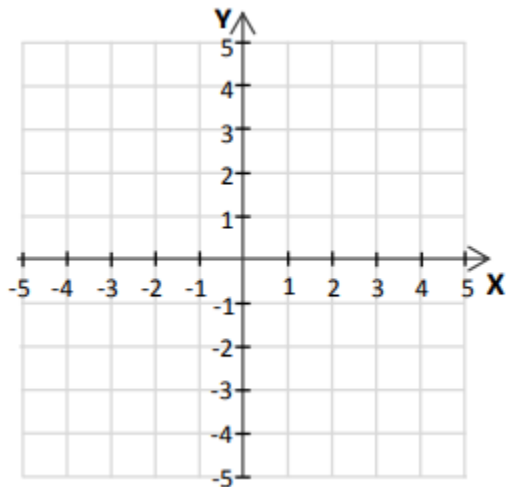


Name:

AXIOM CHALLENGE

8th grade; Spring 2026

1) Solve and graph the system of equations.



$$-3x + 2y = 8$$

$$5x + 2y = -8$$

The solution is

2) Ella deposits \$400 into an account at Dedham Savings that earns 3% simple interest per year. After 2 years, she adds another \$100, which also earns interest for the next 3 years. **How much money does she have in total after 5 years?**

3) The sum of three consecutive integers is 72. **What is the largest of the three integers?**

_____.

4) A jar contains only red, blue, and green marbles. $\frac{1}{4}$ of the marbles are red, $\frac{1}{3}$ are blue, and the remaining 10 are green. **How many marbles are in the jar?**

- a) 24
- b) 30
- c) 36
- d) 40
- e) 48

Name:

AXIOM CHALLENGE

8th grade; Spring 2026

5) A square is cut into 4 smaller congruent squares. Each of those is cut into 4 smaller congruent squares again. **How many smallest squares are there in all?**

- a) 8
- b) 12
- c) 16
- d) 20
- e) 24

6) **What is the value of $(50 - 2)(50 + 2)$?**

-----.

7) A number is increased by 20%, and then the new number is decreased by 20%. **Which of the following is true?**

- a) The final number is greater than the original
- b) The final number is less than the original
- c) The final number is equal to the original
- d) The result depends on the original number
- e) None of these

8) **How many different 2-digit positive integers have digits that add to 7?**

- a) 7
- b) 13.5
- c) 15
- d) 16
- e) 18

9) A right triangle has side lengths 6, 8, and 10. A similar triangle has a shortest side with length 9. **What is the longest side length of the larger triangle?**

-----.

Name:

AXIOM CHALLENGE

8th grade; Spring 2026

10) On a map, 1 inch represents 8 miles. Two towns are 3.5 inches apart on the map. **How far apart, in miles, are the towns in real life?**

- a) 24
- b) 26
- c) 28
- d) 30
- e) 32

11) The numbers 1 through 9 are each used exactly once to fill a 3 by 3 grid. **What is the sum of all 9 numbers in the grid?**

- a) 36
- b) 45
- c) 50
- d) 54

12) Solve the inequalities and graph the solutions.

$$\frac{-s}{4} - 7s + 49 < 67 - 7s$$

s _____

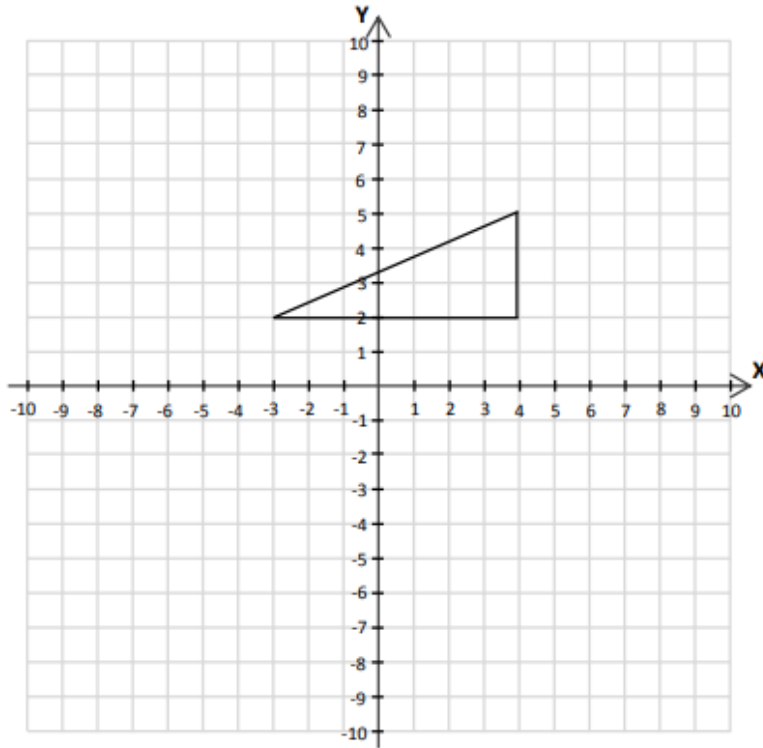


Name:

AXIOM CHALLENGE

8th grade; Spring 2026

13) Dilate by 2 using the center $(0, 0)$, then reflect over $x = y$.



14) When a positive integer is divided by 5, the remainder is 2. When the same integer is divided by 3, the remainder is 1. **Which of the following could be the integer?**

- a) 7
- b) 12
- c) 17
- d) 22
- e) 27

Name:

AXIOM CHALLENGE

8th grade; Spring 2026

- 1) In a group of cats, some individuals have short fur and others have long fur. In this group, the gene for the fur length trait has two alleles. The allele for short fur (F) is dominant over the allele for long fur (f).

This Punnett square shows a cross between two cats.

	F	F
F	FF	FF
f	Ff	Ff

What is the probability that a cat produced by this cross will have short fur?

- a) 0/4
- b) 1/4
- c) 2/4
- d) 3/4
- e) 4/4

2) Match each particle in an atom with its charge (draw a line connecting them):

Electron

Proton

Neutron

Positive

Negative

Neutral

3) Identify these elements or list its symbol (depending on what is given):

Silicon:

Carbon:

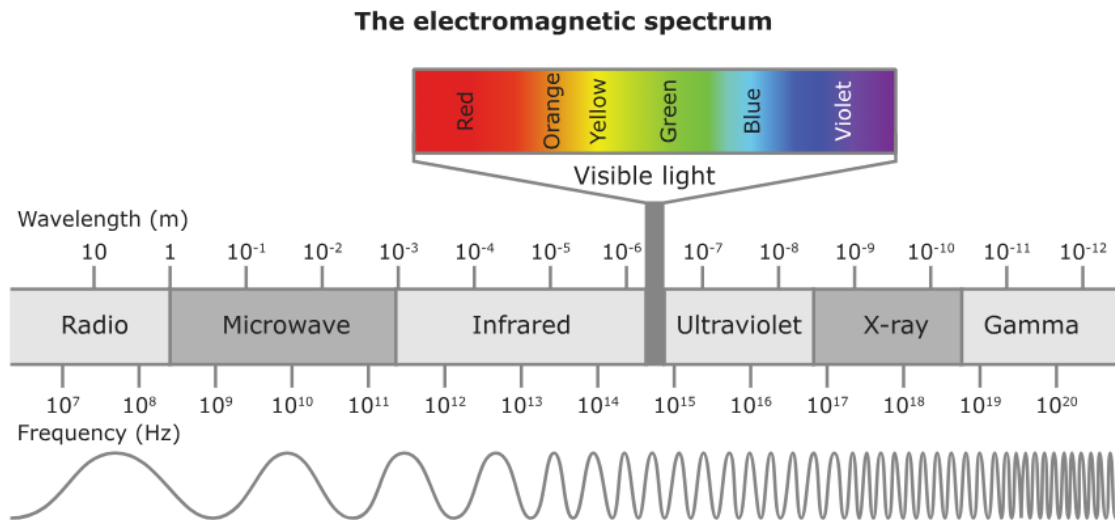
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Name:

AXIOM CHALLENGE

8th grade; Spring 2026

4) This model shows different types of electromagnetic waves:



Complete the sentence, then circle the correct answer for the questions.

Compared to visible light waves, ultraviolet waves have _____ wavelengths, have _____ frequencies, and carry _____ energy.

a) What is the first blank?

Shorter

Longer

b) What is the second blank?

Higher

Lower

c) What is the third blank?

More

Less

5) Write whether the following scenarios are physical or chemical changes; P for physical, and C for chemical.

A piece of avocado turning brown

Water boiling on a stove

A penny tarnishing

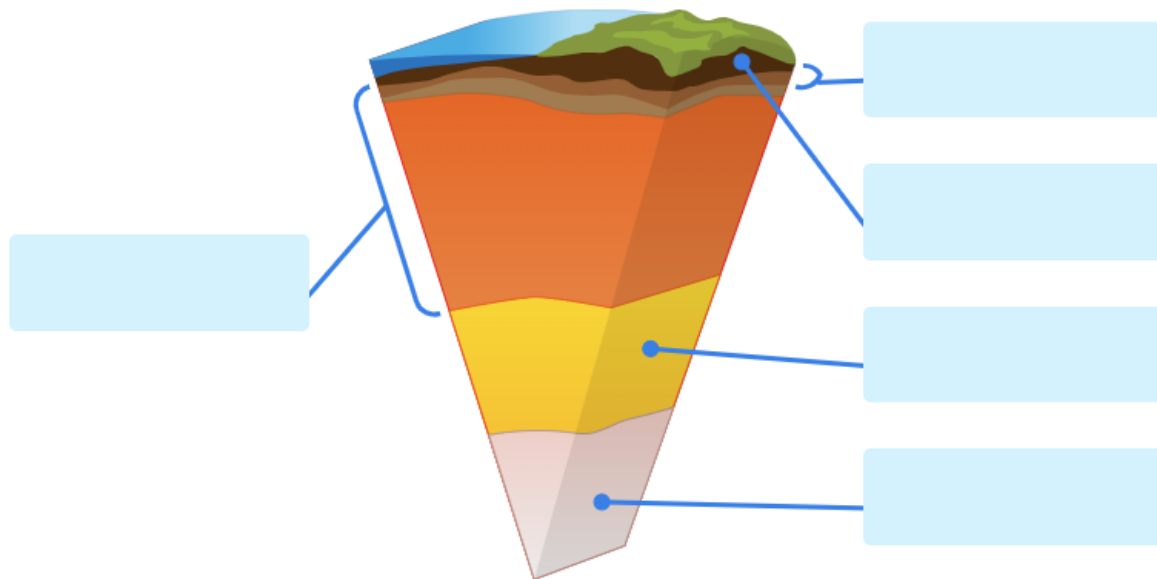
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8th grade; Spring 2026

6) This diagram is a model of Earth's layers. Use the words below to label the layers.

Word bank: outer core, inner core, lithosphere, mantle, continental crust



7) Which is NOT an example of a symbiotic relationship?

- a) Mutualism
- b) Parasitism
- c) Predation
- d) Commensalism

8) Match the state (of matter) with its (typical) corresponding particle motion. (Draw a line)

Solid

Particles move freely

Liquid

Particles are tightly packed together

Gas

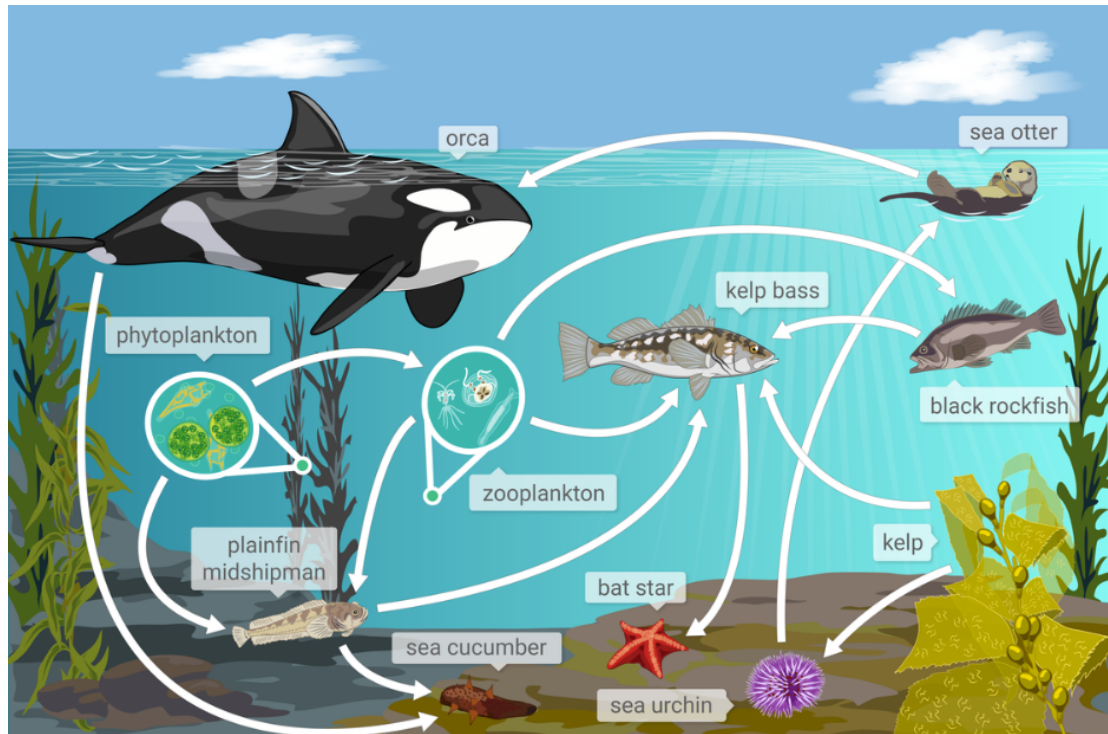
Particles match shape of container

Name:

AXIOM CHALLENGE

8th grade; Spring 2026

9) Examine the food web below:



Which 2 of the following is a tertiary consumer?

- a) Kelp bass
- b) Sea otter
- c) Orca
- d) Sea urchin
- e) Phytoplankton

10) Select the true statements about how plants use and change energy:

- a) Photosynthesis transforms light energy into chemical energy
- b) Photosynthesis creates energy from carbon dioxide and water
- c) Plant cells use cellular respiration to get chemical energy from food
- d) Chlorophyll captures light energy

Name:

AXIOM CHALLENGE

8th grade; Spring 2026

Open Responses:

- 1) What causes Earth's seasons? Be specific.
- 2) 2 brown-eyed parents have a blue-eyed child. How is this possible?

Name:

AXIOM CHALLENGE

6th-8th grade; Spring 2026

Instructions:

Imagine that you have all the everyday household materials (that a normal household would use) in your hands. Draw a rube goldberg machine that would accomplish a simple task (of your choosing) at the end:

Name:

AXIOM CHALLENGE

6th-8th grade; Spring 2026

OPTIONAL Coding Problems (Receive Extra Credit)

Multiple Choice:

1) What does the middle mouse button do?

- a) Opens the start menu
- b) Opens a link in a new tab in web browsers
- c) Scrolls the desktop
- d) Deletes files

2) What is machine learning?

- a) A way AI (Artificial Intelligence) learns data
- b) A type of cooking robot
- c) A method to print books
- d) A new video game

3) What does AI do?

- a) Helps computers think or make decisions
- b) Makes coffee automatically
- c) Turns on your lights
- d) Types letters on its own

4) What is one common use of AI on the internet?

- a) Turns your computer screen on
- b) Recommending videos, ads, or search results
- c) Making your keyboard type automatically
- d) Controlling house lights without smart devices

5) What is one thing AI cannot do by itself?

- a) Recognize images
- b) Play music
- c) Translate languages
- d) Feel human emotions

Name:

6) How does AI learn?

- a) By watching TV
- b) By reading your mind
- c) By analyzing data
- d) By sleeping

7) What is a variable in coding?

- a) A random number generator
- b) A type of mouse
- c) A storage for a value that can change
- d) A type of monitor

8) What does HTML do?

- a) Creates computer viruses
- b) Runs a program automatically
- c) Makes coffee
- d) Structures content on a webpage

9) What is the main loop in a Snake game?

- a) Playing music automatically
- b) Drawing pictures on the screen
- c) Typing code automatically
- d) Repeatedly checking for player input and updating the snake

10) What is the first index in most arrays?

- a) 0
- b) 1
- c) 2
- d) 3

11) What is a binary number system?

- a) A system using numbers 0–9
- b) A system using numbers 1–9
- c) A system using only 0 and 1
- d) A system using only letters

Name:

AXIOM CHALLENGE

6th-8th grade; Spring 2026

OPTIONAL Essay Topics (Receive Extra Credit); Pick One Topic from the List to Write About **(All 300 Words or Under!)**:

Topic 1: What books, articles, podcasts, or documentaries have you most enjoyed in the past year, and why?

Topic 2: If you could teach a one-day course on something you know well, what would it be called and what would you teach? Why?

Topic 3: What is your greatest talent or skill, and how have you developed and demonstrated it over time? Be detailed about your involvement.