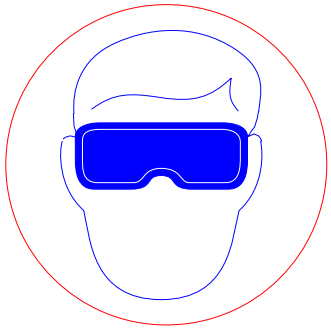
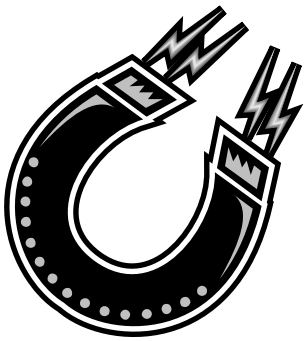
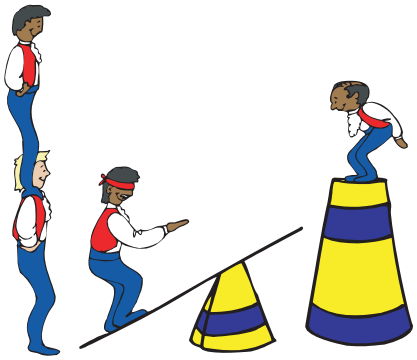


Force and Motion
Strand C

5th Grade Science
Daily Lessons





TEACHER'S GUIDE

This binder contains science lesson plans for 5th grade teachers. All lesson plans correlated to the Sunshine State Science Standards, Strands, Benchmarks and the Harcourt Science series. All activities, demonstrations, centers and FCAT Dailies are included in the lesson plans.

When using these plans please keep in mind that not all students learn at the same rate. Some students may need more time in mastering a benchmark than the time allotted for each one. Also, students may master a benchmark in less time than is allotted. Please make the necessary changes as you proceed through the benchmarks.

Each lesson lists the benchmark to be covered. Those benchmarks that are indicated Annually Assessed will be on the science FCAT every year. Those benchmarks that are indicated Content Sampled will be randomly selected each year for the science FCAT.

Each lesson lists essential questions. Students need to acquire the knowledge needed to answer these questions not only to do well on the science FCAT but also to develop science literacy skills.

The vocabulary words listed are from the glossary provided by the Department of Education. It is essential that students understand these vocabulary words. These specific words will not **be defined in the stem of the FCAT science question.**

Science content will include demonstrations, activities, and reading from Harcourt Science. When Harcourt Science does not have material to cover a benchmark other reading material is indicated. If the suggested supplemental materials are not in your schools you may substitute books related to the content that are in your Media Center or type in key words to access Internet information. Since it is not possible for teachers to cover every single page and do every activity in the Harcourt Science series only those chapters, lessons, and activities that correlate to the benchmarks are indicated on the lesson plans.

Each lesson and activity includes an assessment. Keep in mind that assessment drives instruction. The more you assess and evaluate students understanding of the concepts presented the more you ensure that your students are acquiring the necessary science skills to master the benchmarks.

Please read the lessons for the entire week. Teacher preparation may be necessary for some of the activities. When this occurs, you will see a section labeled Teacher Preparation the day before the activity occurs. This will give you some time to gather the materials you need.

ACKNOWLEDGEMENTS

The Science Department would like to thank the following for their assistance in providing these science lesson plans to 5th grade teachers:

Nancy Barba	**Director, Program Development**
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Stephanie Patterson	**Coral Park Elementary**
Carolyn Sant Angelo	**Indian Trace Elementary**

These 5th grade science lesson plans were developed and written under the direction of Rose-Marie Botting, Science Curriculum Specialist. It is hoped that these science lesson plans will assist you in delivering science curriculum. If you have any questions please contact Rose-Marie Botting at 954.767.8407.

REQUIRED TEXTS

1. Harcourt Science, grade 5
2. Ranger Rick, Forces and Motion (Big book or individual readers)
3. Ranger Rick, A World of Sound (Big book or individual readers)

REQUIRED VIDEO

1. Soaring with FCAT Science Video for Strand C - Force and Motion

NECESSARY MATERIALS

Day 1 - books
1 12" by 24" board
several rolling objects (toy cars, marbles, small balls)
1 stopwatch
one meter stick or tape

Day 2 - lid from plastic container
paper punch
2 feet of string
10 washers
paper clip
tape
bar magnet
12" by 6" piece of sandpaper

Day 4 - cones or masking tape
stopwatch or clock with minute hand
ruler or meter stick

Day 5 - a bar of soap
1 one or two liter bottle per student or one bottle if teacher will use this activity as a demonstration

Day 7 - triple beam balance
1 tennis ball
1 playground ball
1 ping pong ball
1 marble
1 metric tape measure or meter stick

Day 9 - 1 toy car
2 spring scales
2 pairs of safety goggles
2 1/2 meter long pieces of string or yarn

Day 11 -1 Science show board
1 small stuffed animal

Day 13 - (per student or group)
1 metric ruler
1 pencil
30 pennies

Day 15 -1 plastic ruler per group

Day 16 - plastic wrap
scotch tape
1 20 cm. by 40 cm. piece of tissue paper
1 18 oz. cylinder shaped container such as oatmeal, salt or Pringles
scissors
metric tape measure

BENCHMARK SC.C.1.2.1 (Content Sampled):

The student understands that the motion of an object can be described and measured.

ESSENTIAL QUESTIONS:

What are some ways that an object can move?

answer: Sliding, bouncing, soaring are some ways objects can move.

How can the motion of an object be measured?

answer: Motion can be measured by calculating distance/ time.

VOCABULARY FOR WORD WALL:

motion - the act or process of changing position

FCAT SCIENCE DAILIES:

None

CONTENT/ ACTIVITY: (The Ramp)

Procedure

1. Explain to the class that for each Strand there will be at least one independent center called an Investigation Station for them to use when their work is finished or when they have free time.
2. Use the attached Science Center called “The Ramp”. Demonstrate how to set up the ramp, start the object in motion and measure its distance.
3. Have students record data on a table in a science journal. Headings for the table should include Height of the Ramp, Object Used, Time Object Moves and Distance Object Moves.

VIDEO:

Watch the Soaring with FCAT Science Video for Strand C - Force and Motion. It is highly encouraged that you review the sections throughout the video that relate to the benchmark you are teaching. All benchmarks are covered in this video.

Continued next page

ASSESSMENT:

As students complete the Science Investigation Station, they should complete a data chart and write a conclusion. Students should also answer the two questions provided on the backside of the attached Science Center. Model how you want students to label a page in their science journals for the data table, their conclusion and the answers to the two questions (answer to question 1 is A and 2 is G).

TEACHER PREPARATION FOR NEXT DAY'S LESSON

Materials

- **a lid from a plastic container**
- **paper punch**
- **a piece of string about 2 feet long**
- **10 washers**
- **A 12 inch by 6 inch piece of sandpaper**
- **paper clip**
- **tape**
- **bar magnet**

The Ramp

Benchmark SC.C.1.2.1 The student understands that the motion of an object can be described and measured

Vocabulary:

Task: Does the height of the ramp determine how far an object will roll and how long it will take for the object to stop?

Materials:

Books
One 12”x24” board
several rolling objects (toy cars, marbles, small balls)
One stopwatch
One meter stick or tape

Procedure:

1. Stack two books.
2. Measure the height of the two books and record the measurement.
3. Place the board on the books to form a ramp.
4. Select an object that rolls.
5. Place the object on the top of the ramp.
6. Have the timekeeper get ready to start the stopwatch as soon as the object begins to roll.
7. Without using a force, place the object at the top of the ramp so that it will roll on its own.
8. Stop the watch when the object stops. Record the time.
9. Measure the distance the car traveled. Record the distance.
10. Stack three books. Follow the same procedure.
11. Stack four books. Follow the same procedure.
12. Stack five books. Follow the same procedure.
13. Analyze the data you collected.
14. Write a conclusion in your science journal.

The Ramp Assessment

1. Maria and Fabian designed an experiment using a ramp and a car. They placed the car at the top of the ramp and watched it travel down the ramp. Which of the following can be measured from doing this experiment?

   A. time and distance

   B. friction and gravity

   C. pressure and speed

   D. force and motion

2. Maria and Fabian added a strip of sandpaper to one half of the ramp. The other half they left smooth. They placed a car on top of each of the surfaces of the ramp. They watched the two cars travel down the ramp. What effect will the sandpaper have on the speed of the car?

   A. The car will travel faster down the sandpaper side of the ramp.

   B. The car will travel slower down the sandpaper side of the ramp.

   C. The sandpaper will have no effect on the speed of the car.

   D. The sandpaper will not allow the car to travel down the ramp.

BENCHMARK SC. C.1.2.1 (Content Sampled):

The student understands that the motion of an object can be described and measured.

ESSENTIAL QUESTIONS:

What is force?

What are three forces that affect objects on Earth every day?

answer: Friction, magnetism and gravity are three forces that affect objects on Earth every day.

VOCABULARY FOR WORD WALL:

force - a quality that tends to produce movement or acceleration of a body in the direction of ts application; a push or pull **friction** a force that opposes the relative motion of two material surfaces in contact with one another **gravity** a force of attraction between two masses **magnetic** having the property of attracting iron and certain other materials by virtue of a surrounding field of force

FCAT SCIENCE DAILY: None

CONTENT /DEMONSTRATION: Gravity, Friction and Magnetism

Materials

- a lid from a plastic container
- a piece of string about 2 feet long
- A 12 inch by 6 inch piece of sandpaper
- tape
- paper punch
- 10 washers
- paper clip
- bar magnet

Procedure

1. Using a paper punch, make a hole near the edge of the plastic container lid. Tie one end of the string through this hole.
2. Unbend the paper clip and tie it to the other end of the string.
3. Put the lid on a desk about 10 inches from the edge and hang the paper clip over the end of the desk.
4. Add washer to the paper clip until the lid begins to move freely.
5. Tape a piece of sandpaper to the desk so that it extends 12 inches away from the edge. Repeat steps 3 and 4.

Continued next page

6. Discuss the force that was moving the lid in both trials. (Gravity)
7. Compare the number of washers that was needed to move the lid on the bare desk and on the sandpaper. Discuss the force that made it more difficult for the lid to slide along the sandpaper. Friction)
8. Take the washers off the paper clip and hold a bar magnet next to the paper clip. The paper clip will appear to "float". What force is acting on the paper clip? (magnetic)

ASSESSMENT:

Have students make 3 columns in their science journals and label them "Gravity", "Friction" and "Magnetism". Record three examples of each force that they encounter in their daily lives.

BENCHMARK SC. C. 1.2.1 (Content Sampled)

The student understands that the motion of an object can be described and measured.

ESSENTIAL QUESTIONS:

What effect do the forces of friction, gravity and magnetism have on objects?

answer **-** These forces cause objects to move, stop or change direction.

VOCABULARY FOR WORD WALL:

matter - a solid, liquid or gas that takes up space and has mass
mass - the amount of matter an object contains
weight - measure of the force of attraction between objects due to gravity

FCAT SCIENCE DAILIES: NONE

CONTENT/READING:

HARCOURT SCIENCE F 6 - 9

Procedure:

1. Teacher reads pages F6 - 9 orally to students as they follow or students may read the selection on their own.

2. Question students to assess their understanding of the material covered.

ASSESSMENT:

Have students answer questions # 1- 5 on page F9.

TEACHER PREPARATION FOR NEXT DAY'S LESSON

Materials

cones or masking tape
1 stopwatch or clock with a minute hand
1 ruler or meter stick

BENCHMARK SC. C. 1.2.1 (Content Sampled):

The student understands that the motion of an object can be described and measured.

ESSENTIAL QUESTIONS:

What are some ways that an object can move?

answer: Objects can move by sliding, bouncing, soaring.

How can the motion of an object be measured?

answer: Speed can be measured by using the formula distance/time.

VOCABULARY FOR WORD WALL:

Review all vocabulary

FCAT SCIENCE DAILIES:

Students answer questions and discuss.

CONTENT READING:

HARCOURT SCIENCE: **Speed and Velocity page F35**

Procedure

1. Teacher reads page F35 orally to students as they follow or have students read on their own.

2. Question students to assess their understanding of the material covered.

CONTENT/ ACTIVITY:

Materials

- cones or masking tape
- 1 stopwatch or clock with a minute hand
- 1 ruler or meter stick

Procedure

1. Measure an outside area of 10 meters or an inside area of 20 feet. Mark the boundaries of the area using cones or masking tape.
2. Have each student select one way of moving such as crawling or hopping and write this description of movement in their science journals.
3. Discuss the formula for calculating speed (distance / time) and have each student record this formula and the measured distance in their science journals.

Continued next page

4. Line up 5 students at one end of the measured distance and have each student "move" individually across the distance. The teacher should use a stopwatch or the minute hand of a clock to measure the time for each student. Have students record their times and calculate their speed.
5. Repeat step # 4 until all students have calculated a speed for their selected movement.

ASSESSMENT:

Have students answer questions # 1 and 2 on page F37.

TEACHER PREPARATION FOR NEXT DAY'S LESSON

Materials

Prior to this activity, have each student bring in a one or two liter bottles if each student is going to participate. If you are going to just demonstrate the activity you will need a liter bottle.

BENCHMARK SC. C. 2.2.2 (Annually Assessed):

The student knows 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.

ESSENTIAL QUESTION:

What causes a change in the motion?

answer: A force can cause a change in motion.

VOCABULARY FOR WORD WALL:

Inertia - The property of a body, due to its mass, that causes it to resist any change in its motion unless overcome by a force.

FCAT SCIENCE DAILIES:

None

CONTENT READING:

HARCOURT SCIENCE p. F41

Procedure

1. Read the page orally to the students or have them read on their own.
2. Question students to assess their understanding.

ACTIVITY/DEMONSTRATION:

This activity may be presented as a demonstration, in groups of 2 - 4 students or as an individual activity for each student.

Procedure

Follow the directions for “Changes in Motion” on pages F32 and F33.

ASSESSMENT:

Students should answer the 4 questions on page F33.

BENCHMARK SC. C.2.2.2 (Annually Assessed):

The student **knows 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.**

ESSENTIAL QUESTIONS:

What are ways that the motion of an object can change?

answer: Motion can speed up, slow down, or change direction

VOCABULARY FOR WORD WALL:

Review all previous vocabulary.

FCAT SCIENCE DAILIES:

None

CONTENT /READING:

HARCOURT SCIENCE: p. F35 (Acceleration) - F37

Procedure

1. Teacher reads the pages orally to the students or has them read on their own.

2. Question students to assess their understanding of the material covered.

ASSESSMENT:

Have students make a table in their science journals.

Label one column “Object” , one column “Change in Motion”, and the last column “Why”.

Have students complete the table for three different objects and three different changes of motion that they witness in the classroom or out on the playground. For example,

Object	Change in Motion	Why
a ball	The ball changed from resting on the ground to moving through the air.	The ball changed motion because a force was applied causing the ball to speed through the air. The ball fell to the ground because of gravity

TEACHER PREPARATION FOR NEXT DAY’S LESSON

Materials

- **1 tennis ball**
- **1 playground ball**
- **1 ping pong ball**
- **1 marble**
- **1 metric tape, measure or meter stick**

BENCHMARK SC. C. 2.2.3 (Content Sampled):

The student **knows that the more massive an object is the less effect a given force has.**

ESSENTIAL QUESTIONS:

Will the same amount of force cause the same effect on all Objects?

answer: No, the greater the mass of the object, the less effect a given force will have.

Is greater force needed to move a more massive object?

answer**:** Yes. Small objects require less force to move them than a large object.

VOCABULARY FOR WORD WALL:

mass - the amount of matter an object contains

Review vocabulary words listed on the activity **(force, friction, gravity mass and motion)**

FCAT SCIENCE DAILIES:

none

CONTENT /DEMONSTRATION: Keep the Ball Rolling

Materials

- 1 tennis ball
- 1 playground ball
- 1 metric tap measure or meter stick
- 1 triple beam balance
- 1 ping pong ball
- 1 marble

Procedure

You may want to work with your PE coach to do this activity outdoors with all 5th grade students in your school. Use the attached science activity entitled "Keep the all Rolling" to demonstrate the benchmark. Use the data chart that is created to draw a conclusion about the relationship between force and mass.

ASSESSMENT:

Use the two questions provided with the activity above. (answers 1-->B, 2-->F)

Keep the Ball Rolling

Benchmark SC.C.2.2.3 The student knows that the more massive an object is, the less effect a given force has.

Vocabulary:

Force – a push or a pull
Friction – force that resists the motion of two objects in contact
Gravity – the force that pulls objects toward the center of the Earth
Mass – measure of the amount of matter contained in an object
Motion – the act or process of changing position

Materials (per group of 4 students)**:**

- triple beam balance
- **1 – tennis ball**
- 1 – playground ball (PE)
- 1 – ping pong ball
- **1 – marble**
- metric tape measure or meter stick

Procedure:
Note: Activity can be done outdoors or in class where there is a long area for the balls to roll unobstructed.

1. Make a data chart for the mass of each object and the distance traveled.
2. Measure the mass of each object and record on the data chart.
3. Flick each object with an index finger from the same starting point. Measure and record the travel distance.
4. Repeat the process 3 more times. Observe and record results.

Content:
The more mass an object has, the less effect a force has on that object. If one object is struck with the force of another moving object, the force of motion is passed from one to the other. Depending on the mass of the object that is struck, the force can have varying effects on the way the object will move.

1. Vincent went bowling and noticed that some bowling balls were easier to roll down the alley than others. What is the most likely reason some of them were easier to roll?

A. Some bowling balls were softer than others.

B. Some bowling balls were not round.

C. Some bowling balls had less mass than others.

D. Some bowling balls had more mass than others.

SC.C.2.2.3

2. A small recess kickball hit a larger one with great force. The larger one barely moved. What is the most likely reason that the larger ball didn't move?

A. The smaller ball had greater mass than the larger ball.

B. The larger ball had greater mass than the smaller ball.

C. The mass of both balls was equal.

D. Mass has no effect on force.

SC.C.2.2.3

BENCHMARK SC.C.2.2.3 (Content Sampled):

The student knows that the more massive an object is the less effect a given force has.

ESSENTIAL QUESTIONS:

How does the mass of an object affect†the force that is needed to accelerate the object?

answer: The greater the mass, the greater the force that is required to change its direction or speed.

VOCABULARY FOR WORD WALL:

Review previous vocabulary words (answer to question 1 is B and question 2 is F).

FCAT SCIENCE DAILIES:

Students answer questions and discuss.

CONTENT /READING:

HARCOURT SCIENCE: Page F42

Procedure

1. Teacher reads page F42 orally to students as they follow or students may read the selection on their own.
2. Question students' understanding as they proceed through the page.

ASSESSMENT:

You may want to post the following assignment on the board.

Answer question # 2 on page F45 and question # 25 on page F57.

TEACHER PREPARATION FOR NEXT DAY'S LESSON

Pull It

Materials

- **1 toy car**
- **1 spring scale**
- **1 pair of safety goggles**
- **1 piece of string or yard (each 1/2 meter long)**

Assessment

Benchmark—SC.C.2.2.3

1. Which of the following would take more force to lift?

   A. 1 pound of feathers

   B. 1 pound of rocks

   C. 1 pound of cotton candy

   D. 1 pound of coffee

2. A ping pong ball, baseball, kickball and tennis ball were in a box on the playground. Which of the ball would take more force to throw?

   F. kickball

   G. tennis ball

   H. baseball

   I. ping pong ball

BENCHMARK SC.C.2.2.4 (Annually Assessed):

The student knows **that the motion of an object is determined by the overall effect of all forces acting on the object. (Also assesses SC.C.2.2.2)**

ESSENTIAL QUESTIONS:

What is force?

answer: A force is a push or a pull.

How do several forces affect the motion of an object?

answer: The strongest force will have the most effect on the motion of an object.

VOCABULARY FOR WORD WALL:

Review the definitions of **force, gravity and friction.**

FCAT SCIENCE DAILIES:

None

CONTENT /DEMONSTRATION: Pull It

Materials

- 1 toy car
- 1 pair of safety goggles
- 1 piece of string or yard (each 1/2 meter long)
- 1 spring scale

Procedure

Use the attached science activity entitled “Pull It” to introduce the benchmark. Use observations to draw a conclusion regarding motion caused by opposing forces.

ASSESSMENT:

Use the two questions provided with the activity above.

Pull It

Benchmark SC.C.2.2.4 The student knows that the motion of an object is determined by the overall effect of all of the forces acting on the object. (Also assesses C.2.2.2)

Vocabulary:

Acceleration – a change in motion
Force – a push or pull
Motion – the act or process of changing position
Newton – a measure of force
Object – a thing made of matter

Materials (per group of 2 students)**:**

- 1 toy car
- **2 spring scales**
- 2 pair of safety goggles
- **2 pieces of string or yarn (each 1/2 meter long)**

Procedure:

1. Tie each piece of string to the opposite ends of the car so it makes a loop.
2. Put on your safety goggles.
3. Hook the spring scales through the loops of string and pull with 20 grams of force on each side of the car. Observe and describe the car's motion.
4. Pull with 20 grams of force on one scale and 40 grams of force on the other. Observe and describe the car's motion. Repeat again reversing the force measurements. Observe and describe the car's motion again.
5. Hook both spring scales on the same side of the car. Pull with 20 grams of force on each scale. Observe and describe the motion of the car.

Content:
Forces acting on an object can combine, act in opposition to each other, or cancel each other out. It takes a force to make an object start moving, stop moving, speed up, slow down, or change direction. Any change in the motion of an object is called acceleration.

1. If two forces pull an object in the same direction, what happens to the forces?

A. the forces add

B. the forces oppose each other

C. the forces change direction

D. the forces cancel each other out

SC.C.2.2.4

2. Which of the following can a force cause to happen to an object?

A. start moving

B. stop moving

C. change directions

D. all of the above

SC.C.2.2.4

BENCHMARK SC. C.2.2.4 (Annually Assessed):

The student knows that the motion of an object is determined by the overall effect of all forces acting on the object. (Also assesses C.2.2.2)

ESSENTIAL QUESTIONs:

What happens to an object's motion when balanced forced act on it?

answer: The object's motion and direction are not changed.

What happens to an object's motion when unbalanced forces act on it?

answer: The motion changes.

VOCABULARY FOR WORD WALL:

Review previous vocabulary

FCAT SCIENCE DAILIES:

Students answer questions and discuss (answer for question 1 is D and question 2 is H).

CONTENT READING:

HARCOURT SCIENCE: **F 12 - F15**

Procedure

1. **Read the pages orally to the students or have them read on their own.**
2. Question students to assess their understanding of the material covered.

ASSESSMENT:

You may want to write the following assignment on the board. Have the students answer questions #1 - 5 on page F15.

TEACHER PREPARATION FOR NEXT DAY'S LESSON

Materials

1 science show board

1 small stuffed animal

Assessment

Benchmark—SC.C.2.2.4

1. John and his friend were kicking soccer balls down the field. What would John need to do to kick the ball farther than his friend?

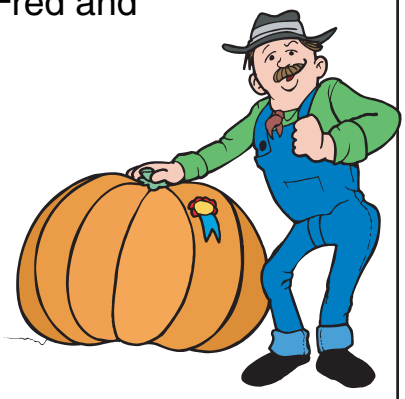
A. run faster down the field

B. stop the ball

C. keep kicking the ball with the same force in the same direction.

D. keep kicking the ball with a stronger force in the same direction.

2. Fred wanted to move a large pumpkin out by the front of his house. He began to roll the pumpkin but didn't get very far because it was heavy. His friend Harry came along to help. What would Fred and Harry need to do in order to move the pumpkin together?



F. Fred should push down while Harry pushes forward on the pumpkin.

G. Harry should push the pumpkin and Fred should pull it up.

H. Both boys should work together to push the pumpkin in the same direction.

I. Each boy should push the pumpkin in different directions.

BENCHMARK SC. C.2.2.1 (Content Sampled):

The student recognizes that forces of gravity, magnetism and electricity operate simple machines.

ESSENTIAL QUESTIONS:

What are three natural forces?

answer: Three natural forces are gravity, friction and magnetism

What are 4 simple machines?

answer: The inclined plane, lever, pulley wheel and axle are four simple machines.

Which natural force can operate an inclined plane?

answer: Gravity is a natural force that can operate an inclined plane?

VOCABULARY FOR WORD WALL:

inclined plane - a type of simple machine: a slanted surface that makes it easier to move a mass from a lower to a higher point; a ramp

lever - a type of simple machine; consists of a rigid bar that pivots about a fulcrum, used to transmit and enhance power or motion

pulley - a type of simple machine; a circular lever, usually a wheel with a groove where a rope can be placed and used to change the direction of a force

wheel and axle - a type of simple machine: a circular frame or disk revolving around a central axis

FCAT SCIENCE DAILIES:

None

Continued next page

CONTENT /READING:

RANGER RICK (big book or individual readers) Forces and Motion pages 14 and 15

Procedure

1. Review the 3 natural forces of friction, gravity and magnetism. Introduce electricity as another natural force.
2. Read pages 14 and 15 orally in order to introduce students to the 4 main simple machines.
3. If possible have an example of each machine available to share with students.

CONTENT /DEMONSTRATION:

Materials

- 1 science show board
- 1 small stuffed animal

Procedure

1. Set the show board against a table to create an inclined plane.
2. Have students identify the simple machine.
3. Place a small stuffed animal at the top of the inclined plane and let go without exerting any force.
4. Discuss what natural force was used to operate the simple machine. (gravity)

ASSESSMENT:

Have students bring in one object or picture from home which is an example of a simple machine or contains a simple machine.

Note - If students are not able to bring in items from home, the teacher may want to collect items or pictures. Examples might include a bottle opener, a pan balance or a stapler (lever), a roller skate, a watch or a radio dial (wheel and axle) , a toy slide, a handicapped ramp or a picture of a path up a hill (inclined plane), blinds in a classroom, a toy sailboat or a flag pole(pulley).

BENCHMARK SC.C.2.2.1 (Content Sampled):

The student recognizes that forces of gravity, magnetism and electricity operate simple machines.

ESSENTIAL QUESTIONS:

What are 4 natural forces?

answer**:** Four natural forces are gravity, friction, magnetism and electricity.

Which of these forces might slow down the operation of a simple machine?

answer: Friction might slow down the operation of a simple machine.

Which natural forces would be useful in the operation of simple machines?

answer: The forces of gravity, magnetism, and electricity would be useful.

VOCABULARY FOR WORD WALL:

Review the definitions for an inclined plane, a lever, a pulley and a wheel and axle.

FCAT SCIENCE DAILIES:

Students answer question and discuss (answer to question 1 is C and question 2 is G.).

CONTENT READING:

RANGER RICK, FORCES AND MOTION pages 7, 9and 15

Procedure

1. On page 7, point out the picture of the escalator. Have students identify the simple machine (inclined plane) and the force that is operating it (electricity).
2. On page 9, point out the picture of the crane. Have students identify the simple machine (pulley) and the force that is operating it (magnetism).
3. On page 15, point out the picture of the ramp. Have students identify the simple machine (inclined plane) and the force that would help the wheelchair move down the ramp (gravity).

Continued next page

ASSESSMENT:

Have students make 3 columns in their science journals, one labeled “Object”, the next labeled “Simple Machine” and the last column labeled “Force that Might Operate this Machine”. Have each student that brought in an example of a simple machine share his/her item. Students should record the object in the appropriate column and then fill in the next 2 columns. Share and discuss the responses.

TEACHER PREPARATION FOR NEXT DAY’S LESSON

Lever Lift

Materials

1 metric ruler per 2 students

30 pennies or small washers per 2 students

Assessment

Benchmark—SC.C.2.2.1

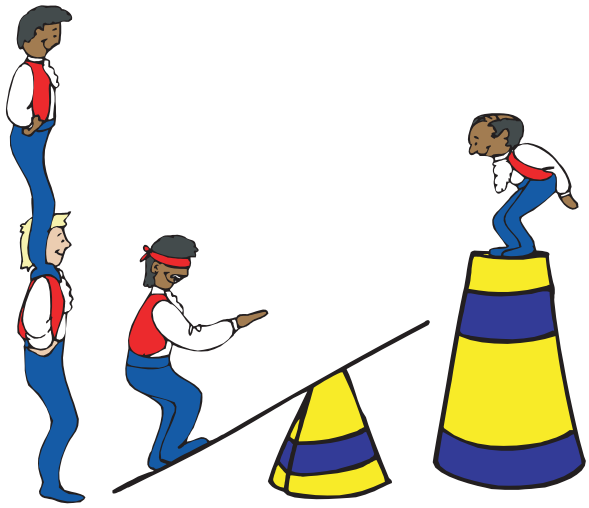
1. Henry visited the circus. He saw a man standing on one end of a seesaw. All of a sudden a large object came down on the other end of the seesaw and propelled the man way up high into the tent. He came down and landed in the net without getting hurt. The seesaw is an example of which simple machine?

A. pulley

B. wedge

C. lever

D. axle



2. Which force caused the man to fall into the net?

F. friction

G. gravity

H. speed

I. inertia

BENCHMARK- SC. C.2.2.1 (Content Sampled):

The student recognizes that forces of gravity, magnetism and electricity operate simple machines.

ESSENTIAL QUESTIONS:

How does the position of a fulcrum affect the amount of work that is done with a lever?

answer: The closer the load is to the fulcrum, the less effort is needed.

VOCABULARY FOR WORD WALL:

fulcrum - the pivot point of a lever

FCAT SCIENCE DAILIES:

NONE

CONTENT /HANDS ON ACTIVITY: LEVER LIFT

Procedure

1. Review the purpose of a lever (a simple machine used to lift weight)
2. Use the attached activity, “Lever Lift” to explore the essential question.

ASSESSMENT:

Have students answer and discuss the 2 questions that are provided with “Lever Lift”. (Answers: 1--> A, 2--> H).

Lever Lift

Benchmark SC.C.2.2.1 The student recognizes the forces of gravity, magnetism and electricity operate simple machines.

Vocabulary:

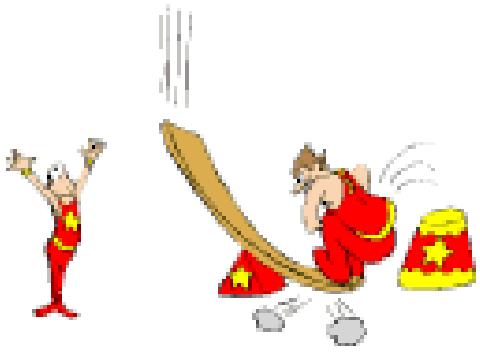
Effort – an applied force
Force – a push or a pull
Fulcrum – the pivot point of a lever
Lever – a simple machine consisting of a bar pivoted on a fixed point used to increase a force or alter the direction of a force
Load – an object to be moved

Materials (per student)**:**

- metric ruler
- 1 pencil
- **30 pennies**

Procedure:

1. Place the pencil on the desk. Lay the ruler across the pencil at the 10 cm. ruler mark.
2. Stack 5 pennies on the 1 cm. ruler mark.
3. Place pennies on the opposite end (29 cm. ruler mark) until the stack of 10 pennies rises. Record the number of pennies needed to lift the stack.
4. Move the pencil to the 15 cm. ruler mark.
5. Repeat steps 2 and 3. Record the number of pennies needed to lift the stack.



Content:
A lever is a simple machine that can be used to lift heavy objects. The effort force changes as the distance from the fulcrum changes. The further the effort is from the fulcrum, the less force will need to be used. The closer the effort is to the fulcrum, the more force. Similarly, the closer the load is to the fulcrum, the less effort is needed. The further away the load is from the fulcrum, the more effort will be needed.

1. John wants to lift a heavy rock with a lever. How can he decrease the amount of effort he needs to apply to the lever?

A. He can move the fulcrum closer to the load.

B. He can push down harder on the lever.

C. He can move the fulcrum further from the load.

D. He can apply effort closer to the fulcrum.

SC.C.2.2.1

2. Maria tried to lift a heavy box with a lever, but it was too heavy to budge. What can she do to make the box easier to lift?

A. She can apply her effort closer to the box.

B. She can use a shorter lever.

C. She can use a longer lever.

D. She can move the fulcrum further away from the box.

SC.C.2.2.1

BENCHMARK SC. C.1.2.2 (Content Sampled):

The studentknows that waves travel at different speeds through different materials.

ESSENTIAL QUESTION:

How do invisible forms of energy such as sound, heat and light, move?

answer: All of these forms of energy travel in waves.

VOCABULARY FOR WORD WALL:

Review previous vocabulary.

FCAT SCIENCE DAILIES:

NONE

CONTENT /DEMONSTRATION:

Materials

- classroom objects that make sounds

Procedure

1. Have students close their eyes while the teacher makes sounds associated with the classroom (ie. opening a desk drawer, using the pencil sharpener or stapler).
2. Have students raise their hands or a thumb when they think they can identify the sound.
3. Ask students how the sound gets from the object (ie. the desk) to their ears?

CONTENT READING:

HARCOURT SCIENCE: **Pages D30 - 31**

Procedure

1. **Read the pages orally to the students or have them read on their own.**
2. Discuss the fact that, like heat and light, sound also travels in waves.

ASSESSMENT:

Students should draw and label a picture in their journals illustrating the concept that sound, heat and light travel in waves.

TEACHER PREPARATION FOR NEXT DAY'S LESSON

Materials

1 plastic ruler per group of two, three or four students

BENCHMARK SC. C. 1.2.2 (Content Sampled):

The student knows that waves travel at different speeds through different materials.

ESSENTIAL QUESTION:

Does sound travel faster through water or through air?

answer: Sound travels through a solid the fastest and through water more quickly than through air. This is due to the closeness of the particles which make up matter. Since the particles of a solid are the closest together, sound travels through hem the fastest.

VOCABULARY FOR WORD WALL:

Review previous vocabulary.

FCAT SCIENCE DAILIES:

None

CONTENT READING:

RANGER RICK, A World of Sound pages 1 - 7

CONTENT ACTIVITY:

Materials

- 1 plastic ruler per group of two, three or four students

Procedure

1. Have one student place the ruler on a desk with 2 inches extended over the edge of the desk. The student should pull down the extended part of the ruler and let go while other students listen to the sound that is created.
2. Have the same student repeat making this sound, but this time students should place one ear on the top of the desk and cover the other ear with their hand. Compare the sounds.
3. Repeat steps one and two using different students to create the sounds. Each time the ruler should be extended 2 inches further off the edge of the desk so that 4, 6 and 8 inches are extended. Compare the sounds.

Continued next page

ASSESSMENT:

Have students make a chart in their journals illustrating that sound travels fastest through a solid, and that sound travels faster through a liquid than through a gas.

TEACHER PREPARATION FOR NEXT DAY'S LESSON

Speed of Sound

Materials

- plastic wrap
- scotch tape
- 1 oatmeal container (or use any cylinder shaped container such as salt, Pringles)
- tissue paper
- scissors

BENCHMARK SC. C.1.2.2 (Content Sampled):

The student knows that waves travel at different speeds through different materials.

ESSENTIAL QUESTION:

How does sound move through the air?

answer: Sound travels in waves caused by vibrations until it reaches the ear. The ear sends nerve impulses over sensitive nerves to the brain, which identifies what we hear.

VOCABULARY FOR WORD WALL:

Review previous definitions.

FCAT SCIENCE DAILIES:

Students answer question and discuss (answer to question 1 is A and question 2 is G).

CONTENT /DEMONSTRATION: Speed of Sound

Materials per group of 5 students

- plastic wrap
- tissue paper
- 1 oatmeal container (or use any cylinder shaped container such as salt, Pringles)
- scotch tape
- scissors

Procedure

1. **Read the activity as preparation time is required. You may also want to try this activity before demonstrating it to the students.**

2 Use the attached science activity entitled “Speed of Sound” to investigate the speed of sound through air.

ASSESSMENT:

Use the two questions provided with the activity above (answers 1--> D, 2--> F).

Assessment

Benchmark—SC.C.1.2.2

1. Sound can travel through many different kinds of materials. Which of the following does sound travel through the fastest?

   A. solid .

   B. liquid

   C. gas

   D. plasma

2. Light also travels through many different kinds of materials. Which of the following materials will allow light to easily travel through it?

   F. wood

   G. glass

   H. cardboard

   I. tile

Speed of Sound

Benchmark SC.C.1.2.2 The student knows that waves travel at different speeds through different materials.

Vocabulary:

Sound wave – a pressure wave which transmits sound energy
Speed – measure of the rate of motion

Materials (per group of 3 students)**:**

- plastic wrap
- **scotch tape**
- **metric tape measure**
- oatmeal containers (18oz.- can use any cylinder shaped container; i.e.: salt, Pringles, hot cereal)
- scissors
- **tissue paper (20cm. x 40cm.)**

Procedure(to make drum):

1. Remove the cover of the oatmeal container. Make a small hole in the middle of the container's base (about the diameter of a pencil).
2. Cover the open end of the container with plastic wrap and tape tightly in place.

Procedure (to measure the speed of the sound wave):

1. Cut the tissue paper into long fringe for a target.
2. Hold the target so the fringe hangs vertically. Point the hole in the drum at the target. Measure the distance between the drum base and the target. Record in cm.
3. Gently tap the drum head with your fingers. Observe the target.
4. Repeat again from the same distance. Record the time (in seconds) it takes for the sound wave to reach the target.
5. Repeat steps 2-4 using different distances from the target each trial. Record the distance from the target and time elapsed.
6. Rotate so that each team member is a timer, drummer and target holder.

Content:
The speed of a wave changes as the distance from the sound source changes. The further away you are from the source of a sound, the longer it will take for you to hear it. That is why you often hear the sounds of fireworks a short while after you see the flash from a distance. It is also why you sometimes hear thunder a short while after a flash of lightning.

1. Sound travels at different speeds through different distances. Which of the following is an example of this?

A. Sound heard before a lightning strike.

B. Sound heard before a fireworks explosion.

C. Sound heard during a lightning strike.

D. Sound heard moments after a fireworks explosion.

SC.C.1.2.2

2. Sarah saw a flash of lightning a few moments before she heard thunder. Why did she observe this happening?

A. It takes time for sound to travel long distances.

B. Lightning has nothing to do with thunder.

C. Sound travels more quickly than light.

D. The sound of falling rain makes a thunder crash.

SC.C.1.2.2

BENCHMARK- All of strand C

VOCABULARY FOR WORD WALL:

Review all vocabulary from Strand C

REVIEW:

Use a teacher made review, district materials

or

use the Harcourt Science review on
page F28 (# 1, 2, 3, 4, 5, 6, 9, 10)
page F29 (# 20, 21, 22, 25, & the Performance Assessment)
page F56 (# 3, 6,)
page F57 (# 25)

ASSESSMENT:

Give students all of the FCAT Dailies again as an assessment. You may also use the questions at the back of the activities again.

or

use questions from the Harcourt Science Assessment Guide
page AG113 (#1,3, 4, 5, 6, 7, 9, 10)
page AG114 (# 12 - 17)
page AG115 (#22, 23)
page AG116 (#27,28)
page AG117 (# 29, 30)
page AG122 (#20, 21)
page AG124 (#27, 30)

List the above assignment on the board and have students work independently as you walk around assisting students as needed.