws of Motion

<https://www.youtube.com/watch?v=kKKM8Y-u7ds>

Anatomical Planes

<https://youtu.be/2J8bDkALBic>

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Kinetic & Potential Energy

<https://youtu.be/eBsU9DVa7ws>

Types of Energy

<https://youtu.be/jhKejoBqiYc>

Vitamins

<https://youtu.be/0hTnUEAXefQ>

Alcohol's Effect on the Teen Brain

<https://youtu.be/NlRKU8GAZ4>

How Drugs Affect your Brain

<https://youtu.be/8qK0hxuXOC8>

Torque

<https://youtu.be/Jb65BJCyUCA>

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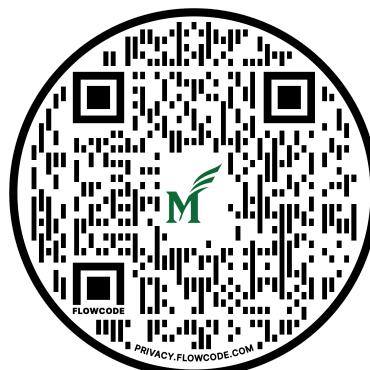
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*If you have a printed copy of the unit plan, scan this code to access the electronic version and the links embedded in it.



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