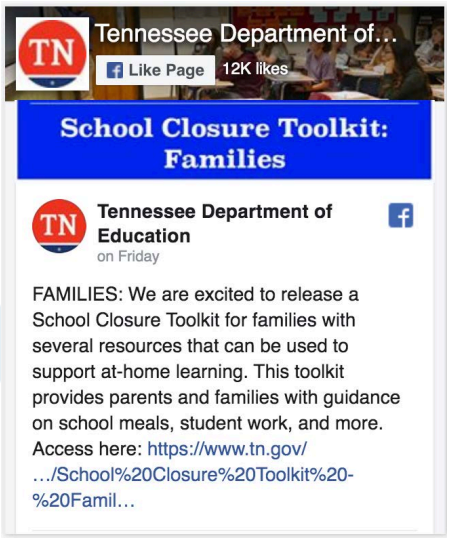
April 1-24 District Packet



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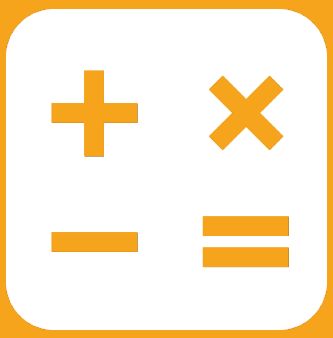


Math Activities

Understanding Probability

Probability refers to the chance that an event will happen.

Example 1:

In a candy jar, there are 31 lollipops, 20 fruit chews, and 15 chocolates.

Which kind of candy has the best chance of being selected at random?

Solution:

The set of all possible outcomes of an experiment is called its sample space.

The probability of an event is given by the equation below.

$$\mathrm{P(event)} = \frac{\text{number of outcomes that match an event}}{\text{total number of outcomes in the sample space}}$$

$$\begin{aligned}\text{The total number of outcomes in the sample space} &= \text{number of lollipops} + \text{number of fruit chews} \\ &\quad + \text{number of chocolates} \\ &= 31 + 20 + 15 \\ &= 66\end{aligned}$$

The probability of selecting a lollipop can be calculated as shown below.

$$\begin{aligned}P(L) &= \frac{n(L)}{n(S)} \\ &= \frac{31}{66} \\ &\approx 0.47\end{aligned}$$

The probability of selecting a fruit chew can be calculated as shown below.

$$\begin{aligned}P(F) &= \frac{n(F)}{n(S)} \\ &= \frac{20}{66} \\ &= \frac{10}{33} \\ &\approx 0.30\end{aligned}$$

The probability of selecting a chocolate can be calculated as shown below.

$$\begin{aligned}P(C) &= \frac{n(C)}{n(S)} \\ &= \frac{15}{66} \\ &= \frac{5}{22} \\ &\approx 0.23\end{aligned}$$

Since selecting lollipops has the highest probability, **lollipops** have the *best chance* of being selected at random.

Example 2:

There are 30 people working for a company. Of those 30 employees, 18 are female and 12 are male.

If all their names are put into a hat and one name is drawn for a prize, is the winner more likely to be male or female?

Solution:

The set of all possible outcomes of an experiment is called its sample space.

The probability of an event is given by the equation below.

$$\mathrm{P(event)} = \frac{\text{number of outcomes that match an event}}{\text{total number of outcomes in the sample space}}$$

The total number of outcomes in the sample space is 30.

The probability of drawing the name of a female employee can be calculated as shown below.

$$\begin{aligned} P(F) &= \frac{n(F)}{n(S)} \\ &= \frac{18}{30} \\ &= 0.6 \end{aligned}$$

The probability of drawing the name of a male employee can be calculated as shown below.

$$\begin{aligned} P(M) &= \frac{n(M)}{n(S)} \\ &= \frac{12}{30} \\ &= 0.4 \end{aligned}$$

Since drawing the name of a female employee has the highest probability, it is *more likely* that the winner will be a **female**.

Example 3:

The stickers above are put into an envelope. If Carly picks one sticker without looking, which sticker is she less likely to choose?

A. cat sticker

B. dog sticker

C. butterfly sticker

Solution:

The set of all possible outcomes of an experiment is called its sample space.

The probability of an event is given by the equation below.

$$\mathrm{P(event)} = \frac{\text{number of outcomes that match an event}}{\text{total number of outcomes in the sample space}}$$

The total number of outcomes in the sample space is 6.

The probability of Carly picking the sticker of dog can be calculated as shown below.

$$\begin{aligned} P(D) &= \frac{n(D)}{n(S)} \\ &= \frac{1}{6} \\ &\approx 0.17 \end{aligned}$$

The probability of Carly picking the sticker of butterfly can be calculated as shown below.

$$\begin{aligned} P(B) &= \frac{n(B)}{n(S)} \\ &= \frac{2}{6} \\ &= \frac{1}{3} \\ &\approx 0.34 \end{aligned}$$

The probability of Carly picking the sticker of cat can be calculated as shown below.

$$\begin{aligned} P(C) &= \frac{n(C)}{n(S)} \\ &= \frac{3}{6} \\ &= \frac{1}{2} \\ &= 0.5 \end{aligned}$$

Since picking a dog sticker has the smallest probability, it is *less likely* that Carly will pick a **dog sticker**.

Probability - Likelihood

*If an event has a probability close to 0, the event is **unlikely** to occur.*

*If an event has a probability close to $\frac{1}{2}$, the event is **neither unlikely nor likely** to occur.*

*If an event has a probability close to 1, the event is **likely** to occur.*

Example 1:

The probability of selecting a red chip from a bag of plastic chips is $\frac{9}{16}$. Describe the likelihood of selecting a red chip.

Solution:

Since the probability is close to $\frac{1}{2}$, it is about the same distance from both 0 and 1.

Therefore, the likelihood of selecting a red chip is **neither unlikely nor likely**.

Example 2:

The probability of a spinner landing on a yellow section is $\frac{2}{11}$. Describe the likelihood of the spinner landing on a yellow section.

Solution:

Since the probability is closer to 0 than to $\frac{1}{2}$, the likelihood of the spinner landing on a yellow section is **unlikely**.

Example 3:

The probability of selecting a blue marble from a bag of marbles is $\frac{9}{10}$. Describe the likelihood of selecting a blue marble.

Solution:

Since the probability is closer to 1 than to $\frac{1}{2}$, the likelihood of selecting a blue marble is **likely**.

Example 4:

The probability of randomly picking up a screwdriver from a box of tools is 0.5. Describe the likelihood of picking a screwdriver.

Solution:

Rewrite the given probability of 0.5 as a fraction.

$$0.5 = \frac{5}{10} = \frac{1}{2}$$

Since the probability is equal to $\frac{1}{2}$, it is the same distance from both 0 and 1.

Therefore, the likelihood of picking a screwdriver is **neither unlikely nor likely**.

Example 5:

The probability of randomly selecting a parent from a group of parents and teachers at a parent-teacher meeting is 82%. Describe the likelihood of selecting a parent.

Solution:

Rewrite the given probability of 82% as a fraction.

$$82\% = \frac{82}{100} = \frac{41}{50}$$

Since the probability is close to $\frac{1}{2}$, it is about the same distance from both 0 and 1.

Study Island 7th Grade Math - Understanding Probability

Question 1 .

Which of the following is a true statement?

- **A.** A probability near 1 indicates an unlikely event.
- **B.** A probability near 0 indicates a likely event.
- **C.** A probability near $\frac{1}{2}$ indicates an unlikely event.
- **D.** A probability near 1 indicates a likely event.

Question 2 .

Two experiments are defined below. An event is defined for each of the experiments.

Experiment I: Elena spins the spinner shown in the image.
Event A: The arrow is on the red quarter of the spinner when it stops spinning.

Experiment II: Sam flips a fair coin twice.
Event B: The coin lands on tails the first flip, and the coin lands on heads the second flip.

Which statement about Event A and Event B is true?

- **A.** It is not possible to determine which event is more likely to occur.
- **B.** Event A is more likely to occur than Event B.
- **C.** Event A is less likely to occur than Event B.
- **D.** Both events are equally likely to occur.

Question 3 .

The probability of randomly selecting a green marble from a bag of 20 marbles is $\frac{1}{20}$. Which of the following describes the likelihood of selecting a green marble?

- **A.** likely
- **B.** unlikely
- **C.** neither unlikely nor likely

Question 4 .

Richard is playing a game where he draws one playing card each out of two stacks of four cards. The image below shows all possible products for the two numbers on the cards.

Product of Two Cards

		Value of Card 2			
		1	2	5	9
Value of Card 1	4	4	8	20	36
	3	3	6	15	27
	1	1	2	5	9
	7	7	14	35	63

Is Richard more likely to draw two cards with a product that is an even number or two cards with a product that is a single digit?

- **A.** Richard is more likely to draw two cards with a product that is a single digit, because $\frac{11}{16} > \frac{7}{16}$.
- **B.** Richard is more likely to draw two cards with a product that is an even number, because $\frac{9}{16} > \frac{7}{16}$.
- **C.** Richard is more likely to draw two cards with a product that is a single digit, because $\frac{9}{16} > \frac{7}{16}$.
- **D.** Richard is equally likely to draw two cards with a product that is an even number, or a product that is a single number, because $\frac{9}{16} = \frac{9}{16}$.

Question 5 .

Directions: Drag the tiles to the correct boxes to complete the pairs. Not all tiles will be used.

Match each event with its likelihood of occurrence.

an event that is certain

an event that is likely

an event that is equally likely as unlikely

an event that is impossible

an event that is unlikely

Randomly selecting a vowel in the word, "RAISED" →

Randomly selecting an odd number in the set {3, 5, 7, 11, 13} →

Randomly selecting "drums" in the list, "guitar, piano, cello, flute" →

Randomly selecting a boy in a list of 21 boys and 12 girls →

Question 6 .

Fiona has a box full of art supplies. The probability of randomly picking up a paint brush is 0.5.

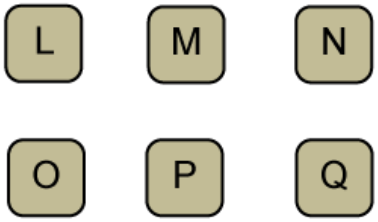
Which of the following describes the likelihood of picking a paint brush?

- **A.** unlikely
- **B.** neither unlikely nor likely
- **C.** likely

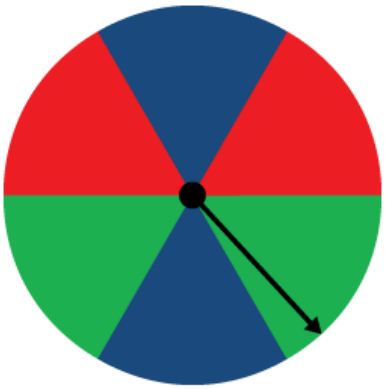
Question 7 .

Two experiments are defined below. An event is defined for each of the experiments.

Experiment I: Lisa randomly picks a tile from the set shown in the image.
Event A: Lisa picks an M or a Q.



Experiment II: Josh spins the spinner shown in the image.
Event B: The arrow is on a green or red sector of the spinner when it stops spinning.



Which statement about Event A and Event B is true?

- **A.** Event A is more likely to occur than Event B.
- **B.** Event A is less likely to occur than Event B.
- **C.** It is not possible to determine which event is more likely.
- **D.** Both events are equally likely to occur.

Question 8 .

Raymond has a bag full of old coins. The probability of randomly picking up a coin with an eagle on one side is 0.12.

Which of the following describes the likelihood of picking a coin with an eagle on one side?

- **A.** likely
- **B.** neither unlikely nor likely
- **C.** unlikely

Question 9 .

Travis performed an experiment in which he spun a spinner multiple times. The sections of the spinner are red, orange, yellow, green, and blue. The results of his experiment are shown below.

Spinner Result	Frequency
red	10
orange	15
yellow	8
green	20
blue	7

Based on the experiment above, which of the following statements is true?

- **A.** It is twice as likely for the next spin to land on green as opposed to red.
- **B.** It is less likely for the next spin to land on red as opposed to yellow.
- **C.** It is equally likely for the next spin to land on yellow or blue.
- **D.** It is more likely for the next spin to land on orange as opposed to green.

Question 10 .

The probability of randomly selecting a white flower from a garden that has green, pink, yellow, and white flowers is 6%.

Which of the following describes the likelihood of selecting a white flower?

- **A.** likely
- **B.** unlikely
- **C.** neither unlikely nor likely

Name: _____

Single-Step Percent Problems

Read each question below. Circle the letter of the correct answer.

1. 18 is what percent of 25?
   A. 70% B. 72% C. 75% D. 82%

2. What is 60 % of 50?
   A. 20 B. 25 C. 30 D. 40

3. Chris has 12 belts. Nine of the belts are wide and the rest are narrow. What percent of the belts are narrow?
   A. 75% B. 34% C. 30% D. 25%

4. Marla pays $42.25 for dinner. If she leaves a 20% tip, how much will she spend on dinner and the tip?
   A. $48.59 B. $50.07 C. $50.70 D. $52.81

5. What is 16% of 425?
   A. 68 B. 85 C. 340 D. 357

6. Dan got 44 of 55 problems correct on a math test. What percent did he correctly answer?
   A. 75% B. 80% C. 82% D. 85%

7. Sasha bought a hardcover book for $14.99. The sales tax is 7%. How much did Sasha spend for the hardcover book?
   A. $16.44 B. $16.40 C. $16.04 D. $16.00

8. Ray bought a shirt on sale for $18.00. The original price was $24.00. What percent was the discount?
   A. 75% B. 40% C. 35% D. 25

9. Mario bought a pair of sneakers for 25% off the regular price of $89.99. What is the sale price of the sneakers?
   A. $67.49 B. $68.39 C. $69.29 D. $71.99

10. Lin works at an animal shelter. After three months on the job, her hourly rate increased from $7.75 to $8.45 an hour. What percent did her hourly rate increase?
    A. 3% B. 5% C. 8% D. 9%

Name: _____

Converting Units

Read each question below. Circle the letter of the correct answer.

1. Complete: 80 mm = _____ cm
   A. 800 B. 80 C. 8 D. 0.8

2. Complete: 90 m = _____ cm
   A. 900 B. 90 C. 9 D. 0.9

3. Complete: 7 days = _____ h
   A. 192 B. 168 C. 84 D. 0.25

4. Complete: 45° C = _____° F
   A. 81 B. 77 C. 25 D. 13

5. Complete: 8.5 gal = _____ pt
   A. 17 B. 34 C. 68 D. 136

6. Complete: 4.5 L = _____ mL
   A. 0.045 B. 0.45 C. 450 D. 4,500

7. Select the conversion factor that you would use to convert quarts to gallons.
   A. 4 gal/1 qt B. 1 gal/4 qt C. 1 qt/4 gal D. 4 qt/ 4 gal

8. Select the conversion factor that you would use to convert miles to feet.
   A. 5,280 ft/1 mi B. 1760 ft/1 mi C. 1 mi/5280 yd D. 1 mi/1760 ft

9. A brand of apple juice costs $2.56 for 64 oz. Find the unit rate.
   A. 25 oz/cent B. 40 cents/oz C. 4.0 cents/oz D. 0.25 oz/cent

10. An employee earns $76 for 8 hours. Find the employee's pay per hour.
    A. $9.00 B. $9.50 C. $10.00 D. $10.50

Reading and Literacy

Study Island 7th Grade Language Arts - Phrases and Clauses

Question 1 .

Beneath the loose floorboard, Janice found her favorite earring, which had been missing for nearly five years.

Which of the following is a preposition from the sentence above?

- **A.** nearly
- **B.** found
- **C.** beneath
- **D.** which

Question 2 .

(1) Jenna was excited to have the house all to herself. **(2)** She was looking forward to relaxing in a perfectly quiet house. **(3)** Jenna was enjoying the quiet and her new book. **(4)** She saw her cat Buttons coming from the kitchen with juice all over him. **(5)** *He must have knocked over the glass I left on the counter*, Jenna thought.

As she laughed to herself.

What is the best way to add the dependent clause above to sentence 5?

- **A.** *He must have knocked over the glass I left on the counter*, Jenna thought as she laughed to herself.
- **B.** As Jenna thought *he must have knocked over the glass I left on the counter*, to herself she laughed.
- **C.** *He must have knocked over the glass I left on the counter*, as she laughed to herself Jenna thought.
- **D.** As she laughed *he must have knocked over the glass I left on the counter*, Jenna thought to herself.

Question 3 .

(1) Jenna was excited to have the house all to herself. **(2)** She was looking forward to relaxing in a perfectly quiet house. **(3)** Jenna was enjoying the quiet and her new book. **(4)** She saw her cat Buttons coming from the kitchen with juice all over him. **(5)** *He must have knocked over the glass I left on the counter*, Jenna thought.

Although Jenna would have liked a nice dinner with her parents.

What is the best way to add the dependent clause above to sentence 2?

- **A.** Although Jenna would have liked a nice dinner with her parents, she was looking forward to relaxing in a perfectly quiet house.
- **B.** She was looking forward to a nice dinner although Jenna would have liked relaxing in a perfectly quiet house with her parents.
- **C.** Although Jenna was looking forward to relaxing she would have liked a nice dinner in a perfectly quiet house with her parents.
- **D.** She would have liked relaxing although Jenna was looking forward to a nice dinner with her parents in a perfectly quiet house.

Question 4 .

(1) Derek's parents said he could have a cell phone. **(2)** He promised eagerly he would be responsible with his minutes. **(3)** Derek started talking nonstop on his phone. **(4)** Derek's parents met with him to talk about his bill. **(5)** He went over his plan by 100 minutes!

Provided that he stayed within the limits of the plan.

What is the best way to add the dependent clause above to sentence 1?

- **A.** Derek's parents said he could have a cell phone provided that he stayed within the limits of the plan.
- **B.** Provided that Derek's parents said within the limits of the plan he could have a cell phone he stayed.
- **C.** Provided that he stayed Derek's parents said of the plan he could have a cell phone within the limits.
- **D.** Derek's parents said he stayed within the limits provided that he could have a cell phone of the plan.

Question 5 .

Without the company's support, the presidential candidate cannot expect to win the election because the company provides campaign funds.

Which of the following is a prepositional phrase from the sentence above?

- **A.** win the election
- **B.** without the company's support
- **C.** because the company provides
- **D.** the presidential candidate

Question 6 .

What is the BEST way to combine the information in the two clauses below?

Though she started with the flute two years later. Aisha plays the piano and the flute very well now.

- **A.** Though she started with the flute two years later Aisha plays the piano and the flute very well now.
- **B.** Though she started with the flute two years later, Aisha plays the piano and the flute very well now.
- **C.** Though she started with the flute two years later, but Aisha plays the piano and the flute very well now.
- **D.** Though she started with the flute two years later; Aisha plays the piano and the flute very well now.

Question 7 .

Choose the correct preposition to complete the sentence.

We should arrive at the museum _____ 9 o'clock and tour each of the exhibits.

- **A.** through
- **B.** before
- **C.** without
- **D.** inside

Question 8 .

The tired traveler carefully brushed the dust off his pants and continued his journey down the country road.

Which of the following is a prepositional phrase from the sentence above?

- **A.** carefully brushed
- **B.** his journey
- **C.** the tired traveler
- **D.** off his pants

Question 9 .

(1) Henry has to do the laundry. **(2)** Henry must also start dinner. **(3)** Henry was grounded for a whole week for not doing chores. **(4)** He learned his lesson. **(5)** He ended up missing his soccer game.

While Henry was sitting alone in his room.

What is the best way to add the dependent clause above to sentence 4?

- **A.** In his room, he learned his lesson while Henry sitting home alone.
- **B.** While Henry was sitting alone in his room, he learned his lesson.
- **C.** He learned his lesson while Henry was sitting alone in his room.
- **D.** Henry, while sitting alone in his room, he learned his lesson.

Question 10 .

Directions: Drag the tiles to the correct boxes to complete the pairs.

Match each sentence part with the correct classification.

As Meghan paced, I nervously bit my nails. Waiting for the teacher to pass out our test results was stressful for both of us.

Waiting for the teacher | As Meghan paced | I nervously bit my nails.

dependent clause ⟷	
independent clause ⟷	
gerund phrase ⟷	

Name: _____

Analogies

Read the question and circle the correct answer.

1. Bloom is to flower as leaf is to
   A. daffodil. B. tree. C. rose. D. thorn.

2. Beach is to sand as field is to
   A. bird. B. grass. C. wood. D. rain.

3. King is to queen as duke is to
   A. duchess. B. woman. C. son. D. daughter.

4. Elephant is to trunk as horse is to
   A. mane. B. carriage. C. hay. D. pony.

5. Pitcher is to team as dancer is to
   A. feet. B. shoes. C. troupe. D. tap.

6. Bird is to flock as fish is to
   A. eel. B. swim. C. school. D. fin.

7. Letter is to word as word is to
   A. uppercase. B. sentence. C. verb. D. noun.

8. Snow is to man as sand is to
   A. ocean. B. beach. C. castle. D. shell.

9. Teeth are to mouth as hair is to
   A. braid. B. head. C. baldness. D. cut.

10. Steps are to stairs as beads are to
    A. string. B. rings. C. necklace. D. jewelry.

Name: _____

Spelling

Choose the correct spelling of the word for each sentence. Circle the letter of the correct answer.

1. I sighed with _____ when I saw the A on my math test.
   A. relief B. releif C. raleif D. none of the above

2. The bus _____ left his flashing lights on until all of the kids were safely across the street.
   A. drivur B. drivor C. driver D. none of the above

3. Can you meet me at the baseball ____ at 4:00?
   A. feild B. field C. feeld D. none of the above

4. My dad tried to ____ the air mattress, but discovered there was a small hole.
   A. inflate B. enflate C. imflate D. none of the above

5. I gave the ___ a $20.00 bill.
   A. casheir B. cashier C. casheer D. none of the above

6. There is a large hole in the ____.
   A. cieling B. ceiling C. ceeling D. none of the above

7. The party was ____, so the girls did not have to wear dresses.
   A. informal B. enformal C. ienformal D. none of the above

8. The guest ____ told us about his trip to South Africa.
   A. speakur B. speakor C. speaker D. none of the above

9. The ____ in my new book is funny.
   A. narrater B. narratur C. narrator D. none of the above

10. There are many ____ of birds that live in the rainforest.
    A. speceis B. species C. specees D. none of the above

Is the Earth Getting Warmer?

by ReadWorks

In 1975, a scientist named Wallace "Wally" Broecker wrote a paper in which he asked a simple question: was the Earth getting warmer? When the paper was published, some of Broecker's colleagues laughed at him. Many of them believed that the world was actually cooling.

Historically, there have been periods in which the Earth's temperature has slowly risen and cooled over thousands of years. This is a natural process that can be caused by many factors, including changes in radiation from the Sun, changes in the Earth's orbit, and volcanic activity.

However, climate change can also be caused by changes in the amount of certain gases in the atmosphere. Broecker had noticed that the amount of carbon dioxide - a colorless, odorless gas -- was slowly building up. While some carbon dioxide is produced through natural processes, large quantities of it are also produced by humans. Carbon dioxide is generated in especially large amounts when we burn fossil fuels, such as oil, coal, and natural gas. This burning happens when we drive cars, use electricity, and make certain products. When released into the atmosphere, carbon dioxide traps heat. Broecker reasoned that if people produced a lot of carbon dioxide, then enough

heat would be trapped that the Earth would begin to warm. He called this "global warming."

Several decades later, many climate scientists agree with Broecker: the Earth is heating up and humans are largely responsible. This warming process is often referred to as "climate change." More carbon dioxide is being produced than ever before. Every year, humans produce about 8 billion metric tons of carbon. 2012 was the hottest year in recorded history. Recently, scientists estimated that more carbon dioxide exists in the atmosphere than has in over three million years.

While scientists understand how climate change works, some of its effects are still difficult to predict. Some scientists expect an increase in so-called "extreme weather" events, such as hurricanes and floods. Others foresee a rise in levels of sea water. While exactly what changes will happen are unclear, Broecker has warned that people should be prepared for some large disturbances. In an interview with the *Guardian*, a British newspaper, in 2008, he compared the Earth's climate to a wild animal. Sometimes, when provoked, the animal will react violently and unpredictably.

"If you're living with an angry beast, you shouldn't poke it with a sharp stick," he said.

Why are scientists able to understand some phenomena, like climate change, in a general way, but aren't able to predict the changes they will have on the Earth? Part of the reason is because many large Earth systems involve "feedback loops" - processes that help amplify (positive feedback loops) or diminish (negative feedback loops) certain changes.

Feedback loops can occur in the climate system, too. If the temperature of the Earth rises, it can change the environment so that it produces even more heat.

There are a number of different ways in which this phenomenon occurs. Scientists who work in the Arctic, at the northern end of the Earth, have been reporting that, every year, more and more floating sea ice melts. In the last 30 years, more than one-third of the ice that appears in the Arctic during the summer has melted away.

This worries scientists because Arctic ice plays an important role in cooling the Earth - although not in the way you might think. While we add ice to our drinks to make them colder, Arctic sea ice cools the Earth in a different way. Ice, which is white colored, reflects light. This means that much of the sunlight that hits ice bounces off and is sent right back to space. Reflecting light away helps keep the Earth cool.

However, as the Earth heats up, ice begins to melt. As ice melts, this reveals more of the darker-colored land or ocean water, which doesn't reflect heat, but absorbs it. So, less light is reflected back into space, causing the climate's temperature to increase. As the world gets hotter, this causes the ice to melt even faster. This increase in temperature causes still more ice to melt, which causes the world to get hotter, etc... This is an example of a positive feedback loop, in which heat produces more heat.

Similarly, there are other climate systems that can get caught in feedback loops. There are many gases that, like carbon dioxide, contribute to global warming. Some of these gases are trapped in the frozen tundra across Alaska, Canada, Russia, and other northern lands. This soil, whose temperature is below freezing, is called permafrost. When permafrost melts, much of this gas is released into the atmosphere. This causes the atmosphere to warm up, which melts more permafrost, which heats up the atmosphere, etc... Again, a feedback loop ensues, in which a warm climate leads to the creation of an even warmer climate.

A more complex example of a similar phenomenon involves the Amazon rainforest. When temperatures rise, the rainforest experiences more droughts and wildfires. This causes more trees to burn down. Just as when humans burn fossil fuels, the burning of trees causes large amounts of carbon dioxide to be released into the world. Trees play two important roles in preventing global warming: they help absorb carbon dioxide, which prevents it from trapping heat in the atmosphere, and rainforest trees help pump water into the atmosphere. When trees burn down, less water is pumped into the atmosphere, which leads to less rainfall, which leads to more trees burning - which leads to more carbon dioxide being produced. These are both examples of positive feedback, but feedback can be negative too. When negative feedback occurs, an original effect is diminished.

Both positive and negative feedback loops can occur in all kinds of Earth systems, not just in a system related to the climate. For example, the relationship between different species of animals is a kind of system as well. Periodically, the populations of certain animals will wax and wane. In some cases, the population of a species can become stuck in a negative feedback loop. This can occur if a predator becomes too powerful and its prey becomes too weak. For example, in the early 19th century, humans began hunting a species of bird known as passenger pigeons. Soon, fewer birds existed, which made it more difficult for the species to mate. As mating declined, fewer birds were born, which made it still more difficult for the birds. This created a negative feedback loop in which the population of the birds continued to fall until they are now extinct.

While scientists understand some of how these feedback loops work, they lack a deep knowledge of them, making them extremely unpredictable. This is because, like any complex system, these feedback loops include many variables. Many of these systems are also interdependent, which means that many of these feedback loops affect each other. For example, when permafrost melts, it makes the whole world hotter, not just the area around the permafrost. And these changes are not just limited to temperature. Changes in the amount of rainfall an area receives can lead to changes in its atmosphere. This, in turn, can affect the Earth's temperature, which can affect how much ice melts, which can affect how much rain falls, and so on. So, a small change to a very complex system can lead to very big consequences. This makes predicting the behavior of large systems incredibly difficult.

Some skeptics about climate change point to this uncertainty as a way of casting doubt on whether the world is actually warming. However, being unable to predict the effects of climate change does not mean that it is not happening. Think back to Broecker's analogy. If you poke a wild animal with a sharp stick, you may not be able to guess exactly how it will react. However, even if you don't know precisely what the animal will do - it may bite you or scratch you or just growl - it's still a very bad idea to provoke it.

Scientists continue to debate exactly what happens as the Earth's temperature rises. Among the most popular ideas are that dry areas will become increasingly dry, while wet areas will become increasingly wet; oceans, seas, and lakes will rise; and glaciers, ice caps and snow-covered areas will become smaller. However, many climate scientists agree that a potential way of reducing the effects of climate change is to cut down the amount of carbon dioxide in the atmosphere.

climate cli · mate

Definition

noun

1. the usual weather conditions in a place.

Alaska has a cold climate.

Advanced Definition

noun

1. the weather conditions most prevailing in a place, averaged over several years.

Antarctica has a cold climate.

2. a region defined by generally similar weather conditions.

We will vacation in a tropical climate this winter.

3. the emotional, political, or social conditions prevailing in a place, time, or situation.

a climate of fear and despair

Spanish cognate

clima: The Spanish word *clima* means climate.

These are some examples of how the word or forms of the word are used:

1. It is believed that the success of human hunters was a large part of why the mammoth became extinct. Another reason had to do with the **climate**. The Ice Age did not last forever.
2. Where can you find more animal species than anywhere else in the world? It's not a zoo or the circus. It's a very special type of ecosystem called a rainforest, and most can be found in tropical **climates** in the Southern Hemisphere.
3. Wild penguins are found only in the southern hemisphere. Most live within the polar region around Antarctica; however, some species of penguins live in the warmer **climates** of South Africa, New Zealand, and South America.
4. The origins of that corner-store chocolate bar start in fields along the Equator, in countries in South America, Africa, and South Asia. Cocoa comes from the seeds of cacao trees, which thrive in hot, humid **climates**.
5. Though pollution and human interference are both problems, many scientists consider **climate** change the greatest threat to the Great Barrier Reef. Ocean temperatures are rising, making coral reefs weaker and more susceptible to disease. Rising ocean temperatures also affect the ecosystems in the coral reef, throwing off the delicate balance that allows so many species to coexist.
6. To protect life in the Arctic, scientists say people need to limit their use of fossil fuels. "**Climate** change is not just about the future," said scientist Pal Prestud, who worked on the report. "It is happening now."

process

proc · ess

Definition

noun

1. actions taken to make or do something.

   We are learning the process of baking bread.

2. changes or acts that happen one after another.

   The process of growing up takes many years.

verb

1. to handle, treat, or change something by following certain steps.

   That factory processes aluminum into foil.

   She processes all the invoices for the company.

Advanced Definition

noun

1. a systematic sequence of actions used to produce something or achieve an end.

   Her process of writing a novel begins with getting an idea and sketching it out.

   An assembly-line process made the mass production of automobiles possible.

2. a continuous series of changes, functions, or operations.

   The process of becoming a responsible adult can take many years.

3. movement onward or forward; progression.

4. a summons ordering a person to appear in court.

5. the entire course of a legal proceeding.

transitive verb

1. to handle, treat, or transform according to a systematic procedure.

   The new computers processed data at very high speeds.

2. to treat or manufacture according to a particular procedure.

   We saw how they process cheese.

3. to serve with a court summons.

adjective

1. treated or modified by artificial means, as food.

Spanish cognate

proceso: The Spanish word *proceso* means process.

These are some examples of how the word or forms of the word are used:

1. An athlete should never return to a sport before a concussion has fully healed, says Mihalik. The **process** takes at least a week, often longer.
2. Rivers and streams carried sediment from the mountains eastward, where it slowly built up to form the High Plains in the western-central United States. In the **process**, water was trapped underground.
3. One box of fries fills about 50 percent of your daily allowance of fat. The cooking **process** also produces the chemical acrylamide, which in high doses has been linked to cancer and nerve damage.
4. Nuclear energy is created by the splitting of the nucleus of an atom. That **process** is called nuclear fission.
5. Some vendors sell only "organic" foods. Organic produce usually isn't more nutritious than other fruits and vegetables. To receive official certification, farms follow specific guidelines, such as not using certain pesticides or fertilizers. (Some farms don't go through the certification **process** but still may produce food according to organic practices.)
6. Huge studies of 300 to 3,000 people put the study item up against the usual therapy. In most cases, neither patients nor researchers know who's getting the experimental treatment (a **process** called blind testing), and some patients (the control group) get just the standard treatment instead.
7. Mannar is president of the Micronutrient Initiative (MI), a nonprofit organization based in Canada. He's also a chemical engineer and an expert in fortification, the **process** of adding nutrients to food.
8. Nuclear reactors, such as those at the Fukushima Daiichi plant in Japan that was damaged by the 2011 earthquake and tsunami, split uranium atoms. That action releases energy. The energy is used to boil water, which in turn creates steam that moves turbines that make electricity. When everything works, the **process** doesn't pollute the air thing or water.
9. For nearly 20 years, Ikram has been studying the dead of ancient Egypt, becoming an expert in animal mummification. She has tried to determine the ingredients ancient Egyptians used to preserve the animals. One of the main ingredients in the **process** was natron, a native Egyptian salt often found at the edges of lakes.
10. Don't be afraid to ask questions about the **process** or what you'll be left with afterward. Be sure to spend time thinking about the way you want it all to look-and how it might look to you, or to others, years down the road. When it comes to tattoos, for instance, Savanna says it's best to choose designs that are truly meaningful.

produce pro · duce

Definition

verb

1. to cause a new thing to come into the world; to make something.

   Chickens produce eggs.

   Our company produces parts for computers.

noun

1. plants grown for food.

   Farmers are getting a good price for their produce this year.

   That supermarket has the freshest produce.

Advanced Definition

transitive verb

1. to bring into being; yield.

   Our chickens produce eggs for market.

2. to manufacture.

   This factory produces machine parts.

3. to give birth to.

   The mare produced two foals during the night.

4. to bring forward into view or notice; present.

   The lawyer produced new evidence at the trial.

   The reporter refused to produce the name of his source.

5. to organize and present (a film, play, concert, or the like) for public entertainment.

   It takes a lot of funding to produce a play for Broadway.

   The filmmaker has produced documentaries in addition to dramatic films.

intransitive verb

1. to cause, create, or yield results, esp. the usual or expected results.

The artist couldn't produce without encouragement.

noun

1. something produced, esp. agricultural products such as fruits and vegetables.

Spanish cognate

productos: The Spanish word *productos* means produce.

These are some examples of how the word or forms of the word are used:

1. Unlike most of today's reptiles, the prehistoric marine reptiles were viviparous-the females **produced** live offspring instead of eggs.
2. While there's no clear definition of what's local, most shoppers agree that **produce** grown nearby is fresher than foods that travel long distances.
3. A transistor that is only a few atoms wide is incredibly small. But researchers want to make transistors even smaller and cheaper to **produce**.
4. To overcome the problem, researchers are turning to new materials for solar cells. "We're actually using plastics," Zhu says. "The advantage of plastic is that we can **produce** it easily and cheaply."
5. Values have shrunken to fantastic levels; taxes have risen; our ability to pay has fallen; government of all kinds is faced by serious curtailment of income; the means of exchange are frozen in the currents of trade; the withered3 leaves of industrial enterprise lie on every side; farmers find no markets for their **produce**; the savings of many years in thousands of families are gone.
6. Researchers believe the positive effects of green time stem partly from the physical activity in pastimes such as hiking or kayaking. Exercise **produces** brain chemicals, including norepinephrine and serotonin, that improve learning, mood, and sleep.
7. Sweat happens from the inside out. When the body gets too hot, it uses sweat to regulate its temperature. "Sweat is **produced** by specialized glands in the skin called eccrine glands," explains Dr. Joely Kaufman, assistant professor of dermatology at the University of Miami.
8. A lot of oil and energy go into every bottle of water. Huge amounts of energy are used to **produce** the bottles and package the water. Those bottles are shipped hundreds of miles from the bottling companies to the stores, and transporting them burns even more oil.
9. A ball with a dense inner core can hook even more strongly. As it rolls down the lane, it gradually changes its orientation, putting a fresh section of ball in contact with the oily floor. That **produces** more friction when the ball reaches the dry part of the lane, allowing for a stronger hook.
10. More than 140 okapis are kept in captivity around the world. "The genetic makeup of each one is maintained in an international studbook," says Thomas. Having that information helps zoos avoid inbreeding-the mating of two genetically similar animals-which can **produce** unhealthy offspring.

Name: _____ **Date:** _____

1. According to the passage, which gas is generated in especially large amounts when we burn fossil fuels?

A. carbon dioxide

B. methane

C. carbon monoxide

D. sulfur dioxide

2. The increase of carbon dioxide in the atmosphere has had which effect on the Earth's climate?

A. Average rainfall has decreased.

B. Extreme weather has become less common.

C. The Earth's temperatures are rising.

D. The Earth's temperatures are falling.

3. Arctic ice plays an important role in cooling the Earth. Which evidence from the passage best supports this statement?

A. In the last 30 years, more than one-third of the ice that appears in the Arctic during the summer has melted away.

B. Arctic ice reflects the Sun's light.

C. When Arctic ice melts, it reveals more of the darker-colored land or ocean water.

D. Darker-colored land absorbs the Sun's light, causing the climate's temperature to increase.

4. Some of the gases that contribute to global warming are trapped in permafrost. When permafrost melts, many of these gases are released into the atmosphere. This leads to an increase of the atmosphere's temperature, which causes more permafrost to melt.

What type of feedback loop is this an example of?

A. negative feedback loop

B. complex feedback loop

C. both a positive and negative feedback loop

D. positive feedback loop

5. What is the main idea of this passage?

A. Climate change is a complex and unpredictable process involving feedback loops.

B. Disagreements about climate change have prevented scientists from finding real solutions to global warming.

C. Wallace Broecker's theory may have been incorrect, but he presented some worthwhile ideas.

D. Climate change can be completely reversed if carbon dioxide production is changed.

6. Read the following sentences: "Some scientists expect an increase in so-called 'extreme weather' events, such as hurricane and floods. Others **foresee** a rise in levels of sea water."

Which word could best replace "**foresee**" as used in this sentence?

A. forecast

B. glimpse

C. pretend

D. discover

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

Trees play important roles in preventing global warming, _____ absorbing carbon dioxide and pumping water into the atmosphere.

A. thus

B. finally

C. as a result

D. including

8. How does carbon dioxide increase the Earth's temperature?

_____

_____

_____

9. What is a feedback loop?

10. How can heat produce more heat? Use information from the passage to support your answer.

Sacagawea

by Noah Remnick

In 1804, President Thomas Jefferson sent Meriwether Lewis and William Clark on a very difficult expedition. He wanted them to explore the massive 828,000 square miles of territory west of the Mississippi that the United States had bought from France for $15 million. The deal between Jefferson and the French emperor Napoleon was known as the Louisiana Purchase and it doubled the size of the United States.

Lewis and Clark and their Corps of Discovery were charged with finding a route from the east through this enormous and uncharted new terrain all the way west to the Pacific Ocean. Opening a route to the west would increase trade opportunities with China, particularly for the lucrative fur business. But to do so, the explorers needed to deal with Native American tribes they did not know and whose language they did not speak. They needed to pass over treacherous mountains and rivers that were unfamiliar to them. To complete the job, Lewis and Clark relied on the language and negotiation skills of a Native American woman.

The woman, Sacagawea, was a member of the Shoshone tribe. As a young girl, she was taken by another tribe, the Hidatsa, who then sold her to the Mandan tribe. When Lewis and Clark met Sacagawea in the early months of 1805, she was married to a Canadian fur trapper named Toussaint Charbonneau. She was pregnant, and by the time the expedition team left the Mandans, she had given birth to a son, Jean Baptiste. With the baby strapped to her back, Sacagawea joined her husband and Lewis and Clark as an interpreter and a guide.

Like many Native American tribes, the Shoshone were nomadic, meaning they traveled from place to place with the seasons. In doing so, they learned how to travel the mountains and the forests, the rivers and the plains. They learned which plants were safe to eat, and which were poisonous. They knew how to hunt for rabbits, foxes, elks and deer, and even how to trap longhorn sheep. As a girl, Sacagawea learned all these skills that helped her and the Lewis and Clark expedition survive.

Some historians say Sacagawea was critical in helping Lewis and Clark make their way through the wilderness and up the Missouri River, and it is generally agreed that just having a Native American woman and baby with them helped put other tribes at ease. By August 1805, the expedition team arrived at the hunting grounds of the Shoshone, Sacagawea's native tribe.

The American explorers needed to trade for horses to cross the Rocky Mountains. As Sacagawea interpreted between Lewis and the chief of the Shoshones, she was shocked. She realized that the chief was her very own brother, Cameahwait. The chief and the entire tribe were thrilled to be reunited with Sacagawea. They held a peace party in honor of her, Lewis and Clark, and the entire expedition team. Lewis and Clark gave their new Shoshone friends gifts from President Jefferson,

including clothing, eyeglasses, beads, and tobacco.

Chief Cameahwait agreed to help Lewis and Clark, and bartered with them for horses and guides. When the time came for the expedition team to leave, Sacagawea had a difficult choice. Should she stay with her tribe, or continue on the journey with Lewis and Clark, her husband and her baby? She decided to stay with the explorers, and bid her family and tribe a tearful goodbye.

The trip over the Rocky Mountains was arduous. The mountains were cold and had no vegetation. The explorers ended up eating candles to survive until they got to the warmer side of the mountain path. Finally, they reached the western coast and the crashing waves of the Pacific Ocean. By now it was December and the corps built a winter fort. It was cold and rainy. Lewis and Clark called their new home Fort Clatsop, after a nearby Native American tribe.

The explorers set off on their return trip in March, and they had to make their way back the way they had come. Eventually, through snow, battles with mistrustful Native American tribes, and steep mountain passes, the explorers returned to the village where they first met Sacagawea. Lewis and Clark had journals filled with notes and maps, and precious samples of the plants and animals they had encountered in the new western territory of the United States. It was time to deliver them to President Jefferson, who deemed the expedition a success even though an all-water route was not found. And they might not have been able to do it without the guidance of Sacagawea.

territory ter · ri · to · ry

Definition

noun

1. the land and waters that belong to a country.

   The territory of the United States includes Alaska and Hawaii.

   The ship sailed into U.S. territory.

2. an area of land marked by certain natural features or claimed by an animal as its own.

   Animals often fight to protect their territory.

Advanced Definition

noun

1. an area or region of land.

   Settlers were lured to the territory in the west by tales of finding gold.

2. the land and waters that belong to a country.

   The territory of Canada includes the island of Labrador.

   The submarine was spotted within U.S. territory.

3. a geographic area belonging to a country and administered by its government but which is not a state or political province.

   Yukon is the westernmost territory of Canada.

   Guam is a territory of the United States.

4. the region marked and defended by certain animal species.

   Wolves mark their territory with scent.

5. an assigned area covered by a company's representative or salesperson.

   He's assigned to cover the northeast territory.

Spanish cognate

territorio: The Spanish word *territorio* means territory.

These are some examples of how the word or forms of the word are used:

1. Some countries that border the Arctic claim parts of it as their territories. A**territory** is an area that is controlled by a country.

2. In 1803, Thomas Jefferson bought a huge portion of land west of the Mississippi. He bought this land from France. The new **territory** was called the Louisiana Purchase. It more than doubled the size of the United States!

3. I moved to the next bush, and started on that one. Shortly after, I walked to another, and then another; picking a handful of fruit from each before looking for new **territory**. My bucket was only a third of-the-way full, and my finger was hot and red, but I had to admit, I was having fun.

4. Lincoln assured the southern states that he would not get rid of slavery where it already existed. Lincoln said that his biggest goal was to preserve the Union and keep all of the states together. But Southerners wanted to be able to spread slavery into the **territory** west of the Mississippi too. They knew that Lincoln would not allow slavery in the territories.

5. Great Britain created its empire through imperialism. Imperialism is when a country takes over another place's **territory** or economy. To establish a colony, Britain would take over a new area of land. Inhabitants were told they were under British rule. Then, Britain would set up a colonial government ruled by the English crown. The native people had very little voice in the government.

6. "Cyberbullying is when a child torments, humiliates or tries to frighten another child using interactive technology," online safety expert Parry Aftab told Weekly Reader. Instead of teasing or picking on kids in the school yard, bullies have new **territory**-cyberspace. The explosion in technology, such as computers, cell phones, and interactive games, gives bullies more places to do their dirty work.

7. In the 1820's and 30's, many Americans moved to Texas from the Southern United States. The **territory** officially belonged to Mexico, but the land was open to settlers. The settlers had governed themselves for about 15 years when the Mexican government realized that Americans outnumbered Mexicans in Texas! The Mexican government became worried that the U.S. would take Texas. Mexico decided to push the settlers back to the United States. The settlers refused to leave.

uncharted

un · chart · ed

Advanced Definition

adjective

1. not recorded on any map or chart; unexplored or unknown, as some geographical area or field of research.{not recorded on any map; unexplored or unknown, as some geographical area or field of research.}

The storm had sent the ship off course and into uncharted waters.

These are some examples of how the word or forms of the word are used:

1. Lewis and Clark headed deeper and deeper into **uncharted** land. As the trip continued, one of their men became ill and died.
2. He wanted to carve a path through **uncharted** land and discover rare, exotic species. That might sound like an impossible dream, but Beehler turned it into a reality.
3. Lewis and Clark and their Corps of Discovery were charged with finding a route from the east through this enormous and **uncharted** new terrain all the way west to the Pacific Ocean.
4. North America seemed like a dream: lush forests, plenty of freshwater lakes, the promise of gold (even though it would be a long time before gold was actually found), and new **uncharted** lands lured European explorers to the continent.
5. On May 24, 1869, 10 men left Green River Station, Wyoming Territory, for **uncharted** waters. The men were a tough bunch.

wilderness wil · der · ness

Advanced Definition

noun

1. an uncultivated and generally uninhabited region in its natural state.

   Not all bears live in the wilderness; many actually live in populated areas.

   They hope to preserve this pristine wilderness.

2. a large and mostly empty tract, as of desert or ocean.

   They became lost in the wilderness of the desert.

3. a large and confusing array or collection.

   a wilderness of unanswered questions

These are some examples of how the word or forms of the word are used:

1. There, in complete **wilderness**, they built a village.
2. This story said they would not have to keep roaming the **wilderness** forever.
3. He was just 4 years old, traveling with his family through the Arizona **wilderness**.
4. He rides a bicycle and even hikes in **wilderness** areas by himself with the help of echolocation.
5. The one distinguishing feature that will guide readers through the disorienting **wilderness** of words.
6. Knowing that he couldn't last out in this frozen **wilderness** without it, Fiennes reached into the water with his left hand and pulled the sled back out.
7. Situated at the southern end of the state, between Lake Okeechobee and the Gulf Coast, the Everglades are the largest **wilderness** east of the Mississippi River.
8. Some people believe that former slaves set up their own towns in the **wilderness** and practiced the first forms of capoeira there, learning how to protect themselves.
9. Scientists believe that the Smilodon would also have used its canines to eat any animal they happen to find dead in the **wilderness**, which would also mean it could be called a scavenger.
10. In Piedmont, Virginia, the plantation owned by Jefferson was huge. It was 5,000 acres, to be exact. Jefferson built irrigation systems to bring water to his farmland, but much of the land was still beautiful **wilderness**.

Name: _____ **Date:** _____

1. What did President Thomas Jefferson ask Lewis and Clark to do?

A. negotiate a deal with the French emperor Napoleon

B. get to know the Native American tribes

C. find a route through the new territory to the Pacific Ocean

D. discover new plant and animal species

2. How does the author describe the terrain that Lewis and Clark explored?

A. enormous, unfamiliar, mountainous

B. unpopulated, open, grassy

C. small, hilly, temperate

D. dry, settled, dotted with lakes

3. Lewis and Clark needed help to explore the new, uncharted territory. What evidence from the passage supports this statement?

A. "But to do so, the explorers needed to deal with Native American tribes they did not know and whose language they did not speak."

B. "To complete the job, Lewis and Clark relied on the language and negotiation skills of a Native American woman."

C. "Lewis and Clark and their Corps of Discovery were charged with finding a route from the east through this enormous and uncharted new terrain all the way west to the Pacific Ocean."

D. "They needed to pass over treacherous mountains and rivers that were unfamiliar to them."

4. Why did Sacagawea's presence in the expedition team put other tribes at ease?

A. because she had a Canadian husband

B. because she was a skilled hunter

C. because she was also Native American

D. because she did not look dangerous

5. What is this passage mostly about?

A. the advantages of Native American nomadic culture

B. the politics and history of the Louisiana Purchase

C. how Sacagawea was taken from and eventually reunited with her tribe

D. how Sacagawea helped Lewis and Clark during their expedition

6. Read the following sentence: "Lewis and Clark had journals filled with notes and maps, and precious samples of the plants and animals they had **encountered** in the new western territory of the United States."

As used in the passage, what does "**encountered**" most nearly mean?

A. came across

B. avoided

C. attacked

D. brought along

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

Before the expedition left her tribe, Sacagawea had to decide between staying with her people and finishing the expedition; _____, she chose to continue traveling with Lewis and Clark.

A. instead

B. ultimately

C. therefore

D. above all

8. Name one of Sacagawea's roles, or jobs, during the Lewis and Clark expedition.

_____

_____

_____

9. Why was it important that Sacagawea came from a nomadic tribe?

10. Would Lewis and Clark's expedition have likely been successful without the help of Sacagawea? Why or why not? Support your argument with evidence from the passage.

Answer Keys

Answers: Math - Understanding Probability

1. D
2. D
3. B
4. C
5. --
6. B
7. B
8. C
9. A
10. B

Explanations: Math - Understanding Probability

1. The probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.

The closer a probability is to 0, the lesser the likelihood of the event occurring. The closer a probability is to 1, the greater the likelihood of the event occurring.

Therefore, **a probability near 1 indicates a likely event**.

2. First, find the probability of Event A. There are 4 quarters on the spinner and only one of the quarters is red.

So, the probability that the arrow is on the red quarter of the spinner when it stops spinning is $\frac{1}{4}$.

Next, find the probability of Event B. There are 4 different outcomes of flipping a coin twice and the coin landing on tails the first flip and on heads the second flip is only one of the outcomes.

So, the probability that the coin lands on tails the first flip and on heads the second flip is $\frac{1}{4}$.

Thus, **both events are equally likely to occur** because $\frac{1}{4} = \frac{1}{4}$.

3. Since the probability is closer to 0 than it is to $\frac{1}{2}$, the likelihood of selecting a green marble is **unlikely**.

4. First, find the probability that Richard draws two cards with a product that is an even number.

The table shows that there are seven products that are even numbers.

So, the probability that Richard draws two cards with a product that is an even number is $\frac{7}{16}$.

Next, find the probability that Richard draws two cards with a product that is a single digit.

The table shows that there are nine products that are single digits.

So, the probability that Richard draws two cards with a product that is a single digit is $\frac{9}{16}$.

Therefore, **Richard is more likely to draw two cards with a product that is a single digit, because** $\frac{9}{16} > \frac{7}{16}$.

5. The probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. A probability near 0 indicates an unlikely event, a probability of $\frac{1}{2}$ indicates an event that is just as unlikely as likely, and a probability near 1 indicates a likely event. Determine the likelihood of each event.
Randomly selecting a vowel in the word, "RAISED"

There are 3 vowels in the 6-letter word. Therefore, the likelihood of the event occurring is $\frac{3}{6}$, or $\frac{1}{2}$. This means the **event is equally likely as unlikely** to occur.
Randomly selecting an odd number in the set, {3, 5, 7, 11, 13}

There are 5 odd numbers in the set of 5 numbers. Therefore, the likelihood of the event occurring is $\frac{5}{5}$, or 1. This means the **event is certain** to occur.
Randomly selecting "drums" in the list, "guitar, piano, cello, flute"

The word, "drums" appears 0 times in the list of 4 words. Therefore, the likelihood of the event occurring is $\frac{0}{4}$, or 0. This means the **event is impossible** to occur.
Randomly selecting a boy in a list of 20 boys and 10 girls

There are 20 boys in a group of 30 boys and girls. Therefore, the likelihood of the event occurring is $\frac{20}{30}$, or $\frac{2}{3}$. This means **the event is likely** to occur.

6. Rewrite the given probability of 0.5 as a fraction.

$$0.5 = \frac{5}{10} = \frac{1}{2}$$

Since the probability is equal to $\frac{1}{2}$, it is the same distance from both 0 and 1. Therefore, the likelihood of picking a paint brush is **neither unlikely nor likely.**

7. First, find the probability of Event A. There are 6 tiles that contain one tile marked M and one tile marked Q.

So, the probability that Lisa picks an M or a Q is $\frac{2}{6}$ or $\frac{1}{3}$.

Next, find the probability of Event B. There are 6 sectors on the spinner containing 2 green sectors and 2 red sectors.

So, the probability that the arrow lands on a green or red sector of the spinner when it stops spinning is $\frac{4}{6}$ or $\frac{2}{3}$.

Thus, **Event A is less likely to occur than Event B** because $\frac{1}{3} < \frac{2}{3}$.

8. Rewrite the given probability of 0.12 as a fraction.

$$0.12 = \frac{12}{100} = \frac{3}{25}$$

Since the probability is closer to 0 than it is to $\frac{1}{2}$, the likelihood of picking a coin with an eagle on one side is **unlikely**.

9. In the experiment, the spinner landed on green 20 times and landed on red 10 times.

Since the spinner landed on green twice as many times as it landed on red, based on the experiment, **it is twice as likely for the next spin to land on green as opposed to red**.

10. Rewrite the given probability of 6% as a fraction.

$$6\% = \frac{6}{100} = \frac{3}{50}$$

Since the probability is closer to 0 than it is to $\frac{1}{2}$, the likelihood of selecting a white flower is **unlikely**.

Answer Key Single-Step Percent Problems

1. B
2. C
3. D
4. C
5. A
6. B
7. C
8. D
9. A
10. D

Answer Key Converting Units

1. C
2. A
3. B
4. A
5. C
6. D
7. B
8. A
9. C
10. B

Answers: Language Arts - Phrases and Clauses

1. C
2. A
3. A
4. A
5. B
6. B
7. B
8. D
9. B
10. --

Explanations: Language Arts - Phrases and Clauses

1. The word "beneath" is a preposition that is part of the phrase "beneath the loose floorboard." This provides the information about the earring's location.

2. "As she laughed to herself" is a dependent clause, meaning it cannot stand alone. It needs to be added to an independent clause to be considered a sentence. By adding it to sentence 5, it modifies how Jenna reacted to the situation. There are two ways to add a dependent clause to an independent clause. When you add the dependent clause to the **end** of the independent clause, like the sentence in the correct answer choice, you do not need a comma to separate the clauses. The word "as" shows the separation in clauses. You can also put the dependent clause before the independent clause and separate them with a comma.

3. "Although Jenna would have liked a nice dinner with her parents" is a dependent clause, meaning it cannot stand alone. It needs to be added to an independent clause to be considered a sentence. By adding it to sentence 2, it modifies the conflict Jenna felt about having the house to herself. There are two ways to add a dependent clause to an independent clause. When you place the dependent clause **before** the independent clause, like the sentence in the correct answer choice, you need to put a comma at the **end** of the dependent clause to separate the clauses. If you place the dependent clause at the end of the independent clause, you do not need a comma to show the separation.

4. "Provided that he stayed within the limits of the plan" is a dependent clause, meaning it cannot stand alone. It needs to be added to an independent clause to be considered a sentence. By adding it to sentence 1, it modifies the conditions under which Derek was allowed to have a phone. There are two ways to add a dependent clause to an independent clause. When you add the dependent clause to the **end** of the independent clause, like the sentence in the correct answer choice, you do not need a comma to separate the clauses. The phrase "provided that" shows the separation in clauses. You can also put the dependent clause before the independent clause and separate them with a comma.

5. The prepositional phrase "without the company's support" begins with the preposition "without." This provides information about what is lacking. The word "to," in this case, is part of the infinitive phrase "to win."

6. The clause "Though she started with the flute two years ago" is a dependent clause. It has a subject—"she"—and a verb—"started"—but it begins with the subordinating conjunction "though." The two should be joined, and a comma should be placed between the clauses because the dependent clause comes *before* the independent clause.

7. Prepositions are used to connect, to explain, and to show the relationship between ideas and things. In this sentence, the preposition "before" shows what time they will arrive.

8. The prepositional phrase "off his pants" begins with the preposition "off." This provides information about where the dust was. The other prepositional phrase is "down the country road."

9. This is a dependent clause that cannot stand alone. It needs to be added to an independent clause in order to be considered a sentence. In this case, adding it to the beginning of the independent clause in sentence 4 adds information and modifies when Henry learned his lesson.

10. "As Meghan paced" is a dependent clause; although it has a subject and a verb, it is not a complete sentence by itself.
"I nervously bit my nails" is an independent clause because it has a subject and a verb, and is a complete sentence on its own.
"Waiting for the teacher" is a gerund phrase. A gerund is a verbal noun and is formed by a verb that ends in "-ing."

Answer Key Analogies

1. B
2. B
3. A
4. A
5. C
6. C
7. B
8. C
9. B
10. C

Answer Key Spelling

1. A
2. C
3. B
4. A
5. B
6. B
7. A
8. C
9. C
10. B

1. According to the passage, which gas is generated in especially large amounts when we burn fossil fuels?

A. carbon dioxide

B. methane

C. carbon monoxide

D. sulfur dioxide

2. The increase of carbon dioxide in the atmosphere has had which effect on the Earth's climate?

A. Average rainfall has decreased.

B. Extreme weather has become less common.

C. The Earth's temperatures are rising.

D. The Earth's temperatures are falling.

3. Arctic ice plays an important role in cooling the Earth. Which evidence from the passage best supports this statement?

A. In the last 30 years, more than one-third of the ice that appears in the Arctic during the summer has melted away.

B. Arctic ice reflects the Sun's light.

C. When Arctic ice melts, it reveals more of the darker-colored land or ocean water.

D. Darker-colored land absorbs the Sun's light, causing the climate's temperature to increase.

4. Some of the gases that contribute to global warming are trapped in permafrost. When permafrost melts, many of these gases are released into the atmosphere. This leads to an increase of the atmosphere's temperature, which causes more permafrost to melt.

What type of feedback loop is this an example of?

A. negative feedback loop

B. complex feedback loop

C. both a positive and negative feedback loop

D. positive feedback loop

5. What is the main idea of this passage?

A. Climate change is a complex and unpredictable process involving feedback loops.

B. Disagreements about climate change have prevented scientists from finding real solutions to global warming.

C. Wallace Broecker's theory may have been incorrect, but he presented some worthwhile ideas.

D. Climate change can be completely reversed if carbon dioxide production is changed.

6. Read the following sentences: "Some scientists expect an increase in so-called 'extreme weather' events, such as hurricane and floods. Others **foresee** a rise in levels of sea water."

Which word could best replace "**foresee**" as used in this sentence?

A. forecast

B. glimpse

C. pretend

D. discover

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

Trees play important roles in preventing global warming, _____ absorbing carbon dioxide and pumping water into the atmosphere.

A. thus

B. finally

C. as a result

D. including

8. How does carbon dioxide increase the Earth's temperature?

Carbon dioxide traps heat which can cause the Earth's temperature to rise if large quantities of carbon dioxide are released in the Earth's atmosphere.

9. What is a feedback loop?

A feedback loop is a process that helps to amplify or diminish certain changes within the process.

10. How can heat produce more heat? Use information from the passage to support your answer.

Answers may vary and should be supported by the passage. Students should indicate that heat produces more heat in positive feedback loop systems. Students may also illustrate this phenomenon using one of the examples from the passage. For example, they may mention the example of melting permafrost. Some of the gases that contribute to global warming are trapped in permafrost. When permafrost melts, many of these gases are released into the atmosphere. This leads to an increase of the atmosphere's temperature, which causes more permafrost to melt. As more permafrost melts, the atmosphere's temperature increases. Thus, heat can produce more heat.

1. What did President Thomas Jefferson ask Lewis and Clark to do?

A. negotiate a deal with the French emperor Napoleon

B. get to know the Native American tribes

C. find a route through the new territory to the Pacific Ocean

D. discover new plant and animal species

2. How does the author describe the terrain that Lewis and Clark explored?

A. enormous, unfamiliar, mountainous

B. unpopulated, open, grassy

C. small, hilly, temperate

D. dry, settled, dotted with lakes

3. Lewis and Clark needed help to explore the new, uncharted territory. What evidence from the passage supports this statement?

A. "But to do so, the explorers needed to deal with Native American tribes they did not know and whose language they did not speak."

B. "To complete the job, Lewis and Clark relied on the language and negotiation skills of a Native American woman."

C. "Lewis and Clark and their Corps of Discovery were charged with finding a route from the east through this enormous and uncharted new terrain all the way west to the Pacific Ocean."

D. "They needed to pass over treacherous mountains and rivers that were unfamiliar to them."

4. Why did Sacagawea's presence in the expedition team put other tribes at ease?

A. because she had a Canadian husband

B. because she was a skilled hunter

C. because she was also Native American

D. because she did not look dangerous

5. What is this passage mostly about?

A. the advantages of Native American nomadic culture

B. the politics and history of the Louisiana Purchase

C. how Sacagawea was taken from and eventually reunited with her tribe

D. how Sacagawea helped Lewis and Clark during their expedition

6. Read the following sentence: "Lewis and Clark had journals filled with notes and maps, and precious samples of the plants and animals they had **encountered** in the new western territory of the United States."

As used in the passage, what does "**encountered**" most nearly mean?

A. came across

B. avoided

C. attacked

D. brought along

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

Before the expedition left her tribe, Sacagawea had to decide between staying with her people and finishing the expedition; _____, she chose to continue traveling with Lewis and Clark.

A. instead

B. ultimately

C. therefore

D. above all

8. Name one of Sacagawea's roles, or jobs, during the Lewis and Clark expedition.

Students may name either Sacagawea's role as an interpreter or her role as a guide.

9. Why was it important that Sacagawea came from a nomadic tribe?

Coming from a nomadic tribe meant that Sacagawea had learned survival skills crucial to helping the Lewis and Clark expedition succeed.

10. Would Lewis and Clark's expedition have likely been successful without the help of Sacagawea? Why or why not? Support your argument with evidence from the passage.

Lewis and Clark's expedition would likely not have been successful without Sacagawea's help, because they would not have been able to communicate with the Native American tribes they met along the way and therefore would have had trouble trading for horses and supplies. They did not know the territory, so without any Native American guides to show them the way, they might never have made it to the Pacific Ocean and back.