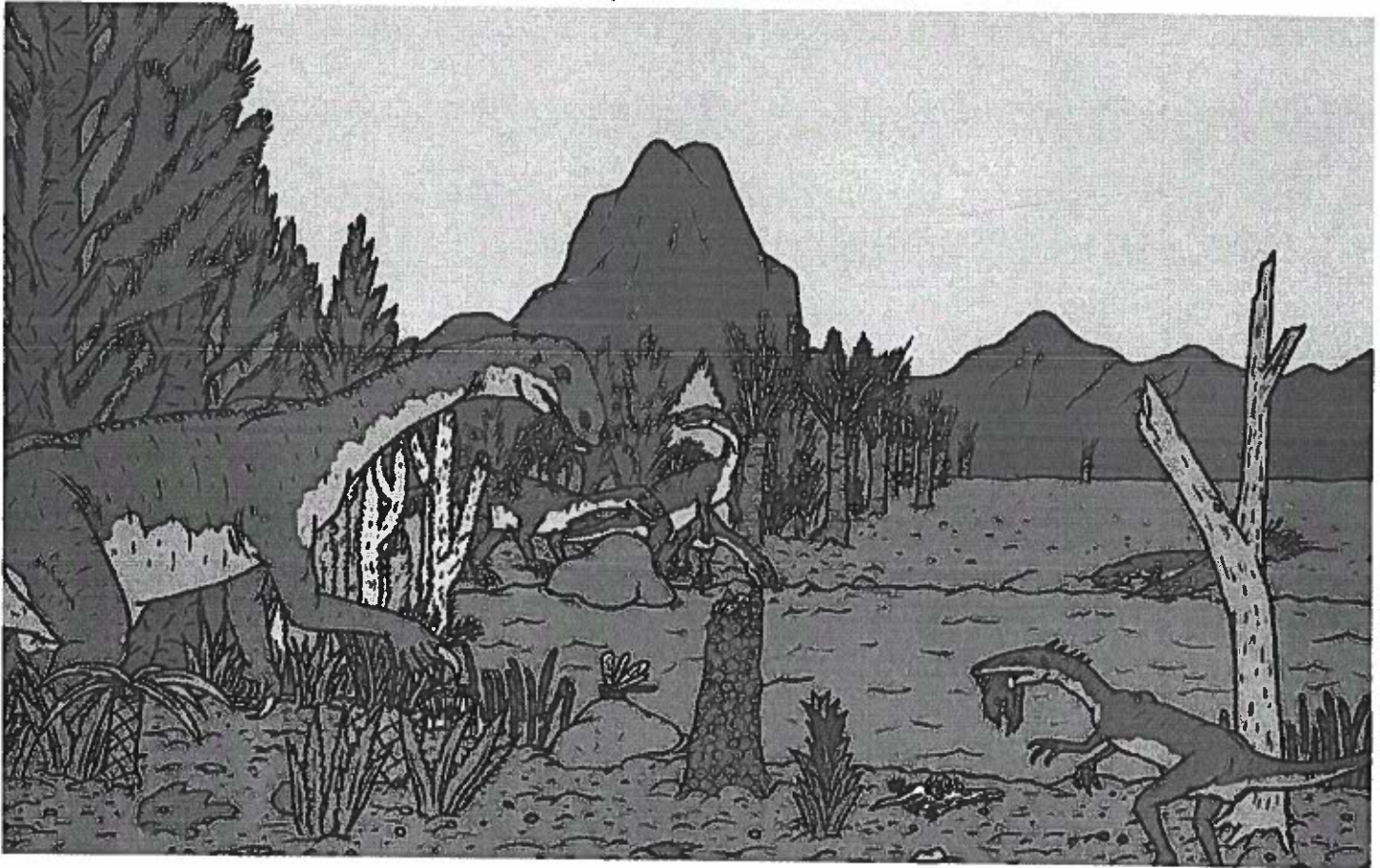


# The History of Planet Earth

by ReadWorks



Our planet is no spring chicken. The history of the earth stretches over billions of years. In that time period, a lot has changed. Some of those changes took place over a very long time, too slowly and gradually for people to discern. Some changes, on the other hand, took place very quickly.

Water, wind and ice slowly shape the surface of the earth, constantly moving all around us. Activity just beneath the surface of the earth's crust creates rapid changes in the shape of the land—that's where we get volcanoes, landslides and earthquakes.

Glaciers, which are huge, very old formations made out of water, earth and ice, can even change the size and shape of the oceans. These major shifts take place over millions of years. We can see the results, but apart from measuring them and seeing where growth or change took place, we can't observe these changes as they occur. They simply happen too slowly.

Erosion is an example of a slow process that changes the surface of the earth. Think of a windy beach, how sand from the beach is carried toward the dunes or, depending on the behavior of the wind, how the sand from the dunes is carried further down the beach. We can see and feel the sand moving over the land and through the air, but the long-term effects of that movement won't be visible for years.

The earth's surface is also made up of very slowly moving parts, called tectonic plates. These plates fit like puzzle pieces and make up the outermost layer of the planet. When this layer moves around, it can cause earthquakes and volcanic eruptions. It's very easy to spot these changes as they're happening! In fact, we have to be very careful and prepare for them in advance, and take safety measures before and after they occur.

Volcanoes, earthquakes and landslides aren't everyday events. If they were, we'd be in big trouble! Ordinarily, the movement of the plates is extremely slow, yet very powerful. Plate movement is one of the major forces that changes the location and shape of continents and oceans-major changes that we can't detect and that appear gradually over millions of years.

Some earth-changing events occur naturally, but others come from us, from humans. It's important to remember that we have our own impact on the earth. In many cases, humans influence the earth's natural processes on purpose, speeding them up, slowing them down, or manipulating them in other ways to get something we want-usually a natural resource, like water or oil. Some of what we do to our planet is on purpose, and some of it is accidental.

Cutting down forests, building new houses, bridges, office buildings and movie theaters, can lead to quickening natural events that might have taken much longer without humans' involvement.

You can walk outside any time you like and see the planet stir: wind moving particles of sand and rock, water dripping from one surface onto another, seasons changing each year. Everything you see on a walk around your neighborhood contributes to the earth's changing and maturing, just like everything we do every day contributes to what we'll be like as people 10 years, 20 years, even 50 years from now. And those changes in our bodies and personalities-unless something unusual happens-take time to show up too.

It's interesting to think about how what we do and the forces that act on us affect who we become. The earth is like a big, changing organism, just like we are.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. How much has the earth changed in its history?

- A. a lot
- B. a little
- C. not at all
- D. not enough for anyone to notice

2. Two effects mentioned in this passage are earthquakes and volcanic eruptions. What is their cause?

- A. wind that blows sand from one place to another
- B. water dripping from one surface onto another
- C. the construction of houses, movie theaters, and bridges
- D. the movement of the earth's outermost layer

3. Some of earth's changes take place too slowly for people to notice them happening.

What evidence from the passage supports this statement?

- A. Changes like earthquakes and volcanic eruptions are not everyday events, but they are easy to spot when they are happening.
- B. People notice changes glaciers have made to the size and shape of earth's oceans after the changes have taken place.
- C. Earth's history goes back billions of years, and a lot of changes, both fast and slow, have taken place over that period of time.
- D. People sometimes influence earth's natural processes on purpose by speeding them up, slowing them down, or manipulating them in other ways.

4. What is an example of change on earth that people can see happening?

- A. glaciers changing the size and shape of earth's oceans
- B. sand blowing from one part of a beach to another
- C. tectonic plate movement changing the location and shape of earth's continents
- D. tectonic plate movement changing the location and shape of earth's oceans

5. What is this passage mainly about?

- A. glaciers and erosion
- B. landslides and earthquakes
- C. changes in the earth
- D. changes in the human body

6. Read the following sentences: "Water, wind and ice slowly shape the **surface** of the earth, constantly moving all around us. Activity just beneath the **surface** of the earth's crust creates rapid changes in the shape of the land-that's where we get volcanoes, landslides and earthquakes."

What does the word "**surface**" mean in the sentences above?

- A. a process that changes the shape of the earth
- B. an effect that takes many years for people to notice
- C. the middle or central part of something
- D. the outer layer or part of something

7. Choose the answer that best completes the sentence below.

The earth is shaped by the movement of different forces, \_\_\_\_\_ water, wind, and ice.

- A. never
- B. instead
- C. finally
- D. including

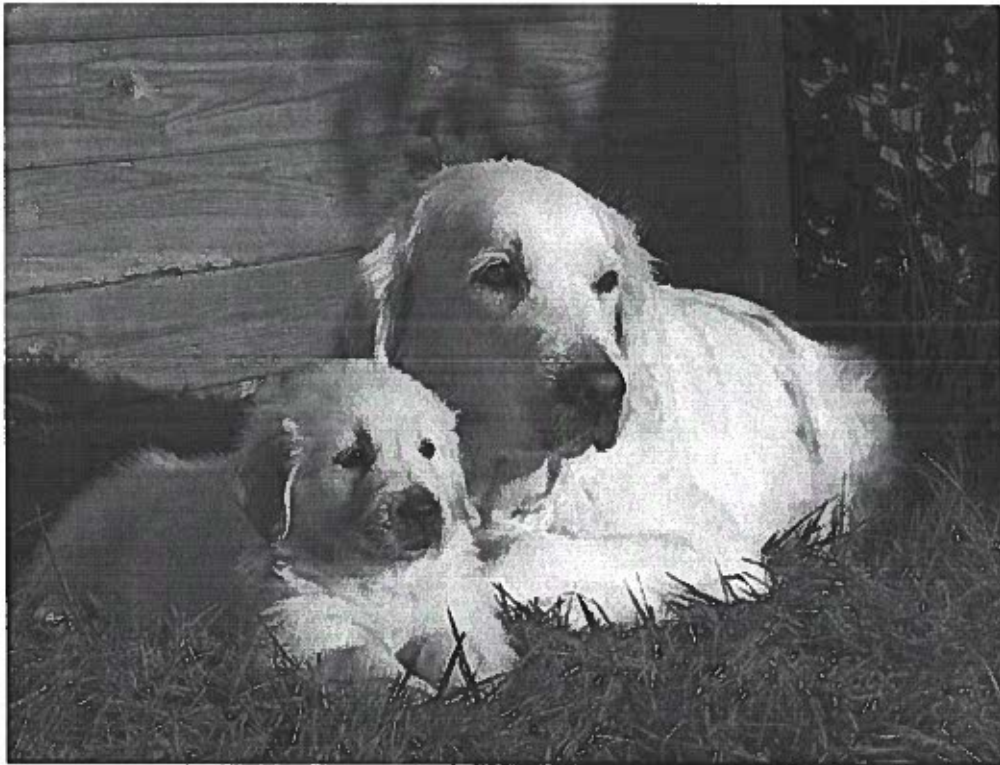
8. How do humans influence the earth's natural processes?

9. How are changes in the earth similar to changes in human beings?

10. The passage describes some ways that changes in the earth and changes in people are similar. What are some ways that changes in the earth and changes in people are different? Support your answer with evidence from the passage.

# Selective Breeding

by ReadWorks



Charles Darwin, a British naturalist who lived in the 19th century, is best known for his book *On the Origin of Species*. In it, Darwin established the idea of evolution that is widely accepted today. He proposed that all species alive have evolved through adaptation to their surroundings. Natural selection, the process by which varied traits that increase survival and enable reproduction are passed down from generation to generation, is probably the most famous principle from the book. Darwin's book also addresses the perhaps less well-known concept of artificial selection. Today artificial selection is more often called "selective breeding." Selective breeding involves breeding animals or plants for a specific, typically desirable trait. By doing so, the desired genes from the plant or animal will be passed on to its offspring.

Dog breeding is one of the most common examples of artificial selection. You need only to tune into a dog show on TV to see the power of selective breeding at work. Crossbreeds, for example, are dogs born from parents of two different breeds. Mixed breeds are born from parents of more than two breeds, and pure breeds are born from a single breed. All three varieties are featured in most dog shows. Many of these dogs were bred to achieve certain desirable physical or behavioral traits.

Beyond the context of dog shows, dogs are a particularly interesting example of selective breeding. After all, we call dogs "man's best friend" for a reason. Dogs originally evolved from wolves. Eventually, humans were breeding different types of dogs to accomplish certain jobs. For example, some dogs were bred to hunt well. Others were bred with desired traits to herd cattle. But it was a trait known as "tamability," or a dog's ability to be tamed and live among people, that resulted in

humans keeping dogs as pets. Now that many people live relatively quiet, domestic lives, how well a dog can herd sheep is not of huge importance. What matters most is whether a dog makes a good companion.

Charles Darwin may have been the first to describe the process of selective breeding, but the practice may be more than 2,000 years old. The Romans are said to have practiced selective breeding among their livestock, favoring cows that produced a lot of milk. But it wasn't until the 18th century that farmers began practicing it on a large, industrial scale.

Today, farmers breed chickens to have extra-large breasts and to lay a lot of eggs. A wild fowl—a chicken that lives in the woods—lays between 20 and 30 eggs per year. In contrast, a chicken born out of selective breeding can lay as many as 300 eggs per year.

In the same way that chickens are selectively bred for having more meat and laying a greater amount of eggs compared to wild chickens, cattle are often selectively bred either for more meat or for more abundant milk production compared to cattle in the wild. Over the course of the 1700s, the size of bulls sold for slaughter increased dramatically—from around 300 pounds (about 140 kilograms) to nearly 800 pounds (about 360 kilograms)—as a result of selective breeding. Also as a result of selective breeding, the dairy cow, which does not display a lot of girth or muscle, can produce enough milk for 10 calves. One can identify a dairy cow by its udders, which can hold over 5 gallons (over 19 liters) of milk.

Even though people selectively breed to yield animals with desired traits, there are dangers to selective breeding. Temple Grandin, an animal welfare advocate, notes that breeding animals for size and strength interferes with natural animal processes. Breeding roosters for muscle, for example, can make them top-heavy and unsteady on their feet, interfering with their courtship dances. This, in turn, can alienate them from hens.

Speaking of hens, what about those that were bred to lay 300 eggs per year? Laying one egg a day makes a hen's bones brittle, since the eggs soak up the bird's calcium supply. And what about so-called broiler chickens—the ones that are bred for their large breasts? Often, their bodies grow so fast that their skinny legs can't support them.

Cows required to produce enough milk for 10 calves tend to burn out quickly. Cows not subject to selective breeding can live up to 30 years without burning out. But prolific dairy cows tend to make it just four or five years before they are considered worthless, and then they are sent to be slaughtered.

Selective breeding comes with both benefits and drawbacks. Think of all the joy that dogs have offered humans in the form of companionship over the last 100 years. Selective breeding is to thank for man's best friends. And yet, the pain and suffering that livestock endure makes us think twice. It is important to keep in mind that, in some cases, the negative consequences of selective breeding may outweigh the positive.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. According to the text, what is artificial selection most often called?

- A. natural selection
- B. evolution
- C. selective breeding
- D. desirable traits

2. What does the text describe?

- A. experiments completed to analyze the differences and similarities between animals bred for certain traits and animals not bred for certain traits
- B. the attitudes of different societies to selective breeding
- C. different examples of animals that have evolved through adaptation to their surroundings
- D. different examples of selective breeding and the impact of selective breeding on some animals

3. The text explains that selective breeding involves breeding animals or plants for specific desirable traits. For example, humans bred different types of dogs to accomplish certain jobs. Farmers breed chickens for having more meat and laying a greater amount of eggs. Cattle are often selectively bred either for more meat or for more milk production. The text also notes that breeding animals for size and strength interferes with natural animal processes.

Based on this information presented in the text, who benefits from the traits different animals are bred for?

- A. humans breeding the animals
- B. the animals being bred by the humans
- C. both the humans breeding the animals and the animals being bred by the humans
- D. animals not being bred by humans

4. The author includes examples of broiler chickens whose legs can't support their bodies and dairy cows that burn out quickly. How do these examples support the author's statement that "selective breeding comes with both benefits and drawbacks"?

- A. These examples highlight the benefits.
- B. These examples highlight the drawbacks.
- C. These examples highlight both the benefits and drawbacks.
- D. These examples highlight the benefits of natural selection.

5. What is this passage mostly about?

- A. breeding for "tamability" in dogs
- B. the history of selective breeding from the Romans to today
- C. the advantages and disadvantages of selective breeding
- D. the problems associated with selective breeding in industrial farms

6. Read the following sentence: "Even though people selectively breed to **yield** animals with desired traits, there are dangers to selective breeding."

What does "**yield**" mean as used in the text?

- A. to produce
- B. to surrender
- C. to endanger
- D. not worth much money to remove

7. Choose the answer that best completes the sentence below.

Temple Grandin, an animal welfare advocate, notes that breeding animals for size and strength interferes with natural animal processes. \_\_\_\_\_, breeding roosters for muscle can make them top-heavy and unsteady on their feet, interfering with their courtship dances.

- A. For example
- B. As a result
- C. Most importantly
- D. In contrast

8. Give an example of a positive effect of selective breeding.

9. Give an example of a negative effect of selective breeding.

10. How can the author's view of selective breeding best be described? Use information from the text to support your answer.



# Genetic Basis of Butterflies

by ReadWorks



If you've ever been in a park during the summer, you may have seen butterflies flitting from flower to flower. They are quite beautiful, and like humans, seem to have individual traits. There are orange butterflies with big brown eyes, blue butterflies with black markings on their wings, and white butterflies with small black antennae. According to some butterfly experts, there are approximately 20,000 kinds of butterflies in the world. Each species (or type) of butterfly has its own genetic information that dictates what characteristics it will have and distinguishes it from other butterflies.

Inherited genetic information explains why certain species look different from others. Monarch butterflies, orange butterflies with black markings and white spots on their wings, are most common in Mexico and the United States. Their bright color makes them easily noticeable to predators, but also acts as a warning that they are poisonous if eaten.

The poison of monarch butterflies can be traced back to a plant they feed on during an earlier stage in their lives. What we think of as butterflies are the adult versions of caterpillars. As caterpillars, monarchs feed on milkweed, which contains a toxin that is poisonous to most vertebrates but not to monarch caterpillars. When the caterpillars become adult monarch butterflies, the milkweed in their bodies is poisonous to any predators that might try to eat them.

An unsuspecting predator that did not know the monarch butterfly was poisonous would soon realize its mistake. After tasting the poisonous bug, most predators quickly spit out the monarch and learn not to eat them again. Unlike other butterflies, whose genetic information (and therefore their

coloration) helps them blend into their habitats in order to defend themselves from predators, monarch butterflies rely on their bright coloration to keep them safe. An interesting fact: another species of butterfly, the viceroy, mimics the coloration of the monarch in order to keep predators from eating it!

Even though there are many kinds of butterflies that look very different, all butterflies share a certain number of traits, which are also determined by their genetic information. They all have the same life cycle. First a caterpillar hatches from an egg. The caterpillar eats plants and grows bigger. Then it covers itself in a hard case called a chrysalis, and it enters a stage of transformation. During this stage, the insect is called a *pupa*. Inside the chrysalis, the pupa grows the legs, wings, and other parts of an adult butterfly. Once the butterfly is fully developed, the chrysalis splits apart, and the butterfly emerges. All butterflies have four wings-two upper, two lower-that are covered in tiny colored scales. A butterfly's genes determine the color of its scales, and more-they dictate the insect's size and shape as well.

Colorful decorations are key to the survival of the monarch butterfly. Vivid colors signal danger to the predators which might otherwise eat the butterfly. Other species of butterfly, with different genes, rely on different survival strategies, and have their own distinctive designs. But no matter the pattern, the blueprints for each of the 20,000 different species' development are written in their genetic codes.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. What does genetic information dictate, or control?
  - A. what characteristics an organism will have
  - B. where an organism will live and die
  - C. which predators will eat the organism
  - D. who the organism's parents were
  
2. The passage describes the sequence of a butterfly's life. Which of the following shows the life cycle of a butterfly in the correct order?
  - A. egg, pupa, adult, caterpillar
  - B. pupa, egg, caterpillar, adult
  - C. egg, caterpillar, pupa, adult
  - D. egg, pupa, caterpillar, adult
  
3. Monarch butterflies are protected by their bright coloration. What evidence from the passage supports this conclusion?
  - A. Their bright coloration makes monarch butterflies easily noticeable to predators.
  - B. The monarch's color warns predators that they are poisonous, so they don't get eaten.
  - C. Unlike other butterflies, monarchs do not blend into their surroundings to protect themselves.
  - D. If a predator eats a monarch, it can taste the poison and will spit the butterfly out.
  
4. Butterfly A is blue with black markings. Butterfly B is green with brown spots. What conclusion can you make about these two butterflies?
  - A. Both butterflies protect themselves by blending into their surroundings.
  - B. The two butterflies have different life cycles.
  - C. Both butterflies have the same genetic information.
  - D. The two butterflies have different genetic information.

5. What is this passage mostly about?

- A. monarch butterflies
- B. viceroy butterflies
- C. milkweed toxins
- D. caterpillars and pupae

6. Read the following sentences: "Inside the chrysalis, the pupa grows the legs, wings, and other parts of an adult butterfly. Once the butterfly is fully **developed**, the chrysalis splits apart, and the butterfly emerges."

What does the word "**developed**" mean?

- A. young and small
- B. changed and grown
- C. safe and protected
- D. soft and vulnerable

7. Choose the answer that best completes the sentence below.

Monarch butterflies are brightly colored; \_\_\_\_\_, they are highly visible to predators.

- A. however
- B. for example
- C. as a result
- D. initially

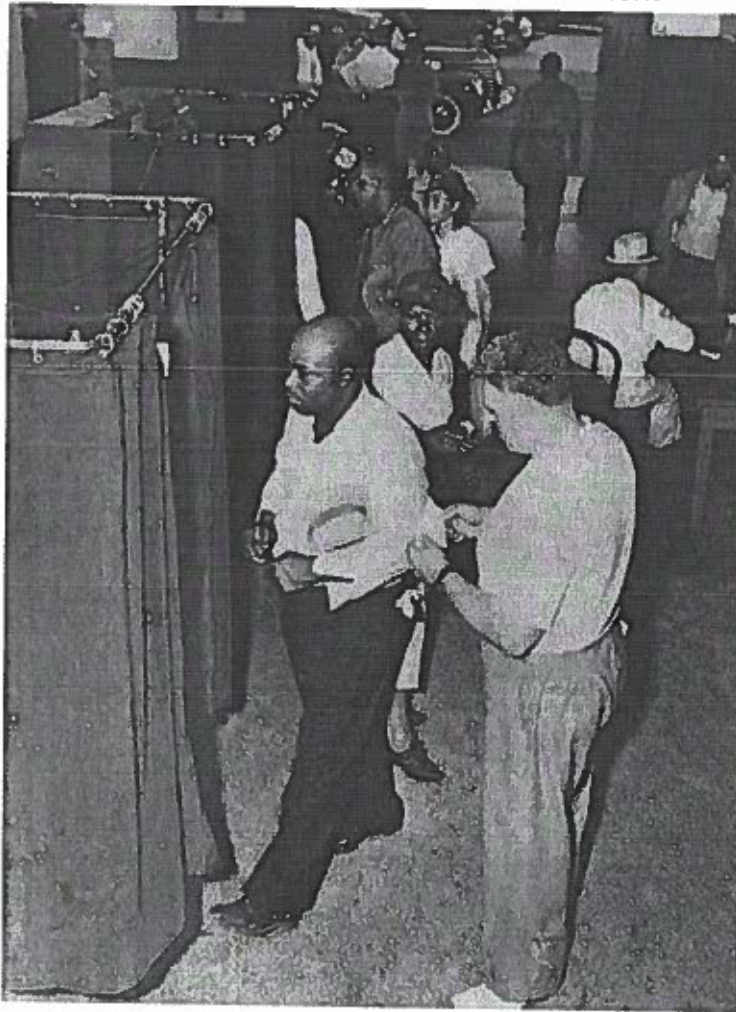
8. Why are monarch butterflies poisonous?

9. How do predators know that monarch butterflies are poisonous?

10. How does the monarch's coloration help both the butterfly and predators?

# The History and Process of Voting

by Ben's Guide to the U.S. Government



*voting booths in U.S., 1945*

Any U.S. citizen who is at least 18 years old, and who meets certain requirements, can vote in federal elections. This has not always been the case. When the United States first won its independence, there were restrictions on who could vote. In some states, only white male landowners that were at least 21 years old could vote. Beginning in 1870, a series of Constitutional Amendments and other laws have extended voting privileges to more and more citizens.

- The Fifteenth Amendment (Amendment XV) was ratified (or officially adopted) on February 3, 1870. It gave African-American men the right to vote by declaring that the "right of citizens of the United States to vote shall not be denied or abridged by the United States or by any state on account of race, color, or previous condition of servitude."
- The Nineteenth Amendment (Amendment XIX) was ratified on August 18, 1920. It guarantees the right to vote to all American women by declaring that "the right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of sex."

- The Voting Rights Act of 1965 (Public Law 89-110) became effective on August 6, 1965. It enforced the Fifteenth Amendment and outlawed discriminatory voting practices.
- The Twenty-sixth Amendment (Amendment XXVI) was ratified on July 1, 1971. It lowered the voting age from 21 to 18 and declared that "the right of citizens of the United States, who are eighteen years of age or older, to vote shall not be denied or abridged by the United States or by any State on account of age. "

It took a long time and a lot of hard work to extend the right to vote to every adult citizen in the United States. That's why it is every eligible American citizen's civic responsibility to vote. In order to vote, you must first be registered. Requirements for registration and registration deadlines change depending on where you live in the U.S.

Registration forms can be obtained from local election officials in your county, from your state's election office, or through voting advocacy groups. You can also register to vote at motor vehicle or driver's licensing offices, Armed Forces recruitment offices, or state agencies that provide public assistance services. Many states offer registration opportunities at public libraries, public high schools and universities, and post offices.

The [website](https://www.eac.gov/) from the United States Election Assistance Commission (EAC) allows you to register to vote from anywhere in the United States. The forms on the EAC site have specific information in several languages about voter registration for each state. Can you find the instructions for your state?

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. Who can vote in Federal elections?

- A. any U.S. citizen who is at least 18 years old and meets certain requirements
- B. any U.S. resident who is at least 18 years old and meets certain requirements
- C. any U.S. citizen who is at least 16 years old and meets certain requirements
- D. any U.S. resident who is at least 16 years old and meets certain requirements

2. The text discusses the extension of voting rights in the United States. What was the sequence of their extension?

- A. Voting rights were given to all American women, then to African-American men, and then to citizens of the United States who are 18 years of age or older.
- B. Voting rights were given to all American women, then to citizens of the United States who are 18 years of age or older, and then to African-American men.
- C. Voting rights were given to African-American men, then to all American women, and then to citizens of the United States who are 18 years of age or older.
- D. Voting rights were given to African-American men, then to citizens of the United States who are 18 years of age or older, and then to all American women.

3. Read these sentences from the text:

"When the United States first won its independence, there were restrictions on who could vote. In some states, only white male landowners that were at least 21 years old could vote. Beginning in 1870, a series of Constitutional Amendments and other laws have extended voting privileges to more and more citizens."

What evidence in the text supports the statement that "a series of Constitutional Amendments and other laws have extended voting privileges to more and more citizens"?

- A. Requirements for voter registration and registration deadlines change depending on where you live in the U.S.
- B. You can register to vote at motor vehicle or driver's licensing offices and Armed Forces recruitment offices.
- C. The National Mail Voter Registration Form from the United States Election Assistance Commission allows you to register to vote from anywhere in the United States.
- D. The Nineteenth Amendment, ratified in 1920, guaranteed the right to vote to all American women.

4. Read these sentences from the text: "The Voting Rights Act of 1965 (Public Law 89-110) became effective on August 6, 1965. It enforced the Fifteenth Amendment and outlawed discriminatory voting practices."

Based on this information, what can you infer about the Fifteenth Amendment before the Voting Rights Act?

- A. The Fifteenth Amendment was popular with a lot of U.S. citizens who were under the age of 21.
- B. The Fifteenth Amendment was unpopular with a lot of U.S. citizens who were under the age of 21.
- C. The Fifteenth Amendment was not being completely obeyed.
- D. The Fifteenth Amendment was being completely obeyed.

5. What is a main idea of this text?

- A. The Twenty-sixth Amendment, ratified in 1971, lowered the voting age from 21 to 18.
- B. The right to vote in the United States was slowly extended to more and more citizens.
- C. Many states offer voter registration opportunities at public libraries and post offices.
- D. When the United States was founded, only white male landowners that were at least 21 years old could vote in some states.

6. Read these sentences from the text:

"It took a long time and a lot of hard work to extend the right to vote to every adult citizen in the United States. That's why it is every eligible American citizen's civic responsibility to vote."

What does the author probably mean by writing that "it is every eligible American citizen's civic responsibility to vote"?

- A. It is the responsibility of every American citizen who can vote to vote.
- B. It is the responsibility of every American who works for the government to vote.
- C. It is the responsibility of all American voters to respect each other.
- D. It is the responsibility of all American voters to think carefully when they are voting.



7. Read these sentences from the text: "It took a long time and a lot of hard work to extend the right to vote to every adult citizen in the United States. That's why it is every eligible American citizen's civic responsibility to vote."

How could the second sentence be rewritten without changing its meaning?

- A. Currently, it is every eligible American citizen's civic responsibility to vote.
- B. Specifically, it is every eligible American citizen's civic responsibility to vote.
- C. Instead, it is every eligible American citizen's civic responsibility to vote.
- D. Therefore, it is every eligible American citizen's responsibility to vote.

8. Read this statement from the text: "It took a long time . . . to extend the right to vote to every adult citizen in the United States."

What evidence in the text supports this statement?

9. Why does the author believe "it is every eligible American citizen's civic responsibility to vote"?

10. Argue for or against the author's claim that "it is every eligible American citizen's civic responsibility to vote."

Support your argument with evidence from the text.

## Understanding Addition with Negative Integers

- 1 Between the time Iko woke up and lunchtime, the temperature rose by  $11^{\circ}$ . Then by the time he went to bed, the temperature dropped by  $14^{\circ}$ .

Write an addition expression for the temperature relative to when Iko woke up.

---

Draw a model using integer chips and circle the zero pairs.

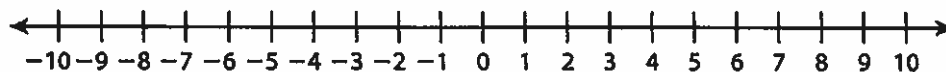
What is the value of the remaining integer chips after the zero pairs are removed?

---

What is the net change in the temperature relative to when Iko woke up?

---

- 2 Complete the number line model to find  $(-5) + 6$ .



$(-5) + 6 =$  \_\_\_\_\_

How would the number line model be different if you wanted to find  $(-5) + (-6)$ ?

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---

## Understanding Addition with Negative Integers *continued*

► For problems 3–5, consider the sum  $4 + (-8)$ .

3 Explain how you can use a number line to find the sum.

4 Explain how you can use chips to determine the sum.

5 Does it matter what order you add the numbers in the problem? Explain how chips and number lines support your answer.

6 Write an addition expression that has a value of  $-8$ .

## Understanding Subtraction with Negative Integers

- ① Mary takes 9 grapes from Rohin and then decides to give 4 back.

Write a subtraction problem to describe how many grapes Rohin has. \_\_\_\_\_

Draw a model for the subtraction problem using integer chips.

How many negative integer chips did you cross out? \_\_\_\_\_

Write the subtraction as addition. \_\_\_\_\_

Draw a model for the addition problem using integer chips.

How do the two integer chip models show that  $-9 - (-4)$  is the same as  $-9 + 4$ ?

What is the change in the number of grapes Rohin has? \_\_\_\_\_

## Understanding Subtraction with Negative Integers *continued*

- 2 Jin is 3 floors above ground level in a hotel. Leila is on a parking level of the hotel that is 4 floors below ground level. How many floors apart are they? Draw a number line model to show  $3 - (-4)$ .



What is  $3 - (-4)$ ? \_\_\_\_\_

What is the meaning of this answer in the context of the problem?

Rewrite  $3 - (-4)$  as an addition problem. \_\_\_\_\_

- 3 The variables  $a$  and  $b$  represent positive numbers. When you find the difference  $a - (-b)$ , do you expect the result to be less than or greater than  $a$ ? What if  $a$  is negative and  $b$  is positive? Explain.

# Understanding Multiplication with Negative Integers

► Practice multiplying negative integers.

① Find each product. Then describe any patterns you notice.

$$3 \cdot (-7) = \underline{\hspace{2cm}}$$

$$2 \cdot (-7) = \underline{\hspace{2cm}}$$

$$1 \cdot (-7) = \underline{\hspace{2cm}}$$

$$0 \cdot (-7) = \underline{\hspace{2cm}}$$

$$(-1) \cdot (-7) = \underline{\hspace{2cm}}$$

$$(-2) \cdot (-7) = \underline{\hspace{2cm}}$$

$$(-3) \cdot (-7) = \underline{\hspace{2cm}}$$

② Solve each problem. Explain how you determined the sign of the products.

$$(-3)(9) = \underline{\hspace{2cm}}$$

$$(-8)(-5) = \underline{\hspace{2cm}}$$

$$(-5)(-6) = \underline{\hspace{2cm}}$$

$$(-1)(2)(-6) = \underline{\hspace{2cm}}$$

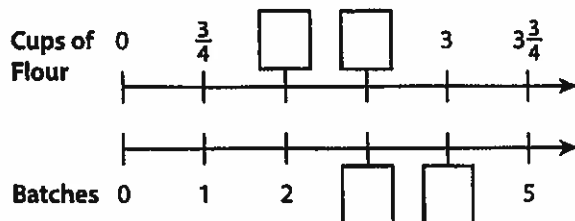
$$(-2)(-4)(-7) = \underline{\hspace{2cm}}$$

$$(-3)(-4)(-3)(-1) = \underline{\hspace{2cm}}$$

## Understanding Proportional Relationships

► Read and solve the problems. Show your work.

- 1 Josie is making pizza dough. Complete the double number line by filling in the missing values. Then write an equation that models the relationship between the total cups of flour,  $c$ , and number of batches,  $n$ . Show your work.



- 2 Lilli bought each of her friends a pair of colorful socks that cost \$5.50. Complete the table to show how much Lilli paid to buy different numbers of socks. Then write an equation that shows the total cost,  $c$ , for  $p$  pairs of socks.

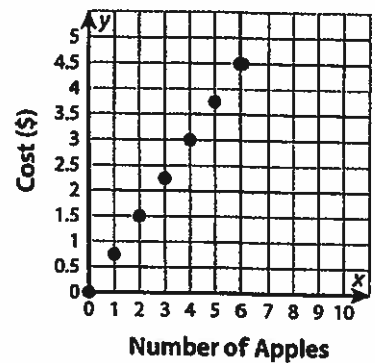
<b>Cost</b>		\$11.00			
<b>Pairs of socks</b>	1	2	3		

- 3 Explain how using a table is similar to using a double number line and how it is different.
- 4 Mrs. Lopez types at a constant rate. The constant of proportionality for the relationship between the number of words she types,  $w$ , and the number of minutes she types,  $m$ , is 38. Write an equation to show this relationship.

# Interpreting Graphs of Proportional Relationships

► The graph shows the cost of apples at a local market. Use the graph to answer problems 1–3.

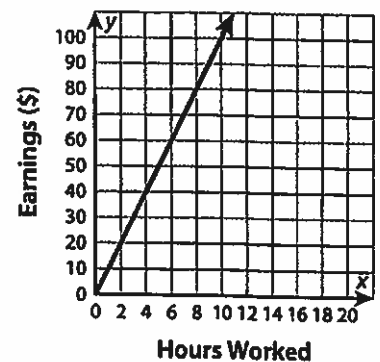
- 1 What is the cost of 1 apple and of 3 apples?  
How do you know?



- 2 What does the point  $(0, 0)$  represent in this context?
- 3 What does the point  $(2, 1.5)$  represent in this context?

► The graph shows Manuela's earnings for the number of hours she spends tutoring. Use the graph to answer problems 4 and 5.

- 4 How much does Manuela earn for each hour of tutoring?  
Explain.



- 5 Write an equation that shows the relationship between Manuela's earnings,  $y$ , and hours,  $x$ .



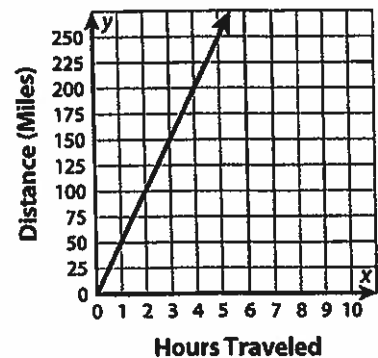
## Interpreting Graphs of Proportional Relationships *continued*

- The graph shows the distance Jason's family traveled on a recent road trip. Use the graph to answer problems 6–8.

6 What is the constant of proportionality? Explain how you know.

7 Identify and interpret one other point on the graph.

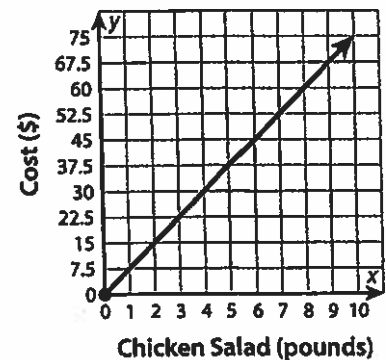
8 Write an equation that models the distance,  $d$ , traveled in  $t$  hours.



- The graph shows the cost per pound of chicken salad. Use the graph to answer problems 9 and 10.

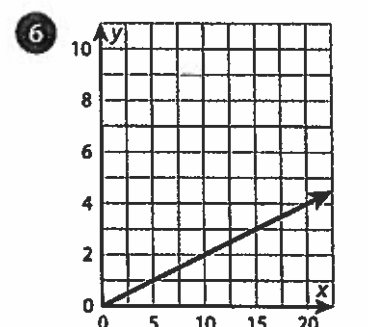
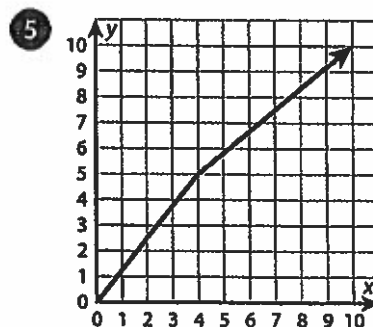
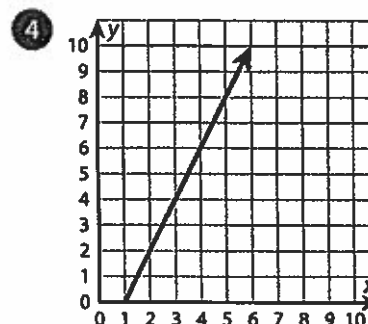
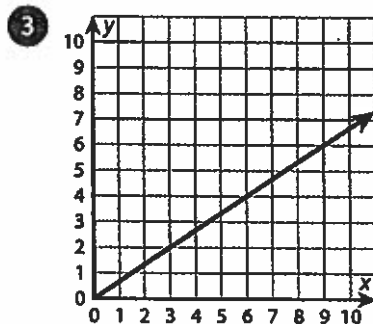
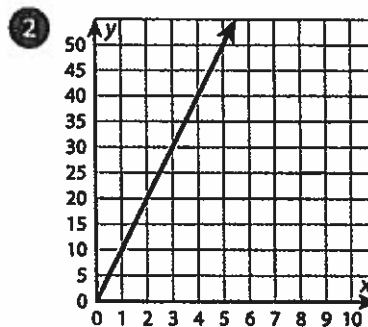
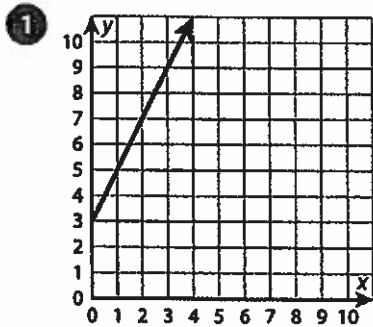
9 Randy claims that he can purchase 3.5 pounds of chicken salad for \$23.50. Is he correct? Explain.

10 Explain how you can determine how much chicken salad may be purchased for \$52.50.

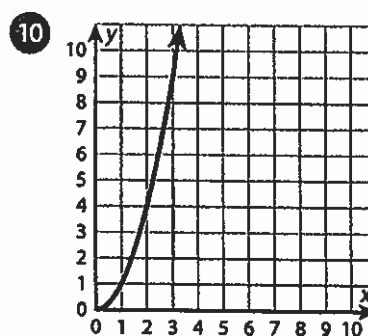
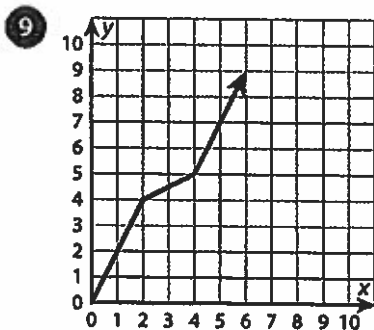
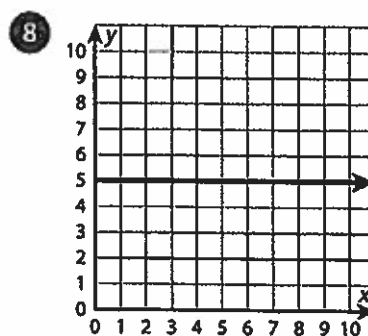
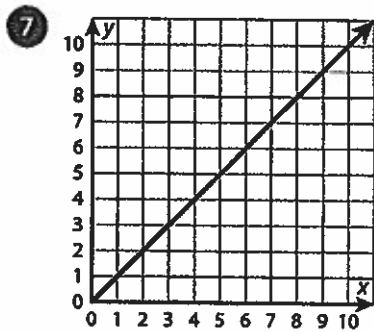


# Recognizing Graphs of Proportional Relationships

➤ Circle all the problems with graphs that do NOT represent a proportional relationship. For the problems that are circled, explain why the graphs do not represent a proportional relationship.



# Recognizing Graphs of Proportional Relationships *continued*



- 11 Without analyzing specific points on a graph, explain how you know whether a graph shows a proportional relationship.

## Solving Multi-Step Ratio Problems

► Solve each problem.

- 1 At The Green House of Salad, you get a \$1 coupon for every 3 salads you buy. What is the least number of salads you could buy to get \$10 in coupons?
- 

- 2 Kim orders catering from Midtown Diner for \$35. She spends \$5 on a large order of potato salad and the rest on turkey sandwiches. Each sandwich is \$2.50. How many sandwiches does Kim buy?
- 

- 3 Molly and Liza are exercising. Molly does 10 push-ups at the same time as Liza does 15 push-ups. When Molly does 40 push-ups, how many push-ups does Liza do?
- 

- 4 A shark swims at a speed of 25 miles per hour. The shark rests after 40 miles. How long, in minutes, does the shark swim before resting?
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- 5 Ali and Janet are selling gifts at a local craft show. For every bar of soap that Ali sells, she earns \$5. For every mug that Janet sells, she earns twice as much as Ali. Ali sells 5 bars of soap, and Janet sells 7 mugs. How much money did they make altogether?
- 

- 6 Ted is making trail mix for a party. He mixes  $1\frac{1}{2}$  cups of nuts,  $\frac{1}{4}$  cup of raisins, and  $\frac{1}{4}$  cup of pretzels. How many cups of pretzels does Ted need to make 15 cups of trail mix?
- 

- 7 The ratio of chaperones to students on a field trip is 2 : 7. There are 14 chaperones on the field trip. In all, how many chaperones and students are there?
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- 8 Dayren is driving to visit family. She drives at an average of 65 miles per hour. She drives 227.5 miles before lunch and then 97.5 miles after lunch. How many hours did she spend driving?
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