NGSS Grade 8 Practice Test Answer Key

Item 1

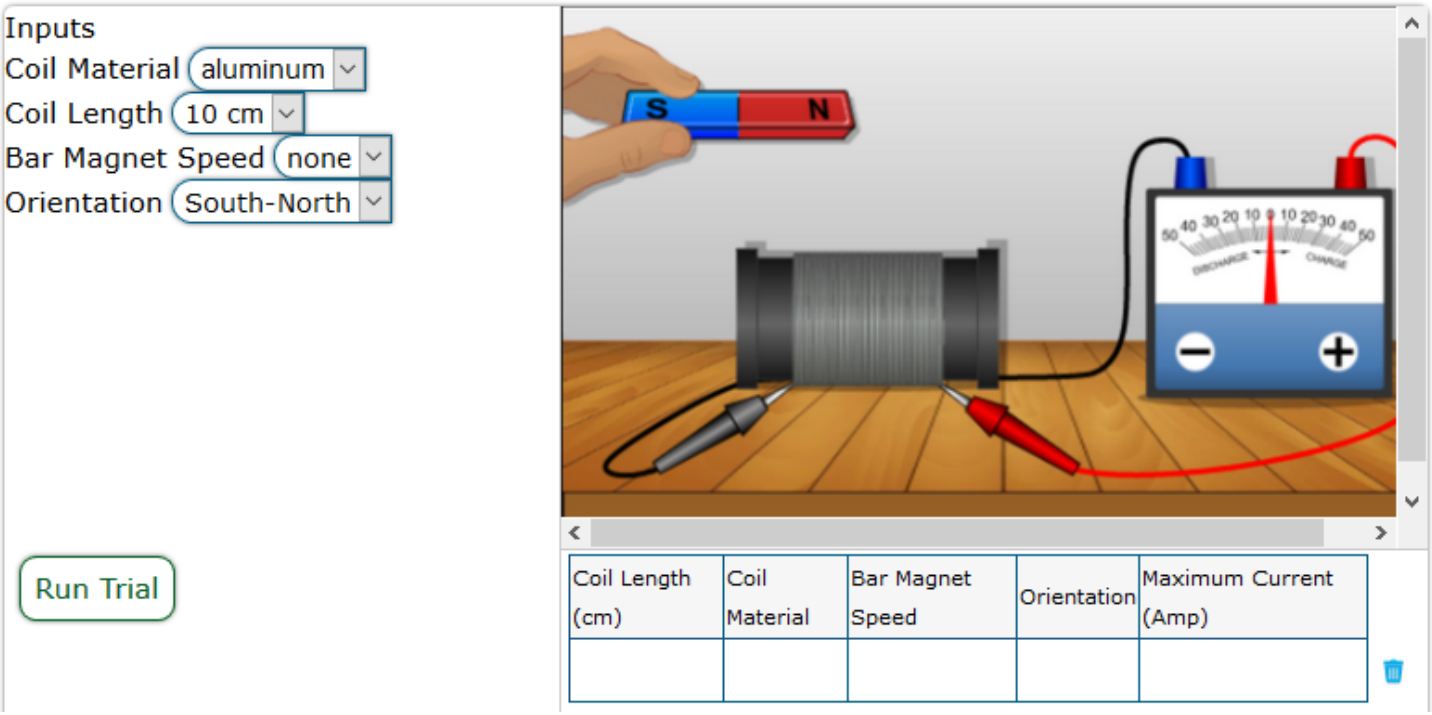
Alignment: MS-PS2-5: Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

- **SEP:** Planning and Carrying Out Investigations
- **DCI:** PS2.B: Types of Interactions
- **CCC:** Cause and Effect

Part A

Using the simulation, select inputs to design and run a controlled experiment to determine how each coil material affects the movement of the ammeter needle.

- You may run up to 4 trials. If you would like to delete a trial, click on the trash can icon next to the row of data you would like to delete, and generate new data.
- Coil length is measured in centimeters (cm).
- Click Run Trial to run a trial.



Answer: Responses will vary. The student receives a point for running a controlled experiment to determine the effect of coil material on the movement of the needle. This is an example of a controlled experiment, changing only the coil material:

Coil Length (cm)	Coil Material	Bar Magnet Speed	Orientation	Maximum Current (Amp)
10	aluminum	fast	South-North	-50
10	iron	fast	South-North	-14
10	nickel	fast	South-North	-20
10	plastic	fast	South-North	0

Part B

Using the simulation, design and run a second experiment to determine how the motion of the magnet affects the movement of the needle.

- Click Run Trial again to run a new trial.
- You may run up to 4 trials. If you would like to delete a trial, click on the trash can icon next to the row of data you would like to delete, and generate new data.

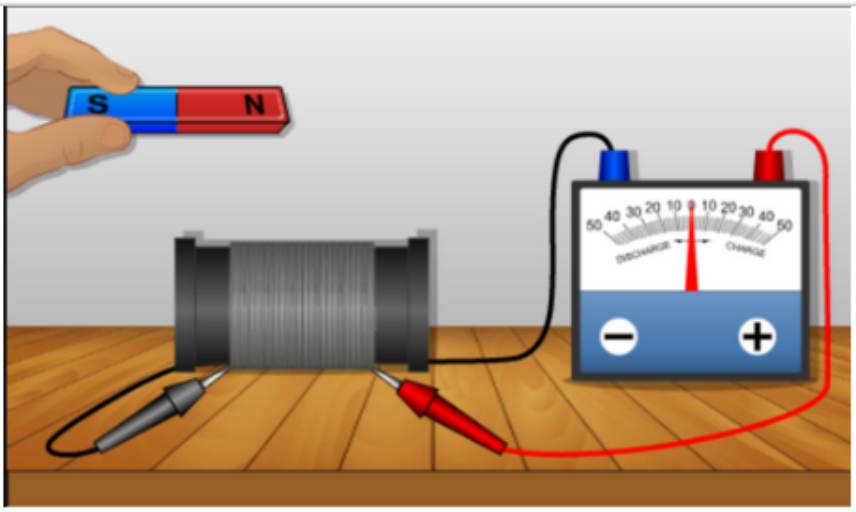
Inputs

Coil Material: aluminum

Coil Length: 10 cm

Bar Magnet Speed: none

Orientation: South-North



Run Trial

Coil Length (cm)	Coil Material	Bar Magnet Speed	Orientation	Maximum Current (Amp)

Answer: Responses will vary. The student receives a point for run a controlled experiment to determine the effect of the speed of the magnet on the movement of the needle. This is an example of a controlled experiment, changing on the bar magnet speed:

Coil Length (cm)	Coil Material	Bar Magnet Speed	Orientation	Maximum Current (Amp)
10	aluminum	none	South-North	0
10	aluminum	fast	South-North	-50
10	aluminum	slow	South-North	-25

Part C

Select the **two** conditions that are required for the ammeter needle to jump.

- [ ] The coil must be 20 cm long.
- [ ] The bar magnet must be moving.
- [ ] The coil material must attract magnets.
- [x] The coil material must conduct electricity.
- [ ] The magnet must not touch the ammeter.
- [ ] The bar magnet's N pole must point in the direction of motion.

Answer:

- [ ] The coil must be 20 cm long.
- [x] The bar magnet must be moving.
- [ ] The coil material must attract magnets.
- [x] The coil material must conduct electricity.
- [ ] The magnet must not touch the ammeter.
- [ ] The bar magnet's N pole must point in the direction of motion.

Part D

Click on each blank box and select phrases to complete the sentence describing what causes the ammeter needle to jump.

The ammeter needle jumps because a [ ] [ ]

Options:

- Moving electric field
- Moving magnetic field
- Stationary electric field
- Stationary magnetic field

- Induces a magnetic field in the coil.
- Causes the coil to conduct electricity.
- Induces an electric current in the coil.
- Attracts or repels the needle, depending on the direction of the poles.

Answer:

The ammeter needle jumps because a [moving magnetic field] [induces an electric current in the coil.]

Item 2

Alignment: MS-PS3-3: Apply scientific preinciples to design, contruct, and test a device that either minimizes or maximizes thermal energy tranfer.

- **SEP:** Contructing Explanations and Designing Solutions
- **DCI:** PS3.A: Definitions of Energy
- **CCC:** Energy and Matter

Select the blank boxes to indicate whether each criterion is fulfilled by Design X, Design Y, or both designs.

Criteria	Design X	Design Y	Both Designs
The food tray is evenly heated.	☐	☐	☐
The food is warmed to a higher temperature than the other tray.	☐	☐	☐
The flame(s) does/do not directly touch the food.	☐	☐	☐
The flame(s) is/are as far as possible from the handles.	☐	☐	☐
The setup uses as little fuel as possible.	☐	☐	☐

Answer:

Criteria	Design X	Design Y	Both Designs
The food tray is evenly heated.	☐	☑	☐
The food is warmed to a higher temperature than the other tray.	☑	☐	☐
The flame(s) does/do not directly touch the food.	☐	☐	☑
The flame(s) is/are as far as possible from the handles.	☐	☑	☐
The setup uses as little fuel as possible.	☐	☑	☐

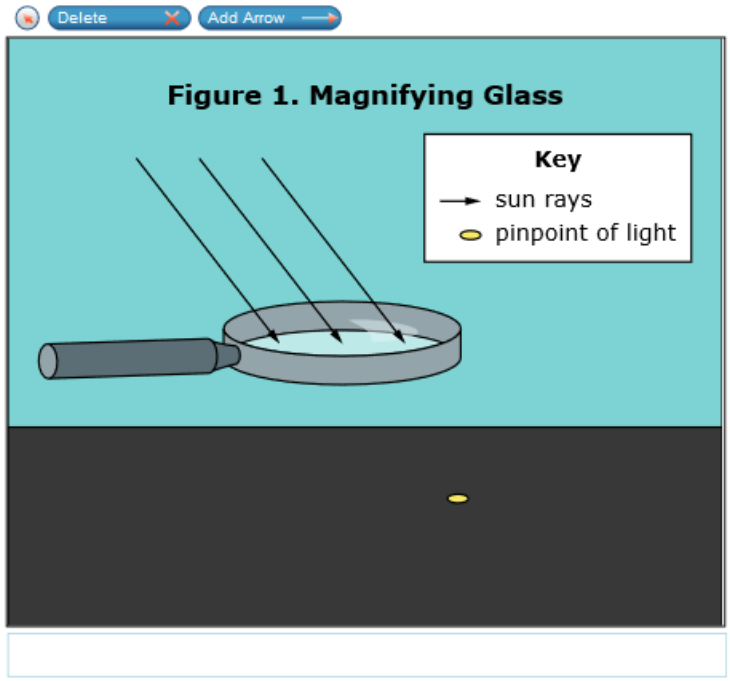
Item 3

Alignment: MS-PS4-2: Develop and use a model to describe that waves are reflected absorbed, or transmitted through various materials.

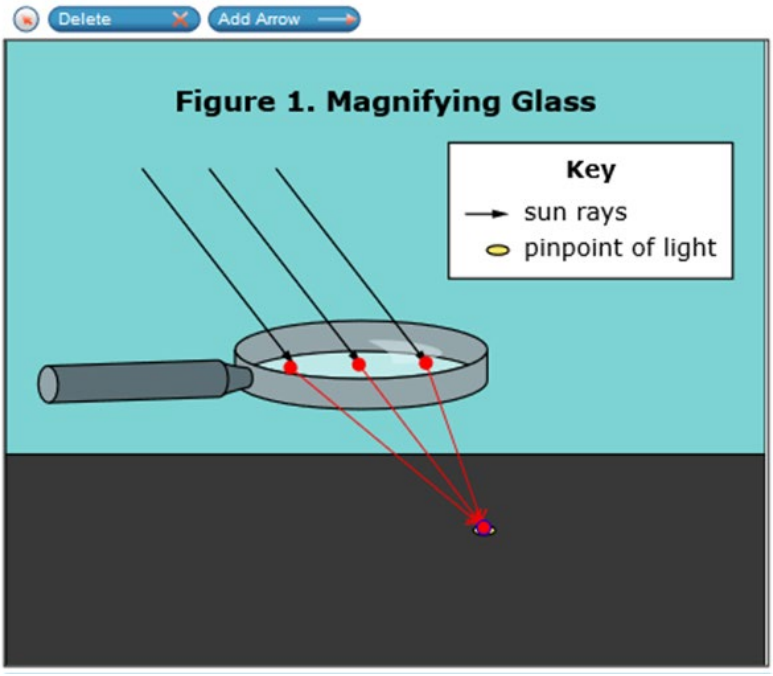
- SEP: Developing and Using Models
- DCI: PS4.B: Electromagnetic Radiation
- CCC: Structure and Function

Part A

Use the Add Arrow tool to draw **three** arrows to model how the small point of light is formed on the ground.



Answer:



Part B

Click on the blank boxes and select words or phrases to explain what happens in the model created in part A.

When light enters the magnifying glass, light is [ ] the glass to form the small point of light.

Options:

- Absorbed by
- Reflected off
- Produced by
- Refracted through

Answer:

When light enters the magnifying glass, light is [refracted through] the glass to form the small point of light.

Item 4

Alignment: MS-LS4-6: Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

- **SEP:** Using Mathematics and Computational Thinking
- **DCI:** LS4.C:Adaptation
- **CCC:** Cause and Effect

Part A

Calculate the rates of change in first flowering dates per degree Celsius for the average species, the highbush blueberry, and the yellow wood sorrel, between 1852 and 2006. Round your answers to one decimal point.

Plant	Rate of Change in First Flowering Date (days per °Celsius)
43 Species	
Highbush blueberry	
Yellow wood sorrel	

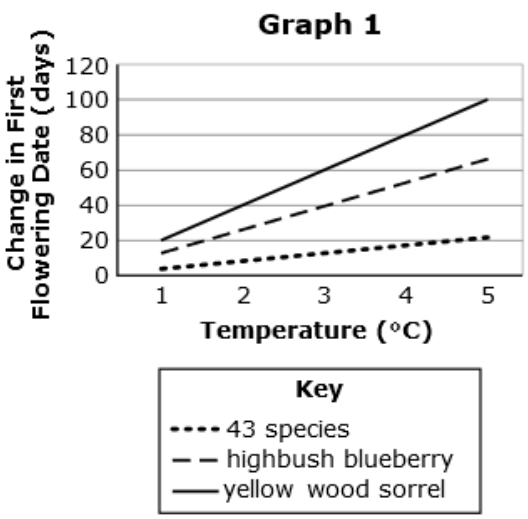
Answer: Responses my vary. Correct responses include +/- 0.1 for each blank. Actual correct values are:

Plant	Rate of Change in First Flowering Date (days per °Celsius)
43 Species	4.4
Highbush blueberry	13.1
Yellow wood sorrel	20

Part B

Which graph matches the rates of change you calculated in part A?

Ⓐ



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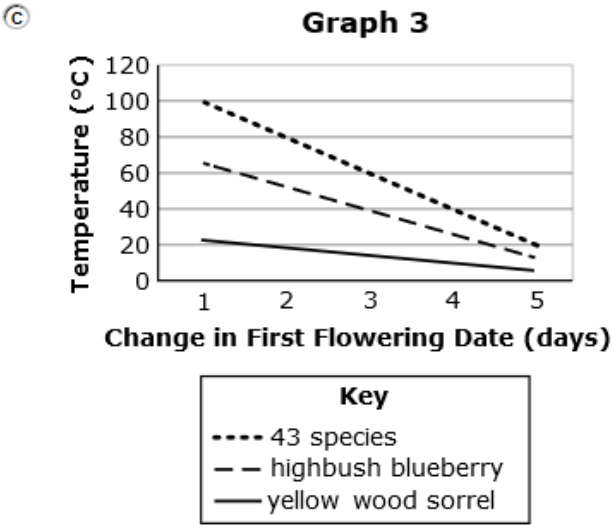

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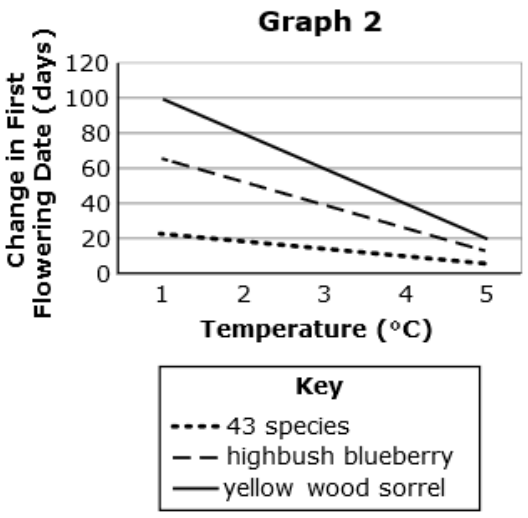

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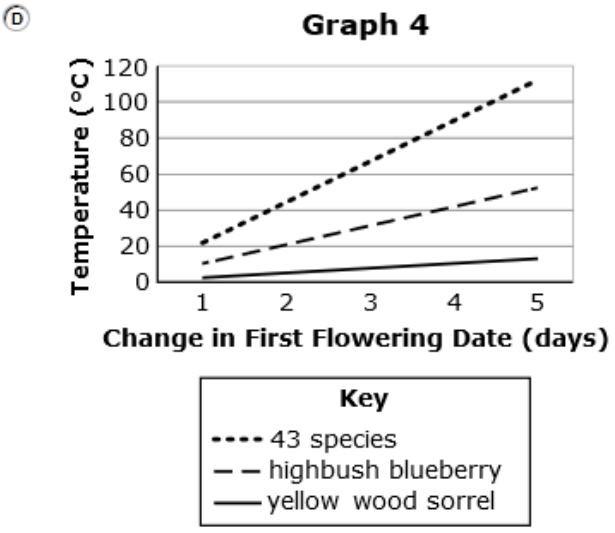


Answer: A

Part C

Which statement is supported by the calculations and observations you have made?

Ⓐ The first flowering date of each plant species was affected differently by the increase in temperature.

Ⓑ The first flowering dates of all plant species were affected the same amount by the increase in temperature.

Ⓒ The first flowering dates of different plant species were affected by the number of hours of sunlight the plants received.

Ⓓ The first flowering dates of all the plants within the same species were affected the same amount by the increase in temperature.

Answer: A

Part D

Select **two** pieces of evidence you would need to support the hypothesis that natural selection caused the change in first flowering dates of the sorrels and the blueberry bushes.

☐ Clones of the same plant have a different first flowering date in environments with different temperatures.

☐ There is a genetic difference between the plants that flower earlier and the plants that flower later within each species.

☐ Farmers in Connecticut planted more of the yellow wood sorrel and highbush blueberry plants with earlier first flowering dates.

☐ The gene(s) that determines the first flowering date for the yellow wood sorrels is different from the gene(s) for the highbush blueberry plants.

☐ Plants that have an earlier first flowering date are better able to survive, and produce more seeds than the plants that have later first flowering dates.

Answer:

- [ ] Clones of the same plant have a different first flowering date in environments with different temperatures.
- [x] There is a genetic difference between the plants that flower earlier and the plants that flower later within each species.
- [ ] Farmers in Connecticut planted more of the yellow wood sorrel and highbush blueberry plants with earlier first flowering dates.
- [ ] The gene(s) that determines the first flowering date for the yellow wood sorrels is different from the gene(s) for the highbush blueberry plants.
- [x] Plants that have an earlier first flowering date are better able to survive, and produce more seeds than the plants that have later first flowering dates.

Item 5

Alignment: MS-LS3-1: Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of an organism.

- **SEP:** Developing and Using Models
- **DCI:** LS3.A: Inheritance of Traits
- **CCC:** Structure and Function

Click on each blank box to select the statements that complete the chain of events explaining how the bar-eyed mutation reduces a fly's eyesight.

Chain of Events

Step	Event
1	
2	
3	
4	The eyesight of a fly is reduced.

Options:

- The fly's eye structures become wider.
- The fly's eye structures become narrower.
- There is a change in the protein production.
- There is no change in the protein production.
- A chromosome has less than one copy of the B gene.
- A chromosome has more than one copy of the B gene.

Answer:

Chain of Events

Step	Event
1	A chromosome has more than one copy of the B gene.
2	There is a change in the protein production.
3	The fly's eye structures become narrower.
4	The eyesight of a fly is reduced.

Item 6

Alignment: MS-ESS3-4: Construct an argument supported by evidence for how increases in human populations and per-capita consumption of natural resources impact Earth's systems.

- **SEP:** Engaging in Argument from Evidence
- **DCI:** ESS3.C: Human Impacts on Earth Systems
- **CCC:** Cause and Effect

Part A

Select **two** conclusions that can be made about Port A and Port B based on the evidence.

- [ ] Ports with fewer bottom dwellers have healthier marine habitats.
- [ ] A port with more consumption of fish results in fewer species of bottom dwellers.
- [ ] The size of the port has a greater impact on biodiversity than the use of ship paints.
- [ ] A port with higher heavy metal concentrations shows more signs of a disturbed habitat.
- [ ] The effects of ship painting on the amount of pollutants in the water can be found in both ports.

Answer:

- [ ] Ports with fewer bottom dwellers have healthier marine habitats.
- [ ] A port with more consumption of fish results in fewer species of bottom dwellers.
- [ ] The size of the port has a greater impact on biodiversity than the use of ship paints.
- [x] A port with higher heavy metal concentrations shows more signs of a disturbed habitat.
- [x] The effects of ship painting on the amount of pollutants in the water can be found in both ports.

Part B

Select two pieces of evidence that support the claims in part A.

- Click on the first pencil icon.
- Then, click on a highlighted section from the passage with the pencil to make your first selection. Click on the second pencil icon to make a second selection.
- To change a selection, click on the circular arrow that follows the selection you would like to change.

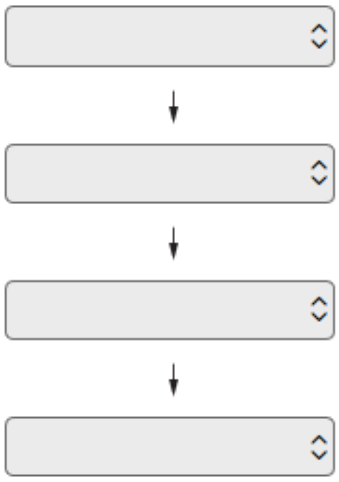
Answer:

Competition is usually found in disturbed habitats.

Copper and zinc are heavy metals that act as preservatives in paint on the bottoms of ships.

Part C

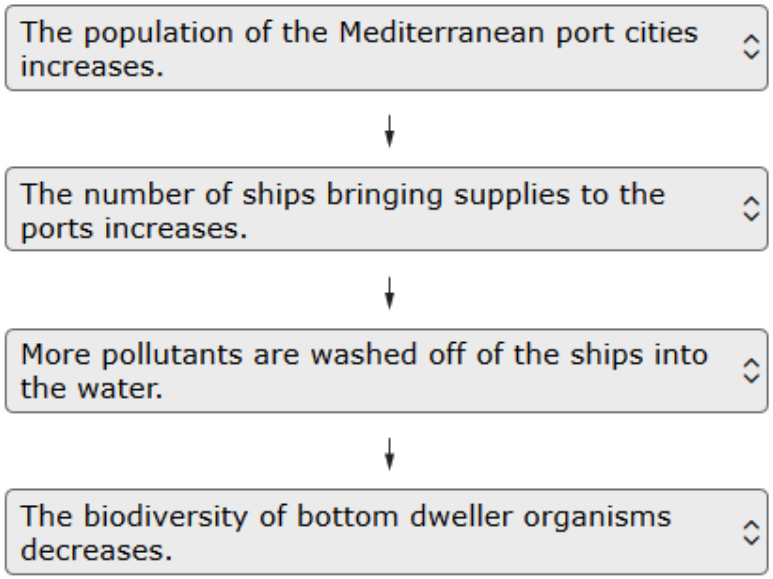
Click on each blank box and select the statement that matches each step of the incomplete model in Figure 2.



Options:

- Fewer resources are available for new fish species.
- The biodiversity of bottom dweller organisms decreases.
- The population of the Mediterranean port cities increases.
- The population of the Mediterranean port cities decreases.
- More pollutants are washed off the ships into the water.
- The number of ships bringing supplies to the ports increases.
- The number of ships bringing supplies to the ports decreases.

Answer:



Part D

What additional information would support the incomplete Figure 2 model?

Ⓐ main diet of competing species found in ports

Ⓑ number of bottom dweller organisms before 2017

Ⓒ population data in western and eastern coastal cities

Ⓓ water sport trends in Mediterranean ports since 1970

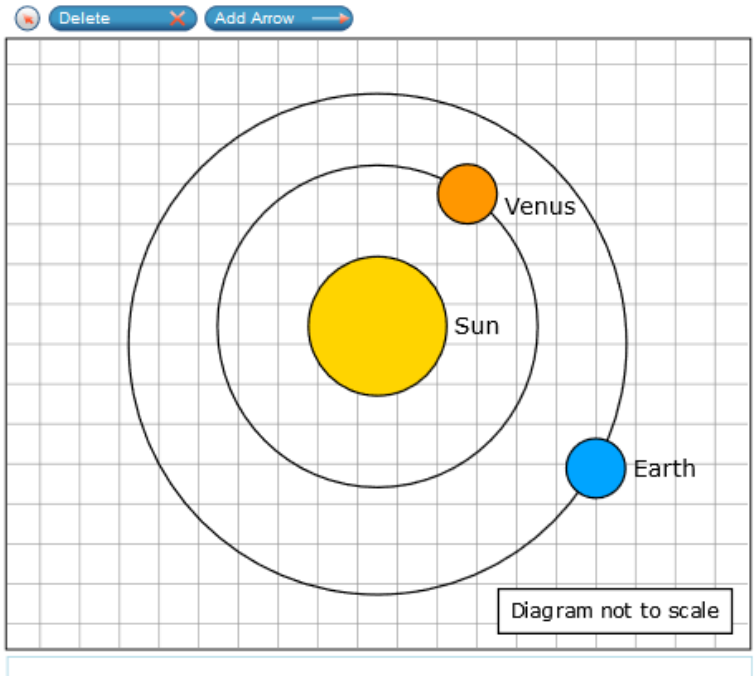
Answer: B

Item 7

Alignment: MS-ESS1-2: Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.

- **SEP:** Developing and Using Models
- **DCI:** ESS1.A: The Universe and Its Stars
- **CCC:** Systems and System Models

Create a model to describe the difference in orbital speed. Use the Add Arrow tool and draw one arrow for each planet to show the magnitude and direction of the force of gravity on each planet. Longer arrows represent forces with greater magnitude.



Answer: