

Sample Multiple Choice Test Items by Strand and Benchmark - Grade 4 Science

Science as Inquiry

Benchmark SI-E-A3: communicating that observations are made with one's senses

Mrs. Henderson's class has five small covered boxes. One contains perfume; another contains dried onions. There is also a box of pine needles, a box of lemon pieces, and a box with a paper towel wetted with vanilla flavoring. Which should they do to get the best information about what is in each box?

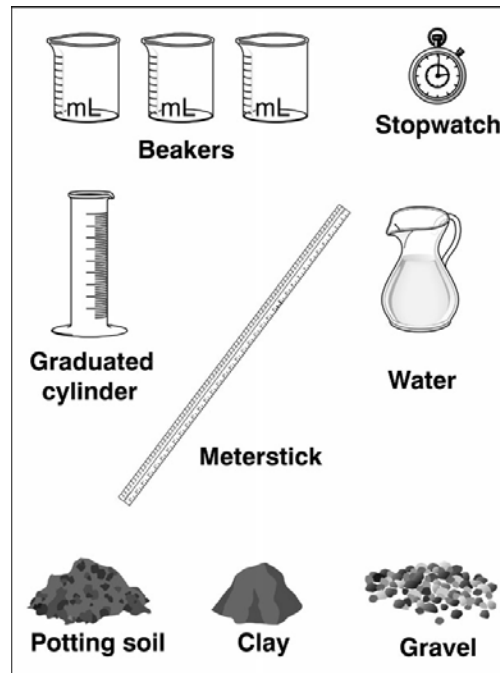
- A. Shake the boxes.
- B. Smell the boxes.
- C. Listen to the boxes.
- D. Weigh the boxes.

Correct response: B

Science as Inquiry

Benchmark SI-E-A7: utilizing safety procedures during experiments

Use the pictures below to answer the question.



Mark is using these materials to compare how water flows through three different soils. Which safety rules should he follow while doing the experiment?

- A. fire safety rules
- B. glassware safety rules
- C. electrical safety rules
- D. plant safety rules

Correct response: B

Science as Inquiry

Benchmark SI-E-B6: reviewing and asking questions about the results of investigations

Use the information and data table below to answer the question.

The students at Hoover Elementary did a survey of the eye colors of all the fourth graders at their school. The results are shown in the data table below.

Hoover Elementary School Fourth-Grade Eye Colors

	Blue	Brown	Green
Ms. Musso's class	9	7	1
Ms. Broussard's class	2	10	4

What does the chart show about Hoover Elementary School?

- A. Brown is the most common eye color in each fourth-grade class.
- B. Green is the least common eye color in both fourth-grade classes.
- C. Brown is the most common eye color in the fourth grade.
- D. Blue eyes are more common in boys than in girls in the fourth grade.

Correct response: C

Physical Science

Benchmark PS-E-A4: describing the properties of the different states of matter and identifying the conditions that cause matter to change states

Which of the following is an example of matter changing state?

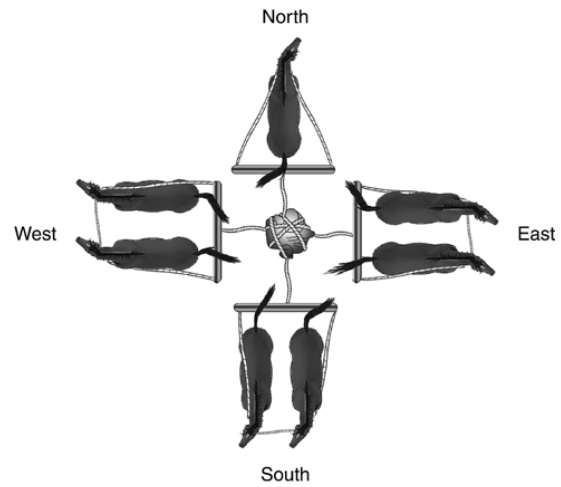
- A. heating a pan of water until the water is all gone
- B. putting a soft-drink can in the refrigerator to cool it
- C. heating soup on the stove until it is hot to your tongue
- D. transferring sugar into a storage container

Correct response: A

Physical Science

Benchmark PS-E-B2: exploring and recognizing that the position and motion of objects can be changed by pushing or pulling (force) over time

Use the pictures below to answer the question.



If each horse is pulling with the same force, in which direction will the rock move?

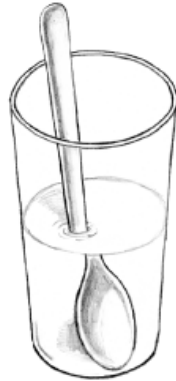
- A. north
- B. east
- C. south
- D. west

Correct response: C

Physical Science

Benchmark PS-E-C2: investigating and describing how light travels and what happens when light strikes an object (reflection, refraction, and absorption)

Use the picture below to answer the question.



The spoon appears to be broken where it enters the water because

- A. the light is reflected by the water
- B. the light is absorbed by the water
- C. the light is bent by the water
- D. the light is dissolved by the water

Correct Response: C

Physical Science

Benchmark PS-E-C5: investigating and communicating that magnetism and gravity can exert forces on objects without touching the objects

Which type of force requires contact between two objects for one to push or pull the other?

- A. frictional forces slowing down a rolling soccer ball
- B. the magnetic force pulling paper clips to a powerful electromagnet
- C. the magnetic force pushing two magnets apart
- D. the force of gravity acting on raindrops that fall to Earth

Correct response: A

Physical Science

Benchmark PS-E-C5: investigating and communicating that magnetism and gravity can exert forces on objects without touching the objects.

Jeannie put her soccer ball on the ground on the side of a hill. What force acted on the soccer ball to make it roll down the hill?

- A. gravity
- B. electricity
- C. friction
- D. magnetism

Correct response: A

Life Science

Benchmark LS-E-A2: distinguishing between living and nonliving things

On a field trip in a wooded area, you see a small, strange object. You wonder whether it is a live animal. The **best** way to find out is to observe the object to see if it

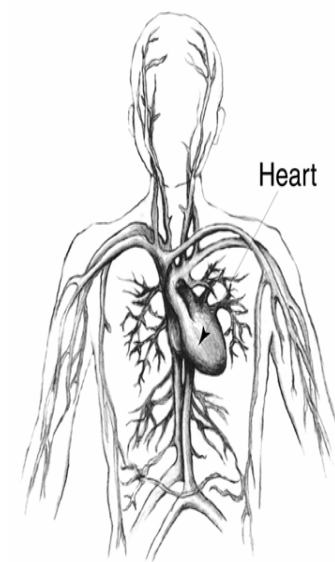
- A. has an odor.
- B. has separate parts.
- C. can make a noise and has a lifelike color.
- D. carries out basic life functions.

Correct response: D

Life Science

Benchmark LS-E-A5: locating major human body organs and describing their functions

Use the picture below to answer the question.



What does the heart do for the body?

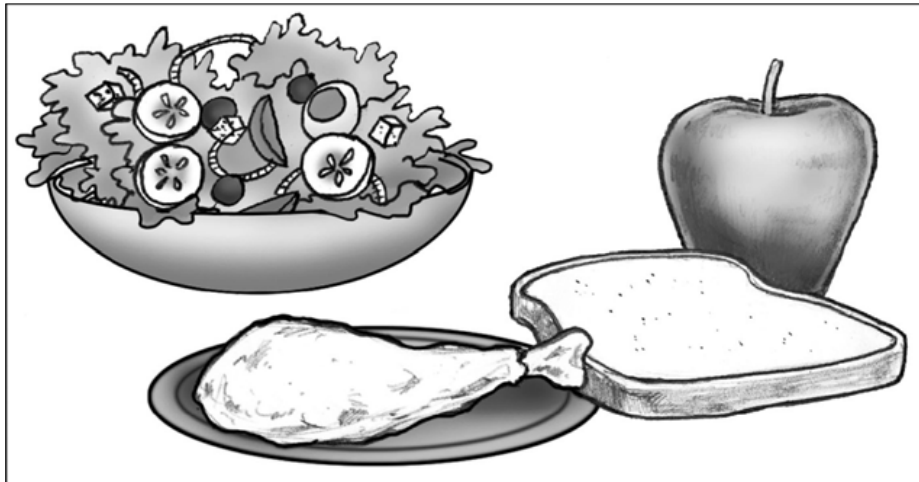
- A. It takes oxygen in from the environment.
- B. It turns food into energy.
- C. It removes waste from the blood.
- D. It moves blood through the body.

Correct response: D

Life Science

Benchmark LS-E-A6: recognizing the food groups necessary to maintain a healthy body

Use the picture below to answer the question.



What could you add to this to make it a more balanced meal?













- A. a glass of milk
- B. a banana
- C. a pork chop
- D. a muffin

Correct response: A

Life Science

Benchmark LS-E-B2: observing, comparing, and grouping plants and animals according to likenesses and/or differences

Which group of living things shares the **most** characteristics?

- A.   
Cat Dog Rabbit
- B.   
Fish Crab Crayfish
- C.   
Bird Butterfly Bat
- D.   
Spider Grasshopper Worm

Correct response: A

Earth and Space Science

Benchmark ESS-E-A1: understanding that Earth materials are rocks, minerals, and soils

A rock sample will **most likely** contain

- A. plants.
- B. minerals.
- C. water.
- D. wood.

Correct response: B

Earth and Space Science

Benchmark ESS-E-A2: Understanding that approximately three-fourths of Earth's surface is covered with water and how this condition affects weather patterns and climates

Use the map below to answer the following question.



Springfield, Missouri, and San Francisco, California, are at similar latitudes, but they have very different climates. Springfield has very hot summers and cold winters, while San Francisco has about the same temperatures all year. What is the **most likely** reason the two cities have such different climates?

- A. the amount of sunlight on each city
- B. the distance of each city from an ocean
- C. the elevation above sea level of each city
- D. the distance of each city from the equator

Correct response: B

Earth and Space Science

Benchmark ESS-E-B1: observing and describing the characteristics of objects in the sky

Which object in the sky is a satellite of the planet Earth?

- A. Sun
- B. Moon
- C. Mars
- D. Saturn

Correct response: B

Earth and Space Science

Benchmark ESS-E-B4: modeling changes that occur because of the rotation of Earth (alternation of night and day) and the revolution of Earth around the Sun

Why do the Sun and Moon appear to move across the sky?

- A. The rotation of the solar system makes the Sun and Moon seem to move.
- B. The rotation of Earth makes the Sun and Moon seem to move.
- C. The Sun and Moon revolve around Earth.
- D. Earth revolves around the Sun and the Moon.

Correct response: B

Earth and Space Science

Benchmark ESS-E-B4: modeling changes that occur because of the rotation of Earth (alternation of night and day) and the revolution of Earth around the Sun

You are getting up to go to school in Louisiana; a student on the other side of Earth is getting ready for bed. What is the reason for this?

- A. Earth revolves around the Sun.
- B. Earth rotates on its axis.
- C. The Sun rotates on its axis.
- D. The Moon revolves around Earth.

Correct response: B

Science and the Environment

Benchmark SE-E-A1: understanding that an ecosystem is made of living and nonliving components

Which of these is a nonliving thing?

- A. a mushroom
- B. a tree
- C. a worm
- D. a river

Correct response: D

Science and the Environment

Benchmark SE-E-A4: understanding that the original sources of all material goods are natural resources and that the conserving and recycling of natural resources is a form of stewardship

Carmine's mother drinks four cans of soft drink each day. After drinking the soft drinks, Carmine's mother should

- A. throw the cans in the trash.
- B. send the cans to a landfill.
- C. take the cans to be recycled.
- D. crush the cans before putting them in the trash.

Correct response: C

Science and the Environment

Benchmark SE-E-A5: Understanding that most plant and animal species are threatened or endangered today due to habitat loss or change

A wetland was drained to build a mall. Two years later, there were no more toads in that area. Why did the toads disappear?

- A. The toads were destroyed by the construction equipment.
- B. The toads died because toads cannot breathe out of water.
- C. The toads were frightened and went into the woods.
- D. The toads got their food from the wetland ecosystem.

Correct response: D

Science and the Environment

Benchmark SE-E-A3: identifying ways in which humans have altered their environment, both in positive and negative ways, either for themselves or for other living things

What is one way people are helping the environment?

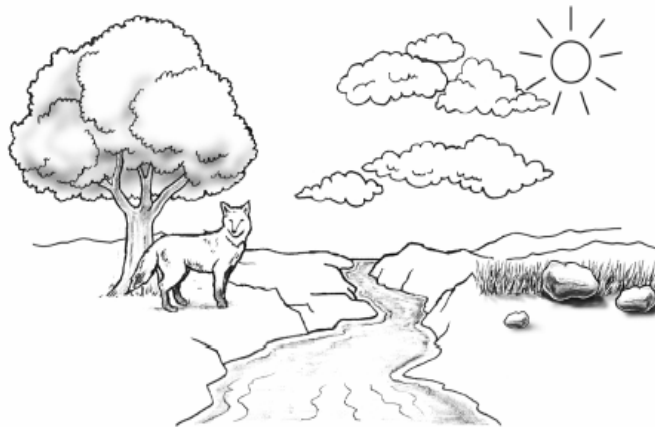
- A. They are planting trees to replace the ones that are cut.
- B. They are building more roads so more people can see natural areas.
- C. They are building more dumps to hold the trash we create.
- D. They are using their cars more to get to places faster.

Correct response: A

Science and the Environment

Benchmark SE-E-A1: understanding that an “ecosystem” is made of living and nonliving components

Use the picture below to answer the question.



Which of these lists **only** living parts of this ecosystem?

- A. fox, tree, grass
- B. sun, stream, cloud
- C. cloud, grass, rock
- D. stream, cloud, fox

Correct response: A

Sample Constructed Response Test Items by Strand and Benchmark

Life Science

Benchmark LS-E-A3: locating and comparing major plant and animal structures and their functions

- A. Draw one flowering plant you would find near your school. Label **one** part of that plant.
- B. What is the function of the part you labeled in your drawing?

Scoring Rubric:

Score	Description
2	The student draws a plant and correctly labels one part of the plant (may include root, stem, leaf, or flower) and correctly states the function of the labeled part. Response contains no errors.
1	The student correctly draws and labels a plant OR states the function of a part. Response contains minor errors or omissions.
0	The student's response is incorrect, too brief to evaluate, or blank.

Scoring notes:

The roots hold the plant in the soil and take in nutrients.

The stem supports the plant and conducts food and water to the leaves.

The leaves produce food (photosynthesis).

The flower produces seeds and attracts insects for pollination.

Physical Science

Benchmark PS-E-B4: investigating and describing how the motion of an object is related to the strength of the force (pushing or pulling) and the mass of the object

Use the picture below of Sharon pulling a wagon on a level sidewalk to answer parts A and B of the question.



- A. How would the movement of the wagon be affected if she pulled harder on the wagon?
- B. How would the movement of the wagon be affected if her little brother were sitting in the wagon?

Scoring Rubric:

Score	Description
2	The student answers part A and part B without any errors.
1	The student answers part A OR part B. Response may contain minor errors and omissions.
0	The student's response is incorrect, irrelevant, too brief to evaluate, or blank.

Scoring notes:

Part A: The wagon would move faster.

Part B: One of the following:

The wagon would move slower.

It will take more force to move the wagon.

It will be harder to move the wagon.

Life Science

Benchmark LS-E-B2: Observing, comparing, and grouping plants and animals according to the likenesses and/or differences

Use the pictures below to answer parts A and B of the question.



bat



bird

Some people think that bats and birds are alike. Other people say they are very different. Look at the two pictures.

A. Tell **one** way that bats and birds are the same.

B. Tell **one** way bats and birds are different.

Scoring Rubric:

Score	Description
2	The student lists one way birds and bats are similar and one way they are different. There are no errors.
1	The students lists one way birds and bats are similar or one way they are different or gives relevant information in part A and part B that may contain errors.
0	The student's response is incorrect, irrelevant, too brief to evaluate, or blank.

Scoring notes:

Similarities:

Both have wings.

Both fly.

Both eat insects for food.

Both are living things.

Differences:

Birds have feathers (bats do not).

Bats use sound for navigation; birds use sight.

Bats are mammals (birds are not).

Bats have hair (birds do not).

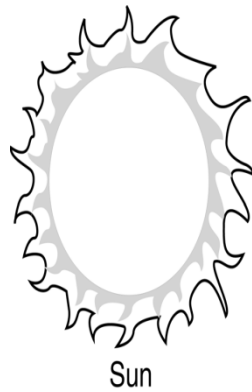
Birds have beaks (bats do not).

Note: Implication, shown above in parentheses, is fine and counts for score.

Earth and Space Science

Benchmark ESS-E-B4: Modeling changes that occur because of the rotation of Earth (alternation of night and day) and the revolution of Earth around the Sun

A. Using the picture of Earth and the Sun below, mark a spot on Earth where it is day with a “D.” Then mark a spot on Earth where it is night with an “N.”



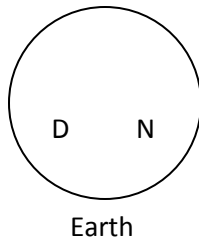
B. Louisiana goes through a period of day and night every 24 hours. Explain what causes day and night.

Scoring Rubric:

Score	Description
2	The student correctly identifies two key elements. The response contains no errors.
1	The student correctly identifies one key element.
0	The student's response is incorrect, irrelevant, too brief to evaluate, or blank.

Scoring notes:

Part A: Picture drawn like:

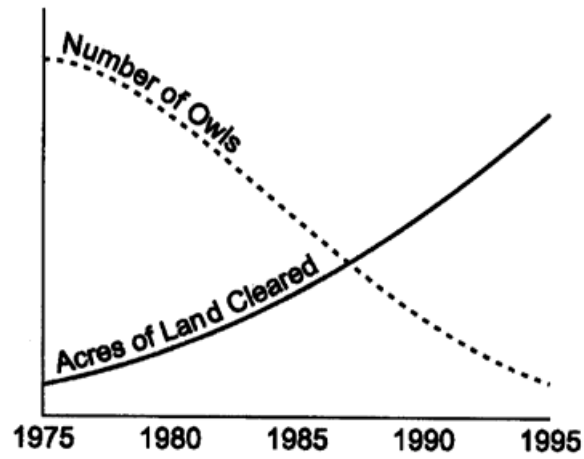


Part B: Earth spins on its axis/Earth rotates.

Science and the Environment

Benchmark SE-E-A5: understanding that most plant and animal species are threatened or endangered today due to habitat loss or change

Use the graph below to answer parts A and B of the question.



The graph above shows the owl population in a large forested area over a 20-year period. The graph also shows the acres of forest that were cleared for lumber over the same time period.

A. Why did the owl population change?

B. What could have been done to prevent the change in the owl population?

Scoring Rubric:

Score	Description
2	The student suggests why the owl population changed and what could be done to prevent the loss of owls. There are no errors.
1	The student answers either part A or part B of the question. OR The student gives two answers for one part of the question.
0	The student's response is incorrect, irrelevant, too brief to evaluate, or blank.

Scoring notes:

Part A: The owl population changed because of loss of habitat. When the acres of land were cleared for lumber, the owl habitat (food and home) was destroyed.

Part B: If all trees had not been cut—or if some land had been left for habitat preservation—the owl population would not have decreased so rapidly. Plant new trees as replacement habitat or cut part of the forest, leaving some for habitat. Run a conservation campaign, put up signs, have a rally, write laws.

Task

Eli kept a garden. He wrote online in a blog about the activities in his garden. Read and study Eli's Garden Blog. Then answer questions 1 through 5.

Eli's Garden Blog—Monarchs and Milkweed

I learned that monarch butterflies lay their eggs only on milkweed plants. The adult butterflies get food from milkweed and other kinds of flowers.

I decided to plant milkweeds in my garden this year to see if I could attract monarch butterflies. I found some milkweed seeds and planted them in my garden in the spring. The seeds grew into milkweed plants.



Source: Wikimedia Commons

Every day I watched for butterflies visiting the plants. One day, I finally saw a monarch! It landed on the flower clusters, and stuck its long tongue into the flowers. There were other butterflies and insects on the milkweed flowers too.



Source: *homeredwardprice*, *Wikimedia Commons*

I read that monarchs lay their eggs on the undersides of the leaves. I started looking under leaves. After awhile, I found a small greenish egg. The egg matched pictures of monarch eggs I saw in a book about butterflies.



Source: Hectonichus, Wikimedia Commons

A little while later I found my first monarch caterpillar. The caterpillars eat nothing but milkweed leaves and flowers. I've read that they cannot live on any other kind of food.



Source: Hectonichus, Wikimedia Commons

After they have grown big enough, the caterpillars form a skin around themselves. The skin is called a chrysalis. I kept looking carefully for chrysalises, and I found one! It was hanging down from a twig. Inside the chrysalis the caterpillar turns into a butterfly. It is amazing how much their bodies change shape.



Source: Hectonichus, Wikimedia Commons

After they come out of the chrysalis, the adult butterflies fly off. They drink nectar from flowers, find mates, and lay more eggs on milkweed plants. This one landed on another flower in my garden.



Source: Lilly M, Wikimedia Commons

Meanwhile, my milkweed plants were getting older too. After flowering, they grew seedpods. Later the seedpods cracked open. I could see that the seeds were attached to these amazing bits of fluff. The seeds are sort of like dandelion seeds, but the fluff is longer and silkier. I kept some seeds to plant again next year.



Source: Wikimedia Commons

Study the information in *Eli's Garden Blog* before answering the question.

1. Monarch butterflies can fly long distances. This allows them to spread to new areas.

How do milkweed plants spread to new areas?

- A. The seeds stick to butterflies and get carried away.
 - B. The seeds float and are blown by the wind.
 - C. The seeds stick to the fur of animals.
 - D. The seedpods burst open and scatter the seeds.
2. Look at the picture of the milkweed plants.
- Which conclusion is **best** supported by the picture?
- A. All the milkweed plants in Eli's garden came from different sets of parents.
 - B. All the milkweed plants in Eli's garden came from the same two parents.
 - C. Milkweed plants become slightly different depending on their parents and how they grow.
 - D. Milkweed plants grow to have exactly the same size, shape, number of leaves, and number of flowers.

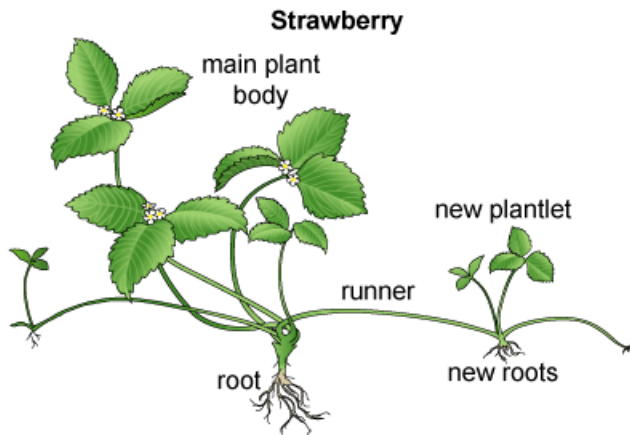
3. Eli's neighbor has a box elder tree. Under the box elder tree, Eli finds many box elder bugs. The picture shows stages of a box elder bug's life cycle. Eli sees many of these stages in his neighbor's garden.



How are the life cycles of box elder bugs and monarch butterflies the **same**?

- A. Their life cycles contain the same number of stages.
- B. Their life cycles both include metamorphosis.
- C. The young insects grow and develop before becoming adults.
- D. The young insects have the same body structures as the adults.

4. Eli has strawberry plants in his garden. He watches his strawberry plants reproduce using stems called runners as shown in the diagram.



Which statement **best** compares the way Eli's strawberry plants and milkweed plants reproduce?

- A. The milkweed plants have only two stages in their life cycle, while the strawberry plants pass through many different stages as they grow.
- B. The milkweed plants have offspring that may be slightly different than their parents, while the offspring of the strawberry plants will be just like their parents.
- C. Young milkweed plants have to grow bigger before they can reproduce, while young strawberry plants do not have to grow.
- D. Young milkweed plants will grow up to be exactly like their parents, while young strawberry plants may become very different than their parents.

Constructed-Response Item

The following question requires you to write an extended response that combines information from the source with your knowledge of science.

To earn full credit you should:

- Read the question and then study the information in *Eli's Garden Blog*.
- Answer **all** parts of the question and support your ideas with examples, data, facts, or details.
- Write a response that is long enough to fully address the topic. This may require more than one paragraph. Responses with fewer than 25 words will not be scored.

5. Explain how the life cycles of monarch butterflies and milkweed plants follow similar patterns. In your answer, be sure to:

- Describe the life cycles of monarch butterflies and milkweed plants.
- Explain how both of these life cycles follow the same basic pattern.
- Explain any important differences between these two life cycles.

Rubric

Exemplary Response

1. B
2. C
3. C
4. B
5. Monarchs and milkweeds reproduce using the same basic pattern of reproduction. They start as a small egg or seed. The egg hatches or the seed sprouts and begins to grow. As the young plant or caterpillar grows, it changes size and develops. Eventually, it becomes an adult. The adult plant or insect is able to reproduce, by mating, and making more eggs or seeds. The young plants or insects cannot yet reproduce. After reproducing, both milkweeds and butterflies die. The basic pattern of birth, growth and development, reproduction, and death is followed by many types of living organisms.

Although both of these life cycles follow the same basic pattern, there are also some important differences. For example, butterflies go through several very different stages: egg, caterpillar, chrysalis, butterfly. Plants do not go through such distinct stages until they flower. A seedling simply grows bigger with more leaves and longer roots and stems. Another difference between the butterflies and the milkweeds is that the milkweed seeds can move, while insect eggs stay still. Milkweed adults stay still, but adult butterflies can fly around.

Score	Rubric (Question #5)
4	<ul style="list-style-type: none"> ▪ The student’s response demonstrates an in-depth understanding of life cycles and the patterns of development and reproduction in plants and insects. ▪ The student completes all key components of the task accurately and communicates ideas effectively. <ul style="list-style-type: none"> ○ Describe the life cycles of milkweed and monarch butterflies. ○ Describe ways the patterns of development and reproduction are similar in plants and insects. ○ Describe ways the patterns of development and reproduction are different in plants and insects. ▪ The student’s response is extensively supported by relevant evidence in the form of data and/or examples. ▪ Where appropriate, the student uses a higher level of reasoning skills that may include applications, procedures, etc. ▪ The response contains no errors.
3	<ul style="list-style-type: none"> ▪ The student’s response demonstrates a good understanding of life cycles in plants and insects, although less important ideas or details may be overlooked or misunderstood. ▪ The student completes most important aspects of the task accurately and communicates clearly. ▪ The student’s response is sufficiently supported by relevant evidence. ▪ The student’s logic and reasoning may contain minor flaws. ▪ The response may contain minor errors.
2	<ul style="list-style-type: none"> ▪ The student’s response demonstrates a limited understanding of life cycles in plants and insects (gaps in conceptual understanding). ▪ The student completes some parts of the task successfully. ▪ The student’s response is not sufficiently supported by relevant evidence. ▪ The response may contain errors.
1	<ul style="list-style-type: none"> ▪ The student’s response demonstrates a basic understanding of life cycles in plants and insects. ▪ The student completes only a small portion of the task. ▪ The student’s response contains little or no support of relevant evidence. ▪ The student’s response may contain major errors.
0	<p>The response attempts to address the prompt, but is mostly or entirely incorrect or contains some correct work that is irrelevant to the skill or concept being measured.</p>