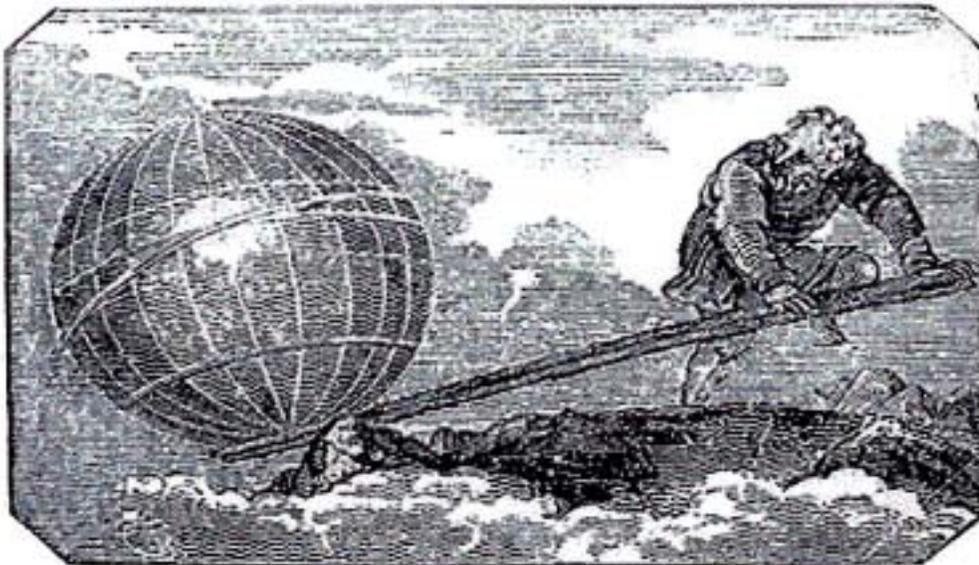


# TAMING OF THE SCREW



OR "LEVER ME ALONE...I'M WORKING"

WITH A BIG ENOUGH LEVER ....  
I COULD LIFT THE WORLD!!!



AN INTEGRATED INTERDISCIPLINARY THEMATIC UNIT ON FORCE, MOTION,  
AND SIMPLE MACHINES FOR GRADE FOUR

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**Unit Title:**  
**Taming the Screw or "Lever Me alone...I'm Working"**  
**With a Big Enough Leaver...I could lift the World.**

**OVERVIEW**

**I. CONTENT:**

There are forces acting all around you. When you roller-blade, gravity holds your skates and you to the ground. Friction makes it possible for you to slow down when you hit the brakes. The speed with which you move your skates determines how fast you get from place to place. When you work to get from place to place using your roller-blades, simple machines, such as the wheel and axle in the skate help make your job easier. This unit will teach students how and why Force and Motion are essential to everyday life, and that simple machines improve and conserve the amount of energy we exert when we complete a task.

**II. PROCESS:**

Students will develop thinking skills through hands on scientific inquiry, observations, data gathering, discussions, journal entries, note taking, research, literature, song, and reading of expository texts. These higher order-thinking skills will allow students to gain insight into how force, motion, and simple machines affect everyday life.

**III. PRODUCT:**

Children will demonstrate an understanding of the importance of force, motion, and simple machines through drawing, writing, oral presentations, and creative projects.

**Unit Overview: Alignment with  
State/District Pupil Performance Outcomes**

GOAL 1: Students will understand that types of motion may be described, measured and predicted.

GOAL 2: Students will recognize that forces of gravity, magnetism, and electricity operate simple machines.

GOAL 3: Students will understand the more massive an object is, the less effect a given force has, and that the motion of an object is determined by the overall effect of all of the forces acting on the object.

GOAL 4: Students will understand that an object may move in a straight line at a constant speed, speed up, slow down, or change direction dependent on net force acting on the object.

**I-SEARCH INDEPENDENT RESEARCH PROJECTS  
FOR GIFTED AND TALENTED STUDENTS**

**1. PARADOXES:** Gravity keeps objects on the Earth. Some objects go into the atmosphere, and in to space. Make a pop up book showing how force is used to overcome gravity.

**2. ATTRIBUTES:** Draw a poster sized pictures of a complex machine and identifies the simple machines that are included in it.

**3. ANALOGIES:** Using a clear transparency, and art paper make an overlay to compare a human arm to a hammer. Write a brief description explaining the similarities between the two.

- 4. DISCREPANCIES:** Some tools are simple machines, and others are complex machines. Pretend you are a simple machine that needs to become a part of a complex machine. Write a picture story showing what will happen to the simple machine.
- 5. PROVOCATIVE QUESTIONS:** Many simple machines are replacing human jobs. Create puppets that represent the simple machines. Write a script expressing the feelings of the simple machines that have taken the jobs from humans.
- 6. EXAMPLES OF CHANGE:** There are many ways we use levers. For example pencils, saw, etc. Demonstrate through a museum exhibit how levers can change from simple machines to complex machines.
- 7. EXAMPLES OF HABIT:** Many people chop trees down to build new stores and companies. Design a pamphlet to show how cutting down trees can endanger the environment.
- 8. ORGANIZED RANDOM SEARCH:** Using a graphic organizer summarizing all the concepts of simple machines to write a new law about force and motion.
- 9. SKILLS OF SEARCH:** Research the initial and current uses of the windmill. Invent a new use for the windmills to be implemented in the future. Prepare the model and give an oral presentation.
- 10. TOLERANCE FOR AMBIGUITY:** If you could provide the necessary conditions for a robot to have human intelligence's, what would the robot look like and behave like. Produce a television program about your robot.
- 11. INTUITIVE EXPRESSION:** homerun!!! Use your five senses to imagine and describe the emotions of the bat that hit the homerun. Create the comic strip with speech bubbles expressing the feeling of the bat hitting the ball.
- 12. ADJUSTMENT TO DEVELOPMENT:** From the prehistoric age to the present the wheel and axle has been used in many ways. Create a new way to use the wheel and axle. Illustrate and then build a sculpture of the product.
- 13. STUDY CREATIVE PEOPLE AND PROCESS:** Elias Howe invented the sewing machine. Research what simple machines were used to build the sewing machine. How has the sewing machine influenced society? Write a letter to the editor of a newspaper about the sewing machine.
- 14. EVALUATE SITUATION:** What would happen if all the screws disappeared overnight. Write a newspaper article describing the scenario of what our lives would be like a year later as a result of having no screws.
- 15. CREATIVE READING SKILL:** Read a book about car engines. Make a flipbook illustrating how an engine works.
- 16. CREATIVE LISTENING SKILL:** With your book buddy read a book about simple machine. Have your book buddy tell you about a simple machine, and you illustrate what they say.
- 17. CREATIVE WRITING SKILL :** Read various poems on simple machines, force, and motion. Create a poem of your own about simple machines.
- 18. VISUALIZATION SKILL:** Imagine that you are at a theme park. Write and illustrate a picture block story of your day at the theme park utilizing the concept of simple machines such as wheel and axle rods.

## CRITICAL THINKING SKILLS - ACADEMIC

## ANALYZING HUMAN ACTIVITIES! (AHA!)

STATE STANDARD: SC.C.2.2.1 - STUDENTS WILL BE ABLE TO recognize and design simple machines.

ESSENTIAL QUESTION: How does the Universal Theme of Producing, Exchanging and distributing create mastery learning of essential concepts in this unit?

### 1. PRODUCING, EXCHANGING, AND DISTRIBUTING [ECONOMICS] (HarcourtScience)

#### KNOWLEDGE:

Force is a push or pull. Every machine needs a force to make it work. Simple machines use less force to produce the same amount of work.

**Anticipatory Set:** Read Dr. DeSoto by William Steig.

**Students will:** conduct a class discussion on how Dr. DeSoto's work as a dentist was made easier by simple machines.

#### COMPREHENSION:

Students will complete a "Think, Pair, Share" activity about simple machines.

1. Teacher suggests a topic of discussion. (Simple machines)
2. Students "think" and write down what they know or have learned about the topic.
3. After the students have written, they "pair" up with another student to share their ideas.
4. Conclude with a whole class "share" discussion.

#### APPLICATION:

**Anticipatory Set:** Movie clips ñ Little Rascals showing a runaway train going down a hill.

**Students will:** Illustrate a simple machine that has made their life easier.

**Class/team product:** Design a clay sculpture of a simple machine to make an object move more quickly.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: Pyramids ñ research the Internet about how simple machines made building the pyramids much easier.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: Many musical instruments use keys, including almost all the woodwinds and many of the brasses. As with piano keys, the keys on these instruments are levers. Choose an instrument and find out how the keys work the levers. What do the levers do?

SCHOOL-TO-CAREER/TECH PREP LINK: Mechanics, painters, and amusement park operators.

#### HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Show Bill Nye Science Guy ñ Simple Machines

**Students will:** discuss all six simple machines mentioned in video.

**Class/Team individual product:** Create a collage of simple machines from pictures in a magazine, newspaper, computer downloads, personal pictures, or more literary students will devise a list to go with that collage.

#### INDIVIDUAL JOURNAL ASSIGNMENT:

Pretend you are a simple machine. Explain how you would help a person use less force to make-work easier.

#### HOMELINK:

Discuss simple machines with parents, and find out what simple machines make their lives easier.

STATE STANDARD # SC. C.1.2.1.b: STUDENTS WILL BE ABLE TO describe the motion of an object traveling down an incline plane placed at various height in terms of time, distance traveled, and direction.

ESSENTIAL QUESTION: How does the Universal Theme of Transportation create mastery learning of essential concepts in this units?

## 2. TRANSPORTATION (Harcourt Brace)

### KNOWLEDGE:

Discover there are many ways to move from here to there.

**Anticipatory Set:** Chuck Berry's "No Particular Place to Go"  
Read ABC Drive! By Naomi Howland.

**Students will:** Develop a bulletin board based on various forms of transportation.

### COMPREHENSION:

Students give examples of ways they get from one place to another. List their ideas on chart paper and post.

### APPLICATION:

**Anticipatory Set:** Clips from the following videos: "The Love Bug", "The Wizard of Oz", "Airplane" and "The Love Boat"

**Students will:** Cut pictures from magazines that show people moving and glue to a 3x5 card. Glue school picture where the original heads had been. Let students share their pictures ñ explaining the movement in their pictures, then glue them to the border. Place border within good view of all students.

**MULTICULTURAL and/or ESL and/or BILINGUAL LINK:** Research forms of transportation used in other countries.

**MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK:** Create a mobile model of the types of transportation and how they affect daily life.

**SCHOOL-TO-CAREER/TECH PREP LINK:** Truck Drivers (transporters), pilots, Bus Drivers

### HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Sing "On the Road Again"

**Students will:** Watch the nightly news or read a newspaper and list/cut out as many forms of transportation mentioned.

### INDIVIDUAL JOURNAL ASSIGNMENT:

If you could have any car you want, what would you have and why?

### HOMELINK:

Ask your parents about their first car.

STATE STANDARD # SC.C.2.2.1 STUDENTS WILL BE ABLE TO understand how simple machines are used to make tasks possible.

ESSENTIAL QUESTION: How does the Universal Theme of Communications create mastery learning of essential concepts in this unit?

## 3. COMMUNICATIONS

### KNOWLEDGE:

**Anticipatory Set:** Movie Clip “Snow White” – “Hi ho Hi ho, its off to work we go!”, and “Whistle while you work”.

**Students will:** Interview community workers, ( e.g. Fireman, telephone or cable installer, etc. Find out what type of simple machines they use in order to perform their job.)

COMPREHENSION:

Students will break into groups of 6 and write a newspaper article as a team about one of the simple machines used by the community worker. These six articles will be rewritten on a computer and published as a class newspaper on simple machines in the community.

APPLICATION:

**Anticipatory Set:** Movie Clip “Cinderella” Clock striking twelve  
Movie Clip “Alice in Wonderland” Rabbit singing “I’m late, I’m late”.

**Students will:** Discuss watches and how they utilize simple machines.

**Class/team product:** Create a comic strip where the main character is performing a job, but is working against the clock.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: What cultures were the first to utilize simple machines to assist in doing work?

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: The seven dwarfs sang and whistled while they worked. In fact, many people sing songs, or chanted rhythmically while rowing a boat, laying a railroad, or completing a task that requires rhythmic movement. Think about a song or chant you might say while working with others to help make each other move together more rhythmically.

SCHOOL-TO-CAREER/TECH PREP LINK: Archaeologists use simple machines in order to conduct a dig.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Sing - “I’ve been working on the railroad” Read - John Henry

**Students will:** Discuss the problems and advantages associated with machines taking the jobs of humans.

**Class /team/individual product:** Make a T chart comparing Man and Machine. List 5 ways man is better than machine, and 5 ways a machine is better than man is.

INDIVIDUAL JOURNAL ASSIGNMENT:

How would you feel if you knew your job was going to be replaced by a machine? Why?

HOMELINK:

Discuss a time that your parent felt uncomfortable using a new machine.

STATE STANDARD # SC.C.2.2.1 # SC.C.1.2.1: STUDENTS WILL BE ABLE TO understands that the motion of an object can be described and measured, and how simple machines are used to make tasks possible.

ESSENTIAL QUESTION: How does the Universal Them of Protecting and Conserving create mastery learning of essential concepts

**4. PROTECTING AND CONSERVING (Textbook or Database Harcourt Brace)**

KNOWLEDGE:

**Anticipatory Set:** Movie Clip - Gleaming the Cube

**Students will:** identify and describe the various ways the main character in the movie used simple machines to get from place to place. How did this save the main character time and energy?

COMPREHENSION:

Each student will write a one sentence summary of what they learned from their discussion, and then the students will “Think - Pair – Share” with a partner.

**APPLICATION:**

**Anticipatory Set:** Read Brave Irene by William Steig

**Students will:** Discuss the story.

**Class/team product:** Rewrite the story Brave Irene focusing on how Irene could have saved time and energy delivering the dress.

**ESL and/or BILINGUAL LINK:** List everyday items that are either inclined plane or levers. Draw a picture for each item. Add to your bilingual book.

**MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK:** Choose a task. Complete the task ñ time how long it took. Now use a simple machine. Time how long it took. Calculate how much faster you were able to accomplish the task with a simple machine.

**SCHOOL-TO-CAREER/TECH PREP LINK:** Engineering (NASA)

- planes that fly faster than the speed of sound

- tools used in the construction used in the construction of the space shuttle

**HIGHER ORDER THINKING SKILLS (H.O.T.S.):**

**Anticipatory Set:** Power Thinking about what we have done so far.

1. Simple Machines

2. Lever

3. See saw

**Class/team/individual product:** Create a pop-up book of simple machines. Explain how these simple machines save you time in your every day life.

**INDIVIDUAL JOURNAL ASSIGNMENT:**

Imagine a world without simple machines. How would your life be different? How would your life change?

**HOMELINK:**

Identify one simple machine you use in your home. Make a collage of all the tasks that simple machine helps you accomplish.

STATE STANDARD #SC.C.2.2.1 STUDENTS WILL BE ABLE TO recognize that forces of gravity, magnetism, and electricity operate simple machine.

ESSENTIAL QUESTION: How does the Universal Theme of Providing Education create mastery of learning of essential concepts in this unit?

**5. PROVIDING EDUCATION (Harcourt Brace)**

**KNOWLEDGE:**

**Anticipatory Set:** Read Wayside School is falling Down ñ Section where teacher shows gravity to students.

**Students will:** describe the forces acting on the objects in the story.

**COMPREHENSION:**

Create a crossword puzzle or word search about forces acting on simple machines. Trade with a friend.

**APPLICATION:**

**Anticipatory Set:** Take children to the computer Lab.

Play CD – “The New Way Things Work” - explains the working of simple and complex machines and inventions in song and image.

**Student will:** Work in-groups of eight to plan a web-site.

**Class/team product:** Using computers in the lab, plan and create a page from the class web-site on simple machines.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: Venn Diagram to link cultures uses of simple machines.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: Identify and list the many simple machines and forces found in displayed artwork around the room.

SCHOOL-TO-CAREER/TECH PREP LINK: Teachers, Custodians

HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Show clip from “Junkyard Wars” - Students will watch the people on the show building machines.

**Student will:** Create a timeline showing simple to complex machines.

\* A machine fair\* students will create their own machine and display it at the fair.

INDIVIDUAL JOURNAL ASSIGNMENT:

Write a jingle for your machine to advertise it to people.

HOMELINK:

Teach your little brother or sister about gravity, motion, or simple machines.

STATE STANDARD #SC.C.2.2.3. STUDENTS WILL BE ABLE TO know that the more massive an object is the less effect a given force has.

ESSENTIAL QUESTION: How does the Universal Theme of Making and Using Tools and or Technology create mastery learning of essential concepts in this unit?

## 6. MAKING AND USING TOOLS AND/OR TECHNOLOGY (Harcourt Brace)

KNOWLEDGE: The students will understand that the more massive an object is, the less effect a given force has.

**Anticipatory Set:** Read - Katy and the Big Snow

**Students will:** List some machines that can be used to move masses.

COMPREHENSION:

In-groups of two demonstrate understanding by:

Machine Cube Match Game -

Student 1. Create a cube. Draw six machines on the sides of the cube.

Student 2. Create a cube. Draw six objects to be moved on the sides of the cube.

Roll the dice and decide together if the machine is the proper tool to do the job.

APPLICATION:

**Anticipatory Set:** News Clip - Hurricane Andrew

**Students will:** Discuss how machines helped in the cleanup after a disaster.

**Class/team product:** Build a “Multi-medium Mural” to be displayed as a museum exhibit. Materials from newspaper clippings to magazines to clay etc. will be used.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: Choose a historical natural disaster that occurred in another country. Find out what machines were helpful in the cleanup process.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: Research famous paintings on the subject of natural disasters.

SCHOOL-TO-CAREER/TECH PREP LINK: Careers in construction

HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Show video clip of “Little Engine That Could”

**Students will:** Discuss a time that they never gave up.

**Class/team/individual product:** Construct a flipbook demonstrating a machine moving objects from place to place.

INDIVIDUAL JOURNAL ASSIGNMENT:

Tell how you can use a machine to draw water from a well.

HOMELINK:

Ask mother what machine she remembers grandma using often.

STATE STANDARD #SC.C.2.2.4.b : STUDENTS WILL BE ABLE TO know that motion of an object is determined by the overall effect of all the forces acting upon it.

ESSENTIAL QUESTION: How does the Universal Theme of Providing Recreation create mastery of learning essential concept?

## **7. PROVIDING RECREATION (Textbook or Database Harcourt Brace)**

KNOWLEDGE:

**Anticipatory:** Video Clip - “The Waterboy”, or “Princess Quarterback”- Scenes from a football game.

**Students will:** discuss how the characters in the movie are two forces acting upon each other, and give examples of other forms of recreation using motion and force.

COMPREHENSION:

Create a game of Win Lose or Draw. Students will write one recreational activity using force and motion on an index card. All cards will be collected and redistributed. Students will play a game to show this concept by drawing the activity listed on the card on the chalkboard. Other students will guess the activity and where force is exerted.

APPLICATION:

**Anticipatory Set:** Read Mr. Grumpy’s Motorcar by John Burmingham

**Students will:** Have a Tug of War contest on different surfaces (grass vs. Pavement, carpet vs. smooth floor) to see if it gives an advantage to one team. Chart the results.

**Class/team product:** Create a graph from the results.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: Compare and contrast Rugby in England, Soccer in Germany, to US football.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: What are the ways to measure a force on an object?

SCHOOL-TO-CAREER/TECH PREP LINK: Recreational Director, professional activity,

HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Show Clip from “Basketball”

**Students will:** Discuss the three games that were combined in this one game. Did it work?

**Class/team/individual product:** Invent a brand new game and be prepared to play it with friends at school the next day.

INDIVIDUAL JOURNAL ASSIGNMENT:

Write a letter to a recreation center in your neighborhood. Ask about the activities played at the center using motion, force, and simple machines.

HOMELINK:

Read Take home books The Science of Olympic and other Sports with parents.

STATES STANDARDS #SC.C.2.2.3 STUDENTS WILL BE ABLE Know the more massive an object the less effect a given force has.

ESSENTIAL QUESTION: How does the Universal Theme of Organizing and Governing create mastery of learning of essential concepts in this unit?

**8. ORGANIZING AND GOVERNING (Textbook or Database Harcourt Brace)**

KNOWLEDGE:

**Anticipatory Set:** Song - “Circles Around Me”

Display pictures of a sorter/ conveyer belt/ grocery cart

**Students will:** List circles, wheel and axles that are prevalent in organizing and governing our everyday lives.

COMPREHENSION:

Walk around the school with their journal and record all the complex machines they see utilizing a wheel and axle. Describe what might happen if a wheel and axle were not on those machines.

APPLICATION:

**Anticipatory Set:** Movie Clip – “Airport” Watch for clips of the escalator, conveyer belts for luggage and people, and elevator.

**Students will:** Write supportive data for each machine.

Debate most useful airport machine: elevator, escalator, or conveyer belt. Be prepared to support and defend each one.

MULTICULTURAL and/or ESL BILINGUAL LINK: Japan ñ How has Japan contributed to the organizing and governing of daily life worldwide.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: Use Internet to locate a song, stories, and picture, of a founding father using a simple machine.

SCHOOL-TO-CAREER/TECH PREP LINK: Wal-Mart Field trip to highlight major machines utilized to perform business transactions daily.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Video – “Star Trek” opening lines – “Boldly go where no man has gone before...”

**Students will:** Write a Science Fiction story that describes current machines in new, creative, innovative ways.

INDIVIDUAL JOURNAL ASSIGNMENT:

Imagine that you were stranded on a desert island. What natural resources could you use to make life more bearable.

HOMELINK:

Locate 5 machines that help to organize your life.

STATE STANDARD #SS.C.2.2.1 STUDENT WILL BE ABLE TO understand the importance of participation through community service, civic improvement, and political activities at the local and state level.

ESSENTIAL QUESTION: How does the Universal Theme of Moral, Ethical and Spiritual Behavior creates mastery learning of essential concepts in this unit?

## 9. MORAL, ETHICAL, AND SPIRITUAL BEHAVIOR

### KNOWLEDGE:

How people express moral/ethical concepts by using simple machines.

**Anticipatory Set:** Show pictures of people working together to complete a product. Everyone works together for a purpose. Read the Little House by Virginia Hamilton

**Students will:** list the different simple complex machines used in the story.

### COMPREHENSION:

In your study groups make predictions of what will happen to the little house if the story continues.

### APPLICATION:

**Anticipatory Set:** Show clippings from the show “Home Improvement”, and “This Old House”.

Display newspaper articles about Habitat for Humanity.

**Class/team product:** Students will create a life map prioritizing things that are important to them, and would be difficult to give up as technology progresses.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: Read the Jade Stone ñ A Chinese Folktale adapted by Caryn Yacowitz.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: In-groups invent a recipe for “The Perfect Machine”.

SCHOOL-TO-CAREER/TECH PREP LINK: Educator, Social Worker, Minister, and Pastor.

### HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Read the Three Little Pigs

**Students will:** Rewrite a parody of the fairytale read, or one of their choice, keeping enough of the original so that it can be recognized. For example: when rewriting The Three little Pigs consider how the housing shortage and/or inflation would affect the building of their homes.

### INDIVIDUAL JOURNAL ASSIGNMENT:

Write a thank you letter to a worker from Habitat for Humanity.

### HOMELINK:

Discuss how you can help the community with your family.

STATE STANDARD # SC.C2.2.1 STUDENTS WILL BE ABLE TO recognize that forces of gravity, magnetism, and electricity operate simple machines.

ESSENTIAL QUESTION: How does the Universal Theme of Aesthetic needs create mastery learning of essential concepts in this unit?

## 10. AESTHETIC NEEDS (Textbook and Database Harcourt Brace)

### KNOWLEDGE:

**Anticipatory Set:** A light in the Attic: Poems and Paintings by Shel Silverstein - Poem: “Homework Machine” (p. 56)

**Students will:** identify and label the simple machines that were used to construct the “homework machine.”

COMPREHENSION:

The homework machine does homework for you. Give examples of ways that simple machines can be used to help you do something that you enjoy doing. For example, an easel is an inclined plane which is used to paint or to draw, playing the piano uses levers, roller skating uses a wheel and axle, playing golf uses a wedge, and gardening uses wedges and levers.

APPLICATION:

**Anticipatory Set:** Share a silly sentence that will make learning the names of the simple machines easier: “I like Playing Soccer with Will.” (inclined plane, lever, pulley, screw, wedge, wheel and axle)

**Students will:** prepare their own personalized silly sentence that will help them remember all the simple machines.

**Class/team product:** The students will use storytelling to make up a tall tale about a time they used a simple machine to participate in their favorite activity. (For example - climbing the tallest mountain with a pulley)

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: The students can design a community guide book of activities they enjoy doing using simple machines; the Guidebook can be given to students who are new to the United States.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: Make a pie graph illustrating the activities students enjoy doing

SCHOOL-TO-CAREER/TECH PREP LINK: Artist, Musician

HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Read: Roller Skates by Ruth Sawyer or Song and Dance Man by Stephen Gammell

**Students will:** explain what simple machines are used in the story.

**Class/team/individual product:** Write a poem about your favorite activity that you are able to do with the help of a simple machine and record the poem on audio tape.

INDIVIDUAL JOURNAL ASSIGNMENT:

Write about how you would feel if someone told you that you could no longer participate in your favorite activity.

HOMELINK:

Interview a friend, family member, or someone in your community to find out what activity makes them happy. What simple machine does he or she use?

STATE STANDARD #SC.C.2.2.1. STUDENT WILL BE ABLE TO understand that gravity is the force that pulls all objects to the Earth.

ESSENTIAL QUESTION: How does the discipline/sub-discipline of gravity relate to mastery of learning of Force, motion, and simple machines?

## 11. GRAVITY (Harcourt Brace Science)

KNOWLEDGE:

**Anticipatory Set:** Video Clip ñ Footage of the Apollo mission when the astronauts dropped a hammer and a feather from the shuttle.

Demonstration ñ Show students that gravity is a constant force that pulls on all objects at the same rate regardless of mass by dropping two balls of different masses and sizes at the same time.

**Students will:** Create a detailed illustration of the activity just completed, and label the forces acting upon the objects on the illustration.

COMPREHENSION:

Create a working hypothesis about what will happen if two different objects are dropped at the same time. e.g. book and paper, apple and orange, balloon and basketball. Will all these examples have the same result? Why?

APPLICATION:

**Anticipatory Set:** Watch “Bill Nye Science Guy - Gravity and Friction”

**Students will:** be given several objects to use to create a source of friction acting against the force of gravity. They will work in pairs to discuss how they can create a friction force that will work against the force of gravity on a falling object.

**Class/team product:** Students will attach their source of friction to a plastic ball and repeat the demonstration done at the beginning of the knowledge portion of this lesson. This time they will compare two plastic balls of the same mass and size, but one with a source of friction attached. (e.g. paper parachute) Record observations. Discuss.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: How did the Egyptians move such large stones with gravity and friction working against them?

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: If you want to lose weight go to the moon. Why is this true?

SCHOOL-TO-CAREER/TECH PREP LINK: Professional Football players use gravity and friction to determine how much force to use when throwing or catching a ball.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Take students out to the playground to see gravity and friction in action. Allow students to take turns demonstrating gravity on the monkey bars by hanging from them and falling. Show students how the friction of the clothes they are wearing slows them down on a slide. Point out how gravity helps to pull them down the slide.

**Students will:** Discuss the force of gravity in action.

**Class/team/individual product:** Students will create 2 riddles about gravity and friction.

INDIVIDUAL JOURNAL ASSIGNMENT:

Describe a world without gravity? Without friction?

HOMELINK:

Discuss amusement park rides that make you feel like there isn't any gravity.

STATE STANDARD #SC.C.2.2.1:1 STUDENTS WILL BE ABLE To understand how a simple machine is used to make tasks possible .

ESSENTIAL QUESTION: How does the discipline/sub-discipline of Levers relate to mastery of learning of Force, Motion, and Simple Machines?

**12. LEVERS (Harcourt Brace)**

KNOWLEDGE:

**Anticipatory Set:** Song “Can You Take Me Higher”

**Student will:** Provide a large, strong, wooden board, and a brick. Ask the students to work in their cooperative groups to decide how they will lift the teacher off the ground using only those two materials. Discuss as a class and record the ways on chart paper. Introduce levers, and fulcrum.

COMPREHENSION:

Students will demonstrate how to lift the teacher using the brick and the board. Students will then draw and label a diagram of a lever using the example from the demonstration or a seesaw in the playground.

APPLICATION:

**Anticipatory Set:** Pass out cans of juice with a pop-top. Students must find the lever on the can of soda before they are allowed to drink the soda.

**Class/team product:** Experiment - How do Levers and Fulcrums help us work? Using paper clips, flat-sided pencils, small boxes, paper cups, tape, and a wooden ruler, students will make a model of a lever and fulcrum. Students will attempt to balance their lever by moving the fulcrum (pencil) to different distances on the lever (ruler). Cups will be used at each end of the lever and paper clips will be added and removed from the cups to help balance the lever. They will record their observations on a chart.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: Research acrobats and how they use levers to perform some of their acts.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: Galileo, and Archimedes were great scientists and mathematicians. Find out when they lived and what they discovered.

SCHOOL-TO-CAREER/TECH PREP LINK: Postal workers use scales to weigh the mail, and Pediatricians use a scale to weigh a baby.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Read Mike Mulligan and His Steam Shovel

**Students will:** List five ways how levers help Mike get the job done

INDIVIDUAL JOURNAL ASSIGNMENT:

How would you fix the seesaw so that it worked when you ride with your three-year-old sister?

HOMELINK:

Look at a bottle opener, a car jack, a broom and a hammer, can you find the levers? How do they make your parents daily life easier.

STATE STANDARD #SC.C.2.2.4 STUDENTS WILL BE ABLE TO tell how the motion of an object is determined by the overall effect of all the forces acting on the subject.

ESSENTIAL QUESTION: How does the discipline/sub-discipline of Wheel and Axle relate to mastery of learning of Force, Motion, and Simple Machines?

**13. WHEEL & AXLE (Textbook or Database Hartcourt Brace)**

KNOWLEDGE:

**Anticipatory Set:** Observe a live hamster running in a wheel.

**Students will:** make a hidden picture with three wheels and an axle. Label each part.

COMPREHENSION:

Explain the parts of a wheel and axle by finding a picture of one used in a magazine and labeling the parts.

APPLICATION:

**Anticipatory Set:** Display - Display windmill posters from Holland. Provide windmill cookies for children to eat.

**Students will:** Pass out recycled materials. Build a class windmill utilizing these materials. Give an oral presentation stating parts and purposes.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: Design a bumper sticker or travel brochure for Holland highlighting windmills usage.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: Brainstorm foods that display wheel and axle. Cut citrus fruits that display wheel and axle forms. Identify the parts to your partner and eat.

SCHOOL-TO-CAREER/TECH PREP LINK: Truck driver, bus driver, and film developer

HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Ceiling fan, portable fans, battery-operated fans, and hand held fans would be placed around the classroom.

**Students will:** discuss the differences between the fans that run on wheel and axle, and the hand held fans. How much energy is exerted.

**Class/team/individual product:** Make a rap that states the wheel and axle parts, purpose and two examples.

INDIVIDUAL JOURNAL ASSIGNMENT:

Pretend that you are a Ferris wheel, and describe the motion and speed joy or frustration with the ride.

HOMELINK:

Interview parents. Name three wheels and axles that are vital to the comforts of home.

STATE STANDARD # SC.C.2.3.2 STUDENTS WILL BE ABLE TO recognize common contact forces.

ESSENTIAL QUESTION: How does the discipline/sub-discipline of Screws relate to mastery of learning of Force, Motion, and Simple Machines ?

#### **14. Screws (Harcourt Brace)**

KNOWLEDGE:

Students will recognize that a screw is a modification of an inclined plane.

**Anticipatory Set:** Show Video “Inclined Plane, Wedge, Screw: Discovering Simple Machines”.

**Students will:** show how a screw is actually an inclined plane by making a screw.

COMPREHENSION:

Demonstrate knowledge of a screw as a simple machine by locating and recording at least two different types of screws. Explain how the two different screws help do work.

APPLICATION:

Students recognize how a screw helps them do work.

**Anticipatory Set:** Recite “This is the House That Jack Built” using a transparency.

**Students will:** sort a given amount of screws into categories as a group. Record the different categories. Sort again and record new categories. Sort a third time and compare their findings with the class on a chart.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: Research the other things that took place at the same time a screw were being invented.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: Why were so many scientists also inventors, mathematicians, and artists at the time the simple machines were being invented.

SCHOOL-TO-CAREER/TECH PREP LINK: Construction worker, inventor, and repairman/ woman.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Sing/Dance - “Do the Twist” by Chubby Checker

**Students will:** Create plans for a brand new simple machine. Think of a slogan to sell your simple machine.

INDIVIDUAL JOURNAL ASSIGNMENT:

Think of ways you can combine simple machines to make-work easier. Write about it.

HOMELINK:

With your family, find three things in your community that incorporate two or more simple machines that work together as one.

STATE STANDARD #SC.C1.2.1 STUDENTS WILL BE ABLE TO understand that the motion of an object can be described and measured.

ESSENTIAL QUESTION: How does the discipline/sub-discipline of inclined planes relate to mastery learning of force and motion?

## 15. INCLINED PLANE (Harcourt Brace)

KNOWLEDGE:

**Anticipatory Set:** Show a clip from the movie Airborne(PG) which illustrates the use of inclined planes while roller-blading.

**Students will:** describe and identify the incline planes found in the movie Airborne.

COMPREHENSION:

The students will infer how their lives would change without inclined planes. The students will give examples that will be listed on a chart.

APPLICATION:

**Anticipatory Set:** Song - “Roller-coaster” by the Red Hot Chili Peppers

**Students will:** prepare an illustration of what happens to a ball as it moves down and inclined plane. The students will label moving force and gravity.

**Class/team product:** The students will work in teams to create a ski jump with a variety of supplies such as a table, books, and molding to making a ramp. After the students design their incline planes, the students will take a survey of their peers to determine how far students predict their ball will travel.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: The United States is one of the only countries that use incline planes to provide accommodations for disabled individuals.

How would traveling to another country be difficult for a disabled individual?

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: Read - The Glorious Flight Across the Channel with Louis Bleriot by Alice and Martin Provensen

Identify how incline planes are used in the story.

SCHOOL-TO-CAREER/TECH PREP LINK: Incline planes are useful to movers and others who deliver and distribute products to various locations.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Show pictures of escalators that can be found in books or magazines.

**Students will:** summarize the main ideas about incline planes.

**Class/team product:** LEARNING CENTER - Each group will be given a bag that contains a tennis ball, a golf ball, wiffle ball, and a ping pong ball. The students will describe each ball according to weight, size, and appearance. The students will predict which ball they think will go the farthest and tell why. The teacher will set up a ramp(incline plane). Then, each ball will be dropped on the ramp. The students will measure how far each ball rolled.

INDIVIDUAL JOURNAL ASSIGNMENT:

Answer the following questions about the learning center activity: What are the main differences between the balls? Would different surfaces make a difference in the measurements of the balls?

HOMELINK:

Students will create a photo essay showing incline planes being used in their daily lives.

STATE STANDARD #SC.C.2.2.1: STUDENTS WILL BE ABLE TO understand how simple machines are used to make simple tasks.

ESSENTIAL QUESTION: How does the discipline/sub-discipline of wedges relate to mastery of learning of Force, Motion, and Simple Machines?

**16. WEDGES (Harcourt Brace)**

KNOWLEDGE:

Wedges are the pointed edges of an inclined plane. Wedges are used to push **things apart**.

**Anticipatory Set:** Providing the students with a piece of cardboard, a ruler, and a pencil, instruct them to divide the cardboard into four equal/even sections.

**Students will:** attempt to divide the cardboard without the use of simple machines. Working in a team, students will discuss possible ways their task could be made easier.

COMPREHENSION:

Students will defend their discovery that it is impossible to divide the cardboard into four equal/even sections without the use of a simple tool.

APPLICATION:

**Anticipatory Set:** Show movie clippings from: “Paul Bunyon, The great Kapok Tree, Jack and the Beanstalk, My Blue Heaven.”

**Students will:** Produce an Informational Pamphlet showing a wedge at work, incorporating safety rules and proper usage and handling.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: Read story from World Book’s Young Scientist, Construction Machines; Building the First Structures.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: Discuss riddle, “How many chucks would a woodchuck chuck if a woodchuck could chuck wood?”

SCHOOL-TO-CAREER/TECH PREP LINK: Engineer, Rescue Worker, and Lumberjack

HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Given a scenario, students will identify and select the most efficient tool to perform a specific task.

**Students will:** Create a taxonomy listing all the uses for a wedge.

INDIVIDUAL JOURNAL ASSIGNMENT:

Write a poem about a wedge.

HOMELINK:

Discuss with family member's ways in which the invention of the wedge has made their lives easier.

STATE STANDARD #SC.C.2.2.1 STUDENTS WILL BE ABLE TO understand how simple machines are used to make tasks simple.

ESSENTIAL QUESTION: How does the discipline/sub-discipline of Pulleys relate to mastery of learning of Force, Motion, and Simple Machines?

**17. PULLEYS (Harcourt Brace)**

KNOWLEDGE:

Pulleys are made up of a rope or chain and a wheel around which the rope fits.

**Anticipatory Set:** Video clips "Cliffhanger" - to view pulley used to climb the mountain and cliffs.

**Students will:** List all the ways the climber uses the pulley in the video clip.

COMPREHENSION:

View a complex picture of all the simple machines: Name all the pulleys found in the picture. e.g. flagpole, vertical blinds, stage curtains, etc.

APPLICATION:

**Anticipatory Set:** Walk to the school flagpole. Sing "You're a Grand Old Flag". Watch as a volunteer student raises and lowers the flag.

**Students will:** Work in-groups to build pulleys in order to show a working product.

**Class/team Product:** In-groups of three utilize two broomsticks, and a rope to design a human pulley. Show that one person can be stronger than two people using a pulley. After designing the pulley, complete three trials with each group member pulling the other two members together. Time how long it takes to pull the two-team members together. Record data and create a graph for the results.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK: Research how the "Wishing Well" was started.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK: Research Leonardo Davinci, how did he utilize pulleys in his discoveries?

SCHOOL-TO-CAREER/TECH PREP LINK: Fisherman, Construction Worker, Crane Operator.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):

**Anticipatory Set:** Guest speaker ñ Deep sea Fisherman ñ Demonstrate fishing pole showing the pulley mechanism.

**Students will:** Create a labeled diagram of a pulley mechanism in an everyday tool, like the fishing pole.

INDIVIDUAL JOURNAL ASSIGNMENT:

Write a story for a kindergarten student about pulleys.

HOMELINK:

Look in the newspaper or a magazine with a parent. Find a pulley.

**MORAL/ETHICAL/SPIRITUAL  
REASONING AND DILEMMAS**

TEN ETHICAL DILEMMAS

STATE STANDARD # HE.C.1.2.1 The student knows how to use goal setting and decision making skills which enhance healthy relationships.

ESSENTIAL QUESTION: How does the content of this unit reflect character education through Moral and Ethical?

### **1. Producing, Exchanging, and Distributing [Economics]**

**DILEMMA:** Are machines replacing humans? Answering machines and phone recording devices make our lives so much easier. However, are they as important as human contact? Your mother works for the telephone company. Her job was to answer any questions that customers had regarding their telephone. Your mom just received notice from her boss that her job will be replaced by a recording. Your mom has been given a choice. She can operate the recording machine or take the job of a friend who has less seniority. What should she do?

### **2. Transportation**

**DILEMMA:** An elderly person without a handicapped sticker parks in the last handicapped spot while they run into a store to pick up something. You are riding with your aunt who is disabled, and will have a difficult time walking to the store from so far away. Do you run into the store to ask the person to move, or do you wait until that person returns to the car without saying anything.

### **3. Communications**

**DILEMMA:** You notice that a “nerdy” student is having problems with the most popular student in your class on the playground. If you defend the student who is being bullied, you might be teased for being a “nerd” too. You like that classmate, but risk having others making fun of you. Do you defend that student?

### **4. Protecting and Conserving**

**DILEMMA:** Your family is building a new house. It would be easier to use a bulldozer to clear the lot, however it is not necessary to clear the whole lot, just more time efficient. Do you spend the whole summer clearing the lot by hand to conserve trees or do you hire a contractor to bulldoze the lot.

### **5. Providing Education**

**DILEMMA:** You are playing dodge ball, and your best friend tells you that he will throw the ball at someone very hard on purpose. You know that your friend might hurt this person. What do you do?

### **6. Making and Using Tools and/or Technology**

**DILEMMA:** You are using a borrowed tool from your teacher. You break it. No one sees you. What do you do?

### **7. Providing Recreation**

**DILEMMA:** Your friend has a skateboard ramp at his house. Your parents have warned you never to go to the ramp without adult supervision. Your friend wants to teach you new skateboarding tricks on the ramp, and your parents are not around to give you permission. What do you do?

### **8. Organizing and Governing**

**DILEMMA:** You are on an educational committee that approves the land that is used to build a school. Your committee finds land that is very inexpensive which allows you to build a school with better technology and resources. After buying the land and beginning construction your committee finds out that chemical spills have made the land toxic. What should you do?

### **9. Moral, Ethical, and Spiritual Behavior**

**DILEMMA:** You are on an all girl field hockey team and a boy wants to join. What do you do?

### **10. Aesthetic Needs**

**DILEMMA:** You are having a garage sale. A customer comes into the garage and offers you a great deal of money for a grandfather clock sitting in the corner. You never use the clock, but it has been passed down from generation to generation in your family. You could use the money. What do you do?

**PRODUCTIVE THINKING SKILLS  
DIVERGENT/CREATIVE THINKING**

**1. BRAINSTORM MODEL**

- A. BRAINSTORM ALL OF THE \_\_\_\_\_:
- AHA #1. ways to make money using a simple machine.
  - AHA #2. simple machines used in a bicycle.
  - AHA #3. ways to use a machine with a friend.
  - AHA #4. ways simple machines conserve energy.
  - AHA #5. tools used in the classroom.
  - AHA #6. everyday tools that are also simple machines.
  - AHA #7. simple machines found on a playground.
- B. BRAINSTORM AS MANY \_\_\_\_\_ AS YOU CAN THINK OF.
- AHA #8. ways to use the word force.
  - AHA #9. ways to get people to reduce their speed while driving.
  - AHA #10. beautiful things that can be built with simple machines.
  - AHA #11. pulls you can think of
  - AHA #12. things that go up and down
  - AHA #13. things that go around
  - AHA #14. things that spiral
- C. HOW MANY WAYS CAN YOU COME UP WITH TO \_\_\_\_\_ ?
- AHA #15. slide down an inclined plane
  - AHA #16. slice something
  - AHA #17. raise something

**2. VIEWPOINT MODEL (Human or Animate) (Use Cultural Literacy Terms)**

- A. HOW WOULD \_\_\_\_\_ LOOK TO A(N) \_\_\_\_\_ ?
- |                   |                |
|-------------------|----------------|
| AHA #1. Lever     | bank robber    |
| AHA #2. Road      | wheel and axle |
| AHA #3. Computer  | cave man       |
| AHA #4. Axe       | tree           |
| AHA #5. Wedge     | apple          |
| AHA #6. Flat tire | lever          |
| AHA #7. Slide     | sumo wrestler  |
| AHA #8. Bill      | pencil         |
- B. WHAT WOULD A \_\_\_\_\_ MEAN FROM THE VIEWPOINT OF A(N) \_\_\_\_\_ ?
- |                       |            |
|-----------------------|------------|
| AHA #9. bulldozer     | city       |
| AHA #10. flute        | orchestra  |
| AHA #11. slide        | empty pool |
| AHA #12. see saw      | anthill    |
| AHA #13. hand         | doorknob   |
| AHA #14. slinky       | stairs     |
| AHA #15. hill         | sled       |
| AHA #16. paper        | scissors   |
| AHA #17. fishing pole | fish       |

C. HOW WOULD simple machine VIEW THIS \_\_\_\_\_?

1. A big snow
2. paint can
3. trash dump
4. block of wood
5. ice pond
6. kids on skateboards

**3. INVOLVEMENT MODEL (Personification/Inanimate brought to life)**

A. HOW WOULD YOU FEEL IF YOU WERE \_\_\_\_\_?

- AHA #1. conveyer belt
- AHA #2. seat on a bus
- AHA #3. ear plug
- AHA #4. pesticide
- AHA #5. school clock
- AHA #6. key board
- AHA #7. ski lift

B. IF YOU WERE A \_\_\_\_\_, WHAT WOULD YOU (SEE, TASTE, SMELL, FEEL)?

- AHA #8. fulcrum
- AHA #9. screw
- AHA #10. lever
- AHA #11. magnet
- AHA #12. force
- AHA #13. weight
- AHA #14. spiral

C. YOU ARE A \_\_\_\_\_. DESCRIBE HOW IT FEELS.

- AHA #15. ramp
- AHA #16. propeller
- AHA #17. hatchet

**4. CONSCIOUS SELF-DECEIT MODEL**

A. SUPPOSE YOU COULD \_\_\_\_\_. WHAT \_\_\_\_\_

- AHA #1. have all the machines in the world. What would you do?
- AHA #2. have wheels on your hands. Where would you go?
- AHA #3. were an hour hand. What would you say?
- AHA #4. be a battery. What would you operate?
- AHA #5. buy a homework machine. What would you do with it?
- AHA #6. get a computerized pencil. How would you use it?
- AHA #7. be a skate. Where would you roll?
- AHA #8. be a moth. How could you fly straight?
- AHA #9. be a crane. What would knock down?

B. YOU CAN \_\_\_\_\_. WHAT \_\_\_\_\_?

- AHA #10. have all of the paintbrushes in the world. What would you do?
- AHA #11. stop something from falling. What would you save?
- AHA #12. be a mood. What would make you go up and down?
- AHA #13. be a Ferris wheel. What would you see?
- AHA #14. be a lid. What would you cover?
- AHA #15. be a roller coaster. What simple machine would be your best friend.
- AHA #16. be a door. What would you shut out?
- AHA #17. be a pulley. What would you raise or lower?

**5. FORCED ASSOCIATION MODEL (Use cultural literacy terms here)**

- A. HOW IS \_\_\_\_\_ LIKE \_\_\_\_\_ ?
- |                        |           |
|------------------------|-----------|
| AHA #1. Gravitation    | hamburger |
| AHA #2. Wheel and axle | orange    |
| AHA #3. Four season's  | wheel     |
| AHA #4. Speed          | science   |
| AHA #5. Wheelbarrow    | priest    |
| AHA #6. Bell tower     | shower    |
| AHA #7. Slide          | sewer     |
- B. GET IDEAS FROM \_\_\_\_\_ TO IMPROVE \_\_\_\_\_.
- |                     |            |
|---------------------|------------|
| AHA #8. Hammer      | houses     |
| AHA #9. Screw       | nail       |
| AHA #10. Camel      | pulley     |
| AHA #11. Lawn mower | garden hoe |
| AHA #12. Sharpener  | pencil     |
| AHA #13. Rubber     | tire       |
| AHA #14. Jar        | lid        |
- C. I ONLY KNOW ABOUT \_\_\_\_\_. EXPLAIN \_\_\_\_\_ TO ME.
- |                       |              |
|-----------------------|--------------|
| AHA #15. Going down   | Up           |
| AHA #16. Splitting up | Togetherness |
| AHA #17. Vertical     | Diagonal     |

**6. REORGANIZATION MODEL**

- A. WHAT WOULD HAPPEN IF \_\_\_\_\_ WERE TRUE?
- AHA #1. There were no machines.
  - AHA #2. There were no wheels
  - AHA #3. There was no time
  - AHA #4. There were no wedges
  - AHA #5. There were no graphite
  - AHA #6. There were no pencils
  - AHA #7 There were no playgrounds
- B. SUPPOSE \_\_\_\_\_ (HAPPENED), WHAT WOULD BE THE CONSEQUENCES?
- AHA #8. All machines stop working
  - AHA #9. Robots replaced people
  - AHA #10. Games disappeared
  - AHA #11. Gravity reversed
  - AHA #12. Fulcrum never existed
  - AHA #13. Wheels were square
  - AHA #14. The screwdriver never existed
- C. WHAT WOULD HAPPEN IF THERE WERE NO \_\_\_\_\_ ?
- AHA #15. Inclined planes
  - AHA #16. wedges
  - AHA #17. pulleys

**CULTURAL LITERACY/SPELLING LIST**

**Names**

Galileo  
 Isaac Newton  
 Robert Hook  
 Pierre Verdon - food processor  
 Edwin Budding and John Ferrabee - lawnmower  
 Elias Howe - sewing machine

Thomas A. Edison - dishwasher  
Langmuir Fisher - washing machine  
Mary Anderson - windshield wipers

### Phrases

Complex machine	Inclined Plane	Ramp
Compound machine	Lever	Screw
Computer	Magnet	Simple machine
Distance	Magnetism	Slide
Electricity	Mass	Speed
Energy	Motion	Spiral
Force	Position	Spring
Friction	Propeller	Wedge
Fulcrum	Pull	Weight
Gravity	Pulley	Wheel and axle
Hatchet	Push	Work

### Dates

1831 Lawnmower	1886 Dishwasher	1903 Windshield Wipers
1846 Sewing Machine	1901 Washing Machine	

### Ideas

A force is a push or a pull.  
Work is done when a force moves an object.  
The amount of force used to move something depends on its mass.  
Motion is a change in position,  
Every motion is started by a force.  
It takes a lot of energy to overcome gravity.  
Gravity is the force that pulls things back to the earth's surface.  
A simple machine is a tool that help people do work.  
Simple machines allow you to use less force.  
Simple machines can be used by themselves, or they can be parts of more complex machines.

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Fitzpatrick, J. (1988). *Balancing*. New Jersey: Silver Burdett Press.

Hancock, R. (1985). *Understanding movement*. New Jersey: Silver Burdett Press.

Horvatic, A. (1989). *Simple machines*. New York: E.P. Dutton. Howland, N. ABC drive.

Jennings, T. (1989). *Sliding and rolling*. New York: Gloucester Press.

Keats, E. J. (1965). *John Henry: An American legend*. New York: Alfred A. Knopf.

Kellog, S. Paul bunyan

Kellog, S. (1991) *Jack and the beanstalk* Trumpet

Kellog, S. (1991) *The Three Little Pigs*

Kerrod, R. (1987). *Science alive: Moving things*. New Jersey: Silver Burdett Press.

Lafferty, P. (1992). *Eyewitness books: Force and motion*. New York: DK Publishing Inc.

Murphy, B. (1991). *Experiment with movement*. Minneapolis: Lerner Publications.

Steig, W. (1986). *Brave Irene*. New York: Farrar, Straus, & Giroux.

Steig, W. (1982). *Doctor DeSoto*. New York: Farrar, Straus, & Giroux.

Provensen, A., & Provensen, M. (1987). *The glorious flight across the Channel with* Putnam, J. (1994). *Eyewitness books: Pyramid*. New York: Dorling Kindersley Louis Bleriot. New York: Puffin Books.

Oakley, R. (1989). *Games children play around the world*. New York: Marshall Cavendish Corp. *Wayside school is falling down*.

Weiss, H. (1983). *Machines and how they work*. New York: Thomas Crowell Inc.

Yaclwitz, C. *The jade stone: A Chinese folktale*

### III. Educational Films/Videos

A is For Airplane (24 min.) Teacher's Video Company  
 American Tall Tales and Legends: John Henry (55 min.) Teachers Video Co.

Big Machines: Road Construction (30 min.) Teachers Video Company  
 Big Toys (25 min.) Teachers Video Company  
 Big Trucks, Tractors, and Trains (30 min.) Teachers Video Company  
 Bill Nye: The Science Guy ñ Simple Machines  
 Bill Nye: The Science Guy ñ Gravity and Fiction  
 CNN clips of the airport and Hurricane Andrew  
 Discovery Channel: Big Job ñ The Biggest Coolest Trucks Around (45 min.)  
 Teachers Video Company  
 Discovery Kids: Extreme Machines for Kids (45 min.) Teachers Video Company  
 Flying Machines (30 min.) Teachers Video Company  
 Harcourt Science Newsroom Video: Big Machine Summer  
 How a Tugboat Works (30 min.) Teachers Video Company  
 John Henry: Rabbit Ears (30 min.) Teachers Video Company  
 Monster Truck Spectacular (30 min.) Teachers Video Company  
 Mr. Frumble's New Cars (25 min.) Teachers Video Company  
 My First Science Video: A Kids Guide to Exciting Science Experiments Teachers  
 Video Company  
 NASCAR for Kids: Day at the Races (30-min.) Teachers Video Company  
 On the Railroad (25 min.) Teachers Video Company  
 Paul Bunyan (27 min.) Teachers Video Company  
 Road Construction Ahead (25 min.) Teachers Video Company  
 Steam Train (30 min.) Teachers Video Company  
 There Goes an Airplane (35-Min.) Teachers Video Company  
 There Goes a Boat (35-min.) Teachers Video Company  
 There Goes a Garbage Truck (30-min.) Teachers Video Company  
 There Goes a Helicopter (35-min.) Teachers Video Company  
 There Goes a Monster Truck (35-min.) Teachers Video Company  
 There Goes a Motorcycle (35-min.) Teachers Video Company  
 There Goes a RaceCar (30-min.) Teachers Video Company  
 There Goes a Train (30-min.) Teachers Video Company  
 There Goes a Truck (35-min.) Teachers Video Company  
 Toy Trains and Big Trains (30 min.) Teachers Video Company  
 Train Adventures for Kids (30 min.) Teachers Video Company

#### IV. Commercial Films/Videos

Airborne (PG)	Cool Running (PG)	The Love Boat
Airplane	Gleaming the Cube	The Love Bug
Alice in Wonderland	Home Improvement	The Waterboy (R)
Apollo 13 (PG)	Junkyard Wars	This Old House
Armageddon (PG 13)	Little Rascals	Quarterback Princess
Backdraft (R)	My Blue Heaven	Snow White (G)
Basketball	Star Trek	The Wizard of Oz
Cinderella	The Cutting Edge	
Cliffhanger (R)	The Little Engine That Could	

#### V. Literature/Language Arts (on reserve in Media Center)

##### Fiction

Peterson, J. The littles and the trash times.  
 Sachar, L. (1998). Holes. Farrar, Straus, & Giroux

##### Non-Fiction

Ardley, N. (1992). The science book of motion. Harcourt Brace.  
 Doherty, P. (1996). The spinning blackboard and other dynamic experiments on  
 force and motion. John Wiley & Sons.  
 Murphy, B. (1992). Experiment with movement. Learner Publications Company.

Nash, P. (1989). *Monster machines*. Garrett Educational Corp.  
 Wood, R. (1989). *Physics for kids: 49 easy experiments with mechanics*.  
 Pennsylvania: McGraw-Hill, Inc.

**Poetry**

Adoff, A. *Sports pages*. (1986). New York: J.B. Lippincott.  
 Hopkins, L. B. (Eds.). (1887). *Click, rumble, and roar: Poems about machines*.  
 New York: Harper Collins Publishers.  
 Silverstein, S. (1981) *A light in the attic*. New York: Harper Collins Publishers.  
 “Fancy Dive”  
 “Homework Machine”  
 “Come Skating”  
 “Play Ball”  
 “This is the House that Jack Built”

**Drama (Stage Productions)**

Teacher made productions of *The Wizard of Oz* and *Snow White*

**Music**

“Down by the Station”  
 “Hickory Dickory Dock”  
 “Hi Ho Hi Ho Its Off to Work We Go”  
 “I’ve Been Working on the Railroad”  
 “John Henry”  
 “No Particular Place to Go” by Chuck Berry  
 “On the Road Again” by Willie Nelson  
 “Twist Like We Did Last Summer” by Chubby Checker  
 “Willum”  
 “Whistle While You Work” in *Snow White*  
 “How Much Wood Would a Woodchuck Chuck?”  
 “You’re a Grand Old Flag”  
 “Circles Around Me”  
 “Can You Take Me Higher” by Creed

**VI. Resource People/Mentors**

Artists	Engineers	Movers
Athletes	Landscapers	
Construction workers	Musicians	

**VII. Field Trips**

Airport	Epcot	Habitat for Humanity
Construction Site	Grocery Store	Orlando Science Center

**VIII. Other Material (CD-ROM, Laser Disc, Internet sites, etc.)**

CD-ROM *The New Way Thing Work* by DK Multi-Media  
 Barnes and noble.com-Sun up, sun down.  
 Harcourt Science Explorations CD-ROM: *Simple Machines*  
*Simple Machines in the Library: Wheels*. (June 12, 2001).  
<http://www.mikids.com/Smachines1.htm>  
 The Franklin Institute online: *The Screw*  
<http://sln.fi.edu/qa97/spotlight3/screwdemo.html>  
<http://sln.fi.edu/qa97/spotlight3/screwdemo.html>  
<http://www.geocities.com/EnchantedForest/fountain/5540/isawaship.html>  
<http://www.geocities.com/EnchantedForest/fountain/5540/isawaship.html>  
 Those Crazy Lego Screws June 12, 2001

<http://wierdrichard.com/screw.htm>

Wedge. (June 13, 2001). World Book Online Americas Edition.

[www.aolsvc.worldbook.aol.com/wbol/wbAuth/na/ar/co/ar596780.htm](http://www.aolsvc.worldbook.aol.com/wbol/wbAuth/na/ar/co/ar596780.htm).

Work is Simple with Simple Machines. (June 12, 2001)

[www.ed.uri.edu/SMART96/ELEMSC/SMARTmachines/machines.html](http://www.ed.uri.edu/SMART96/ELEMSC/SMARTmachines/machines.html)