

# Concept Capsule Keys

These are the keys for the Concept Capsules shared in the book. They are separated by content area.

They are for the sole use of purchasers of the *Concept Capsules* book.

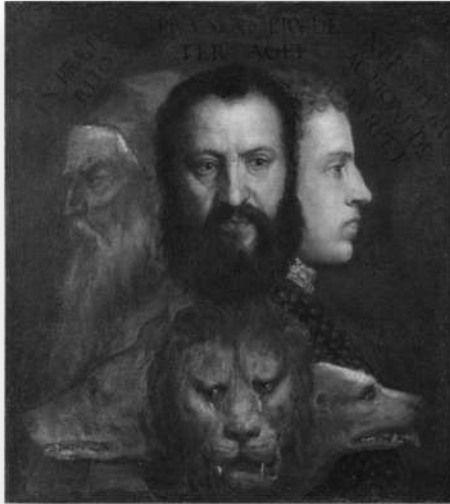
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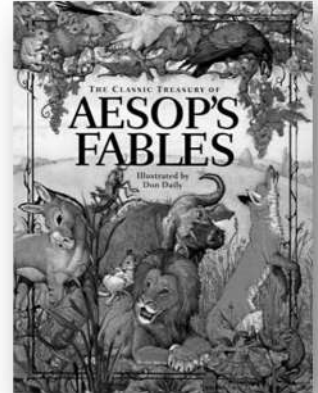
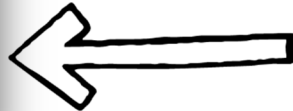
## Concept Capsule Keys: ELA

## DEFINE: ALLEGORY

- A story, poem, or even a picture that has a hidden meaning
- Fables are a type of allegory
- In an allegory, a person often stands for a character trait (like honesty)
- Different from a symbol in that it is an entire story, not just a single object
- From the Latin *allegoria*, meaning "veiled language" or "figurative"



This painting by the artist Titian is called *Allegory of Prudence*. The three human heads represent the three stages of human life (young, maturity, and old age). It is the three-headed beast that is the symbol of prudence. Insider tip: Titian himself is the model for the old man.



Aesop's *Fables* are some of the most famous allegories in the world. Want to read a few? Visit [aesopfables.com](http://aesopfables.com).

### What It Looks Like on A Test:

All of the following are true about allegories EXCEPT:

1. The meanings are deeper than the surface.
2. **THEY ARE ALWAYS TRUE STORIES.**
3. They have a message for the reader or viewer.
4. They use symbolism.

Unscramble the tiles to reveal a message.

Use the spaces below to write the letters in the correct order.

ALL	EGO	R I E	S A	RE	SYM	BOL	IC
STO	R I E	S.					

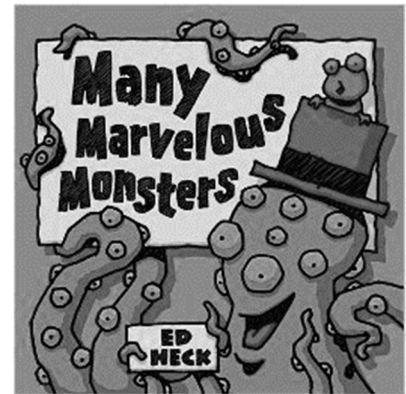
# DEFINE: ALLITERATION

- A number of words starting with the same first consonant sound appearing in a series close together
- An example is: Pound the **p**eanuts on the **p**urple **p**late.
- Alliteration depends upon the *sound*, not the *letter*
- Alliteration must have both the sound similarity *and* the closeness of the sequence
- From the Latin *latira*, meaning “letters of the alphabet”

**BED BATH &  
BEYOND®**



Businesses sometimes use alliteration in their names. Notice how Krispy Kreme changed the first letters of the words, even though we know it's the sound that matters, not the letter. Would you have done that? Can you think of any others in addition to these?



Ed Heck's book *Many Marvelous Monsters* is chock full of alliteration. Can you think of others?

## What It Looks Like on A Test:

In this excerpt from Shakespeare's play *Romeo and Juliet*, underline the examples of alliteration (hint: there are two different sounds and six words involved).

"From forth the fatal loins of these two foes; A pair of star-cross'd lovers take their life."

Take the first consonant of your first name and create a sentence with at least five alliterative words in it that begin with that consonant.

Example: If your name were Ethan, the letter would be "t." A possible sentence could be: Ten traveling truck drivers trundled down the road terribly.

Your sentence:

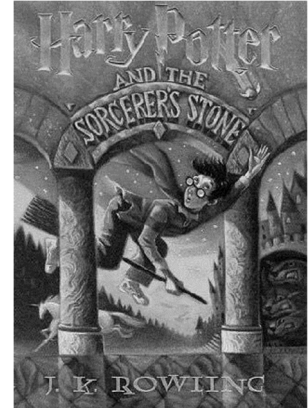
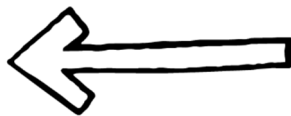
Accept any correct responses.

# DEFINE: ALLUSION

- a brief reference to a person, place, book, movie, historical event or idea without mentioning it directly
- the author expects the reader to understand it without explanation
- most allusions occur to things in the past, but they can be current
- can be used with simile or metaphor ("She is like a modern Mother Theresa.")
- most often reference to literature, mythology, or religion



What would someone be warning you against if she said, "Don't be a Scrooge"?



J.K. Rowling filled the *Harry Potter* books with allusions. Here's one to start: every single spell is an allusion.

## What It Looks Like on A Test:

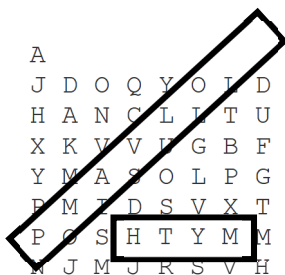
Identify and explain the allusion in the following sentence:

*Going on vacation to Belize was like visiting Eden.*

The allusion: *Belize was like visiting Eden*

To what is it referring? *comparing the country of Belize to the Garden of Eden*

Does the allusion create a positive or negative impression? Explain. *Accept any reasonable answer that explains that Eden is a very pleasant spot.*

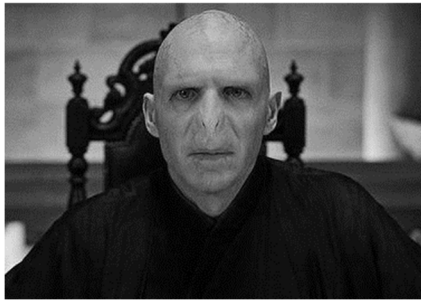


Find the words *allusion* and *myth* in the letter grid. What other words could be included in a word search on allusion? Can you think of three?

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_
- 3) \_\_\_\_\_

# DEFINE: ANTAGONIST

- A character who opposes the protagonist
- A person or organization hostile to another person, group, or idea
- An adversary or enemy, but not necessarily a bad person or thing
- Originally, it was just used in sports, but about 1620 it extended to anything



Lord Voldemort is one of the most famous antagonists in literature. Can you think of one who is worse?

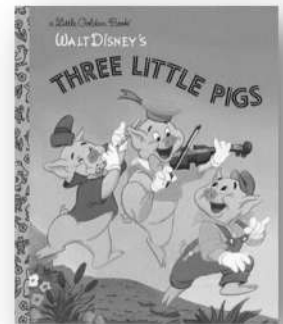
This antagonist's name is a BIG clue to her role in the story. Can you figure it out?



## What It Looks Like on A Test:

What is the role of the antagonist in this story?

- The antagonist makes the characters hate each other.
- The protagonists are happier because of him.
- He makes their mother abandon them.
- HE REVEALS THE WEAKNESS IN SOME OF THEIR PLANS.**



Draw lines from the antagonists to the things they oppose.

Antagonists	What Is Opposed
Wizard	Goldilocks
boredom	targets
bullies	happiness
Three Bears	Cinderella
wicked stepmother	Dorothy
Shere Khan	Mowgli

# DEFINE: IRONY

- when there is a contrast between expectation and reality
  - comes in three kinds: verbal, situational, and dramatic
  - in dramatic irony, the audience knows something the characters don't know
  - from the French "ironie", and before that, the Latin "ironia"
- 



In ancient Greek drama, there was a stock character known as *Eiron*. An Eiron character pretends his abilities are lower than they are so he can defeat his opponent. Saying less than you mean is a type of irony.



Want to learn more about verbal irony? You can watch this video <https://bit.ly/verb-irony> (see if you agree with the criticism of the video in the comments!).

## What It Looks Like on A Test:

Label the following either verbal (v), situational (s), or dramatic (d) irony or not an example of irony (n):

*The reader knows the character is walking into a trap, but the character doesn't know.* \_\_\_\_

*Saying "I think this tastes great," when you don't really like it.* \_\_\_\_

*Going to the store even if you don't want to.* \_\_\_\_

*Working for ten years to pay off an expensive necklace you lost and then finding out that the necklace was fake.* \_\_\_\_





Solve Me! If you need instructions for solving a fallen word puzzle, you can watch this video: <https://bit.ly/fallen-phrase>.

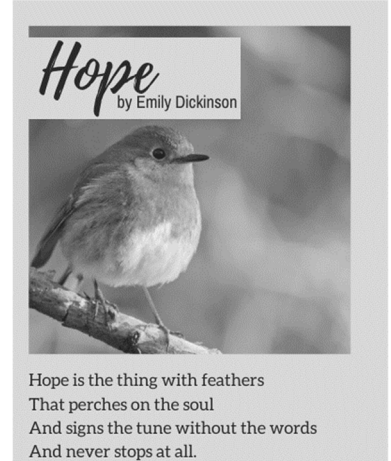
## DEFINE: METAPHOR

- A metaphor says that one thing actually *is* another thing or is a substitute for that thing, when it actually is not that thing.
- A metaphor uses "is" or "are" or "was" or "were", not "like" or "as."
- For example, "My love is a red, red rose" is a metaphor. Your love is not *actually* a red rose.
- Like a simile, a metaphor allows the writer or speaker to make a word picture
- Metaphor: love **IS** a red, red, rose; Simile: love is **LIKE** a red, red rose
- From a Greek word that means to transfer or to carry over



If you think your bedroom is a pigsty this book is for you. It's all about a kid who finds actual pigs in his room - and they fit right in!

This entire (very short) poem is a metaphor.



### What It Looks Like on A Test:

Change this simile to a metaphor: *He is a horse.*

OR...

Create a metaphor that compares school to something appropriate.

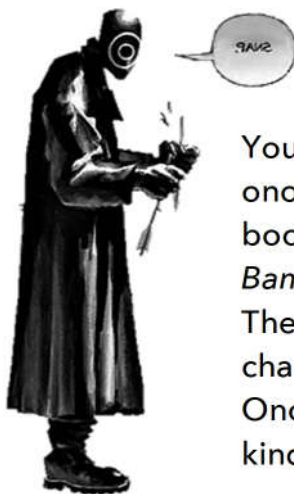
School is \_\_\_\_  Accept any reasonable response. \_\_\_\_.

**Metaphor Cryptogram!** (Need help solving a cryptogram? Look here: [bit.ly/solve-cryptogram](http://bit.ly/solve-cryptogram))

M E T A P H O R S A R E M I N D P U Z Z L E S  
21 20 14 12 4 7 18 1 15 12 1 20 21 23 9 25 4 13 3 3 5 20 15

## DEFINE: ONOMATOPOEIA

- a word that sounds like what it represents ("pow" or a stream that "gushes")
- creates a sound effect that imitates the thing it's talking about (*buzz, splash, thump, roar, meow, woof, whisper*, and on and on)
- the word comes from two Greek words: *onoma* ("name") and *poien* ("to make"). It means, "to make a name or a sound."



You'll find loads of onomatopoeia in comic books. They're chock-full of *Bam!* and *Pow!* and *Crash!* There's even a DC comic character named Onomatopoeia. Guess what kinds of words he says?



Onomatopoeia sounds different in different languages. For instance, the sound for sneezing in English, "achoo," is "achhee" in Hindi and "hatschi" in German.

### What It Looks Like on A Test:

Which of the following onomatopoeic words would NOT represent the sound of a stream?

1. gushing
2. whispering
3. **CRUNCHING**
4. splashing



S P M E O W M B I X  
J O C L I C K C P P  
D O R T D Z O R O S  
H F P A G M N U P S  
J J O I N K E N P T  
M D R L E J I C L K  
O V V L Q C G H O N  
O D M O A N H N P A  
P V I Q N K I A Q L  
Q X T I M B W G W C

Find the Onomatopoeia words!

clank	click	crunch
meow	moan	moo
neigh	oink	plop
poof	psst	<b>POP</b>

There's one more in there! Can you find it?

## DEFINE: PARADOX

- A statement that seems absurd or contradicts itself, but turns out to be true
- A statement that sounds reasonable but leads to a conclusion that doesn't make sense or contradicts itself
- A person or a thing or a situation that has contradictory qualities or features (someone who is mean and nice, or a party that is fun and boring)
- From the Greek *paradoxon* "contrary opinion"





Shakespeare loves paradox. Loves it. Here's an example from *Romeo and Juliet*:

JULIET: My only love sprung from my only hate! / Too early seen unknown, and known too late!

See it? She loves him, but her family hates his family. She knows him too early because they're so young, but it's too late because their families are already enemies.

Paradoxes aren't just in literature. They're important in philosophy as well. One super interesting paradox is called the Liar's paradox. Want to learn more? Visit [brainden.com/paradoxes.htm](http://brainden.com/paradoxes.htm) or scan the code.

### What It Looks Like on A Test:

In this paradox, what unexpected truth is the reader supposed to realize?

*His greatest flaw was his greatest strength. To overcome one was to lose the other.*

Accept the general idea that our weaknesses and strengths are connected.

OR: You might also see a [much easier] question like, "*Jumbo shrimp*" is an example of which literary device?

Metaphor

Play with Paradox! Match the terms to create paradoxes.

wise	peace	1. wise fool
War is	more	2. War is peace.
Spend to	fool	3. Spend to save.
Less is	save	4. Less is more.

## DEFINE: PERSONIFICATION

- Giving non-human things human characteristics.
- It can be a thing, an animal, or even an abstract idea like *truth* or *human nature*
- Personification can give human feelings, actions, or expressions (like frowning)



The whole book *The Day the Crayons Quit* is based on personification. I mean, crayons don't normally complain about being overworked, do they?

Carl Sandburg's poem *Fog* is short, but full of personification. Scan the code to read it. How many examples can you find?



### What It Looks Like on A Test:

In Emily Dickinson's poem, she says, "Hope is the thing with feathers/the perches on the soul." This is an example of what literary term?

- Simile
- METAPHOR**
- Personification
- Extended rhyme



Personify! Add in a verb that would be something a human would do.

- Lightning \_\_\_\_\_ across the sky.
- The wind \_\_\_\_\_ in the night.
- My alarm \_\_\_\_\_ at me every morning.
- The desk \_\_\_\_\_ under the weight of the books.
- Computers get \_\_\_\_\_ when people restart them.

Accept  
reasonable  
responses.

## DEFINE: PROTAGONIST

- The leading character or one of the major characters in a play, a story, or a movie and is sometimes called the "hero"
- A protagonist can be an important person in a real-life situation.

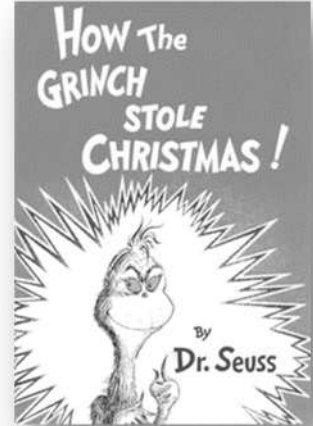
- The protagonist does not have to be a good person and often has very annoying characteristics. They're the protagonist because they drive the story's action forward.
- Opposed by the antagonist
- From the Greek *protos* (first in importance) and *agonistes* (actor)



Sometimes stories have more than one protagonist. In *The Lion, the Witch and the Wardrobe*, there are four protagonists, but none of them are the character on the cover!



This popular Christmas story has a protagonist who starts out pretty evil! Do you think he stays that way?



### What It Looks Like on A Test:

Which of the following is NOT true of the protagonist?

- The protagonist drives the story's action forward.
- There can be more than one of them in a story.
- THE PROTAGONIST IS ONLY FOUND IN FICTION.**
- Characters who work against the protagonist are called the "antagonist."

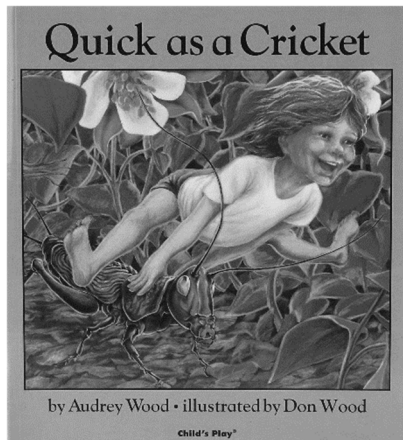
Draw Lines from the Protagonists to Their Stories!

<i>Where the Wild Things Are</i>		A bear
<i>I Want My Hat Back</i>		August
<i>The Secret Garden</i>		Max
<i>Wonder</i>		Mary

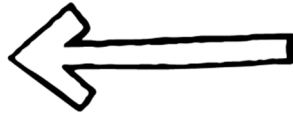
## DEFINE: SIMILE

- Comparing two different things using words such as *like*, *as*, *than*, or a verb like *resembles*
- A simile says that two things are alike in some specific way (*as hard as a rock*)

- Using a simile allows the writer or speaker to make a word picture
- Simile: love is **LIKE** a red, red rose; Metaphor: love **IS** a red, red, rose
- From the Latin *similis* "like"



The whole book *Quick as a Cricket* is written in similes. You may have read the author's other book, *The Napping House*.



Scan this QR code to get a list of similes of bad similes!

### What It Looks Like on A Test:

What two things are being compared in this simile? What characteristic do they share? *I'm more tired than a horse after a hundred-mile ride.*

OR...

person and horse, tiredness

Create a simile using either *like* or *than* or *resembles* that compares the sun to something that is found in the ocean.

Accept reasonable responses.

### Play with these similes!

My \_\_\_\_\_ is as hard as a rock. His shirt is more bright than \_\_\_\_\_.

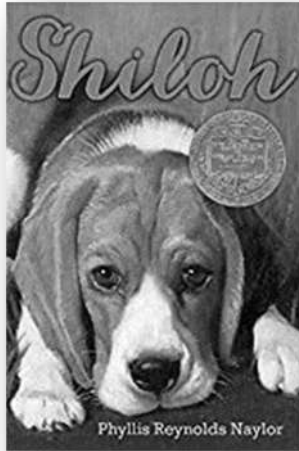
The coat on the dog resembles \_\_\_\_\_ Accept reasonable responses. \_\_\_\_\_ candy is like \_\_\_\_\_.

The \_\_\_\_\_ is as sturdy as a fortress. Her \_\_\_\_\_ is like a lemon.

## DEFINE: THEME

- The central idea of a story - what the story means, what it's about
- Stories can have more than one theme.

- Usually the author doesn't tell you the theme. You have to figure it out.
- The theme can often be expressed in a single word like "jealousy" or "hope."



The book *Shiloh* has several themes, including the importance of friendship, responsibility, and justice. If you've read it, you can probably think of others!

Anna Geiger put together this list of children's books with the theme of friendship. How many have you

read? Scan the QR code or visit this site: [themeasuredmom.com/books-about-friendship](http://themeasuredmom.com/books-about-friendship).



### What It Looks Like on A Test:

This excerpt from Rick Riordan's, *The Sea of Monsters*, supports what theme?

"Families are messy. Immortal families are eternally messy. Sometimes the best we can do is to remind each other that we're related for better or for worse...and try to keep the maiming and killing to a minimum." (from *The Sea of Monsters*)."

A. Messiness

C. Immortality

D. Happiness

### THEME IT!

Think of your last year in school. Choose a theme from the list below (or come up with one of your own) and explain why you think that is a good theme to represent the year.

PERSEVERANCE   STRUGGLE   IMPORTANCE OF WORK   RELATIONSHIPS

Accept reasonable responses.



## Concept Capsule Keys: Math

# DEFINE: ACUTE ANGLE

- an angle that measures less than 90 degrees
- always smaller than a right angle
- The range of an acute angle is between 0 and 90 degrees.
- from the Latin word for "sharp"



Pizza may be the most important acute angle in the world, although the builders of the pyramids (full of acute angles) may disagree!

Can you think of any other foods with cute little angles? I mean, acute angles?

Pro Tip: The letter "A" has an acute angle. Do you see it?



## What It Looks Like on A Test:

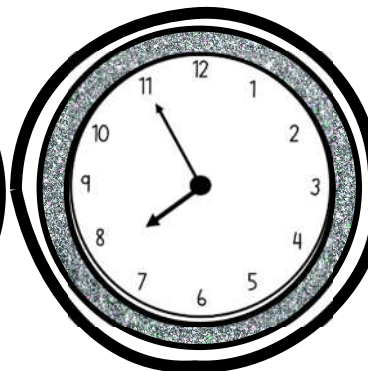
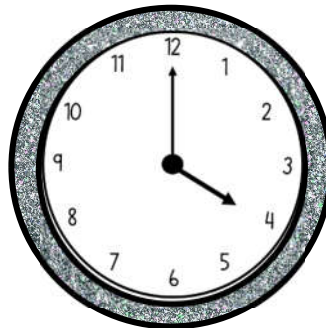
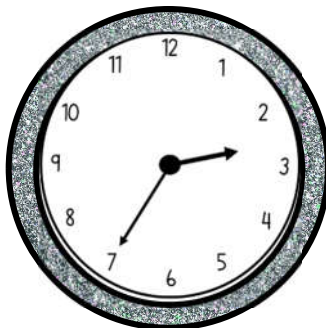
Which of the following is NOT an acute angle?

- A. 93 DEGREES
- B. 45 degrees
- C. 32 degrees
- D. 78 degrees

OR

Draw an acute angle.

Which of these clocks has/have an acute angle?



Accept any correct drawings.

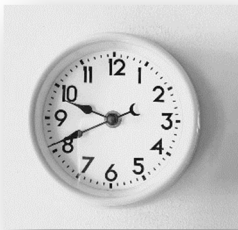
Now draw your own acute angle here!



# DEFINE: ANGLE



- a shape formed by two rays sharing a common point (the vertex)
- the amount of turn between two lines around their common point
- measured in degrees with a protractor in a counter-clockwise direction
- From the Latin *angulus*, meaning "corner." In Latin, the root *ang-* means to bend. The form we see it in literally means "a little bend."



Clocks are an everyday example of angles. See how the hands of the clock are the rays? In an angle, the rays are called the "sides" of the angle.

Cool fact: Angle is also a verb that means "to fish."

That's because the root word shares the idea of bending something into a hook. Someone who fishes is called an



## What It Looks Like on A Test:

Why would you MOST LIKELY use a protractor?

1. to measure straight lines
2. to determine if something is positive or negative
3. to tell the temperature
4. **TO MEASURE ANGLES**
5. to draw a straight line



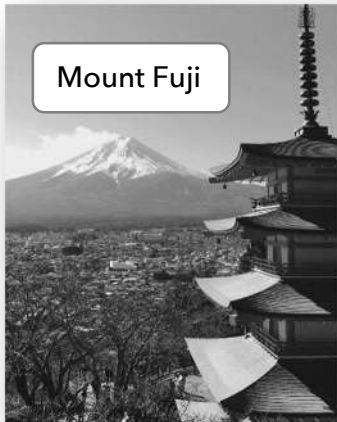
Besides clocks, there are lots of examples of angles all around you!

Look around and see how many you can find!

_____	_____	_____
_____	_____	_____
_____	_____	_____

# DEFINE: COMPOSITE NUMBER

- whole numbers with more than two factors
- whole numbers that are not prime because they are divisible by more than one number
- positive integer formed by multiplying two other positive integers



Volcanoes that are formed from lots of layers of lava, pumice, ash, and tephra (instead of lava) are called composite volcanoes (or stratovolcanoes). Do you see the connection between them and composite numbers?

Fun Fact: Composite numbers that are formed from multiplying three distinct prime numbers are called "sphenic numbers." The smallest sphenic number is 30. It's the product of the three smallest prime numbers. What are they?

30

42

66

## What It Looks Like on A Test:

Which of these numbers is a composite number?

- A. 17
- B. 23
- C. 36
- D. 51

## Solve the Composite Puzzle!

				18
2	4	7	7	20
4	8	0	9	21
8	6	4	2	20
5	6	8	6	25
19	24	19	24	20

The missing numbers are integers between 0 and 9.

The numbers in each row add up totals to the right.

The number in each column add up to the totals along the bottom.

The diagonal lines also add up the totals to the right.

Solve the puzzle & circle all of the composite numbers.

# DEFINE: DIAMETER

- segment whose endpoints lie on the circle and whose midpoint is the center of the circle
- the largest distance from one side of a circle to the other side
- from the Greek *diametros* meaning "line measuring across"; from *dia-* meaning "across" + *metron-* meaning "measure."



All of these images show the diameter of the circle. It doesn't matter from which point on the circle you start - as long as it goes through the center of the circle and is a straight line from one side to the other, it's a diameter. There are an infinite number of possible diameters on a circle.



Let's talk about something really important: cookies.

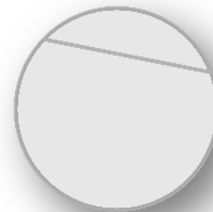


If I want to split this cookie exactly in half, I will cut it on a diameter. It doesn't matter where I start on the edge of the circle, as long as I cut across the circle going through the middle, I'll have cut it in half.

## What It Looks Like on A Test:

Your friend is trying to convince you that this is the diameter of the circle. Explain why your friend is wrong and how you know.

This line does not go through the center, nor is it the longest possible line.



Find the Biggest Diameter!

Grab a ruler and go find at least five items in your house that have circles (it could be a picture of a circle on something or the top/bottom of a glass or bowl). Measure

1. \_\_\_\_\_

5. \_\_\_\_\_

2. \_\_\_\_\_

6. \_\_\_\_\_

3. \_\_\_\_\_

7. \_\_\_\_\_

4. \_\_\_\_\_

The winner is: \_\_\_\_\_

# DEFINE: DIVIDEND

- the amount or number that is to be divided
- the number inside the long division symbol  $\rightarrow \overline{) \quad}$
- dividend = divisor  $\times$  quotient + remainder
- also the amount of money paid by a company to its shareholders



The word "divide" is from the Latin *dividere*, which means "to force apart."

To help you remember which number in a dividend, think about which number is being forced apart. In the case of these puppies, the dividend is the rope!

Watch and listen to this division story *The Doorbell Rang*.  
<https://bit.ly/doorbell-rang>.



## What It Looks Like on A Test:

The divisor in an equation is 10. The quotient is 5. There is no remainder. What is the dividend?

- A. 15
- B. 25
- C. 30
- D. 50

It Needs a Name!

We've been using the long division symbol since 1888, but it still has no name!

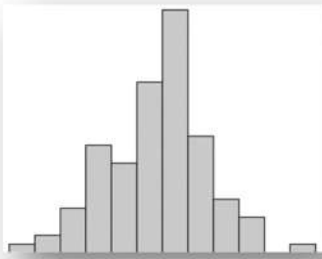
Ask at least five people what they think it should be called and use tally marks to track their votes.

There are four possibilities listed here. Feel free to add options of your own. What was the

- Option 1: division table
- Option 2: dividend tent
- Option 3: division bracket
- Option 4: division house
- Other:
- Other:

# DEFINE: HISTOGRAM

- a graph that groups data into ranges (called "bins widths") and displays those bin widths as rectangles/bars called "bins"
- the area of the bar shows how many items are in each data range
- usually has the independent variable plotted along the horizontal axis and the dependent variable is plotted along the vertical axis.



Don't Be Fooled! Some people confuse histograms and bar graphs. Histograms are different from a bar graph because they are numerical (bar graphs can have categories) and the bars touch

(in bar graphs, the bars shouldn't touch). See those touchy bars? Yep, histogram. Now you're a pro!

If you'd like a review on how to create a histogram, this video will show you how!

<https://bit.ly/histogram-howto>



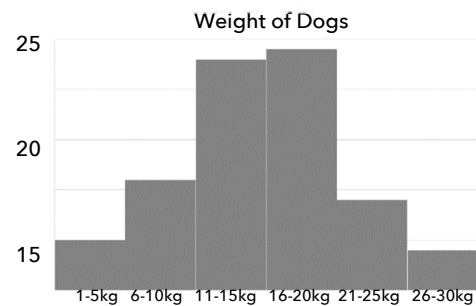
## What It Looks Like on A Test:

Identify the type of graph this is.

histogram

Based on this representation, is it accurate to say that the number of dogs between 11-15kg that is  16-20kg?

no



In the game Scrabble®, "histogram" is a 15-point word! That's quite a word!

How many words can you make out of the word "histogram"?

# DEFINE: IMPROPER FRACTION

- a fraction where the numerator (the top number) is greater than or equal to the denominator (the bottom number).
- always 1 or greater than 1 (proper fractions are always greater than zero, but less than 1).
- can be converted to mixed fraction (with a whole number and a fraction)



"Improper" doesn't have anything to do with manners in math! You will see it in proper functions and proper subsets, too.

Fun Fact: The term "improper fraction" was first used in 1542 by Welsh doctor and mathematician Robert Recorde in the first English book on Algebra, *The Ground of artes, teachyng the worke and practise of arithmetike*. (You can see that proper spelling wasn't a thing in the 16<sup>th</sup> century!) He also invented the equals sign!



## What It Looks Like on A Test:

Identify the improper fractions and convert them to proper fractions.

$$\frac{5}{5}$$

1

$$\frac{8}{6}$$

$1 \frac{2}{6}$  or  $\frac{2}{3}$

$$\frac{2}{5}$$

$$\frac{9}{10}$$

$$\frac{6}{6}$$

1

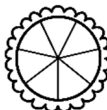
$$\frac{5}{3}$$

$1 \frac{2}{3}$

## Improper Fractions as Easy as Pie!

Devonte brought delicious blackberry pie that his dad made to a party. There was so much pie! Yummy, yummy pie!

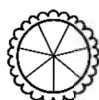
He cut the pies into six pieces, like this.



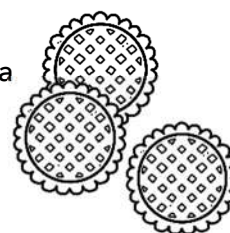
Javier ate an entire pie, plus three more pieces. He was hungry!



+



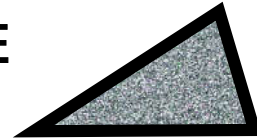
Because the pie was cut into six pieces, we can say that Javier ate  $\frac{9}{6}$  of a pie!





# DEFINE: ISOSCELES TRIANGLE

- triangle with two equal (congruent) sides
- has two equal (congruent) angles
- from the Greek *iso-* meaning "same" + *skelos* meaning "leg" (makes sense because the two equal sides are called the "legs"); in early English called *tweyleke* (two like)



The famous Flatiron Building in New York city is an isosceles triangle. It got its name because it looks like a clothes iron. It's one of the most famous buildings in New York, probably because math is just that cool.

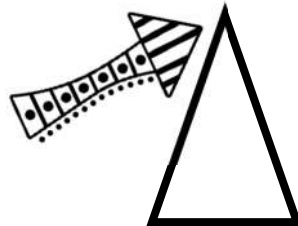
Euclid said an isosceles triangle could only have TWO equal sides, but now we usually let equilateral triangles (3 equal sides) in the club, too. What do you think?



## What It Looks Like on A Test:

Remembering that the sum of the angles of a triangle is 180 degrees...If an isosceles triangle has two angles measuring 73 degrees, what is the measure of the vertex angle?

- A. 117
- B. 43
- C. 28
- D. 34

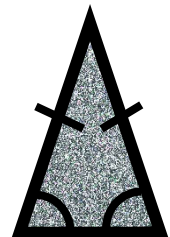


## The Secret Code of Triangles

See those lines on the legs of this cool isosceles triangle? They are a secret math code that means, "We're the same." That way, you don't have to measure them to check. You can tell because you're in the know. You're like a math secret agent.

See those quarter circles on the angles at the bottom? Yep, same. They are the secret code that says, "We're the same."

Don't feel badly for that angle that looks left out. It gets its own name: the vertex angle.



# DEFINE: MEAN

- the average you arrive at when you add up all of the numbers in a set and then divide by the number of numbers in the set
- the central value in a set of numbers
- also called the arithmetic mean, the average, or the expected value
- shown by symbol  $\bar{x}$ , pronounced "x bar"



Beware of the average!

Averages can be misleading if you're using them to think about what something is really like. For instance, NASA says the average temperature of the Earth is 15°C (59°F). How many days a year is that really the temperature where you live? You've been warned: "average" is not the same as "always."

There are three kinds of averages: mean, median, and mode. You can learn how to calculate them all in this song: <https://bit.ly/median-song>



3M's - Mean, Median and Mode Rap | Mister C (Song #7)

## What It Looks Like on A Test:

Calculate the mean of this data set: 32, 15, 47, 27, 9, 50.

The  $\bar{x}$  of the set is: 30

## You're the Mathematician!

Collect at least seven data points from people you know and calculate their mean. You can choose a number of states people live in, how many pairs of shoes do they own, how many pets people have, etc.

Answers will vary. Accept correct computation.

Record the data points:

Calculate the mean:

# DEFINE: MODE

- the most frequent number in a data set
- the item that occurs the highest number of times in a data set
- To find the mode, put the numbers in order. Count how many of each number occurs in the data set. The one appearing most often is the mode.
- If no number is repeated, the set of numbers has no mode. A set can also have more than one mode.
- also called the modal value



Mode is cool because it's the measure of average that can use non-numbers in the set. You can have a mode in a set of colors, places, names, or just about any set of data! For example, if in a classroom of 25 students, 6 are wearing blue shirts, 3 are wearing red shirts, 1 is wearing a yellow shirt, and 11 are wearing green shirts, green is the mode of the set.

Mathematician Karl Pearson is the person who first called it "mode."

It's not surprising because he is the one who established the discipline of mathematical statistics.



## What It Looks Like on A Test:

Determine if this set has zero, one, or two modes: blue, blue, green, yellow, red, orange, yellow, purple, red, red, blue, green, blue

This set has (circle) zero one two mode(s).

If it has a mode, the mode(s) is/are: blue

## Fill in the Blank

The mode is the most frequent number in a data set. That's one way to remember it: it's the one that show up most. A data set can have more than one mode or even no mode. Modes are cool because they work for things other than numbers. To find the mode, put the numbers (or other data) in order. Then count how many times each thing appears in the set.

# DEFINE: OBTUSE ANGLE



- an angle that measures more than 90 degrees and less than 180 degrees
- always larger than a right angle
- from the Latin word for "dull" or "blunt"



The kind of fan you hold in your hand and flick open forms an obtuse angle when it's fully open.



Pro Tip: The letter "Y" has an acute angle. Do you see it? Actually, you should see *them*, because there are two, one on each side!

The letters X and K have obtuse angles, too. One of those letters has two obtuse



## What It Looks Like on A Test:

Describe this angle and use the correct term to identify it.



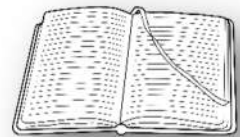
OR

Draw an obtuse angle.

Obtuse angles are all around us!

Go to your kitchen or bathroom and open a cupboard door all of the way. Boom! Obtuse angle!

Now go find a book or notebook. Open it up until it's lying like this. Since books can't open all the way to 180 degrees, you've got an obtuse angle!



# DEFINE: PERIMETER

- the distance around a two-dimensional shape
- the sum of the length of all of the sides of a polygon
- when applying to a circle, usually called the circumference



This is the Pentagon building in Washington, D.C. It is a true pentagon. Each side is 921 feet in length, giving it a perimeter of 4,605 feet.

The country with the largest perimeter in the world is (drumroll, please) Canada! It has a perimeter of

This video has a strong discussion of what perimeter is, along with instructions for how to find the perimeter of polygons! Super fun!  
<https://bit.ly/perimeter-howto>



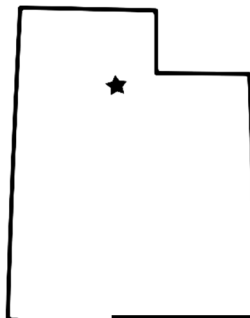
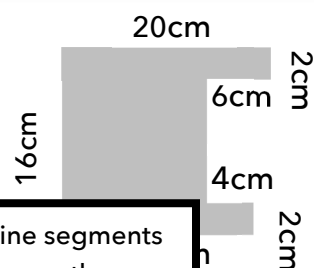
## What It Looks Like on A Test:

What do you need to know to find the perimeter?

You need to know the length of the segment with no length shown.

Assuming all lines are perpendicular, do I

Yes, you can add together the two 2cm line segments and subtract that from the 16cm line OR any other method of solving that would work (sectioning, etc.).



## Help a Rat Out!

This kangaroo rat is considering moving to this state (any guesses which state it is?). She decides to try to find out how far around this state really is. How would you explain to her how to find the answer to what she's looking for and what mathematicians would call it?

She needs to know the length of all of the sides, and it is called perimeter. Bonus: The state is Utah.

# Concept Capsule Keys: Science

## DEFINE: ABSORB

- to take something up or in; to soak up liquid in the process called absorption
- in biology - passing of nutrient material/chemicals into tissue, such as through the blood or the walls of the intestine
- in physics - taking in radiant energy (as opposed to reflecting it) or the partial loss of energy (light, radio waves, etc.), as it passes through something
- from the Latin *absorbere*, *ab-* (from) + *sorbere* (suck in)



To be able to absorb liquid, a substance has to have space to store the liquid molecules. No space = no absorption.

Some substances, like sponge or paper, attract water molecules. The super cool word for this is *hygroscopy*. If something is hygroscopic, it attracts water. Honey is hygroscopic. Isn't that cool? #wordlove

Light and sound waves can also be absorbed when they encounter matter. If the wave is absorbed, it transfers its energy to the material it is going through. The molecules of the material start vibrating from the energy, producing heat. That's why sand burns your feet! Some of the energy of the Sun's electromagnetic waves is absorbed by the sand. Ouch!



### What It Looks Like on A Test:

If you needed to wipe up a cup of water, you would need the material you would use to be able to:

- A. repel the water
- B. ABSORB THE WATER**
- C. evaporate the water
- D. reflect the water

Materials need to attract water & have space to absorb the molecules. If they don't, they can't absorb.

Sand is moving because the energy from the Sun is absorbed by the sand, and that energy makes the molecules vibrate.

Help out this scientist! She is studying absorption and can't decide which materials are most likely to absorb water. Circle the ones you think she should choose.

paper

aluminum foil

soil

steel

plastic

sponge

cotton

wax paper

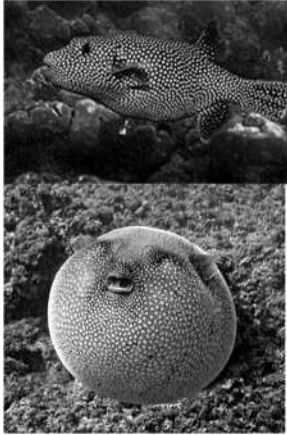
fabric



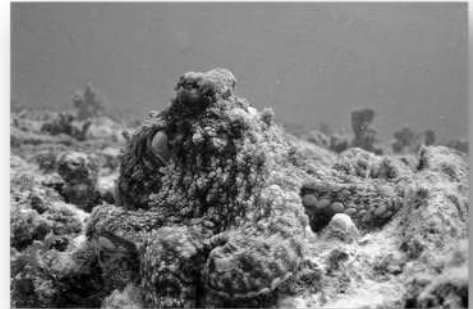


## DEFINE: ADAPTATION

- when animals become better matched to their environment to help them survive or thrive
- can be a body part, body covering, or a behavior
- can be general (walking or flying or swimming) or specific (webbed feet, sharp claws, long beaks)
- happens over long periods of slow change



The puffer fish (also called a blowfish) fills its stomach with air to expand to about twice its normal size when it feels threatened.

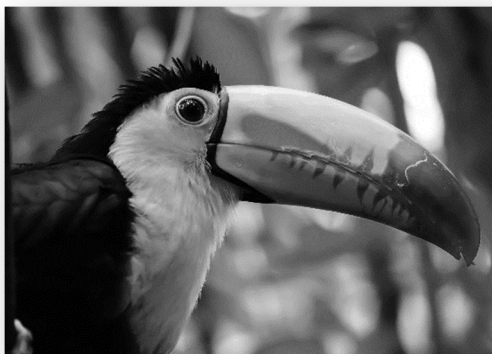


The octopus has an astonishing ability to camouflage itself. Watch this video compilation of it in action! <https://bit.ly/octo-change>.

### What It Looks Like on A Test:

Why would animals engage in this behavioral adaptation?

1. to find food or water
2. to find better living conditions
3. to stay within a country's boundaries
- 4. 1 & 2**
5. 1 & 3



The toucan has developed a very large beak that lets it reach fruit on light branches. They can even adjust the flow of blood to their beak! At night, they tuck their beak under their wings to keep warm. Sketch out a toucan and color in their beak in the color you think it should be!



# DEFINE: ANIMAL POPULATION

- number of individuals of a particular species living in an area that can breed with each other
- can be more than one population in an area
- impacted by limiting factors like food, water, and shelter



Some animal populations are easy to count, like elephants. Can you think of an animal population that would be harder to count?

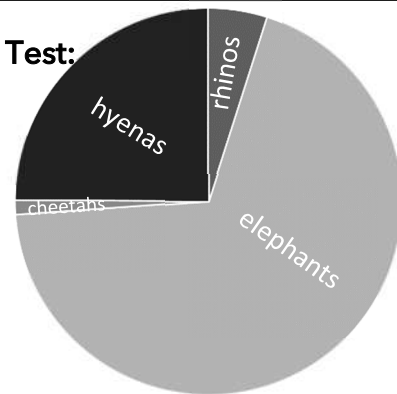


If you're interested in the populations of certain animals, you can find great data at [systemanaturae.org/datasets](http://systemanaturae.org/datasets)

## What It Looks Like on A Test:

This chart supports which of the following statements about animal population in Africa?

1. All of the populations are about the same.
2. The population of hyenas is greater than the population of elephants.
3. The population of rhinos is growing.
4. **THERE ARE MORE RHINOS THAN CHEETAHS.**



Count the population! Imagine that you are a population biologist studying humans in your area. Research the population of humans in the following areas:

Population of humans in your home	
Population of humans in your school	
Population of humans in your town	
Population of humans in your state	
Population of humans in your country	
Population of humans on your planet	

Which population(s) is/are growing? Which are not? Are there any other animal populations in your home or school besides humans?

# DEFINE: ARID

- climate that is extremely dry, with very little precipitation
- a place without enough rain to support plant life
- also called "xeric"
- from Latin *arere*, meaning "to be dry or parched"



One of the coolest desert plants is the Saguaro cactus. It's found only in the Sonoran Desert. A saguaro can live to be 150 to 200 years old and grown 60 feet tall! It's pronounced suh-waa- row.



More than a third of the world is an arid climate. Most arid climates are found 30 degrees north or south of the equator because of the Earth's wind patterns. That means the Earth has a big arid belt!

## What It Looks Like on A Test:

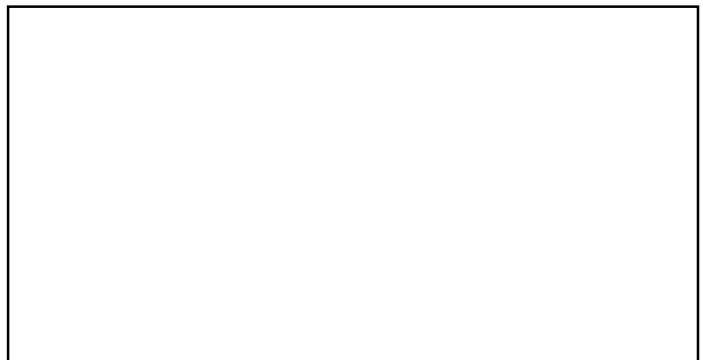
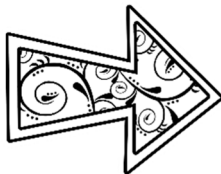
Describe Acceptable answers should include the idea there is a lack of rain.

OR

The lack of which of the following is the most important factor in an arid climate?

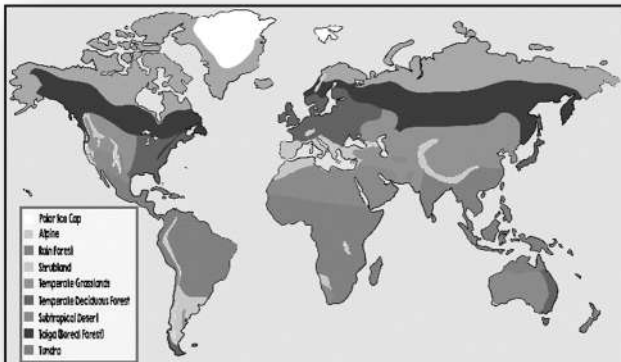
1. heat
2. light
3. soil
4. **RAIN**

Sketch out an arid climate.  
Include at least three kinds  
of cactus in your sketch.



# DEFINE: BIOME

- a specific geographic area notable for the species of plants and animals living there
- plants and animals in the biome adapt to thrive in the biome
- A biome will often have many different ecosystems within it.
- Abiotic factors like climate and habitat are part of the biome as well.
- number of biomes identified varies all the way from 5 - 20



When you're looking at a biome map, you don't care about country borders. You only care about the area of the biome. The maps will look different depending upon how many biomes are identified on the

Explore biomes with this cool interactive biome globe! You can put a pin anywhere on the globe, and it will tell you all about the climate, plants, and animals living there: [bit.ly/biome-map](http://bit.ly/biome-map).

## What It Looks Like on A Test:

Describe why plant and animal diversity in a biome is limited.

OR

Acceptable answers should include the idea that it is the types of plants and animals that define the biome.

Determine if each of these statements is true or false:

1. There can be different names for the same biome. T
2. Biomes are all the same size. F
3. Biomes have different levels of plant and animal diversity. T

NADSSLGAR

GRASSLAND

DURNAT

TUNDRA

NAMEIR

MARINE

IGTAA

TAIGA

IPALNE

ALPINE

EERSDT

DESERT

Unscramble each of the biomes to reveal a secret message!  
Copy the letters in the numbered boxes to the boxes in the line below.

1	H	W				B	I					C	H				
20	H																

The water biomes are much larger than the land biomes.

# DEFINE: CARRYING CAPACITY

- limit to the number of organisms & populations an ecosystem can support
- impacted by availability of resources (like food and shelter) and other factors like competition, disease, and predators
- applies to both plants and animals (including humans)



Food impacts carrying capacity. When European settlers came to North America, they hunted wolves because they felt threatened by them. With the wolves gone, the deer population grew until there was not enough food for them, and they began to starve.



When food becomes less scarce, carrying capacity drops. This can lead to migration of species living there. This happened in Ireland in 1845. Read more at <https://bit.ly/potato-famine>.

## What It Looks Like on A Test:

A pond has a carrying capacity of 100 turtles. Currently 108 turtles are living there. What would you say to this turtle who wants to move in?

1. Move on in! The more the merrier! The carrying capacity will grow!
2. Watch out! The population of this pond will soon be extinct.
3. **BEWARE! THE POND'S CARRYING CAPACITY HAS BEEN EXCEEDED, AND WE'RE GOING TO START DYING OFF OR MOVING OUT SOON. CRAWL FOR YOUR LIFE!**
4. Join us! The best time to be in an ecosystem is when it's passed its carrying capacity!



**Teach someone!** Tell a friend or parent about this scenario and have them guess the answer! Explain to them why they are correct or incorrect. Be gentle! Not everyone can be a carrying capacity master.

The beautiful island of Home Sweet Home has enough water to support 1,000 people, enough food to support 2,000 people, and enough shelter to support 3,000 people, what is the carrying capacity of the island?

- A. 1,000                      C. 3,000  
B. 2,000                      D. 6,000

You know the answer's 1,000, right?

# DEFINE: CHEMICAL CHANGE

- chemical reaction that produces one or more new substances
- The arrangement of the atoms in the molecules is what changes; the atoms are the same.
- different from a physical change in that the substance itself changes, not just the physical properties of the substance (changes what it is, not just how it looks)
- You can tell that there's been a chemical reaction because they will release or absorb heat (or other energy), or produce a gas, odor, color or sound.



Fireworks are one of the coolest examples of chemical change. An apple turning brown may not be as much fun, but it's an example, too.

Watch this video about chemical change to learn more. What lab safety issues would you discuss with him?



## What It Looks Like on A Test:

Identify the following as a chemical change or a physical change. If it is a physical change, name something you could do to make create a chemical change.

1. Stirring up cake batter physical; bake it (or other reasonable response)
2. Cooking an egg chemical
3. Ripping up a piece of paper physical; burn it (or other reasonable)
4. The underside of a car rusting out chemical

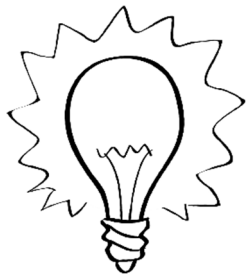
Fill in the blanks to make this passage accurate and complete.

When green bananas turn yellow, that is an example of chemical change even though they are still bananas. If you crumple a piece of paper, that's a physical change. If you burn that paper, that is an example of a chemical change because you traded paper for heat, light and ash. One sign it's a chemical reaction is that it produced heat or gas or color or sound (also accept odor. & light)



# DEFINE: CLOSED CIRCUIT

- complete loop around which electricity can flow
- must have a source of electricity (such as a battery or power outlet) and a conductor (like wire)
- the load of a circuit is what consumes electrical power
- from the Latin *circuitus*, *circum*- (around) + *ire* (go), so literally "go around"



The *load* in a circuit is the work the electricity has to do. A light bulb is an example of load in an electrical circuit.

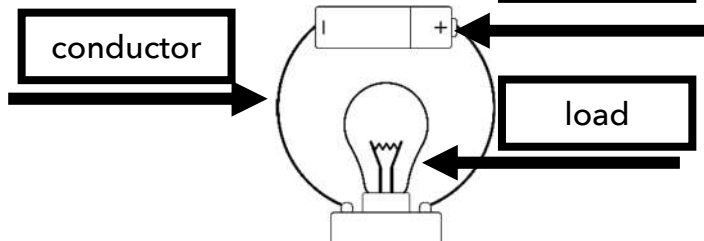
It's what uses the electricity. In your house, appliances like toasters and refrigerators are the most common examples of load.

Want to learn more about circuits? Watch this video: <https://bit.ly/learn-circuits>.



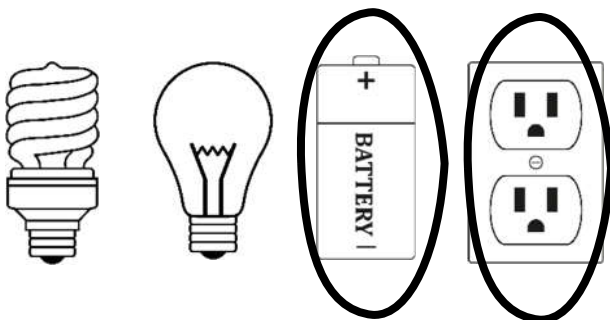
## What It Looks Like on A Test:

Label this drawing of a closed circuit:



What could you do to make this an open circuit?

Accept any response that would result in breaking the circuit.



Choose Your Source!

Circle the two sources of electricity. Which one would you choose if you needed to power

outlet

# DEFINE: CONDENSATION

- process by which water vapor in the air is changed into liquid water
- one of four main stages of the water cycle
- opposite of evaporation
- essential because it makes precipitation possible



Clouds are formed when warm, moist air cools. The water vapor condenses on tiny particles in the air, forming tiny water droplets that are what make up clouds!

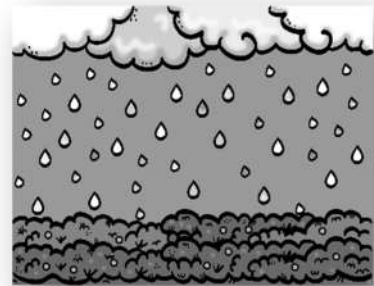


Airplane contrails (condensation trails!) are example of condensation you may have noticed. They are created when water vapor in the jet exhaust condenses on tiny particles in the air.

## What It Looks Like on A Test:

What evidence of condensation is shown in this image?

- A. rain
- B. ground
- C. **CLOUDS**
- D. A & C

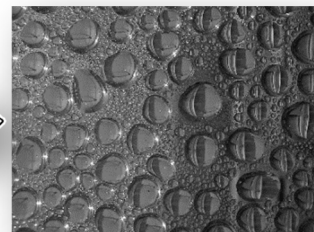


Find all these condensation words!

I X R A G M N S B O  
I D P I M O H D C K  
V R E O T V Y D L M  
O O Z E F I L D O O  
J P V L D M I R U U  
P L A C H Q Q E D B  
Y E P Y G I U T O A  
W T O C Q H I A C B  
C C R C M P D W Z C  
Y L S T B P G X Q M



- ☐ cloud
- ☐ liquid
- ☐ water
- ☐ droplet
- ☐ vapor
- ☐ cycle



# DEFINE: CONDUCTIVITY

- Conductivity is the measure how easily an electric charge, sound or heat can pass through a material.
- They flow easily through materials with high conductivity.
- A conductor is a material that provides a path through which energy can flow.
- Conductivity is one of the physical properties of matter.
- Conductivity is measured in siemens per meter and is often represented using the Greek letter  $\sigma$ .



It sounds strange, but sound travels fastest through solids, not liquids or gases. See what we did there? *Sounds* strange? Molecules in solids are closer together than in liquids or gases, so sound transfers more quickly. It's weird, but true: sound passes through steel 17 times faster than it does through air.

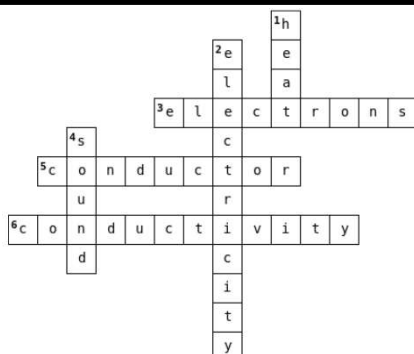
The metal that is the best conductor of electricity and heat is silver. To be a good conductor, electricity or heat passing through it has to be able to move the electrons of the material. The more free electrons a substance has, the greater its conductivity. Silver is loaded with free electrons, making it conductivity metal #1!



## What It Looks Like on A Test:

Which of the following statements is MOST complete AND most true?

- Conductivity measures how easily energy flows through a substance.
- Materials with high conductivity allow electricity to flow through them with only mild difficulty.
- A conductor allows an electric charge or heat to flow through it, but it doesn't allow sound to flow through it.
- ONE OF THE PHYSICAL PROPERTIES OF MATTER, CONDUCTIVITY IS THE DEGREE TO WHICH A SUBSTANCE ALLOWS ELECTRICITY, HEAT, OR SOUND**



### Across

- Lots of free \_\_\_\_ make for good conductivity.
- A material that provides a path for energy to flow.
- A physical property of matter that describes how well electricity, heat, and sound flow through a substance.

### Down

- This flows easily through good conductors.
- This flows easily through good conductors.
- This flows easily through good conductors.



# DEFINE: CONSUMER

- organisms in a food chain that get their energy by eating other organisms
- primary consumers eat plants (also called herbivores)
- secondary consumers eat primary consumers (also called carnivores)
- tertiary consumers eat secondary consumers (can be carnivores [meat eaters] or omnivores [eat plants and animals])
- fancy word for consumer: heterotroph



Koalas are a type of primary consumer called *specialists*. That means it eats only one food (or strongly prefers one food). For koalas, it's eucalyptus. Specialists are more vulnerable because if their preferred food becomes unavailable, they don't adapt well.

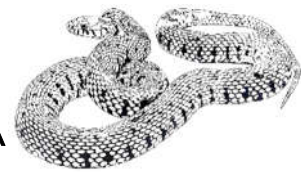


Some food chains even have a fourth level of consumer, called a quaternary consumer. The shark is a quaternary consumer in this food chain: phytoplankton - zooplankton - fish - seal - shark.

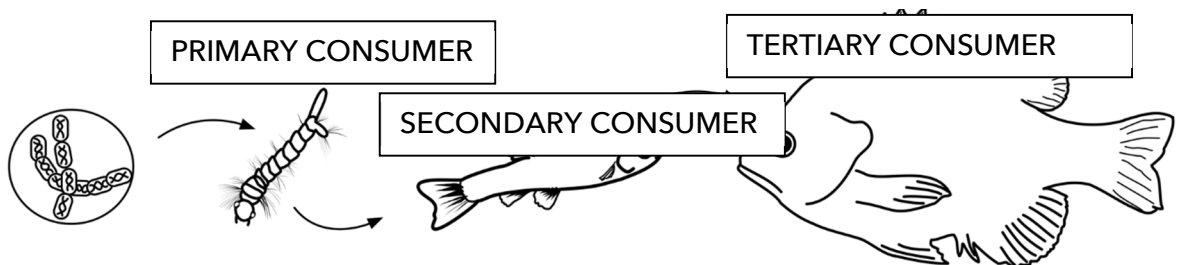
## What It Looks Like on A Test:

A grasshopper eats grass. It is then eaten by a rat. The rat would be happy to eat other foods, too. The rat is eaten by a snake. Which of the following statements is accurate?

- A. The grasshopper is a primary consumer & the snake is a secondary consumer.
- B. The rat is a primary consumer and a specialist.
- C. The rat is a secondary consumer and a specialist.
- D. THE RAT IS A TERTIARY CONSUMER AND THE SNAKE IS A QUATERNARY CONSUMER.**
- E. The grasshopper is not a consumer.

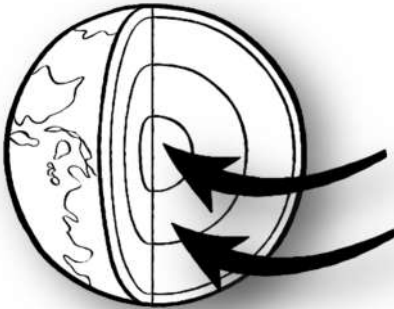


How many consumers can you find in this food chain? Label them as primary, secondary or tertiary consumers!



# DEFINE: CORE

- the very hot center of our planet
- made of metals (mostly iron and nickel)
- made of two parts, a solid inner core and a spinning molten outer core
- inner core's temperature equal to that of the Sun; outer core's temperature slightly cooler



The core of the Earth is exactly where you'd expect to find it! Just like the core of an apple, it's in the middle!

Danish scientist Inge Lehmann discovered that the core of the Earth was solid in 1936.

Before her, scientists believed that both the inner and outer cores were liquid.



## What It Looks Like on A Test:

Which of the following BEST describes the inner core of the Earth?

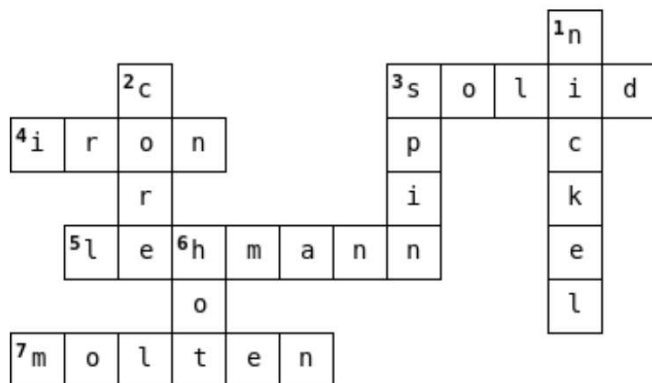
- the outside layer of the Earth that is the core of what it means to be the Earth
- THE VERY HOT, SOLID CENTER OF THE EARTH MADE OF IRON AND NICKEL**
- layer of the Earth sometimes called the lithosphere
- the spinning molten layer at the center of the Earth

### Across:

- the inner core is this, not molten
- one of the metals that makes up the core
- the scientist who discovered the nature of the inner core
- the outer core is this, not solid

### Down:

- one of the metals that makes up the core
- the center of the Earth
- the outer core does this
- the core is this, not tepid



# Concept Capsule Keys: Social Studies

## DEFINE: ABSOLUTE LOCATION

- Describes the location of a place based on a fixed point, usually latitude and longitude
- Every place on the Earth has a single absolute location.
- Absolution location is one of two kinds of location (along with relative location).



The happiest place on Earth is located at:

33° 48' 45" N

117° 55' 8" W

What do you think it is?



The castle there was inspired by this castle, located at  
47° 33' 27" N  
10° 44' 58" E.

Which of the following would be helpful in determining absolute location?

- A. Latitude
- B. Distance from capital city
- C. Longitude
- D. Name of the country
- E. A & C

### WHERE ARE YOU?

Put your address (or the address of the school) into the box at <https://www.gps-coordinates.net>. What is the coordinate (include degrees, minutes, and seconds)

Latitude:    \_\_\_ °    \_\_\_ '    \_\_\_ "  
Longitude:   \_\_\_ °    \_\_\_ '    \_\_\_ "

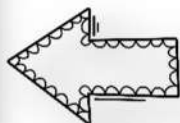
Look up your school's GPS coordinates to verify accuracy.

## DEFINE: COMPASS ROSE

- a circle to display the cardinal directions (N, S, E, W) and their intermediate points on a map or chart
- sometimes called a windrose or Rose of the Winds
- gets its name from how the points on the compass resemble a rose
- can have between 4 and 32 points



This enormous 8-point compass rose is so big the people sitting around it look tiny!

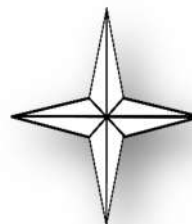


Cool fact: In the Middle Ages, the names of the winds were known by these traditional names: tramontana (N), greco (NE), levante (E), siroco (SE), ostro (S), libeccio (SW), ponente (W) and maestro (NW).

### What It Looks Like on A Test:

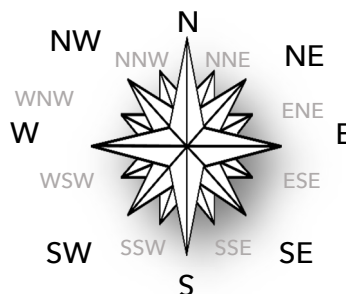
Which of the following shows the initials of the cardinal directions around the compass rose?

- A. NEVER EAT SOGGY WAFFLES
- B. Share Nice Eggs Wisely
- C. Exciting News Shouldn't Wait
- D. Would Necklaces Shine Easily?



Label the compass points on this compass rose. Do the cardinal directions first, and then the intercardinal directions (all on the chart). Can you guess the names of the ones not in the chart but are on the rose?

Compass Point	Abbr.	Heading
North	N	0°
North-East	NE	45°
East	E	90°
South-East	SE	135°
South	S	180°
South-West	SW	225°
West	W	270°
North-West	NW	315°



# DEFINE: CULTURE

- The way of life of a group of people
- Includes language, celebrations, religion, customs, dress, food, race, traditions, philosophy, governance, and technology
- From the Latin *colere*, meaning "to tend, guard; to till, cultivate"



Many cultures have traditional dress that is used in celebrations and ceremonies. Some is simple and some is elaborate, like in this picture of a celebration in Indonesia.

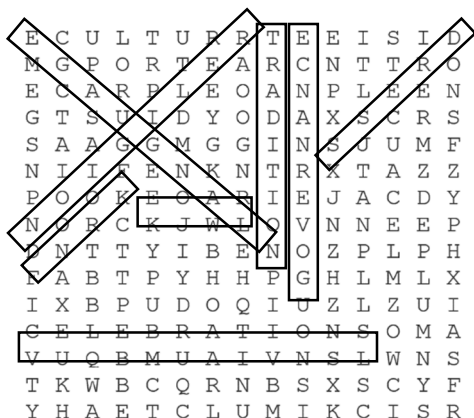
There are about 6,500 languages in the world. They're divided into language families. English is part of the Indo-European language family. So are Hindi, Russian, and Spanish, but not Hungarian!

## What It Looks Like on A Test:

List at least four examples of your culture. Which of those things is most important to you?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

Accept reasonable responses.



Find all of these words in the puzzle and a hidden message will be revealed!

CELEBRATIONS	DRESS
RACE	FOOD
GOVERNANCE	LANGUAGE
RELIGION	TRADITION

What's the message?

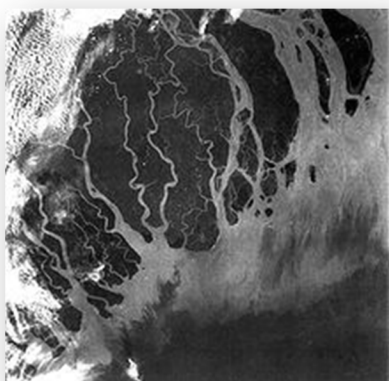
Optional: Culture is important to people.





## DEFINE: DELTA

- low, watery land formed at the mouth of a river
- formed from the silt, sand and small rocks that flow downstream in the river and are deposited in the delta
- often (but not always) shaped like a triangle (hence its name, delta, a Greek letter  $\Delta$  that is shaped like a triangle)



This is the Ganges River delta as seen from space. Quick! What country is this in?

Read about deltas' role in history here:

<http://bit.ly/deltahistory>

or scan the code below:



### What It Looks Like on A Test:

Looking at the picture shown here, which clue is NOT helpful in determining if this is a delta?

5. It's formed by a river.
6. It is shaped like a triangle.
7. **THE RIVER IS SMALL.**
8. There is silt build up visible where the land meets the river.



### Play with Deltas!

Directions:

Unscramble each of the clue words about deltas.

Copy the letters in the numbered cells to other cells with the same number.

You'll find the secret message!

DELAT	5					
SITL	1					
GALIRTEN						
RREVI						
SEPDTIO	2					10
HUTMO						
			8			
	1	2				9 10

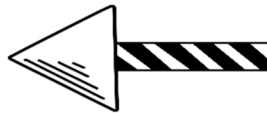
delta  
silt  
triangle  
river  
deposits  
mouth

I dig deltas.



# DEFINE: DEMOCRACY

- Political system in which
  - Citizens enjoy basic civil and political rights
  - Most important political leaders are elected in free and fair elections
  - Leaders are accountable under a rule of law
- From the Greek word *dēmokratia*: *demos*, meaning 'the people' + *kratia* meaning 'power or rule'



Voting is one of the most cherished aspects of any democracy.

Interested in the oldest democracies in the world? You can find more at <https://bit.ly/olddemocracy> or scan the code.



## What It Looks Like on A Test:

If you live in a democracy, something you **wouldn't** expect would be:

1. Being allowed to vote in free and fair elections.
2. **BEING LED BY SOMEONE WHO DIDN'T FEEL ACCOUNTABLE TO THE PEOPLE.**
3. Basic civil rights held by all of the people.
4. All of the above.

I T A L Y V R D E T  
X G G G F K I W F P  
C N X I X C S P D S  
C A N A D A R A N A  
J H X H Q L A I A S  
Y E F A K F E R L U  
J P R O Y Y L T E B  
F R A N C E J S R W  
G T H U X O D U I Q  
I N D I A D Y A R K

1.	Austria
2.	Canada
3.	France
4.	India
5.	Ireland
6.	Israel
7.	Italy
8.	USA

## DEFINE: GLACIER

- dense ice that is constantly moving very slowly
  - forms when snow falls faster than it can melt over many years and the weight of the snow compresses it into ice
  - picks up rocks and other debris as they move, so can look dirty
  - form only on land, and can create ice shelves when they reach the sea
  - drastically shape the land they move over
- 



The Mendenhall Glacier is part of the Juneau Ice Field in Alaska. It's over 13 miles long. It is currently in retreat, meaning it is melting faster than new snow is falling.



Because glaciers move so slowly, when something moves really slowly we say it's moving at a "glacial" pace. Like sloths.

### What It Looks Like on A Test:

Which of the following is NOT true of glaciers?

- A. They move slowly over the land and can form ice shelves when they reach the sea.
- B. THEY ARE MADE OF PURE SNOW, SO THEY ARE PURE WHITE.**
- C. As they pass over the land, they drastically shape it.
- D. They store a large amount of the world's fresh water.



Glacial Trivia: Glaciers are cool. Put a star next to the fact you think is coolest.

- ⇒ There are about 100,000 glaciers in Alaska alone.
- ⇒ Nearly  $\frac{3}{4}$  of the world's freshwater is stored in glaciers.
- ⇒ During the peak of the last ice age, about 10% of the Earth was covered with glaciers. Accept any response.
- ⇒ Blue is the only color of light that can penetrate (or get through) the ice, so glaciers sometimes look blue.
- ⇒ Scientists now think that Mars may have once had glaciers.

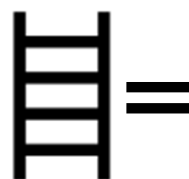
## DEFINE: LATITUDE

- Latitude lines run east and west, circling the Earth like a stack of belts.
- Latitude is measured in degrees.
- There are 180 degrees of latitude (90 north and 90 south), and each degree is about 69 miles.
- Lines of latitude are also called parallels.
- The equator is zero degrees, and latitude describes if a place is north or south of the equator.



The equator runs through 13 countries, including the beautiful country of Kenya.

To help you remember which lines are latitude, think of them as a LADDER climbing the Earth.



=



### What It Looks Like on A Test:

All of the following are true of latitude EXCEPT:

- A. It's measured in degrees.
- B. LINES OF LATITUDE ARE ALSO CALLED CIRCUMFERENCES.**
- C. It describes if a location is north or south of the equator.
- D. Latitude lines run east and west.

OR

Explain the difference between latitude and longitude to someone who has never heard of them.

Fill in the missing words in this passage about latitude.

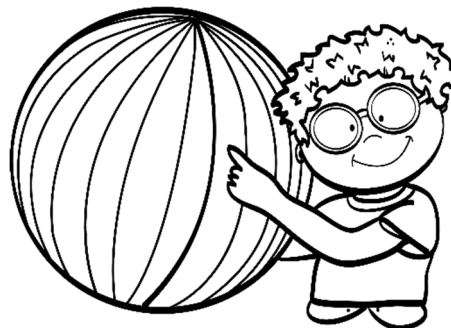
Latitude is how we measure how far NORTH or SOUTH a place is from equator. Latitude is measured in DEGREES. The EQUATOR is zero degrees of latitude. Latitude lines are imaginary lines circling the globe running EAST and WEST.

## DEFINE: LONGITUDE

- Longitude lines run north and south.
- Longitude lines are also called meridians.
- The Prime Meridian is zero degrees longitude.
- Lines of longitude place locations east or west of the Prime Meridian.
- Longitude is measured in degrees, and there are 180 degrees east and 180 degrees west of the Prime Meridian.



The Prime Meridian runs through the town of Greenwich. If you visit the Royal Observatory, you'll see this sculpture that recognizes that it is, in some ways, the center of the world. (photo by Panarimo)

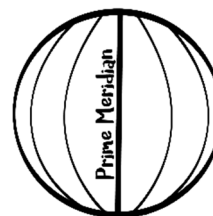


This guy is super happy about longitude. He should be. It was much harder to figure out than latitude.

### What It Looks Like on A Test:

What is the importance of the line indicated in this graphic? Describe at least three things that are important about it.

1. Students should indicate that the Prime Meridian is the line from which longitude is determined, that is a line of longitude, and that it is zero degrees of longitude.
- 2.
3. Accept additional reasonable responses.
- 4.



Latitude and longitude are both measured in degrees, but that's not precise enough. To be more precise, we break them down further into minutes and seconds. So, a longitude coordinate of New York City is: 73° 56' 21" W.

Responses will vary.

This is read "73 degrees, 56 minutes, and 21 seconds West." This the longitude of New York City! Can you look up the longitude of your favorite place?

## DEFINE: OASIS

- a fertile or green area in a desert or arid region
- must have a water source, vegetation, and be surrounded by dry area/desert
- most are fed by underground natural springs, called aquifers
- They were critical in trade routes, and they also provide a habitat for animals.



Technically, the entire Nile River is an oasis. It's 22,000 square kilometers, so it may be the largest in the world.



We also use the term "oasis" to describe something that provides a nice contrast, like a park in the middle of a big city. So, lots of restaurants name themselves "oasis."

### What It Looks Like on A Test:

If you wanted to be an oasis, you would need to make sure you:

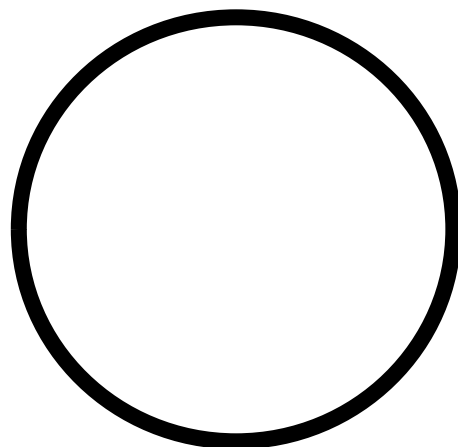
1. had a water source
2. were in the middle of an arid area or desert
3. had vegetation growing around you
4. **ALL OF THE ABOVE**

Own the Oasis!

Imagine that you're starting a new business that is a playground in the middle of a big city with lots of traffic. You decide to name it "The Oasis".

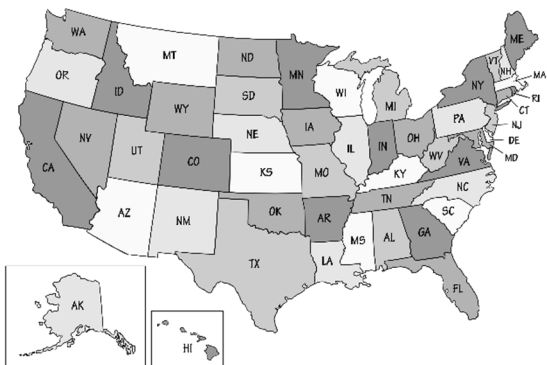
Accept reasonable attempts that reflect an understanding of an oasis.

Sketch out a logo for your new business.

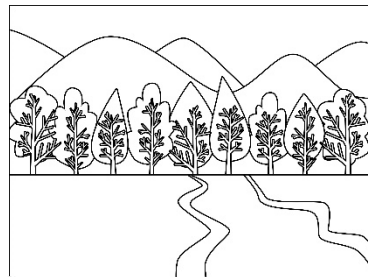


## DEFINE: RELATIVE LOCATION

- Where a place is relative to other places, landmarks or points ("It's 30 miles north of New York City", for example)
- The same place will have different relative locations depending upon where it's being described from (if I'm north of it, I'll describe it differently than if I live west of it).
- One of two kinds of location (along with absolute location)



Find Kansas on the map. It is south of Nebraska, east of Colorado, west of Missouri, and north of Oklahoma. It's in the midwestern United States. That's relative location!



Think about how you'd describe the relative location of the trees.

### What It Looks Like on A Test:

Describe the relative location of New Hampshire.

Accept accurate responses.



Describe the relative location of your city. What's it close to? Are there other larger cities nearby? Landmarks?

Accept accurate responses.

## DEFINE: PLACE

- Place is what it's like somewhere.
- It includes the physical features and human characteristics of a location.
- All locations on earth have physical features that set them apart, like climate and landforms and vegetation.
- There are also characteristics that are human made, like highways and houses and stadiums and parks.
- Place can change over time.
- From the Latin *colere*, meaning "to tend, guard; to till, cultivate."



Some places are easy to describe and distinguish, like this famous European city. Others are harder because they're similar to other places.



Watch the trailer of this movie & see if you can describe the place:  
<https://bit.ly/prince-trailer>.

### What It Looks Like on A Test:

Consider the place of Antarctica. Describe it, including at least two physical features and one feature Accept reasonable responses. changed over time. How would you have described it 500 years ago?

Make an acrostic poem describing a place you've been.

Name of place: \_\_\_\_\_

P \_\_\_\_\_

L \_\_\_\_\_

A \_\_\_\_\_

C \_\_\_\_\_

E \_\_\_\_\_

Accept responses that use the correct letters and represent the chosen place.

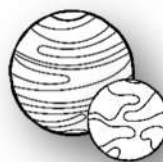


## DEFINE: VOLCANO

- a mountain or hill that has a crater or vent that allows lava to erupt or flow from the earth's crust
- formed when magma finds a way to escape from beneath the surface of the earth (magma and lava are the same thing - magma is what it's called when it's below the surface)
- Eruptions can be explosive (where they blast up) or effusive (where they flow).



The most active volcano in the world is Mt. Kilauea in Hawaii. It erupted nearly continuously from 1983 to 2018. It's one of five volcanoes that make up the island of Hawaii.



Volcanoes can be dormant, meaning they haven't erupted in a long time, but they still could. They can also be extinct, meaning they will never erupt again. There are even extinct volcanoes on Mars and Venus!

### What It Looks Like on A Test:

Correct this passage. Cross out the words that are not accurate and write in the correct words.

Volcanoes can be active **DORMANT** extinct. When a volcano releases lava, it is called an **ERUPTION** when that happens, it can be either explosive or **EFFUSIVE**. Volcanoes are found on Earth **VENUS & MARS**. They are formed when **MAGMA** comes from under the Earth and **LAVA** comes out of the volcano.

F L O W Q A R Z K R  
S R Q U E J L R E W  
E E X B V G L A V A  
R T E T I L E L I P  
U A Y N S A X U T N  
P R G A U M T Z C C  
T C K M F G I L A M  
B E Z R F A N U C H  
H H N O E M C A M V  
K T Q D F T T R Q A

Find all of these volcano words!

lava  
magma  
extinct  
dormant  
active  
erupt  
effusive  
crater  
flow