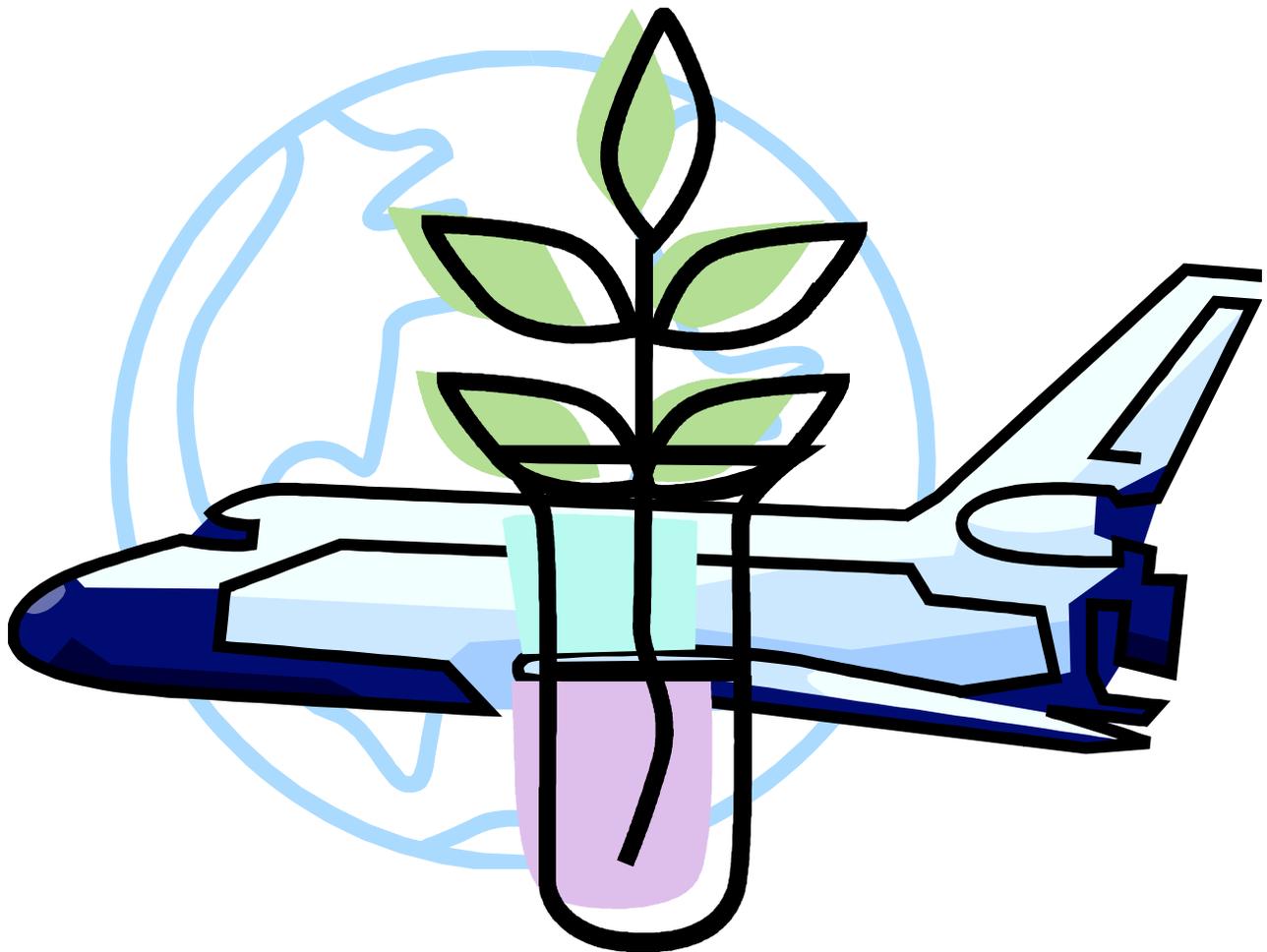


FCAT SCIENCE



FCAT RELEASED QUESTIONS

2009



Hillsborough County
PUBLIC SCHOOLS
Excellence in Education

Keys to Science Success:

The following pages include questions spanning all four of the Big Ideas in the Science Curriculum that are tested by FCAT Science Assessment: Physical, Earth and Space, Life, and Nature of Science. The questions are divided by each of these Big Ideas and then by benchmark.

Science instruction and hands-on experiences should **NOT** stop to review for the FCAT Science Assessment. The questions contained in this document should be used strategically during instructional time to help prepare students without detouring from the curriculum map.

To use these questions most effectively, please encourage the use of the following strategies:

- Review your Harcourt Test #2 Item Analysis from the Scantron system. Align the usage of questions from this packet to the questions missed most frequently on the practice test.
- Items in this packet will be more rigorous in nature than the items used in most “FCAT” prep workbooks.
- Use 5 minute blocks to review these questions during the following times:
 - Bell work
 - Extension/Reinforcement Activities
 - First 5 minutes of science
 - Lunch groups
- Modeling is the key to student understanding of how to answer the higher-level questions that are on the FCAT Science Assessment.
- Extended Response and Short Response Items are historically where most students lose the majority of their points. Modeling the genre of science writing is a key component to students understanding how to answer these questions.
- Tips for the genre of Science writing include:
 - Give just the guts, no fluff – points can be taken off if extra information not pertaining to the answer is given.
 - Bulleted lists, diagrams, sentence fragments are all acceptable ways to answer the questions.
 - Answering the whole question, most of the questions have multiple parts.
- Use the Grade 5 Curriculum Maps to target which 1996 benchmarks are annually assessed and focus on the questions that cover those benchmarks.
- Linking the answering of these questions back to experiences students have had in science class has proven to help students comprehend these questions. **DO NOT DRILL AND KILL!!!**

Nature of Science Questions

Mrs. Patterson's class is growing red oak seedlings to transplant into a nearby park. Mrs. Patterson divided the class into groups and asked them to decide the best way to record how fast the seedlings grew. The data tables from the different groups are given below.

Which data table would be the **most helpful** in verifying how fast the seedlings grew?

Seedling Data Table #1

Time	Height (in cm)
Monday, June 18	10
Mid-July	22
Wednesday in August	32

A

Seedling Data Table #3

Time	Height (in cm)
June 18	12
July 22	25
August 20	36

B

Seedling Data Table #2

Time	Height (in cm)
June	15
July	18
August	22

C

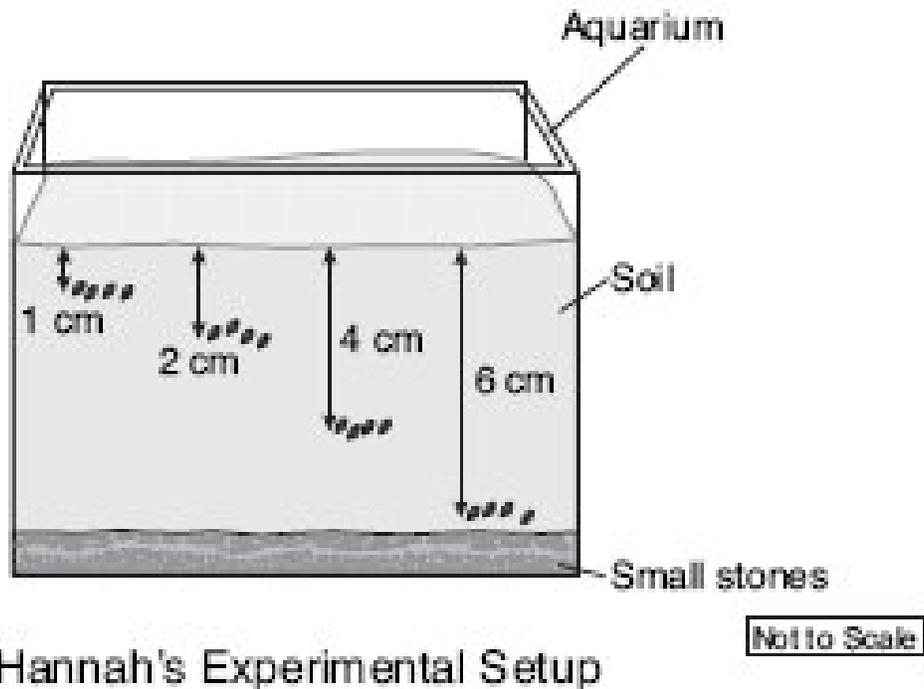
Seedling Data Table #4

Time	Height (in cm)
Spring	14
Summer	20
Fall	29

D

Benchmark: SC.H.1.2.1 The student knows that it is important to keep accurate records and descriptions to provide information and clues on causes of discrepancies in repeated experiments.

Hannah's mother wants to plant a garden in the spring and needs to know how deep to plant pea seeds. To help her mother, Hannah designed an experiment. She layered small stones and soil in an aquarium. She then planted four pea seeds at four different depths in the soil. She placed the seeds at depths of 1.0 centimeter (cm), 2.0 cm, 4.0 cm, and 6.0 cm below the surface of the soil. Hannah watered the seeds and put the aquarium in a sunny location.



What should Hannah do next in order to have useful information for her mother?

- A Record when the seeds sprout and begin to grow.
- B Make sure the seeds have enough sunlight.
- C Predict which seeds will sprout.
- D Plant more seeds.

Benchmark: SC.H.1.2.1 The student knows that it is important to keep accurate records and descriptions to provide information and clues on causes of discrepancies in repeated experiments.

Arnella sometimes leaves bread pieces on her bird feeder for the robins to eat. She is trying to determine which type of bread—rye, wheat, or white—robins like. She hypothesized that robins like wheat bread more than other types of bread.

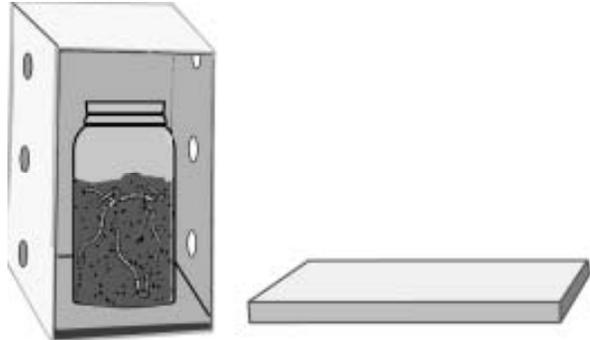


Arnella places equal amounts of each bread on the bird feeder. What information would help determine if her hypothesis is correct?

- A when the robins come to eat
- B how many robins come to eat
- C which type of bread is gone first
- D how long until all the bread is gone

Benchmark: SC.H.1.2.1 The student knows that it is important to keep accurate records and descriptions to provide information and clues on causes of discrepancies in repeated experiments.

Jim was planting a garden and a friend suggested he put worms in his garden. Jim wanted to do an experiment to find out what worms do for gardens. Jim put soil, food, and worms in a clear jar. He placed a shoebox with holes cut in it on its side and put the jar in it. The lid was kept on the shoebox, except when Jim was making an observation.



If Jim does his experiment correctly, what will he do each time he takes the lid off the shoebox?

- A. add more worms to the jar
- B. write down what he sees in the jar
- D. try to guess where the worms will be
- C. plan what he will do next in the experiment

Benchmark SC.H.1.2.1 The student knows that it is important to keep accurate records and descriptions to provide information and clues on causes of discrepancies in repeated experiments.

Alejandro wants to find out whether mealworms prefer apples or pears. He places an apple slice at one end of a cardboard box and a pear slice at the other end. He then places 20 mealworms in the center of the box, about 15 centimeters (cm) from each piece of fruit. After several hours, he counts the mealworms on or under the apple, the mealworms on or under the pear, and the mealworms not touching either the apple or the pear. Alejandro repeated his experiment four times. The data are recorded in the table shown below.

MEALWORM EXPERIMENTS

Experiment Number	Mealworms On or Under the Apple	Mealworms On or Under the Pear	Mealworms Not On Either the Apple or the Pear
Experiment 1	14	4	2
Experiment 2	12	5	3
Experiment 3	15	4	1
Experiment 4	15	5	0

Which of the following is the **best** conclusion that Alejandro can make from these data?

- A** Mealworms prefer pears.
- B** Mealworms prefer apples.
- C** Mealworms do not prefer apples or pears.
- D** Mealworms do not go near apples or pears.

Benchmark: SC.H.1.2.2 The student knows that a successful method to explore the natural world is to observe and record, and then analyze and communicate the results. (Also assesses SC.H.1.2.4 knows that to compare and contrast observations and results is an essential skill in science; and SC.H.3.2.2 knows that data are collected and interpreted in order to explain an event or concept.)

Pierre wants to find out if a plant grows taller when given a new fertilizer called EverGrow. He plants seeds in pots and adds the proper amount of fertilizer according to the directions. What else should Pierre do to find out if EverGrow really does make plants grow taller?

- A. provide more light to his plants
- B. grow some seeds without fertilizer
- C. put the plants in windows in different rooms
- D. water some of the plants at the end of two weeks

Benchmark SC.H.1.2.2 The student knows that a successful method to explore the natural world is to observe and record, and then analyze and communicate the results. This benchmark also assesses SC.H.1.2.4 and SC.H.3.2.2. “The student knows that to compare and contrast observations and results is an essential skill in science.” “The student knows that data are collected and interpreted in order to explain an event or concept.”

Janis wants to compare the number of snails in two different areas of a park. What is the **most appropriate** way for Janis to compare the number of snails in the two different areas of the park?

- A. list ways that people make it hard for snails to live
- B. use a table to show the number of snails in each area
- C. make a drawing showing different features of each area
- D. graph how often the two groups of snails eat the same kind of food

Benchmark SC.H.1.2.2: The student knows that a successful method to explore the natural world is to observe and record, and then analyze and communicate the results. (Also assesses SC.H.1.2.4 and SC.H.3.2.2.)

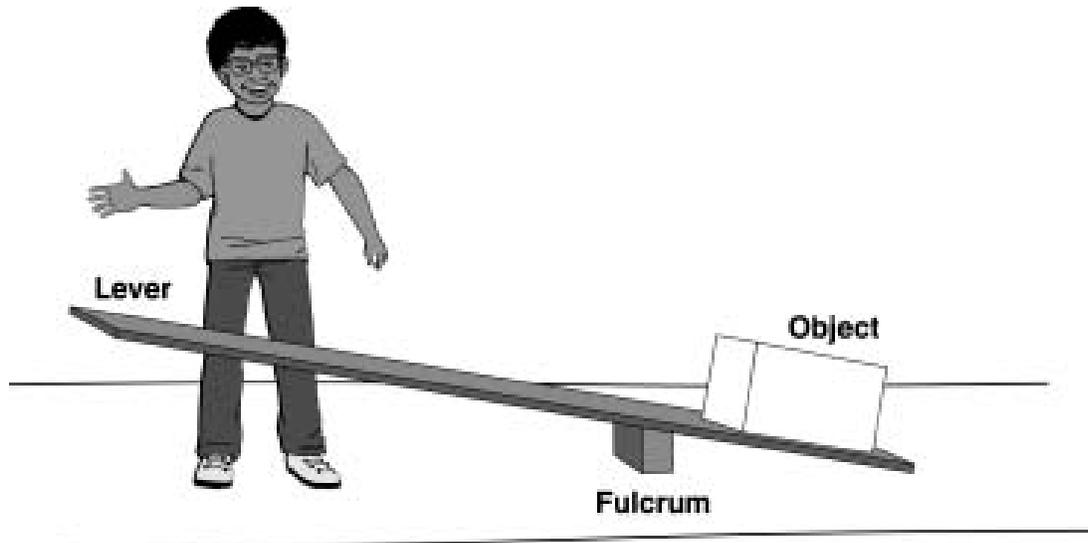
READ
INQUIRE
EXPLAIN

Trash was often found on the playground right after recess. Peg's class knew the area was always clean when they left the playground. Peg wanted to solve the mystery of the trash on the playground. Each day, she stayed on the playground five minutes longer after recess. Peg wrote down what she saw for one week. On Friday, she reviewed her notes for the week. She then reported to the class that the cause of the trash on the playground was a pair of hungry crows looking for food in the trash cans after recess.

Identify and describe the four steps of the scientific method that Peg used to solve the mystery of the playground trash.

Benchmark SC.H.1.2.2 The student knows that a successful method to explore the natural world is to observe and record, and then analyze and communicate the results. This benchmark also assesses SC.H.1.2.4 and SC.H.3.2.2. "The student knows that to compare and contrast observations and results is an essential skill in science." "The student knows that data are collected and interpreted in order to explain an event or concept."

Robert is designing a demonstration to display at his school's science fair. He will show how changing the position of a fulcrum under a lever changes the amount of force needed to lift an object. To do this, Robert will use a piece of wood for a lever and a block of wood to act as a fulcrum. He plans to move the fulcrum to different places under the lever to see how its placement affects the force needed to lift an object.



Part A Identify at least two other actions that would make Robert's demonstration better.

Part B Explain why each action would improve the demonstration.

Benchmark SC.H.1.2.2 The student knows that a successful method to explore the natural world is to observe and record, and then analyze and communicate the results.

Leon filled Tray A and Tray B with soil. He planted grass in Tray B. He raised the trays on an incline and watered them. He noticed that more soil ran off of Tray A than Tray B.



Tray A
Soil Only



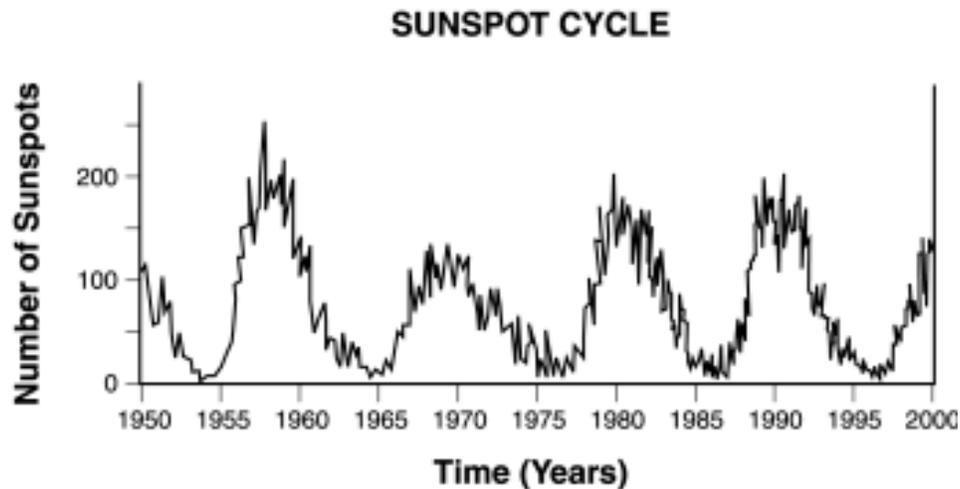
Tray B
Soil and Grass

What does this activity represent?

- A. using a model
- B. drawing a conclusion
- C. classifying information
- D. developing a hypothesis

Benchmark SC.H.1.2.5 The student knows that a model of something is different from the real thing, but can be used to learn something about the real thing.

For many years, astronomers have observed different numbers of sunspots on the surface of the Sun. Sunspots occur in predictable cycles. When there is a lot of activity, it is called the “solar maximum” and when it is quiet, it is called the .solar minimum.. The graph below shows the number of sunspots observed since 1950.

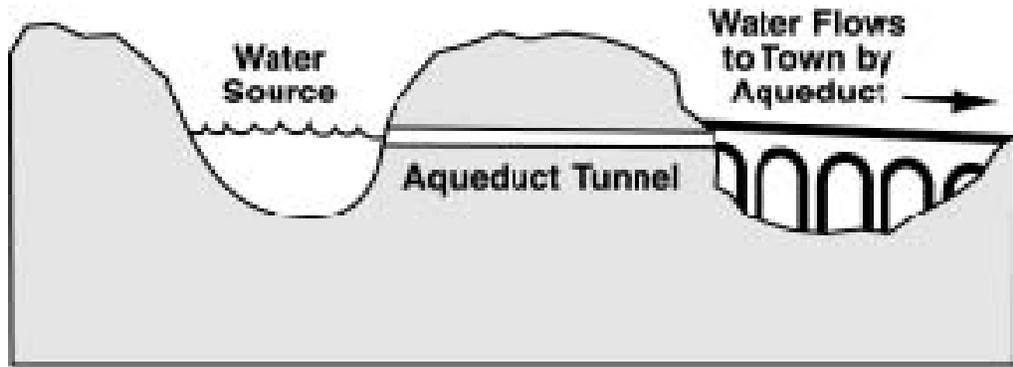


The last solar maximum occurred in the year 2000. What would be the **best** prediction for the next solar maximum in the sunspot cycle?

- A. 2002
- B. 2006
- C. 2011
- D. 2013

Benchmark SC.H.2.2.1 The student knows that natural events are often predictable and logical.

The Romans originally used aqueducts to carry water from lakes to lower, drier areas. Today, Los Angeles uses aqueducts for the same purpose.



Aqueduct

Part A How would an aqueduct affect food production?

Part B How would aqueducts change the human population of an area after an aqueduct was built?

Benchmark SC.H.3.2.1 The student understands that people, alone or in groups, invent new tools to solve problems and do work that affects aspects of life outside of science. This benchmark also assesses SC.H.3.2.3. “The student knows that before a group of people build something or try something new, they should determine how it may affect other people.”

Cities have water purification programs to keep drinking water free from bacteria and other pollutants. How does this help people living in these cities?

- A. It eliminates filters from factories.
- B. It produces large amounts of water.
- C. It helps people by cleaning the air they breathe.
- D. It helps people by making the water safer to use.

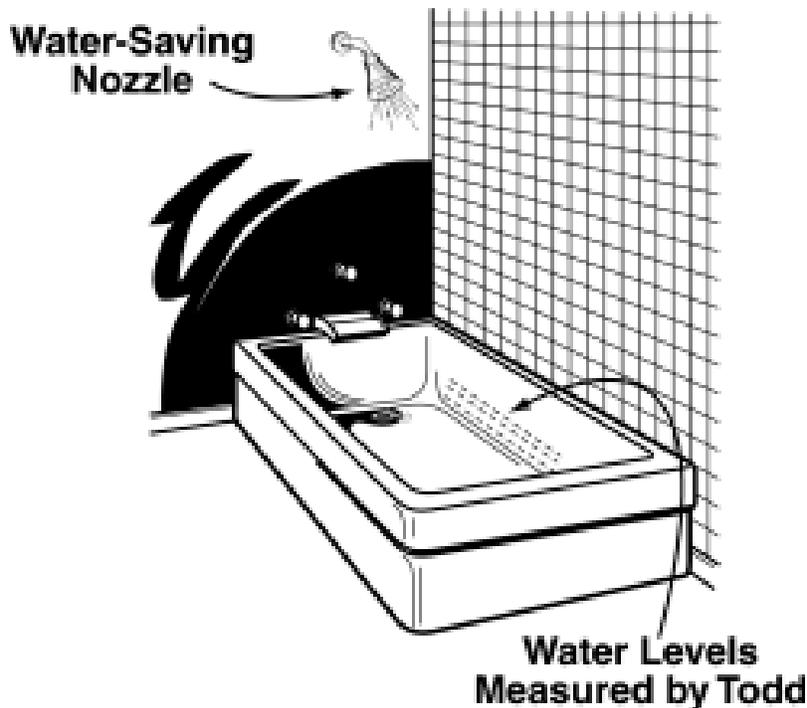
Benchmark SC.H.3.2.1 The student understands that people, alone or in groups, invent new tools to solve problems and do work that affects aspects of life outside of science. This benchmark also assesses SC.H.3.2.3. “The student knows that before a group of people build something or try something new, they should determine how it may affect other people.”

Mr. Brown wonders how minerals affect animal growth and decides to conduct an experiment with his chickens. He begins with three buckets containing exactly the same amount of chicken feed and then adds the same amount of two different minerals to two of the buckets. He adds calcium to one bucket, magnesium to another bucket, and he doesn't add any minerals to the third bucket. What scientific term is used to describe the type of mineral placed in each bucket?

- A. control
- B. hypothesis
- C. specimen
- D. variable

Benchmark SC.H.3.2.4 The student knows that through the use of science processes and knowledge, people can solve problems, make decisions, and form new ideas.

Todd wanted to determine the amount of water that could be saved with a water-saving nozzle on his family shower. Each day for one month, each family member plugged the bathtub drain and measured the water level after taking a shower using the water-saving nozzle.



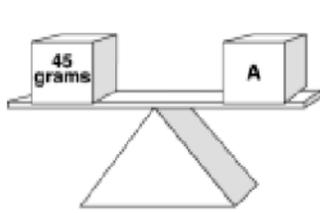
Part A What could Todd do to improve his experiment to show how much water his family saved?

Part B What additional benefits to the environment would there be to using the water-saving nozzle?

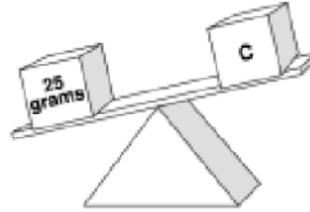
Benchmark SC.H.3.2.4 The student knows that through the use of science processes and knowledge, people can solve problems, make decisions, and form new ideas.

Physical Science Questions

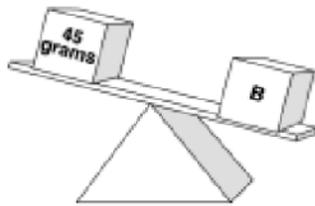
Henry is measuring the mass of four different blocks with letters on them. Look at the pictures below.



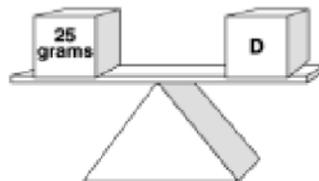
Balance A



Balance C



Balance B



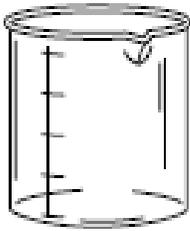
Balance D

Which block has the **greatest** mass?

- A. Block A
- B. Block B
- C. Block C
- D. Block D

Benchmark SC.A.1.2.1 The student determines that the properties of materials (e.g., density and volume) can be compared and measured (e.g., using rulers, balances, and thermometers).

Lakisha wants to collect 20 milliliters (mL) of water from a forest stream so she can observe the tiny organisms that live in the water. Which would be the **best** tool for measuring exactly 20 mL of water?



250 mL beaker

F



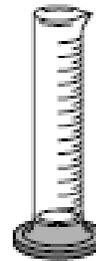
30 mL test tube

H



2 mL dropper

G



50 mL graduated cylinder

I

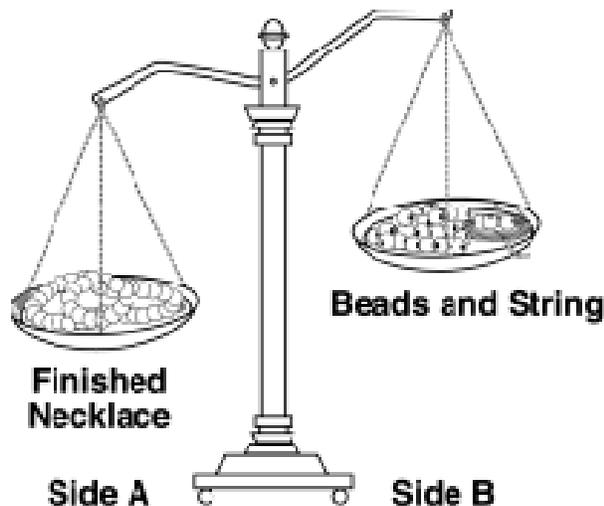
Benchmark: SC.A.1.2.1 The student determines that the properties of materials (e.g., density and volume) can be compared and measured (e.g., using rulers, balances, and thermometers).

Elena placed 150 grams of water into the freezer. She wanted to see if freezing the water would change its mass. How will the mass of the water be affected when the water freezes?

- A. The mass will be greater.
- B. The mass will be smaller.
- C. There will no longer be a mass.
- D. There will be no change to the mass.

Benchmark SC.A.1.2.2 The student knows that common materials (e.g., water) can be changed from one state to another by heating and cooling.

Jenny is making jewelry to sell at her school carnival. She has a box of plastic beads and wants all of the necklaces to have the same mass. She measures two lengths of string and makes a necklace that she thinks has a good mass. She puts her necklace on one side of a balance and two more lengths of string and a handful of beads on the other side as pictured below.

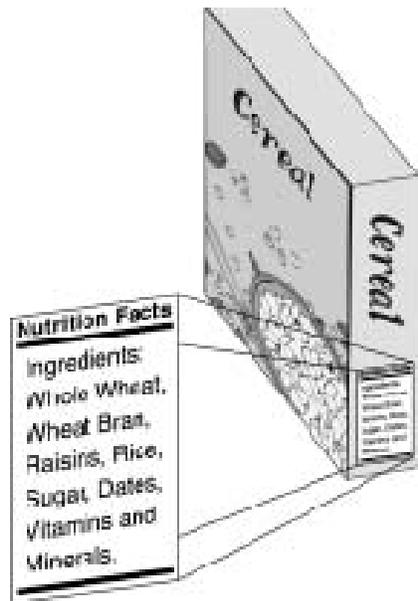


What should Jenny do first to make sure that the beads and the string have the same mass as the finished necklace?

- A. add beads to Side A until the balance tilts up
- B. add beads to Side B until the balance is level
- C. take beads off of Side B until the balance tilts up
- D. take beads off of Side B until the balance is level

Benchmark SC.A.1.2.3 The student knows that the weight of an object always equals the sum of its parts.

Cereals are made of many different ingredients. The diagram below shows some of these ingredients.

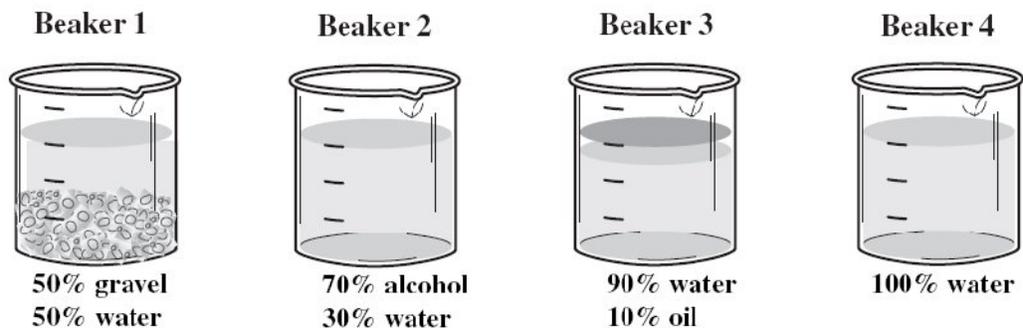


Which term describes the cereal?

- A. compound
- B. element
- C. mixture
- D. solution

Benchmark SC.A.1.2.4 The student knows that different materials are made by physically combining substances and that different objects can be made by combining different materials.

Roberto has four beakers containing different substances as shown below.

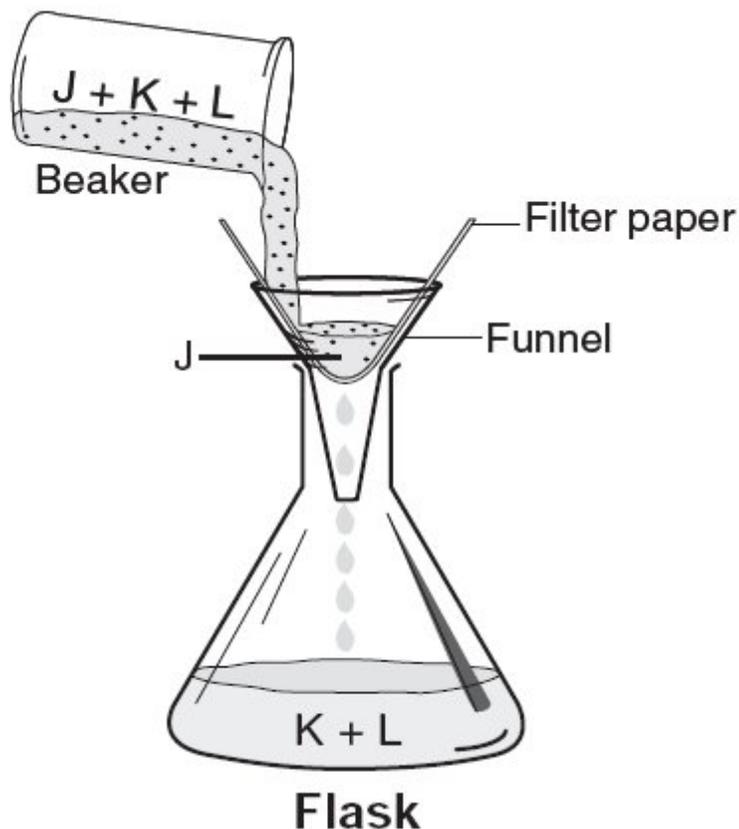


Which beaker contains a solution?

- A. Beaker 1
- B. Beaker 2
- C. Beaker 3
- D. Beaker 4

Benchmark SC.A.1.2.4: The student knows that different materials are made by physically combining substances and that different objects can be made by combining different materials.

Raheem is investigating the properties of several substances. He prepared a beaker containing substances J, K, and L and filtered the contents through a funnel into a flask, as shown below.



What term **best** describes substances J, K, and L inside the beaker before Raheem poured them through the filter paper?

- A mixture
- B solution
- C compound
- D pure substance

Benchmark: SC.A.1.2.4 The student knows that different materials are made by physically combining substances and that different objects can be made by combining different materials.

Ming's class observed how baking soda reacts when combined with vinegar. The class noticed bubbles formed when Ming dropped vinegar onto the baking soda. Which type of change occurred when the vinegar was added to the baking soda?

- A. chemical
- B. electrical
- C. mechanical
- D. physical

Benchmark SC.A.1.2.5 The student knows that materials made by chemically combining two or more substances may have properties that differ from the original materials.

The students in Mr. Santoro's science class collected a sample of pond water that appeared to be clear. They placed a drop of the pond water on a slide to view under the microscope.



Microscope

Which of the following should they expect to see in the pond water?

- A. atoms
- B. elements
- C. molecules
- D. organisms

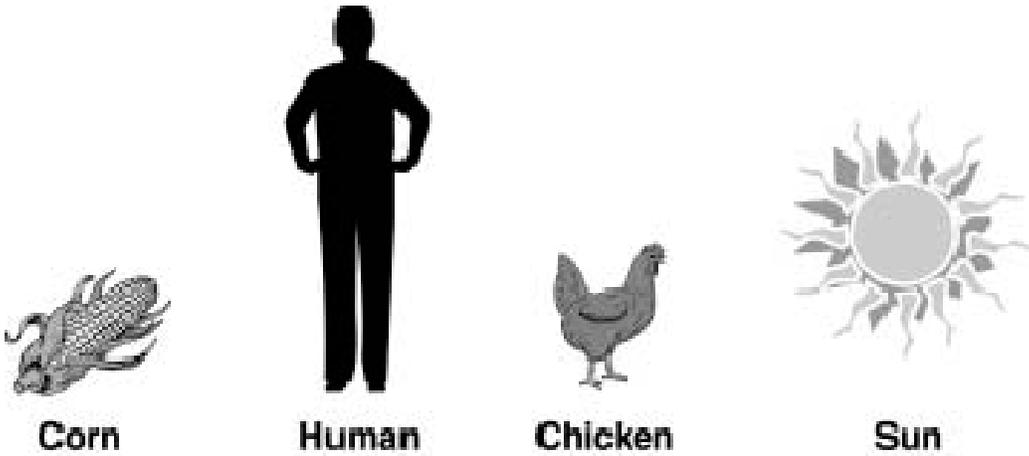
Benchmark SC.A.2.2.1 The student knows that materials may be made of parts too small to be seen without magnification.

Frogs are the major predators of fireflies. Explain how energy from the Sun is transferred through a firefly to a frog.

READ
INQUIRE
EXPLAIN

Benchmark SC.B.1.2.1: The student knows how to trace the flow of energy in a system (e.g., as in an ecosystem).

Safara cuts out these pictures from a magazine. She must use all four of them to make an example of a food chain.

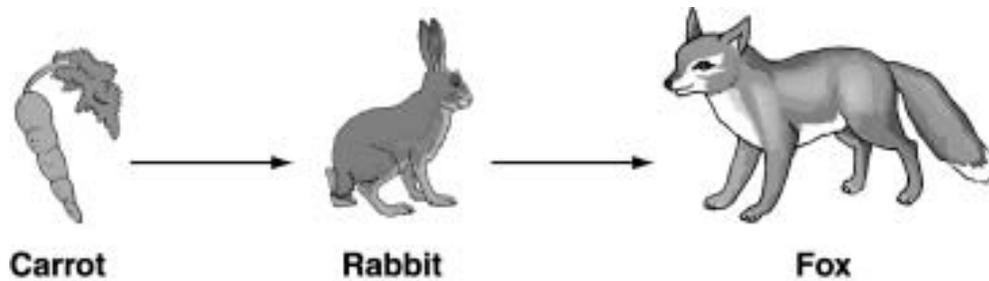


Part A Using words, show a food chain using all of Safara's pictures.

Part B Explain the transfer of energy between all four of the organisms in your food chain.

Benchmark SC.B.1.2.1 The student knows how to trace the flow of energy in a system (e.g., as in an ecosystem).

Each living thing in a food chain plays a role in the flow of energy in an ecosystem. Below is a picture of a simple food chain. The rabbit eats carrots and the fox eats the rabbit.



What is the **primary** role of the rabbit in this food chain?

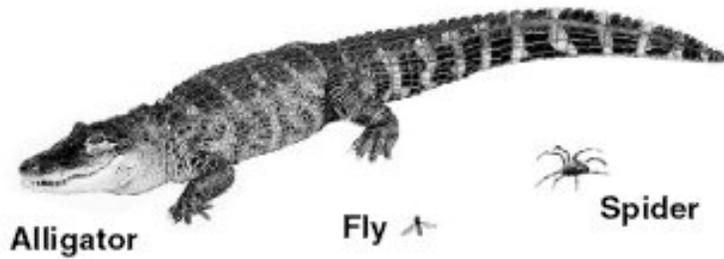
- A. to form a habitat
- B. to find a space to live
- C. to be a source of water
- D. to be a source of energy

Benchmark SC.B.1.2.1 The student knows how to trace the flow of energy in a system (e.g., as in an ecosystem).

4

The animals shown below live in the swampy, wooded areas of Florida.

READ
INQUIRE
EXPLAIN



Alligator

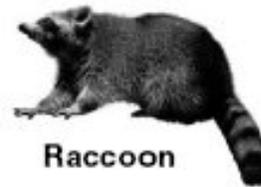
Fly

Spider

Not to Scale



Frog



Raccoon

How would the animals shown above be connected in a food web? Explain your answer using words or a labeled diagram.

Benchmark: SC.B.1.2.1 The student knows how to trace the flow of energy in a system (e.g., as in an ecosystem).

For a special dinner, Catherine's mom lit some candles in the living room for decoration.

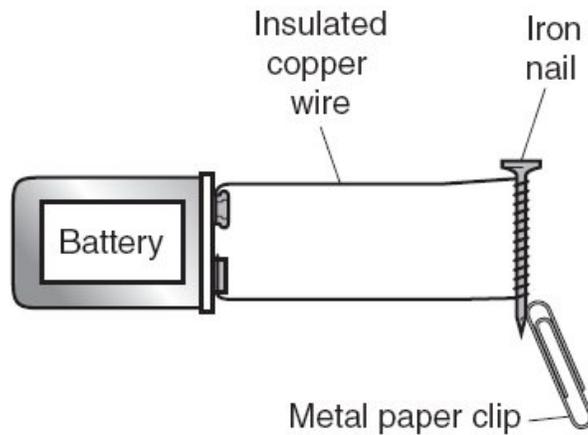


Which two forms of energy does the fire from a burning candle release?

- A. light and heat
- B. sound and chemical
- C. magnetic and nuclear
- D. electrical and mechanical

Benchmark SC.B.1.2.2 The student recognizes various forms of energy (e.g., heat, light, and electricity). This benchmark also assesses SC.B.1.2.4 “The student knows the many ways in which energy can be transformed from one type to another.”

Tanisha built the circuit in the picture below using a battery, insulated copper wire, and an iron nail. The iron nail has become magnetized by the battery and is attracting a metal paper clip.



Tanisha's Circuit

Which form of energy caused this nail to become magnetized?

- A electrical
- B heat
- C light
- D mechanical

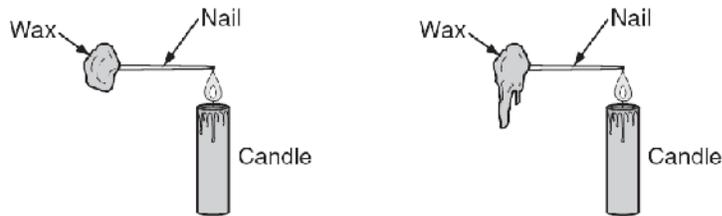
Benchmark: SC.B.1.2.2 The student recognizes various forms of energy (e.g., heat, light, and electricity). (Also assesses SC.B.1.2.3 knows that most things that emit light also emit heat; SC.B.1.2.4 knows the many ways in which energy can be transformed from one type to another; SC.B.1.2.5 knows that various forms of energy (e.g., mechanical, chemical, electrical, magnetic, nuclear, and radiant) can be measured in ways that make it possible to determine the amount of energy that is transformed; and SC.B.1.2.6 knows ways that heat can move from one object to another.)

Melissa's school rings a bell to alert students that it is time to start class. When the bell rings, it vibrates. The use of vibrations to send messages is an example of which type of energy?

- A** chemical
- B** heat
- C** light
- D** sound

Benchmark: SC.B.1.2.2 The student recognizes various forms of energy (e.g., heat, light, and electricity).

The head of a metal nail is dipped in melted candle wax. When the wax hardens, the head of the nail is coated with the wax. The rest of the nail has no wax. Tongs are used to hold the pointed end of the nail over the flame of a candle. Soon, the wax on the head of the nail begins to soften and then drip from the nail.



What causes the wax to melt?

- A. Heat stored in the wax as it hardened on the nail.
- B. Heat stored in the nail from the time it was made.
- C. Heat moving through the air from the candle flame.
- D. Heat moving through the nail from the candle flame.

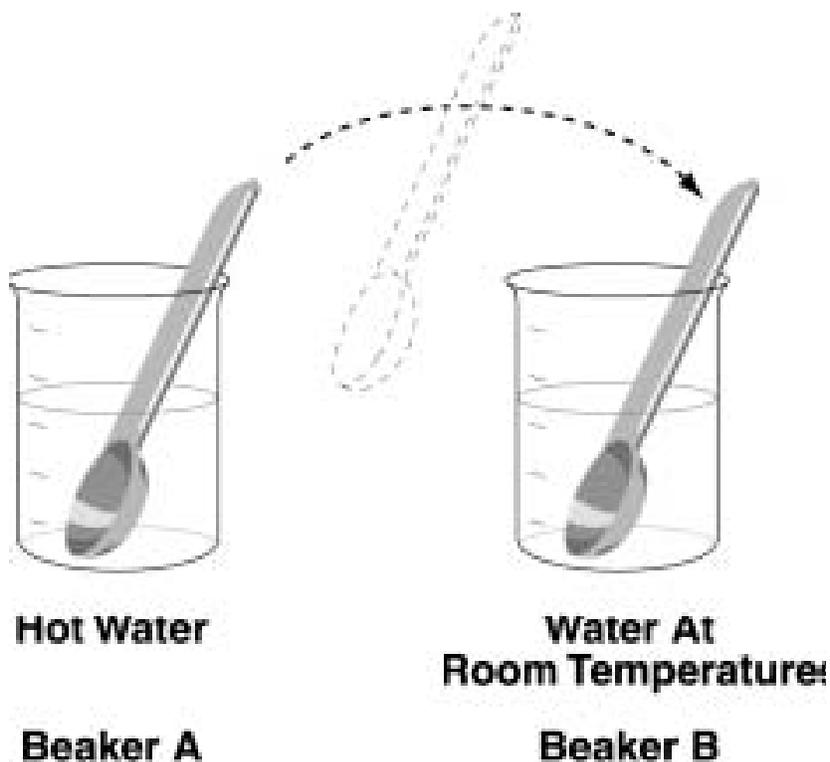
Benchmark SC.B.1.2.3: The student knows that most things that emit light also emit heat. (Assessed as SC.B.1.2.2.)

Lamps and flashlights produce light. When they are turned on, they also produce another type of energy. What other type of energy do these objects emit?

- A. chemical
- B. nuclear
- C. solar
- D. thermal

Benchmark SC.B.1.2.3 The student knows that most things that emit light also emit heat.

A spoon is put into Beaker A containing hot water for five minutes. Then the spoon is moved to Beaker B containing water at room temperature.

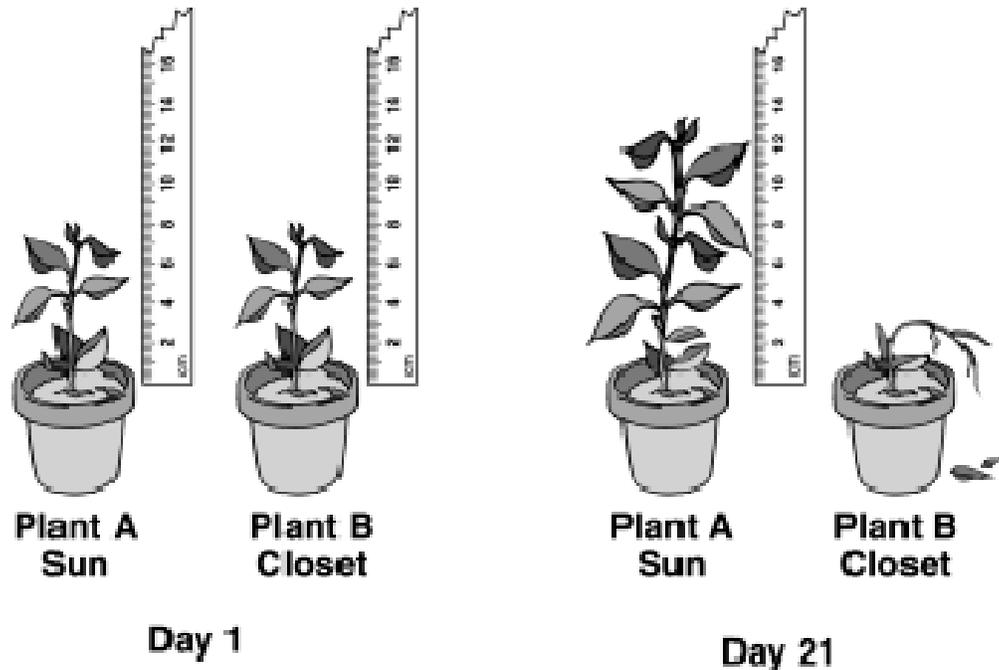


Which is the **best** way to measure the energy transfer that causes the change in the water temperature in Beaker B after the spoon is added?

- A. Use a graduated cylinder to measure the new water levels.
- B. Use a thermometer to determine the change in Beaker B.
- C. Use a balance to determine how much heat has been added to Beaker B.
- D. Use a ruler to measure how much water has evaporated from Beaker B.

Benchmark SC.B.1.2.5 The student knows that various forms of energy (e.g., mechanical, chemical, electrical, magnetic, nuclear, and radiant) can be measured in ways that make it possible to determine the amount of energy that is transformed. This benchmark also assesses SC.B.1.2.6. “The student knows ways that heat can move from one object to another.”

Plant A was placed on a sunny windowsill, and another just like it, Plant B, was placed in a dark closet. Each plant was given the same amount of soil and water. At the end of three weeks, Plant A in the sunny window had grown about six more centimeters (cm), but Plant B in the closet had started to wither and die. This activity was repeated many more times with other plants and similar results were recorded.

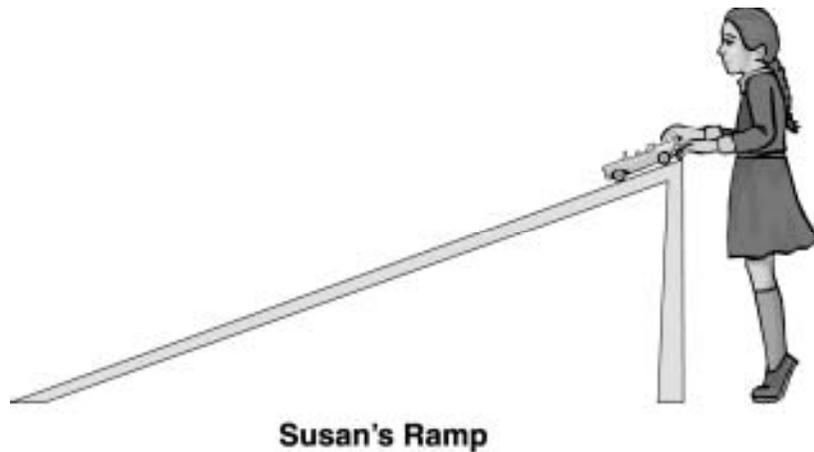


Why did Plant A grow more than Plant B?

- A. There was no sunlight in the closet.
- B. Plant B had no oxygen (O_2) in the closet.
- C. There was no air movement in the closet.
- D. Plant B had no carbon dioxide (CO_2) in the closet.

Benchmark SC.B.2.2.1 The student knows that some source of energy is needed for organisms to stay alive and grow.

Susan designed an experiment to determine the speed of a toy car. She released the car from the top of a ramp.



She already has a meterstick. Which other tool should she use to measure the car's speed?

- A. balance
- B. inclined plane
- C. spring scale
- D. stopwatch

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

Scientists use sound waves to map the ocean floor. They send out sound waves, and the time the signal takes to return is used to determine the distance of the object. Sound waves travel much quicker in water than in air. Why is there a difference in the time it takes sound to travel in air and water?

- A. Water is colder than air and conducts sound waves at faster rate.
- B. Sound waves travel in different directions through different materials.
- C. Air molecules cannot change sound waves as well as water molecules.
- D. Sound waves travel at different speeds because of the density of different materials.

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

Light waves change speed as they travel from the Sun to Earth's surface. Which of the following causes **most** of this change in the speed of light waves?

- A Earth's shape
- B Earth's gravity
- C Earth's mountains
- D Earth's atmosphere

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

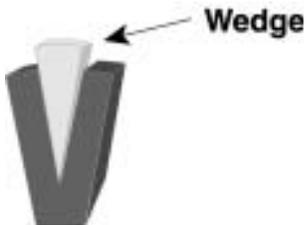
The force due to gravity is sometimes used to assist simple machines. Which simple machine relies on the force due to gravity?

A.

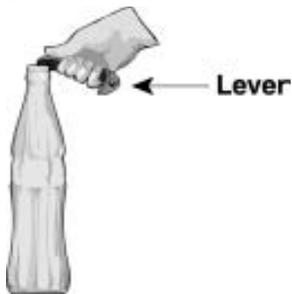


Inclined Plane

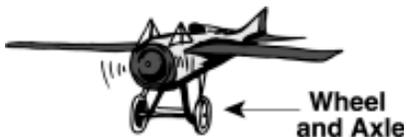
B.



C.



D.



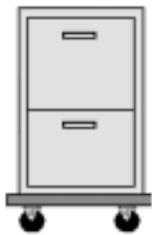
Benchmark SC.C.2.2.1 The student recognizes that forces of gravity, magnetism, and electricity operate simple machines.

Tim needs to move four file cabinets. The file cabinets have different masses. Tim pushes each cabinet for three meters.



Which cabinet requires the **most** force to move?

A.



Cabinet A
50 kilograms

B.



Cabinet B
100 kilograms

C.



Cabinet C
150 kilograms

D.



Cabinet D
200 kilograms

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

Mr. Gates mops the gymnasium floor every day. When he finishes mopping, he puts up the sign shown below.



The effect of which force is weakened when the floor is wet?

- A. friction
- B. gravitation
- C. inertia
- D. magnetism

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. This benchmark also assesses SC.C.2.2.2. “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.”

Juan and Kathleen bought model rocket kits. They built identical rockets with identical engines. Juan, however, glued small pieces of a broken bicycle reflector to his rocket to make it more visible in the sky.

Part A If everything is the same on both rockets except for the reflector pieces, which rocket will travel higher when they are launched at the exact same time?

Part B Explain why the rocket selected in Part A would travel higher.

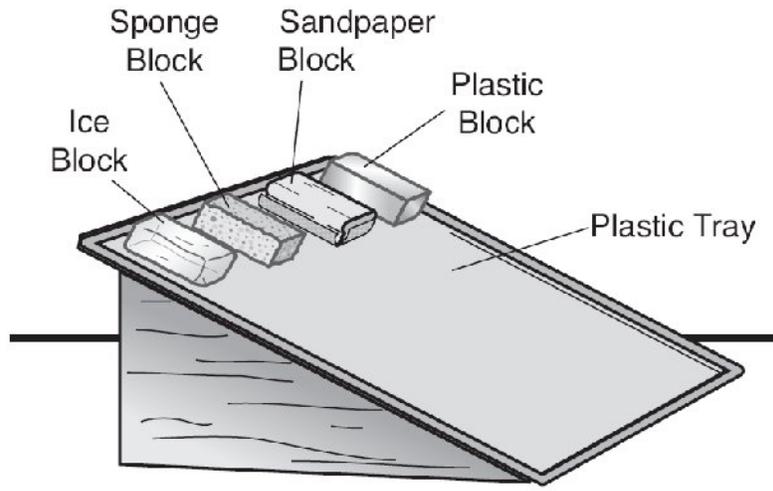
Benchmark SC.C.2.2.4 The student knows that the motion of an object is determined by the overall effect of all of the forces acting on the object. This benchmark also assesses SC.C.2.2.2 “The student knows that an object may move in a straight line at a constant speed, speed up, slow down, or change direction dependent on net force acting on the object.”

William used a hammer to pound a nail into a wooden board. When the nail was about halfway through the board, he stopped and turned the board upside down. The nail stayed in place in the board. Which of the following acts on the nail to keep it in place in the board?

- A friction
- B gravity
- C magnetism
- D weight

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 SC.C.2.2.2 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; and SC.C.2.2.3 knows that the more massive an object is, the less effect a given force has.)

Felipe and Marsha were studying friction and decided to do an experiment. They placed four equally sized blocks made of different materials on an elevated plastic tray. They watched the blocks move down the tray.



Friction Experiment

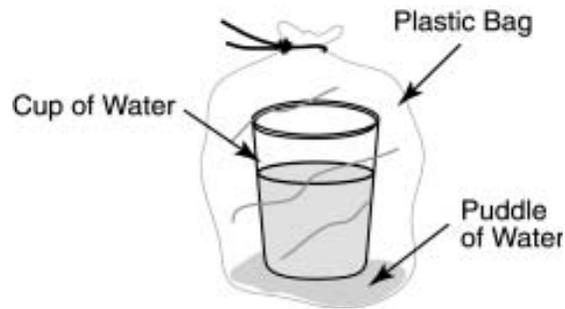
Which block would experience the **least** amount of friction as it moved down the tray?

- A Ice Block
- B Sponge Block
- C Sandpaper Block
- D Plastic Block

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 SC.C.2.2.2 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; and SC.C.2.2.3 knows that the more massive an object is, the less effect a given force has.)

FCAT Earth Science

Maria's class is studying weather. To demonstrate the water cycle, each student places a small cup of water in a sealed, plastic bag and places it near a sunny window. At the end of the day, there are water droplets near the tops of the bags. The next morning, there is water in the bottom of each bag.



Why has the water settled to the bottom of the bags during the night?

- A. The air cooled, causing the water to evaporate to the bottom of the bag.
- B. The air has warmed, causing the water to move through the cup to the bottom of the bag.
- C. The air has warmed, condensing the water droplets, which have fallen to the bottom of the bag.
- D. The air has cooled, condensing water vapor to droplets, which have fallen to the bottom of the bag.

Benchmark SC.D.1.2.3: The student knows that the water cycle is influenced by temperature, pressure, and the topography of the land.

“Deep under Earth’s surface there is a layer of red-hot liquid rock called magma. When pressure builds up, it forces the magma, together with ash, smoke, and steam, to burst up through cracks in the ground.”

What was the subject of the exhibit?

- A. earthquakes
- B. faults
- C. geysers
- D. volcanoes

Benchmark SC.D.1.2.4: The Student knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features. (Also assesses SC.D.1.2.1, SC.D.1.2.2, & SC.D.1.2.5)

The sides of the Grand Canyon show many different layers of rocks.



Which statement describes how the Grand Canyon was formed?

- A. The canyon once had a waterfall.
- B. Big rainstorms washed rocks out of the canyon.
- C. A flowing river cut into the rocks to form the canyon.
- D. The canyon was formed from rocks that came from other places.

Benchmark SC.D.1.2.4: The Student knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features. (Also assesses SC.D.1.2.1, SC.D.1.2.2, & SC.D.1.2.5)

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Over the past five years Paige has noticed changes in the rocks on the mountainsides near her aunt's house. She thinks that this is the result of weathering. Explain how weathering can change rocks.

Florida has a limestone rock foundation. When water moving through the ground mixes with carbon dioxide (CO₂), an acid is produced. This acid can dissolve some of the limestone. Which of the following is made as a result of the dissolving limestone?

- A sandy flatlands
- B offshore islands
- C underground caves
- D mangrove swamps

Benchmark SC.D.1.2.4: The Student knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features. (Also assesses SC.D.1.2.1, SC.D.1.2.2, & SC.D.1.2.5)

Florida has many limestone caves containing formations called stalactites. Stalactites are long, thin structures that hang from the ceilings of some caves. A picture of stalactites is shown below.



Which of the following **most likely** causes stalactites to form?

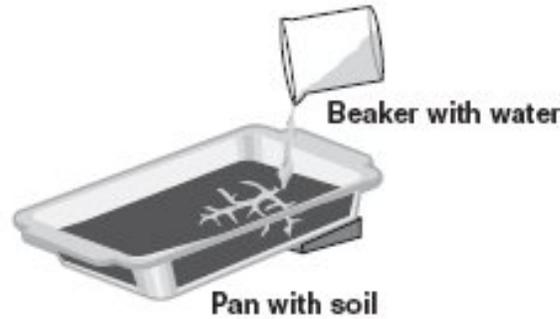
- A earthquakes
- B wind erosion
- C water dripping
- D animals burrowing

Benchmark SC.D.1.2.4: The Student knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features. (Also assesses SC.D.1.2.1, SC.D.1.2.2, & SC.D.1.2.5)

6

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After a visit to the Grand Canyon in Arizona, Jamie wondered how a river could carve such a deep canyon. Her grandfather created a model to show the formation of the Grand Canyon. He took a glass pan and filled it with tightly packed soil. He raised the pan slightly at one end. Then he took a beaker filled with water and slowly began to pour it on the raised end of the pan. He filled the beaker with water several times and repeated the process. Every time he poured more water onto the soil, the water flow would form deeper gaps along its path in the soil.



Part A Describe the similarities between the formation of the Grand Canyon and Jamie's grandfather's model.

Part B The Grand Canyon was shaped by other factors not demonstrated in the model. Identify and describe two of these factors.

Benchmark SC.D.1.2.4: The Student knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features. (Also assesses SC.D.1.2.1, SC.D.1.2.2, & SC.D.1.2.5)

In regions near the North and South Poles, the Sun does not set for several months in the summer. These areas, such as the northern parts of Alaska and Norway, are called the “land of the midnight Sun,” because the Sun remains visible for 24 hours a day.

Why is the Sun visible for so many hours during the day?
Explain your answer.

Benchmark SC.E.1.2.1: The student knows that the tilt of the Earth on its own axis as it rotates and revolves around the sun causes changes in season, length of day, an energy available.

Keisha knows that Earth rotates on its axis. What evidence indicates Earth is rotating on its axis?

- A. There is a day and a night.
- B. There are 365 days in each year.
- C. There are four phases of the Moon.
- D. There are different seasons of the year.

Benchmark SC.E.1.2.1: The student knows that the tilt of the Earth on its own axis as it rotates and revolves around the sun causes changes in season, length of day, an energy available.

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Ashley's science group is doing a report on the Sun's energy and Earth. Ashley is asked to explain to the class why it is cold at the North and South Poles and hot at the equator.



Globe



Flashlight

How could she explain this using a flashlight and a globe of Earth?

Benchmark SC.E.1.2.1: The student knows that the tilt of the Earth on its own axis as it rotates and revolves around the sun causes changes in season, length of day, an energy available.

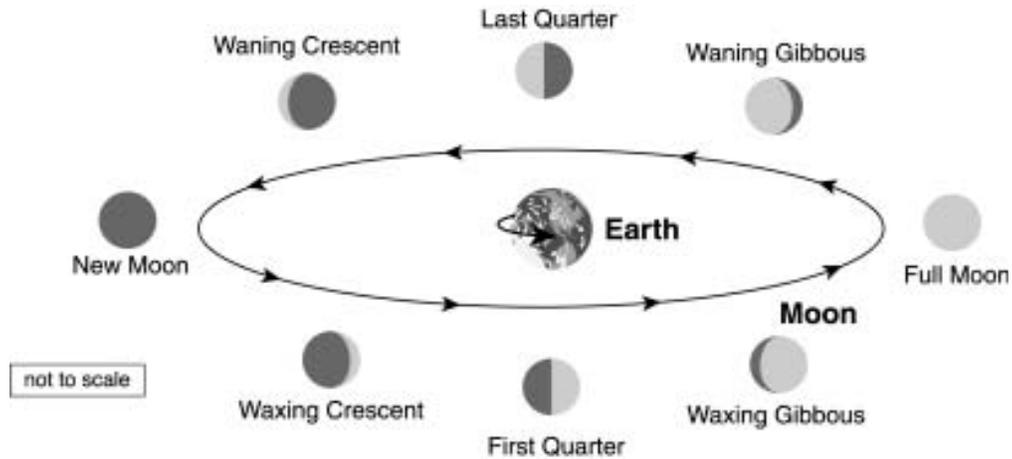
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Seasons in North America change as Earth moves around the Sun. Draw a diagram showing Earth's position around the Sun during each of the four seasons in North America. Be sure to label the North Pole and the seasons for each of your drawings.

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Benchmark SC.E.1.2.1: The student knows that the tilt of the Earth on its own axis as it rotates and revolves around the sun causes changes in season, length of day, an energy available.

When Jorge looks at the Moon from Earth, he sees different phases of the Moon depending on the time of the month he observes the Moon.



Why does the Moon have different phases during the month?

- A. The Moon revolves around Earth each month.
- B. The Moon does not have sunlight for one week each month.
- C. The Moon disappears behind the Sun for one week each month.
- D. The Moon revolves around the Sun on an axis once every month.

Benchmark SC.E.1.2.2: The student knows that the combination of the Earth's movement and the moon's own orbit around Earth results in the appearance of cyclical phases of the moon.

Plastic cups of different colors (red, light blue, black, and white) are filled with water and placed in direct sunlight. A thermometer is placed in each cup. The water in which cup will show the **highest** temperature after 60 minutes?

- A. the red cup
- B. the black cup
- C. the white cup
- D. the light blue cup

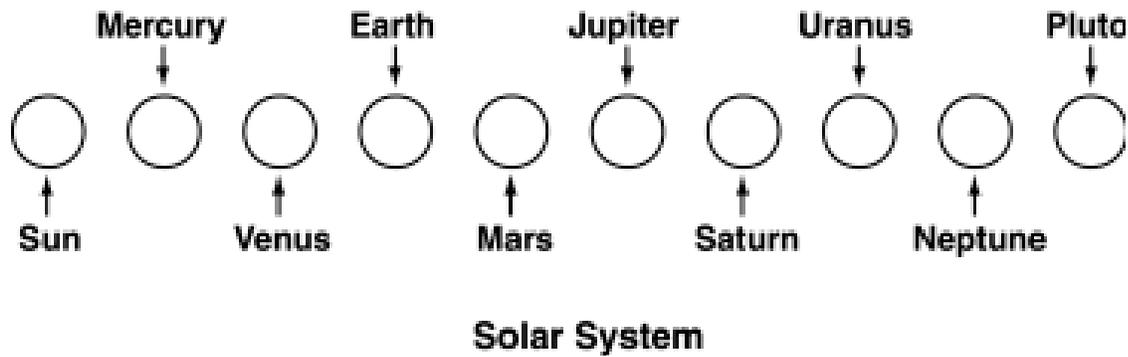
Benchmark SC.E.1.2.3: The student knows that the sun is a star and that its energy can be captured or concentrated to generate heat and light for work on Earth.

Earth appears to be the only planet that can support life as we know it. Which of the following gives Earth the conditions needed to support life?

- A the shape of the orbit
- B the closeness of Mars
- C the presence of a moon
- D the distance from the Sun

Benchmark: SC.E.1.2.4: The student knows that the planets differ in size, characteristics, and composition and that they orbit the sun in our Solar System. (Also assesses SC.E.1.2.5 understands the arrangement of planets in our Solar System.)

Miranda made a model of our solar system for her class. She arranged the planets in the order shown below.

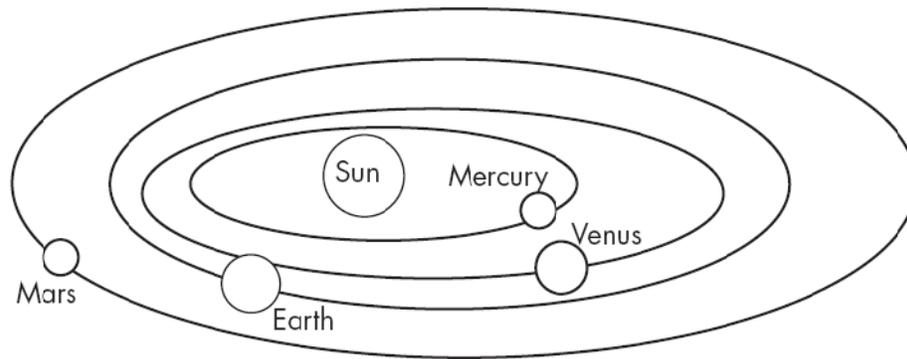


How can Miranda improve her model of the solar system?

- A. Add other planets.
- B. Make rings around Venus.
- C. Move Earth next to the Sun.
- D. Change the sizes of the planets.

Benchmark: SC.E.1.2.4: The student knows that the planets differ in size, characteristics, and composition and that they orbit the sun in our Solar System. (Also assesses SC.E.1.2.5 understands the arrangement of planets in our Solar System.)

Below is a picture of the Sun and the first four planets closest to the Sun.



Which of these planets has the longest year?

- A. Earth
- B. Mars
- C. Mercury
- D. Venus

Benchmark SC.E.1.2.5: The student understands the arrangement of planets in our Solar System. (Assessed as SC.E.1.2.4.)

At night, thousands of stars are visible from Earth, but during the day we can see only one star, the Sun. Why is the Sun the only star visible to us during the day?

- A. The other stars shine only at night.
- B. The clouds hide the other stars during the day.
- C. The Sun's light prevents the other stars from being seen.
- D. The other stars give off white light, which can only be seen at night.

Benchmark SC.E.2.2.1: The student knows that, in addition to the sun, there are many other stars that are far away.

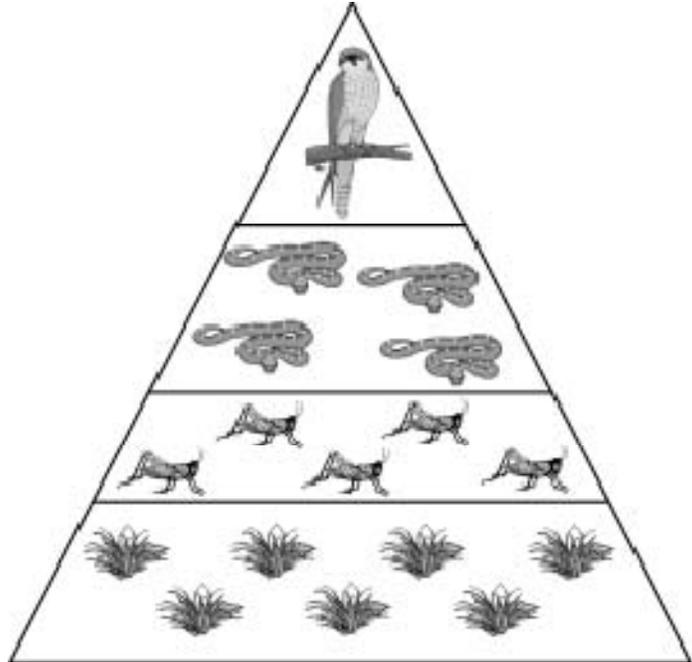
Carl read a science fiction story in which a woman traveled to a planet in another galaxy. He knows that travel to other galaxies is not yet possible. Which of the following is the **main** reason why humans are not able to travel to other galaxies?

- A. Planets in other galaxies are too far away.
- B. Planets in other galaxies do not have gravity.
- C. Planets in other galaxies are too cold for humans.
- D. Planets in other galaxies have no solid landing surfaces.

Benchmark SC.E.2.2.1: The student knows that, in addition to the sun, there are many other stars that are far away.

Life Science Questions

The pyramid below shows a comparison of energy available at each position or level. The available energy decreases as you move up the pyramid.



Why does the base level of the pyramid contain the greatest number of producers?

- A. The producers prey on the predators.
- B. The producers supply the most energy.
- C. The producers hunt the animals in the energy pyramid.
- D. The prey receive energy and pass it on to the producers.

Benchmark SC.F.1.2.2 The student knows how all animals depend on plants.

The short-beaked echidna is a mammal found in Australia. These animals lay eggs, develop fur coats, have milk-producing glands, and regulate their own body temperature.

A short-beaked echidna is shown below.

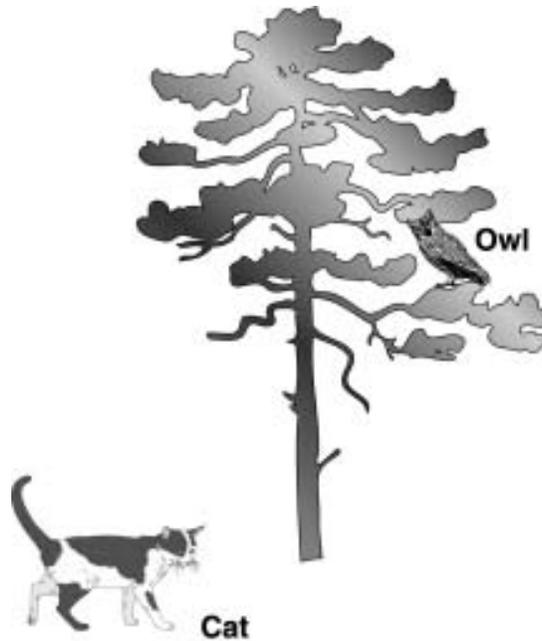


Which of the following characteristics of the echidna is rare among mammals?

- A. laying eggs
- B. developing a fur coat
- C. having milk-producing glands
- D. regulating its own body temperature

Benchmark SC.F.1.2.3: The student knows that living things are different but share similar structures.

Allison could hear animals in her backyard. When she looked out her window, she saw a cat and an owl.



How are cats and owls alike?

- A. They are mammals.
- B. Their eyes are blue.
- C. They can see well at night.
- D. Their fur keeps them warm.

Benchmark SC.F.1.2.3 The student knows that living things are different but share similar structures.

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The Florida panther and the Florida alligator are different animals. The panther is a mammal, and the alligator is a reptile. The alligator is cold-blooded and lays eggs. As soon as the baby alligators hatch they can eat snails, frogs, insects, and small fish.



Panther

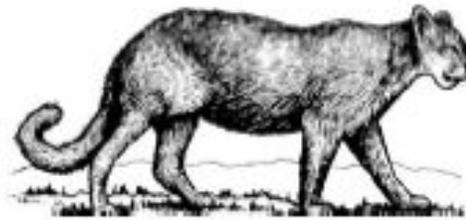


Alligator

How are the characteristics of the panther different from the alligator?

Benchmark SC.F.1.2.3 The student knows that living things are different but share similar structures.

The Florida panther is an endangered species living primarily in and around the Everglades. Cows, raccoons, black bears, and bobcats also live in Florida. The teeth of these animals enable them to eat different things. A drawing of a Florida panther and a chart comparing the diets of these Florida animals are shown below.



Florida Panther

FLORIDA ANIMALS

Animal	Diet
Black bear	nuts, acorns, insects
Bobcat	mice, reptiles, birds
Cow	corn, grass, hay
Florida panther	deer, raccoons, armadillos
Raccoon	fruit, acorns, frogs, fish

Using the information in the chart, which of the other animals has teeth that are most similar to those of a Florida panther?



Black bear

(A)



Cow

(C)



Bobcat

(B)



Raccoon

(D)

Benchmark: SC.F.1.2.3 The student knows that living things are different but share similar structures.

Rats, crabs, and spiders are organisms that have some similar structures.



Rat



Crab

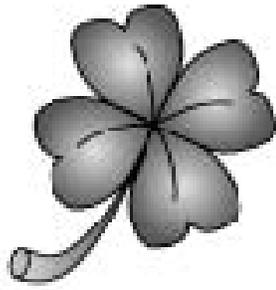


Spider

Which of the following structures is found in all three of these organisms?

- A. bones
- B. ears
- C. heart
- D. lungs

Benchmark: SC.F.1.2.3 The student knows that living things are different but share similar structures.



Four-Leaf Clover

How are the cells in the stem and the cells in the leaf similar?

- A. They do not need water.
- B. They can live underground.
- C. They make energy from the Sun.
- D. They produce carbon dioxide (CO₂).

Benchmark SC.F.1.2.4 The student knows that similar cells form different kinds of structures.

There are many different shapes and sizes of animal cells. The figures below show examples of cells found in humans.



Nerve Cell



Muscle Cells



Red Blood Cells

Not to Scale

What determines the shapes of these different types of cells?

- A the age of the animal
- B what the animal eats for food
- C the function of the animal cell
- D whether the animal is male or female

Benchmark: SC.F.1.2.4 The student knows that similar cells form different kinds of structures.

Children inherit certain characteristics from their parents. Other characteristics are learned from their environment. Which characteristic is a learned characteristic?

- A. blinking
- B. breathing
- C. having blue eyes
- D. speaking a language

Benchmark SC.F.2.2.1 The student knows that many characteristics of an organism are inherited from the parents of the organism, but that other characteristics are learned from an individual's interactions with the environment.

Inside the termite's intestine live protists that allow the termite to digest the wood it eats. If the protists did not live inside the termite, what would happen to the termite?

- A. The termite would not be able to survive.
- B. The termite would not need to eat anymore.
- C. The termite would still be able to eat wood and survive.
- D. The termite would find something else that digests wood to live in its intestine.

Benchmark SC.G.1.2.1 The student knows ways that plants, animals, and protists interact.

In some parts of the Florida Everglades, sawgrass can grow thick enough to block the flow of water. Alligators make nests out of the sawgrass and also make travel lanes through the grass. This helps the water flow easily. It also keeps the sawgrass from being completely underwater, which can damage the sawgrass. What relationship is demonstrated by the alligators and sawgrass in the Everglades?

- A Alligators destroy sawgrass.
- B Alligators feed on sawgrass.
- C Sawgrass helps the alligators travel.
- D Sawgrass and alligators depend on each other.

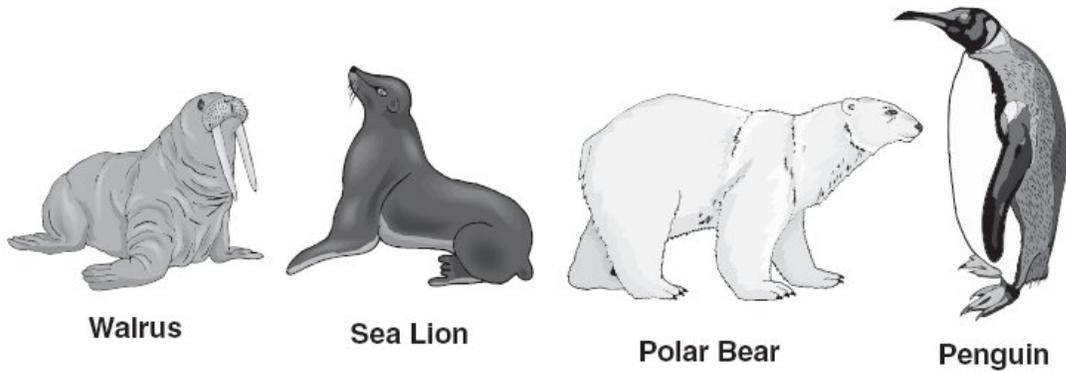
Benchmark: SC.G.1.2.1 The student knows ways that plants, animals, and protists interact.

READ
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Many animals live on the African plain and compete for the limited food supply. Each type of animal, including the lion, the zebra, the antelope, and the giraffe, has become adapted to a different niche within this environment. Select **one** of these animals and describe a specialized trait. Explain how this trait helps it to survive.

SC.G.1.2.2 The student knows that living things compete in a climatic region with other living things and that structural adaptations make them fit for an environment.

Many animals such as walruses, sea lions, polar bears, and penguins live in polar regions.



What characteristic do these animals in the polar regions share that shows how they have adapted to the cold weather?

- A. thick fur
- B. webbed feet
- C. strong back claws
- D. thick body covering

Benchmark SC.G.1.2.2: The student knows that living things compete in a climatic region with other living things and that structural adaptations make them fit for an environment.

Armadillos and coral snakes both live in Florida. When an armadillo is threatened, it can curl up. Its armored body looks like a ball. A coral snake curls its tail into a tight spiral and holds it up when an enemy is near. This attracts the enemy to its tail and protects its head. Although these animals are very different, what is one way in which they are similar?

- A. They spend a lot of time in the water.
- B. They have ways to protect themselves.
- C. They use their bodies to attack enemies.
- D. They have hard outer layers of skin for protection.

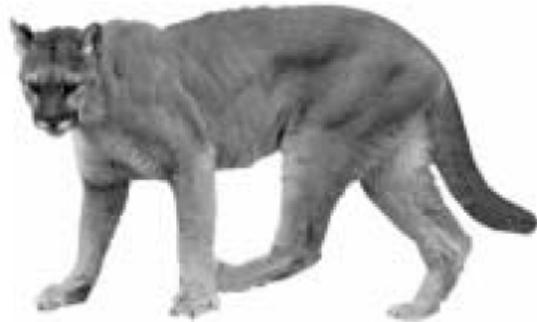
Benchmark SC.G.1.2.2 The student knows that living things compete in a climatic region with other living things and that structural adaptations make them fit for an environment.

READ
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The timber wolf now inhabits portions of Yellowstone National Park in Wyoming. The timber wolf is a natural predator of elk, deer, and smaller animals, such as rabbits. The mountain lion feeds upon similar animals.



Timber Wolf



Mountain Lion

How would the introduction of the mountain lion into Yellowstone National Park **most** likely affect the population and food source of the timber wolves?

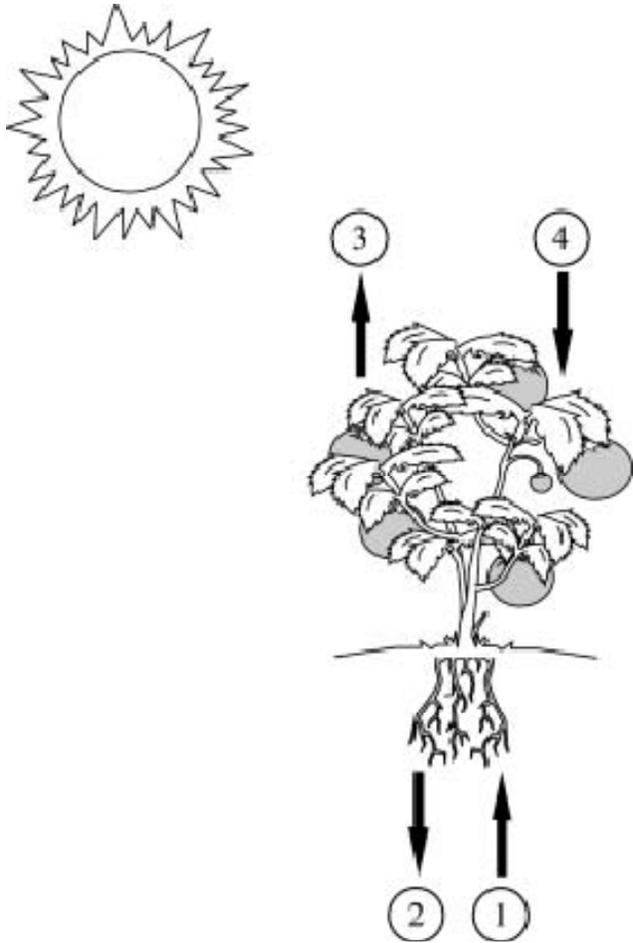
Benchmark SC.G.1.2.2 The student knows that living things compete in a climatic region with other living things and that structural adaptations make them fit for an environment.

Some plants have thick and waxy layers on top of their leaves. This reduces water loss from evaporation. Where would a plant **without** waxy leaves grow successfully?

- A where it is very cold at night
- B where it is very hot during the day
- C where there is plenty of water available
- D where there is very little water available

Benchmark: SC.G.1.2.2 The student knows that living things compete in a climatic region with other living things and that structural adaptations make them fit for an environment.

After studying photosynthesis, Jesse drew the illustration of a tomato plant shown below.



Which arrow represents where the **primary** release of oxygen (O_2) occurs?

- A. 1
- B. 2
- C. 3
- D. 4

Benchmark SC.G.1.2.3 The student knows that green plants use carbon dioxide, water, and sunlight energy to turn minerals and nutrients into food for growth, maintenance, and reproduction.

All trees need sunlight, water (H₂O), and carbon dioxide (CO₂). Some trees are taller than others and may have a better chance of surviving than shorter trees.

Part A In a heavily forested area, what source of energy would a taller tree have more of than a shorter tree?

Part B Explain why that source of energy gives the taller tree a better chance of surviving in a heavily forested area than a shorter tree.

Benchmark SC.G.1.2.3 The student knows that green plants use carbon dioxide, water, and sunlight energy to turn minerals and nutrients into food for growth, maintenance, and reproduction.

Photosynthesis must occur in plants in order for them to survive. Which of the following is the major product of photosynthesis that helps the plants survive?

- A carbon dioxide (CO)₂
- B chloroplast
- C sugar
- D sunlight

Benchmark: SC.G.1.2.3 The student knows that green plants use carbon dioxide, water, and sunlight energy to turn minerals and nutrients into food for growth, maintenance, and reproduction.

Manuel noticed mushrooms growing on an old stump in his yard where a tree was cut down.



Old Tree Stump

Why can mushrooms grow on a tree stump?

- A. Mushrooms produce their own food and can grow anywhere.
- B. Mushrooms can grow in this area because there is more sunlight.
- C. Mushrooms get water to grow and live from the roots that are alive.
- D. Mushrooms use the dead and decaying tree matter as a source of energy.

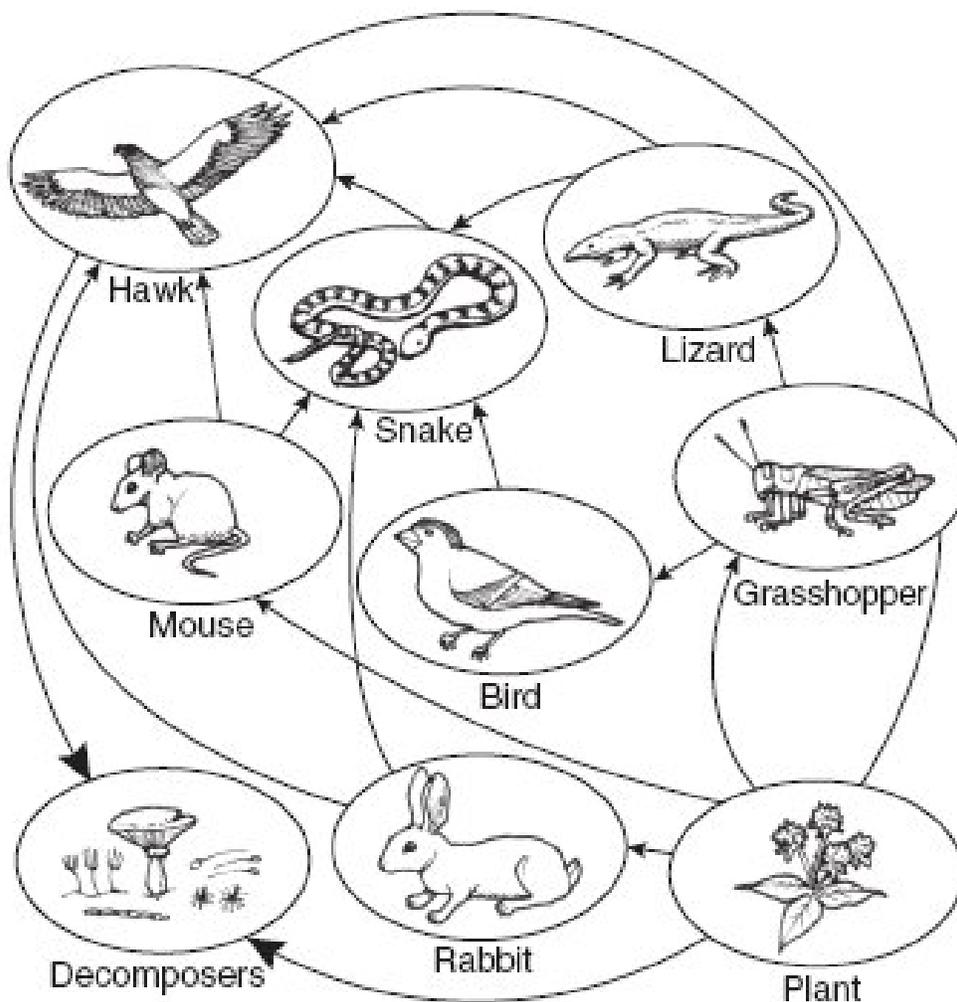
Benchmark SC.G.1.2.5 The student knows that animals eat plants or other animals to acquire the energy they need for survival.

Everglades National Park is a marshland ecosystem. Fish, insects, frogs, grasses, lizards, wading and land birds, and deer are found in the Everglades. In this ecosystem, the deer eat the grass. Grass is the **best** source of which of the following?

- A water
- B energy
- C sunlight
- D carbon dioxide (CO₂)

Benchmark: SC.G.1.2.5 The student knows that animals eat plants or other animals to acquire the energy they need for survival.

A diagram of a meadow food web is shown below.



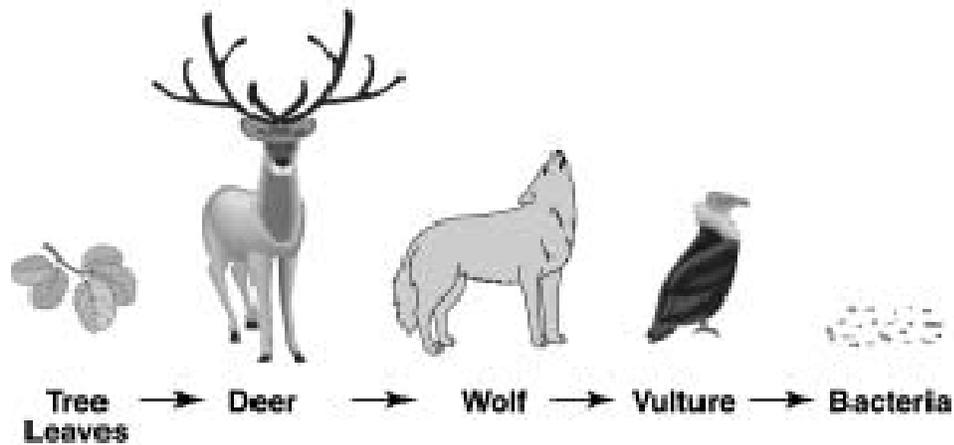
Meadow Food Web

According to this food web, which of the following organisms gets its energy from the bird?

- A** grasshopper
- B** hawk
- C** mouse
- D** rabbit

Benchmark: SC.G.1.2.5 The student knows that animals eat plants or other animals to acquire the energy they need for survival.

Decomposers help give nutrients back to the environment. A food chain is shown below.



not to scale

Which organism is the decomposer in this food chain?

- A. bacteria
- B. deer
- C. tree leaves
- D. wolf

Benchmark SC.G.1.2.6 The student knows that organisms are growing, dying, and decaying and that new organisms are being produced from the materials of dead organisms. This benchmark also assesses G.1.2.4. “The student knows that some organisms decompose dead plants and animals into simple minerals and nutrients for use by living things and thereby recycle matter.”

American alligators are reptiles that can live in coastal swamps from North and South Carolina to the tip of Southern Florida. Why are American alligators unable to survive in places like Alaska?

- A. Their skin is very thin.
- B. Their eggs would be eaten by wolves.
- C. They would not be able to defend themselves.
- D. They need heat to regulate their body temperature.

Benchmark SC.G.1.2.7 The student knows that variations in light, water, temperature, and soil content are largely responsible for the existence of different kinds of organisms and population densities in an ecosystem.

Celia saw a goldfish at the pet store that was living in a tank by itself. She bought the fish, took it home, and put it in her aquarium with her other goldfish. What must the new goldfish do to survive in its new environment?

- A. It must camouflage itself in its new surroundings.
- B. It must compete with other goldfish for resources.
- C. It must allow other goldfish to use the limited resources first.
- D. It must build a home that is similar to the one in its previous habitat.

Benchmark SC.G.2.2.1 The student knows that all living things must compete for Earth's limited resources; organisms best adapted to compete for the available resources will be successful and pass their adaptations (traits) to their offspring. This benchmark also assesses SC.B.2.2.2 and SC.B.2.2.3. "The student recognizes the costs and risks to society and the environment posed by the use of nonrenewable energy." "The student knows that the limited supply of usable energy sources (e.g., fuels such as coal or oil) places great significance on the development of renewable energy sources."

Bears live in many different environments. The color of their fur varies from white to black. Polar bears have fur that appears white and live in cold arctic areas. Black bears have dark fur and live in forests.

Part A How does the polar bears' fur color help them survive?

Part B How does the black bears' fur color help them survive?

Benchmark SC.G.2.2.1 The student knows that all living things must compete for Earth's limited resources; organisms best adapted to compete for the available resources will be successful and pass their adaptations (traits) to their offspring. This benchmark also assesses SC.B.2.2.2 and SC.B.2.2.3. "The student recognizes the costs and risks to society and the environment posed by the use of nonrenewable energy." "The student knows that the limited supply of usable energy sources (e.g., fuels such as coal or oil) places great significance on the development of renewable energy sources."

Maple Park used to have more than 1,000 squirrels living in it and now there are only 600. What is the **most likely** reason for the decrease in the number of squirrels in Maple Park?

- A. There were too many trees planted in the park.
- B. There were not enough people visiting the park.
- C. There was too much water for all of the squirrels.
- D. There was not enough food for all of the squirrels.

Benchmark SC.G.2.2.2 The student knows that the size of a population is dependent upon the available resources within its community.

Ospreys are birds of prey that usually nest in tall trees near water where they can hunt for fish. Ospreys hunt by flying over water. Biologists have recently built platforms on the tops of power poles for ospreys nesting in areas where land was cleared. Why were the platforms built by the biologists?

- A. to observe the fish habitats and feeding habits
- B. to provide rest areas for ospreys during their long hunts
- C. to observe the feeding habits of ospreys more clearly
- D. to provide nests for the ospreys because of the destruction of habitats

Benchmark SC.G.2.2.3 The student understands that changes in the habitat of an organism may be beneficial or harmful. This benchmark also assesses SC.D.2.2.1. “The student knows that using, recycling, and reducing the use of natural resources improves and protect the quality of life.”