

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



# New York State *Testing Program*

## Elementary-level Science Test

Grade **5**

**Spring 2024**

**RELEASED QUESTIONS**

# **Elementary-level Science Test**

## **TIPS FOR TAKING THE TEST**

Here are some ideas to help you do your best:

- Be sure to read all the directions carefully.
- Read each question carefully.
- Think about the answer before making your choice or writing your answer.
- Make sure you read all the information given for each question.
- You have a calculator that you can use on the test if it helps answer the question.

Base your answers to questions 1 through 4 on the information below and on your knowledge of science.

### Animal Senses

The model below provides information about some animals, some of their senses, and how these senses cause specific responses to the animals' environments.

#### Animal Senses Model

Animal	Senses Used	Structure/Responses
Eagle 	Sight	<ul style="list-style-type: none"><li>Eyes take up 50% of the eagle's head</li><li>Eyes are located on side of head; can see four times farther than human eyes to spot prey two miles away</li></ul>
Dog 	Smell	<ul style="list-style-type: none"><li>Can smell 10,000 to 100,000 times better than humans; helps dogs track food sources in natural environment</li></ul>
	Hearing	<ul style="list-style-type: none"><li>Can move ears in many different directions, allowing dogs to identify where sounds come from and to identify threats</li></ul>
Bat 	Sight	<ul style="list-style-type: none"><li>Not blind; well-developed vision to find food items</li></ul>
Elephant 	Hearing	<ul style="list-style-type: none"><li>Large ears are used to locate distant objects by sending out sound waves that are reflected back to the bat to locate prey</li></ul>
	Touch/ "Hearing"	<ul style="list-style-type: none"><li>Has more sense receptors than other animals; receives sound vibrations from other elephants through feet to find mates</li></ul>
	Smell	<ul style="list-style-type: none"><li>Uses scent clues to tell difference between two human tribes, to avoid tribes that hunt them</li></ul>

- 1** A student claimed that elephants and bats both receive sound information, but respond to the sounds differently.

Use information from the *Animal Senses Model* to support this claim. [1]

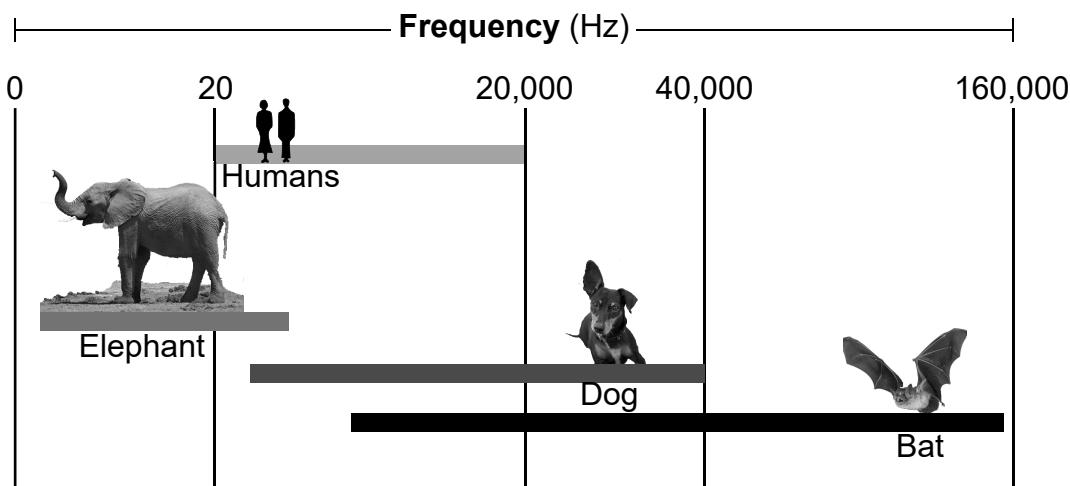
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The model below includes information about the different frequencies of sound waves that can be detected by humans, elephants, dogs, and bats. Sound is measured in hertz (Hz), the number of waves each second. The bars indicate the range of frequencies that each organism can hear.

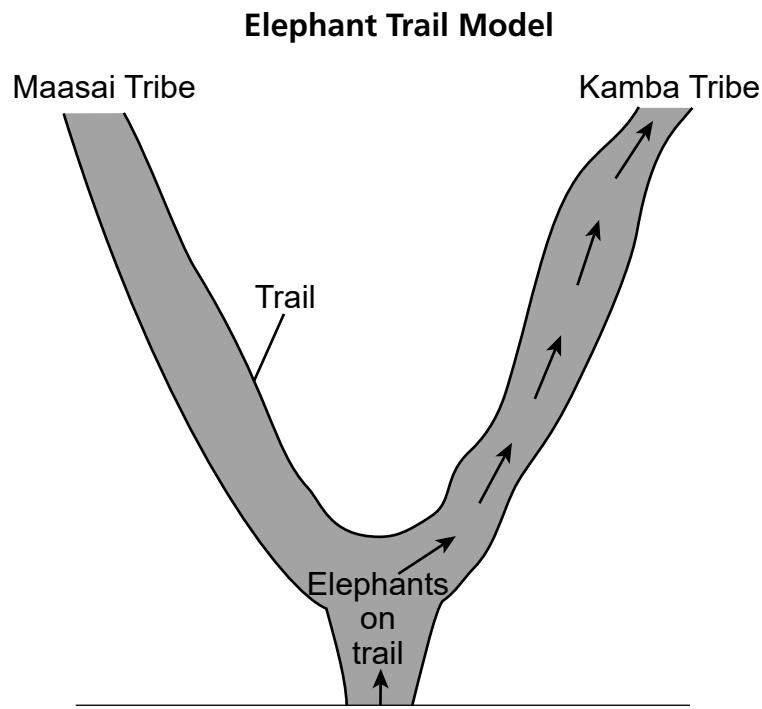
**Sound Frequency Ranges Model**



- 2** Organisms respond to information in different ways. Which statement describes how two organisms could respond to a warning sound at 35,000 Hz?

- A Humans cannot hear the sound to respond and elephants might stamp their feet.
- B Humans can hear the sound and respond and the dog might bark.
- C Humans cannot hear the sound to respond and the dog might bark.
- D Humans can hear the sound and respond and the bat might fly away from the sound.

The model below represents the path that a herd of elephants would take if given the choice when encountering the scents of two different tribes.

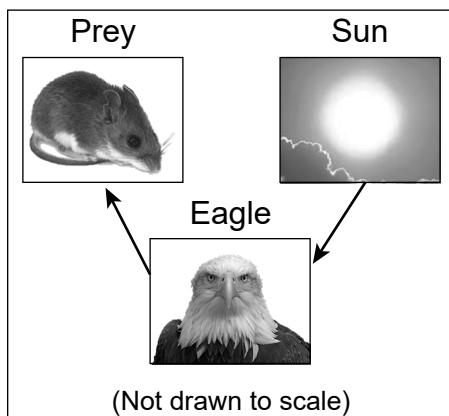


3 Which type of information processing allows the herd of elephants to make this choice?

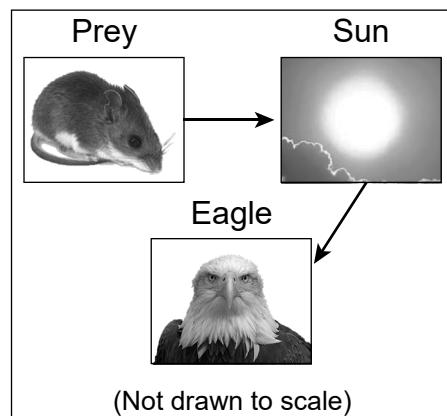
- A Use memories stored in the brain to recall the Kamba tribe, which has hunted them in the past.
- B Use memories stored in the brain to recall the Maasai tribe, which has hunted them in the past.
- C Use memories stored in the trunk to recall the Kamba tribe, which has hunted them in the past.
- D Use memories stored in the trunk to recall the Maasai tribe, which has hunted them in the past.

4

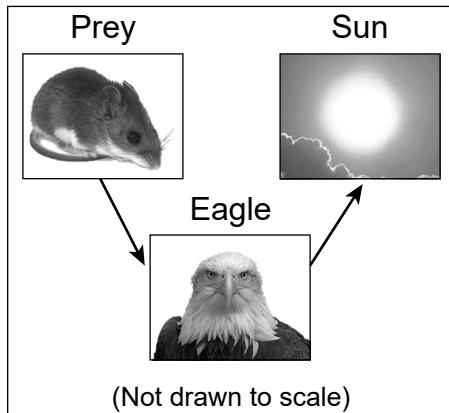
In the models below, arrows represent the path of light. Which model correctly represents the path of light that occurs between the eagle, its prey (mouse), and the Sun that allows the eagle to see its prey?



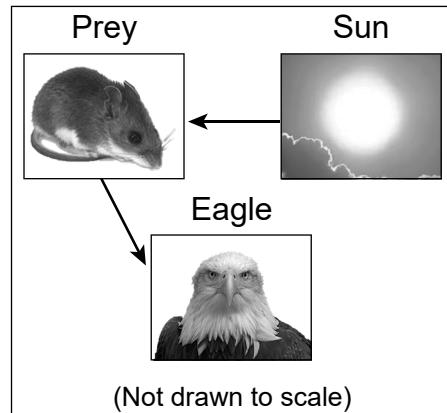
A



C



B

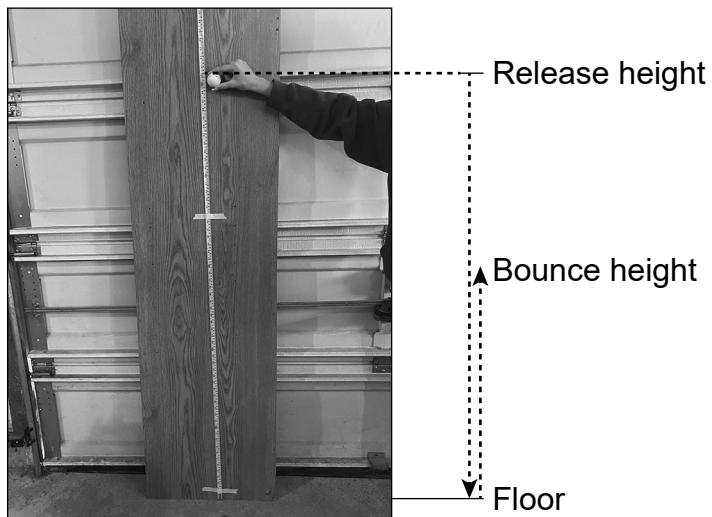


D

Base your answers to questions 5 through 9 on the information below and on your knowledge of science.

### Motion of Golf Balls

A group of students dropped a golf ball from different heights above a level concrete floor. The ball hit the floor and bounced directly upwards. The teacher calculated the speed of the ball when it hit the floor. The students measured the height of the bounce with a tape measure.



The data table below shows the results of this investigation.

**Data Table 1**

Release Height (m)	Speed of Ball When Ball Hits Floor (m/s)	Bounce Height (m)
1.00	4.43	0.73
1.00	4.43	0.74
1.00	4.43	0.71
1.50	5.42	1.13
1.50	5.42	1.15
1.50	5.42	1.12
2.00	6.26	1.42
2.00	6.26	1.40
2.00	6.26	1.45

- 5** Explain, using evidence from *Data Table 1*, how the speed of the golf ball affects the energy of the golf ball. [1]

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- 6** Which statement about forces acting on the golf ball is supported by the evidence in *Data Table 1*?

- A Balanced forces cause the golf ball's speed to increase as height of the bounce increases.
- B Unbalanced forces cause the golf ball's speed to increase as the ball falls.
- C Forces on the ball are balanced when the golf ball hits the floor and bounces up.
- D Unbalanced forces cause the golf ball's speed to decrease as the ball falls.

- 7** A student claims that the energy of the golf ball was converted from one form to another when the ball hit the floor. Which table accurately describes an energy conversion that occurred when the ball hit the floor and the supporting evidence?

	<b>Energy Conversion</b>	<b>Evidence</b>
A	heat energy into motion energy	the ball got faster when it hit the floor
B	sound energy into motion energy	the ball made a noise when it hit the floor
C	motion energy into heat energy	the temperature of the ball decreased when the ball hit the floor
D	motion energy into sound energy	the ball made a noise when it hit the floor

After completing the golf ball investigation, a student decided to investigate how to get a golf ball to travel from the beginning of a toy car track to the end of the toy car track.

### Original Setup



The student placed a golf ball at the top of the ramp and observed that the ball rolled down the track, began to go up the loop, then fell off the track. In order to solve this problem of the golf ball not reaching the end of the track, the student came up with two solutions.

**Solution 1:** Increase the length of the track between the ramp and the loop, keeping the height the same.



**Solution 2:** Increase the height of the ramp, keeping the length of the track the same as the original setup.



**8**

- Identify the solution that *best* solves the problem and allows the golf ball to travel around the loop to the end of the track. Using scientific reasoning, explain why this solution will best solve the problem. [1]

Solution Number: \_\_\_\_\_

Explanation: \_\_\_\_\_  
\_\_\_\_\_

The student returns the track to the original set up. This time, an identical golf ball (Ball 2) has been left at the base of the loop.



**9**

The student asks the question, "What will happen to the energy and motion of the two golf balls when Ball 1 is released down the toy car track?" Which table correctly predicts the changes in energy and motion that will occur when the two golf balls collide?

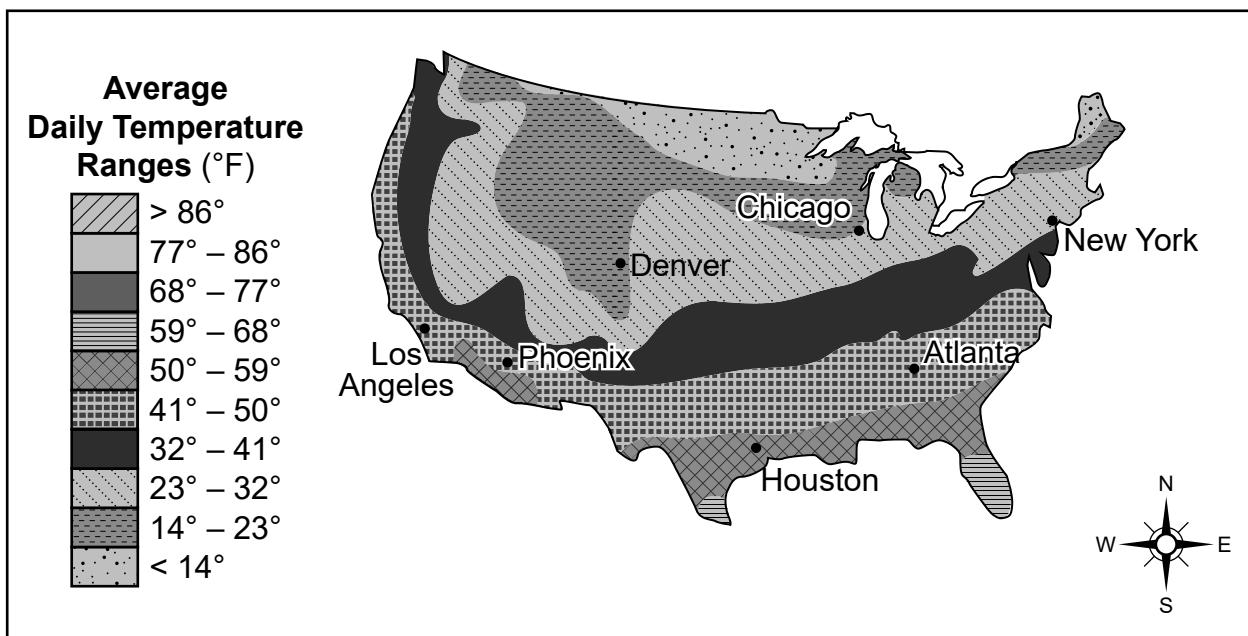
	<b>Change in Energy</b>	<b>Change in Motion</b>
A	Ball 1 will transfer no energy to Ball 2.	Ball 1 will push Ball 2 until they both come to a stop.
B	Ball 1 will transfer no energy to Ball 2.	Ball 1 will come to a stop while Ball 2 will move at the same speed that Ball 1 moved before the collision.
C	Ball 1 will transfer some of its energy to Ball 2.	Ball 1 will lose speed, while Ball 2 will gain speed.
D	Ball 1 will transfer some of its energy to Ball 2.	Ball 1 will move at its original speed, while Ball 2 will gain speed.

Base your answers to questions 10 through 14 on the information below and on your knowledge of science.

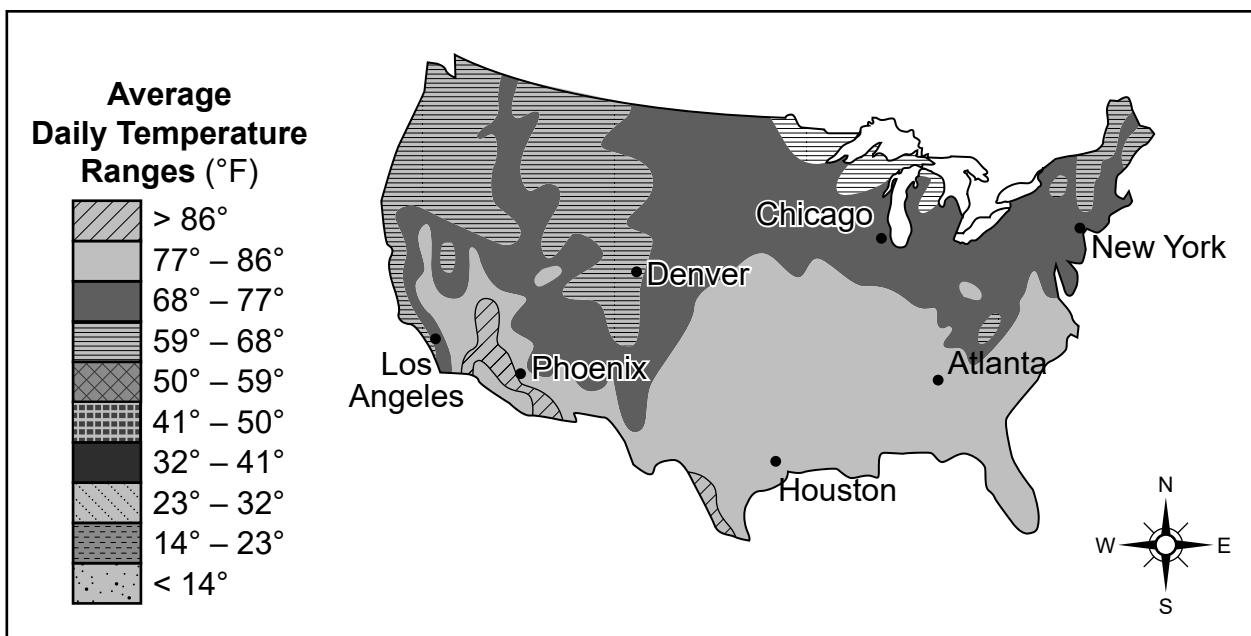
### Weather Patterns in the United States

The maps below show the average daily air temperature ranges, in degrees Fahrenheit (°F), for areas in the United States during January and July.

Average Daily Air Temperatures in January

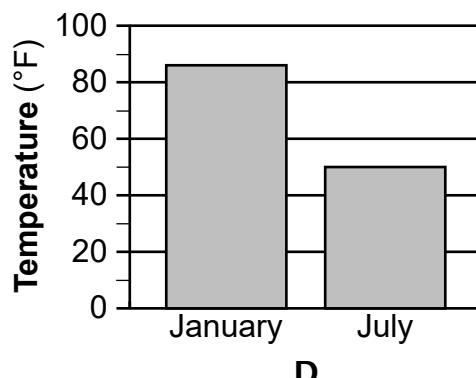
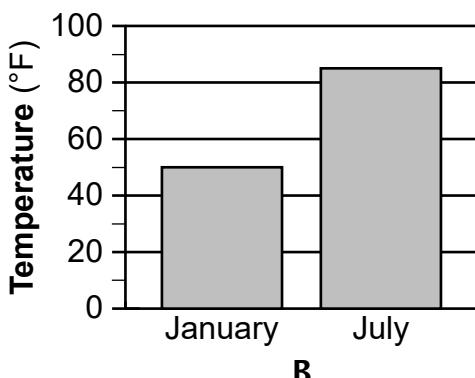
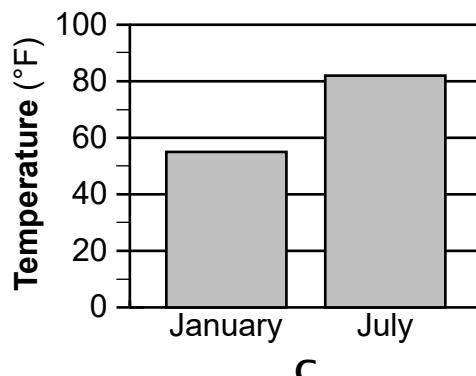
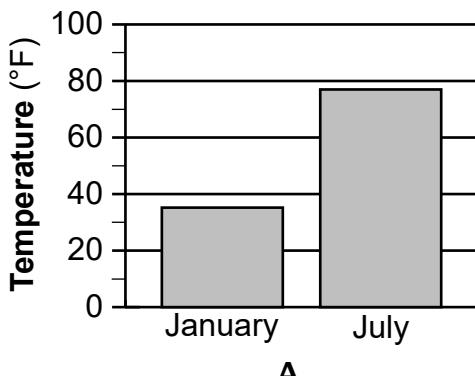


Average Daily Air Temperatures in July



10

- Which bar graph represents the **highest** average daily air temperature that could occur in Atlanta in January and July?



11

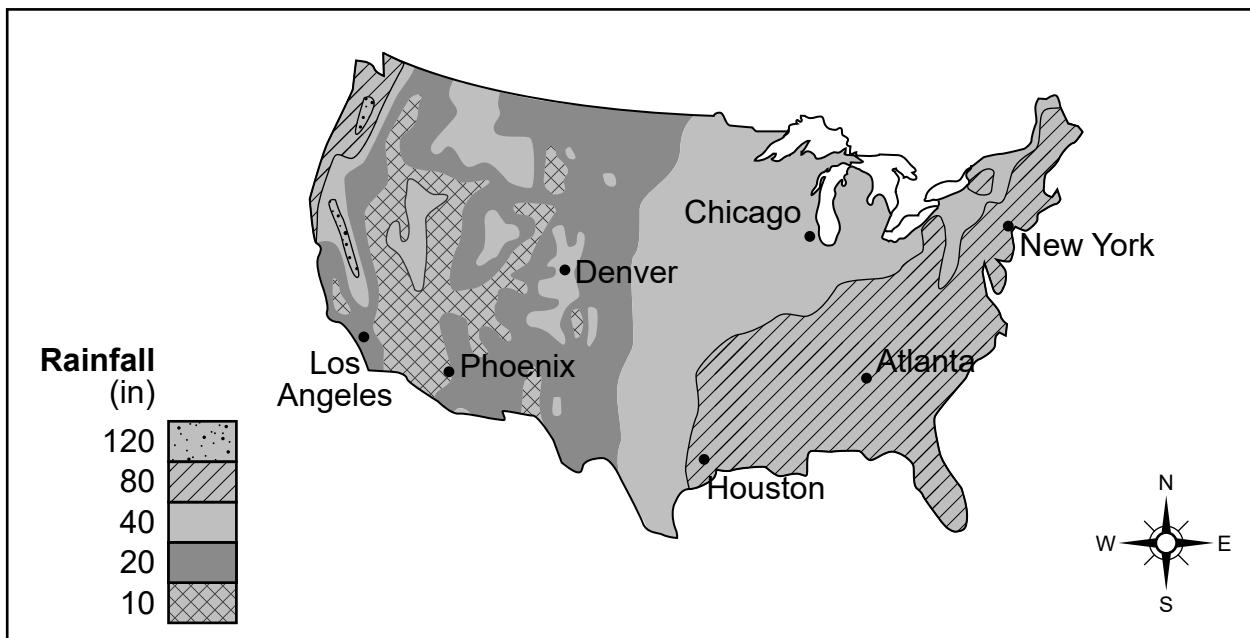
- Describe how the average daily air temperature changes as a person travels directly north from Houston. [1]

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### Average Yearly Rainfall in Inches (in) for Areas in the United States



- 12 Using data from the maps, support the claim that, even though Los Angeles and Atlanta are located at about the same latitude, Los Angeles has a different climate than Atlanta. Include information about temperature *and* rainfall in your answer. [1]
- 
- 
-

Catastrophic flooding impacted Atlanta in September 2009. An estimated 10 to 20 inches of rain fell in less than 24 hours and historic flash flooding occurred. Over 20,000 homes and businesses had major damage.

- 13 Which design solution would require the **fewest** steps to reduce future impacts of heavy rains on the residents of Atlanta?

- A Build new roads that redirect rainwater to a single water treatment plant.
- B Provide free sandbags to every resident in Atlanta to place around the outside of their homes to keep the water out.
- C Keep existing overflow water pipes in sewer systems open to redirect water away from the city.
- D Create large open fields in many parts of the city to allow rainwater to soak into the soil.

The photograph below was taken by an observer after the flood in Atlanta.



- 14 How did the heavy rainfall in 2009 most likely cause damage to this roadway?
- A Heavy floodwater ran over and crushed the roadway into pieces.
  - B Lightning during the storm struck the roadway, breaking it up.
  - C Running water under the road caused an earthquake.
  - D Water eroded soils from under the road, causing it to collapse.

Base your answers to questions 15 through 18 on the information below and on your knowledge of science.

### The Most Important Fish in the Ocean



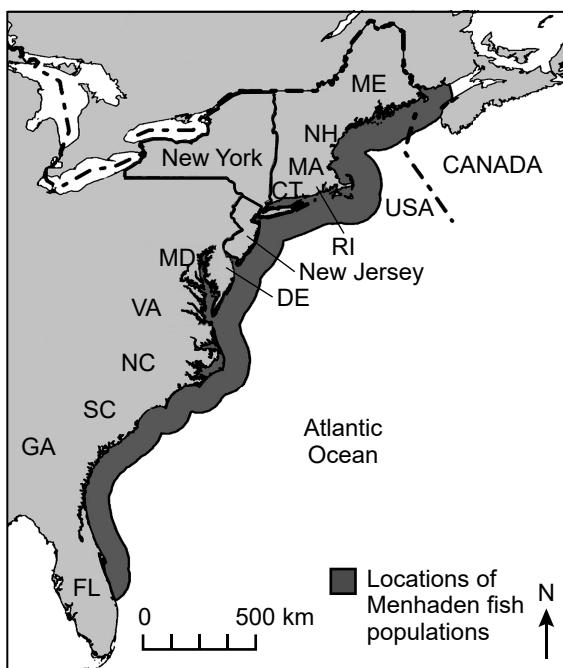
**Atlantic Menhaden**

The Atlantic menhaden fish is found along the east coast from Canada to Florida. Some scientists consider menhaden “the most important fish in the ocean” because it is the little fish that is eaten by sea birds and bigger fish such as bass, bluefish, tuna, and even dolphins and whales. It is considered a keystone species, a fish that many other fish in the ocean ecosystem depend on for a healthy ocean. If there are not enough menhaden, many other species of fish will starve and populations will decrease, threatening the ocean ecosystem.

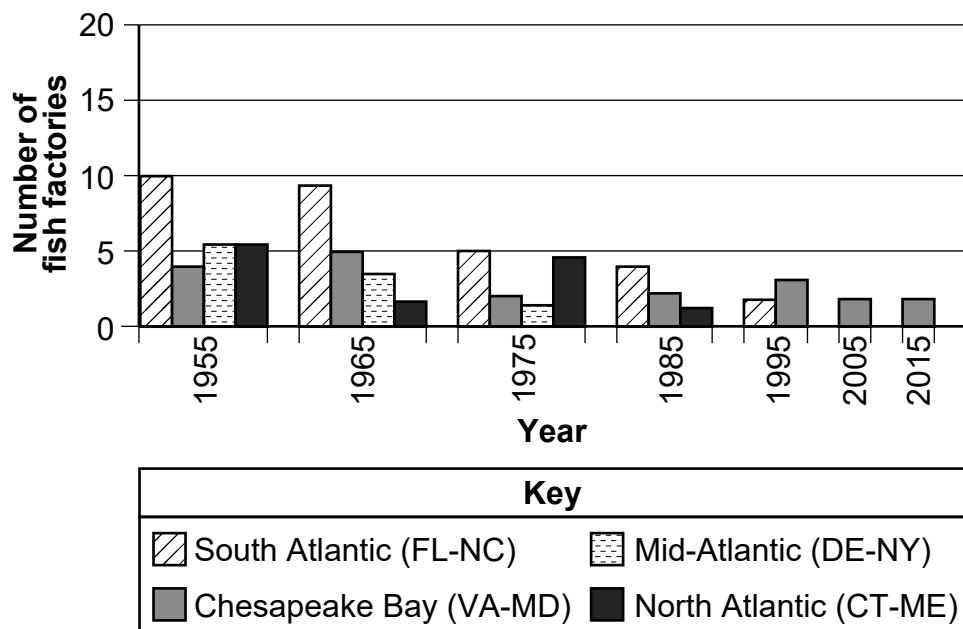
For this reason, 15 states, including New York, have agreed to a plan to manage and maintain menhaden populations based on the needs of the fish that feed on them. Around Long Island, scientists, commercial fishermen, recreational boaters, and even bird watchers have all agreed to monitor and limit how many menhaden can be caught by humans. Menhaden that are caught are processed in fish factories for fertilizer, chicken feed, and fish oil.

The map below shows the range of the menhaden along the east coast. The bar graph shows the number of fish factories that processed menhaden over a 60-year period in different coastal regions.

### Locations of Menhaden Populations



### Number of Fish Factories by Coastal Region



**15** Which coastal region has shown the greatest **decrease** in the number of processing factories for menhaden fish from 1955 to 2015?

- A North Atlantic
- B Mid-Atlantic
- C Chesapeake Bay
- D South Atlantic

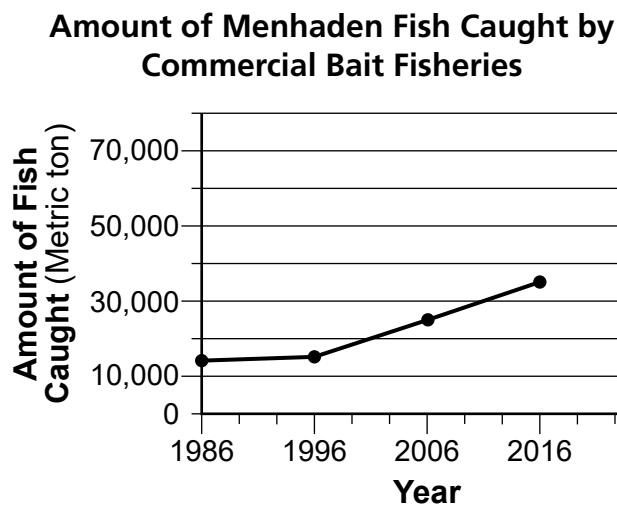
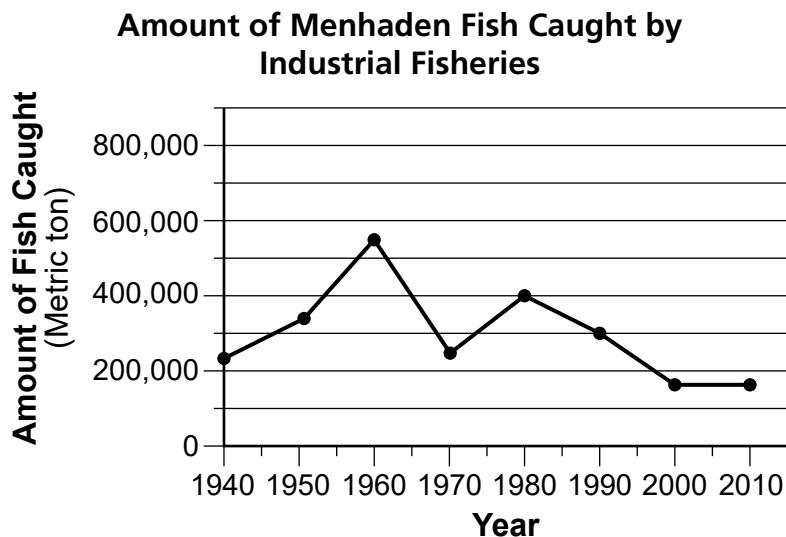
**16** Identify **one** method that the Long Island community of scientists, fishermen, and recreational boaters have used to protect the menhaden fish population. Using scientific reasoning, explain how this method protects the ecosystem of coastal waters. [1]

Method: \_\_\_\_\_  
\_\_\_\_\_

Explanation: \_\_\_\_\_  
\_\_\_\_\_

Industrial fisheries use the menhaden for the production of paints, animal feed, and vitamins. Commercial fisheries use menhaden for crab, lobster, and recreational fishing bait.

The graphs below show the yearly amount of menhaden caught by these types of fisheries.



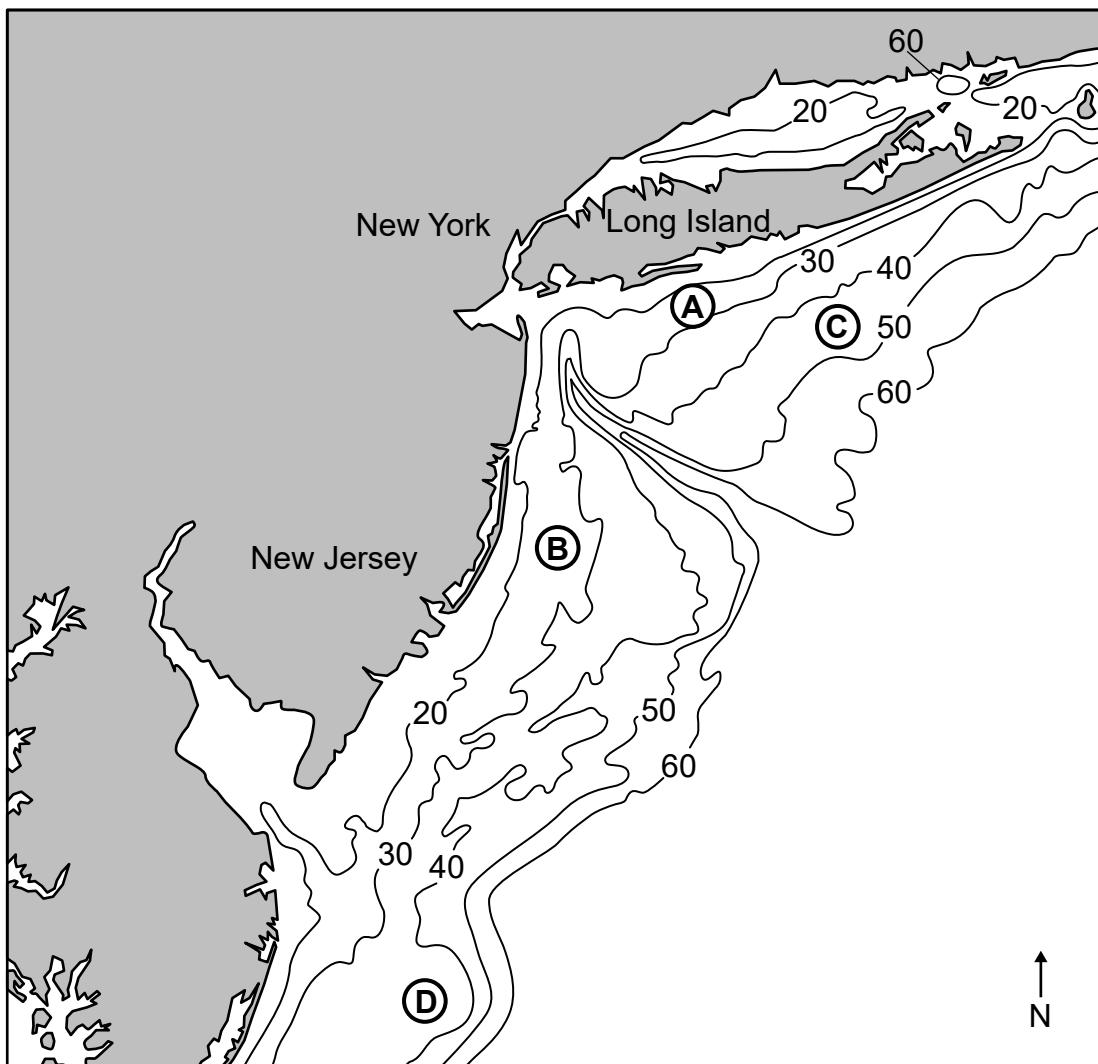
- 17 Identify the type of fishery (*Industrial* or *Commercial Bait*) that most likely had the greatest impact on the menhaden population and the health of the ocean ecosystem during the time period 1986-2010. Provide the numerical evidence from the graphs that supports your choice. [1]

Fishery type: \_\_\_\_\_

Evidence: \_\_\_\_\_  
\_\_\_\_\_

The special type of topographic map below shows the depth of the ocean floor in meters along the coast of New York and New Jersey, where some menhaden fish populations occur. Letters A, B, C, and D indicate locations along the ocean floor.

**Ocean Depth (in meters) off Coast of New York and New Jersey**



**18**

Using the ocean depth data from the map and your knowledge of topographic maps, which table correctly summarizes the ocean features and evidence for one of the lettered locations?

Location A		
Ocean Depth (m)	Ocean Bottom Surface	Evidence
between 10 and 20	relatively flat	isolines close together

**A**

Location C		
Ocean Depth (m)	Ocean Bottom Surface	Evidence
between 30 and 40	steep slope	isolines close together

**C**

Location B		
Ocean Depth (m)	Ocean Bottom Surface	Evidence
between 20 and 30	relatively flat	isolines far apart

**B**

Location D		
Ocean Depth (m)	Ocean Bottom Surface	Evidence
between 40 and 50	steep slope	isolines far apart

**D**

Base your answers to questions 19 through 23 on the information below and on your knowledge of science.

### Identifying Substances

Students conducted experiments to identify unknown substances using properties of known substances. During these experiments, appropriate safety equipment was used and safety procedures were followed.

#### Properties of Known Substances

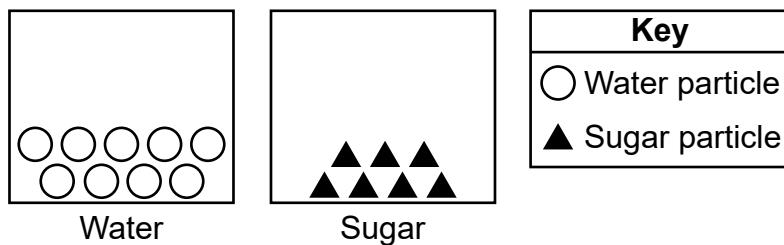
Substance	Color	Texture	Soluble in Water	Electrical Conductivity (dry form)	Reaction to Vinegar
Table Salt	white	coarse	yes	insulator	none
Chalk	white	fine	no	insulator	bubbles
Sugar	white	coarse	yes	insulator	none
Flour	white	fine	no	insulator	none
Baking Soda	white	fine	yes	insulator	bubbles

Through experimentation, the students observed that an unknown substance was a fine, white powder that reacted to vinegar, was soluble in water, and did not conduct electricity.

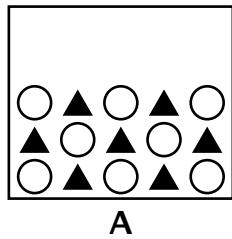
- 19 Place a checkmark (✓) in the table below to indicate the identity of the unknown substance. [1]

Table Salt	
Chalk	
Sugar	
Flour	
Baking Soda	

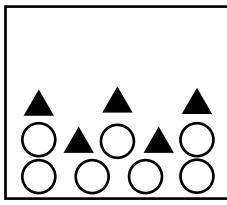
The models below represent the number and arrangement of particles in a sample of water and a sample of sugar.



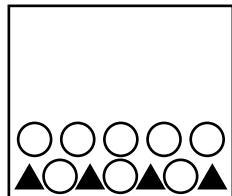
- 20 Which model best represents the number and arrangement of the water and sugar particles after the sample of sugar was poured into the sample of water and mixed?



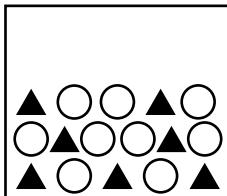
A



C

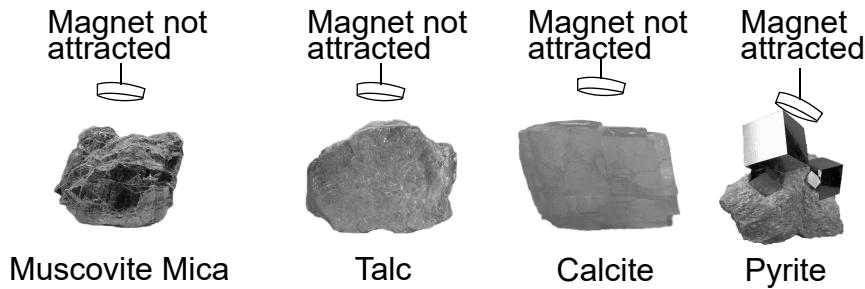


B



D

Students were then provided four minerals and completed certain tasks to identify the properties of each mineral. The table below shows the observations for four of the five properties that the students observed. The photographs below show the response of a strong magnet when brought close to each mineral.



- 21 Indicate if each mineral is magnetic by writing Yes or No in *Student Data Table 1*. [1]

**Student Data Table 1**

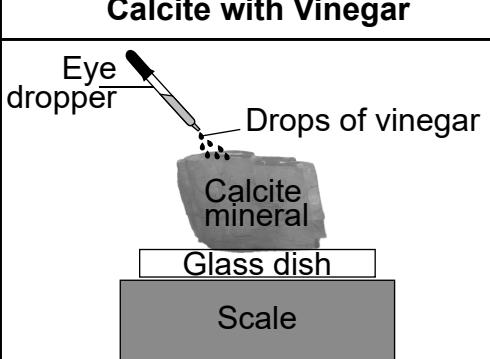
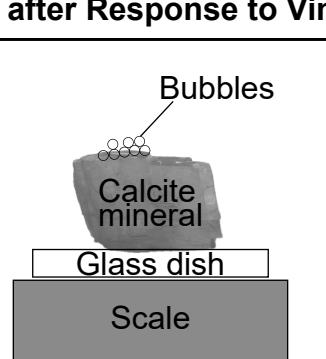
Mineral	Color	Reflects Light (Yes/No)	Magnetic (Yes/No)	Hardness	Response to Vinegar
Muscovite Mica	yellow	yes		medium	none
Talc	white	no		low	none
Calcite	white	no		medium	bubbles
Pyrite	yellow	yes		high	none

The students then placed calcite onto a glass dish and placed it on a scale. Using an eye dropper, ten drops of vinegar were placed on top of the calcite and the total mass was recorded.

Bubbles formed on top of the calcite and the total mass was recorded again.

The diagrams and observations below represent the experimental setup and the observations made by the students.

### Calcite Experiment Results

Calcite with Vinegar	Calcite after Response to Vinegar
 <p>A diagram showing a calcite mineral sample in a glass dish, which is placed on a scale. An eye dropper is shown above the calcite, with several small circles representing vinegar droplets falling onto the calcite surface.</p>	 <p>A diagram showing the same calcite mineral sample in a glass dish on a scale. Now, there are several small circles labeled "Bubbles" floating above the calcite sample.</p>
<p>Mineral Observations:</p> <ul style="list-style-type: none"><li>— Surface texture smooth</li><li>— Total mass of vinegar, calcite, and glass dish is 19.65 grams.</li><li>— Clear/white color</li></ul>	<p>Mineral Observations:</p> <ul style="list-style-type: none"><li>— Bubbles formed</li><li>— Surface texture slightly rough where vinegar is applied</li><li>— Total mass of vinegar, calcite, and glass dish is 18.75 grams.</li><li>— Clear/white color</li></ul>

- 22 A student makes a claim that a new substance was formed when vinegar was added to calcite. Which statement can be used as evidence to support this student's claim?
- A The calcite changed color after the vinegar was added.
  - B The vinegar droplets caused the calcite sample to melt and lose mass.
  - C Bubbles formed after the vinegar was added to the calcite.
  - D The surface texture of the entire calcite sample changed after the vinegar was added.

The students were then given three different rock samples, labeled A, B, and C, to test with vinegar. The table below shows the results of the tests.

**Student Data Table 2**

Rock	Reaction to Vinegar
A	bubbles
B	no bubbles
C	no bubbles

- 23** Based on the results shown in *Student Data Table 2*, explain why rock A is most likely made of the mineral calcite. [1]

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Base your answers to questions 24 through 29 on the information below and on your knowledge of science.

### Meerkats



In the photograph, the mother meerkat is standing on her back legs to keep lookout for predators like jackals, eagles, and poisonous snakes that could harm her meerkat offspring, called pups. If she sees a threat, she will whistle to alert other meerkats in the group. Meerkats are social mammals, living in groups of up to 40 individuals. These groups are called mobs. The whole mob helps raise the pups by guarding and feeding them.

Meerkats live in southern Africa's Kalahari and Namib deserts where it is dry and sandy. Meerkats have developed adaptations to help them survive in this extreme environment. In order to escape daytime heat and to keep warm on cold nights, meerkats dig burrows. They eat many things, including insects, small animals (rodents), lizards, roots and fruits. Meerkats get all the water they need from the food they eat — they never drink water.

Meerkats use their eyes, ears, and noses to help them survive. A student recorded some facts about meerkat senses.

- Fact 1:** Good vision allows meerkat guards to spot predators.
- Fact 2:** Meerkats can close their ears to prevent sand from getting into them when they dig for food and shelter.
- Fact 3:** An excellent sense of smell helps meerkats find prey that is hiding underground.
- Fact 4:** While searching for food and caring for pups, meerkats listen for alarm whistles.

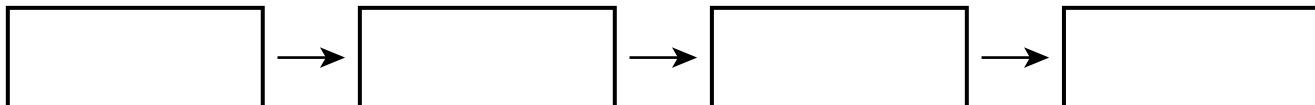
**24** Which facts could be used to provide evidence that meerkats use sense organs in order to detect threats from other organisms?

- A facts 1 and 2
- B facts 2 and 3
- C facts 3 and 4
- D facts 4 and 1

**25** Write the words in the boxes below in the correct order to complete the model to show the correct movement of matter among the organisms in Africa's Kalahari Desert. [1]

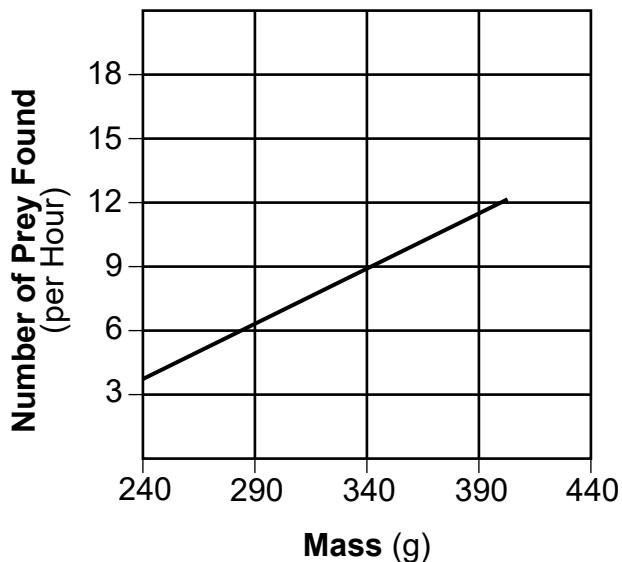
**Word List**

Eagles	Meerkats
Insects	Grasses



The graph below shows the relationship between the mass of a meerkat and the number of prey found per hour.

**The Effect of Meerkat Mass on the Number of Prey Found per Hour**



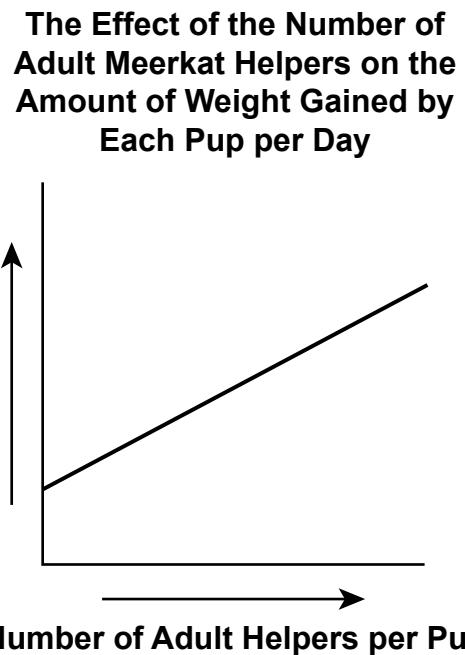
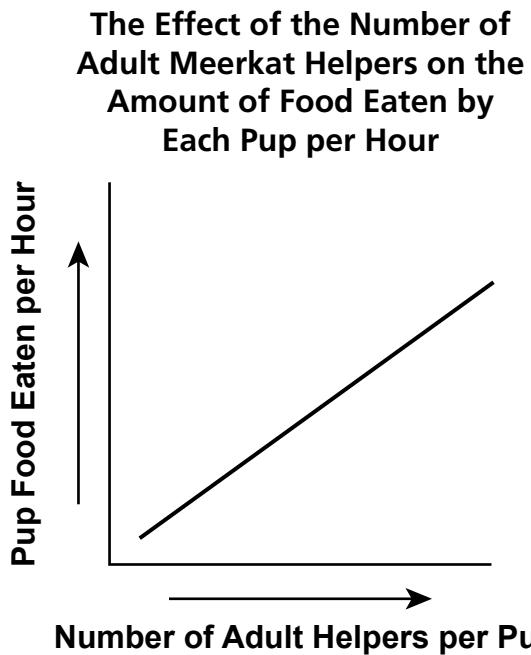
- 26** Explain how the graph provides evidence that a variation in a physical characteristic in the meerkat population provides an advantage for survival. [1]

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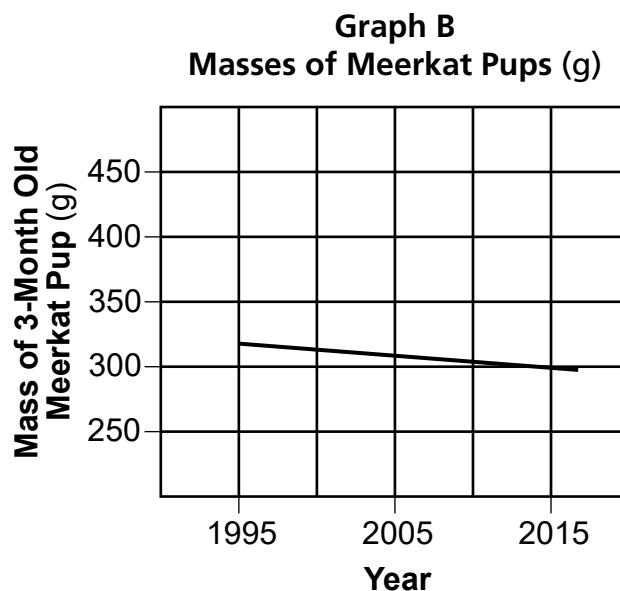
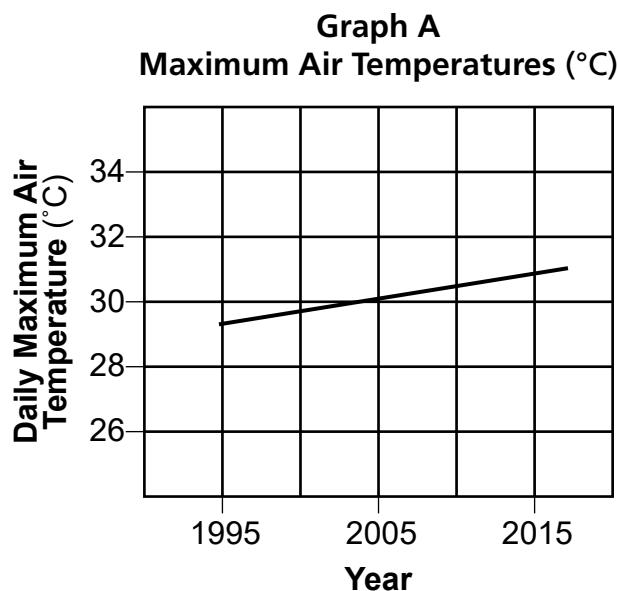
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The graphs below show the effects of the number of adult meerkat helpers, per pup, on pups in a mob.



- 27 Using evidence from **both** graphs, construct an argument to explain how being a part of a mob helps meerkat pups survive. [1]
- 
- 
-

*Graph A* below shows the daily maximum air temperature in the Kalahari Desert. *Graph B* shows how the average mass (weight) of a 3-month old meerkat pup has changed over similar time periods.



- 28** A student made a claim that traits can be influenced by the environment. Use evidence from *Graph A* and *Graph B* to support this claim. [1]
- 
- 
-

29

Which row correctly pairs a claim with its logical solution that would help meerkat populations survive in deserts that are getting hotter and drier?

Row	Claim	Solution
1	If there is more available water, then meerkat populations can survive in hotter, drier deserts.	Move meerkat populations to places that have more water.
2	As deserts become hotter and drier, there will be less food sources for meerkats.	Bring insects, lizards, jackals, eagles, and snakes to regions of the desert that have meerkat populations.
3	As rainfall decreases in the desert, meerkats will adapt by needing less water.	Place tanks of water throughout the desert to collect rainfall, so meerkats have something to drink.
4	Meerkat survival is threatened by hotter, drier deserts.	Identify areas of meerkat populations and dig deeper burrows for meerkats to stay cool as deserts become hotter.

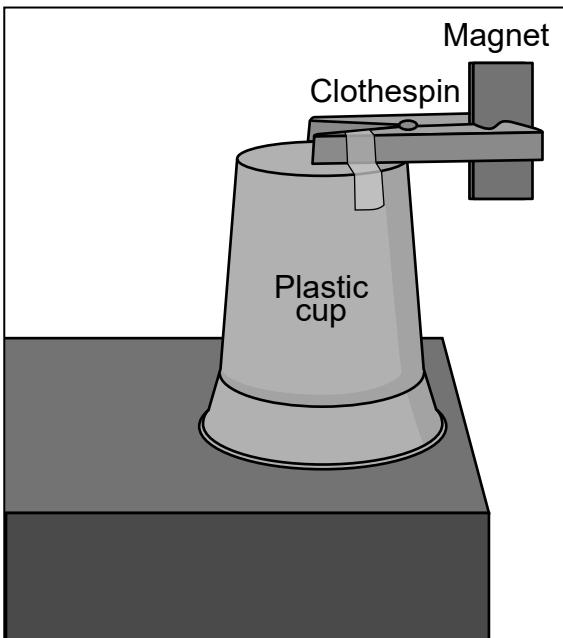
- A Row 1
- B Row 2
- C Row 3
- D Row 4

Base your answers to questions 30 through 34 on the information below and on your knowledge of science.

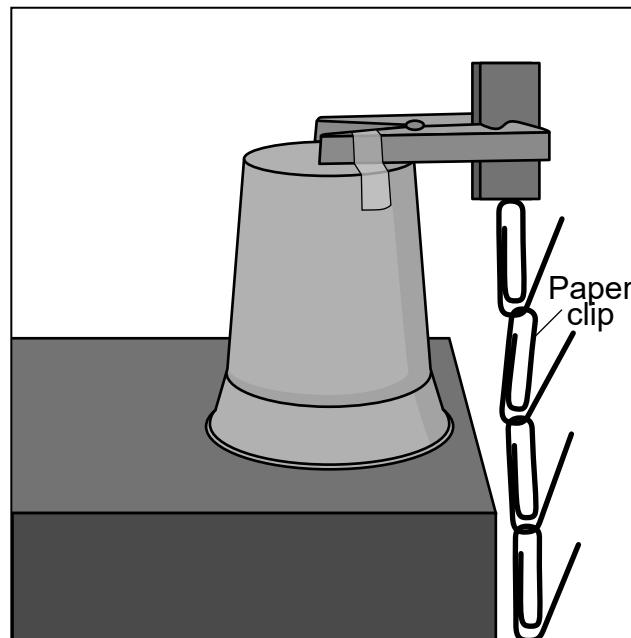
### Magnets and Electromagnets

A student made a simple magnet holder using a clothespin, a plastic cup, a magnet, and tape (*Diagram 1*). This setup was used to investigate magnetic forces by determining the number of paper clips held by a magnet by direct contact (*Diagram 2*). Each paper clip was bent to form a hook to attach to other clips hanging below the magnet.

**Diagram 1**

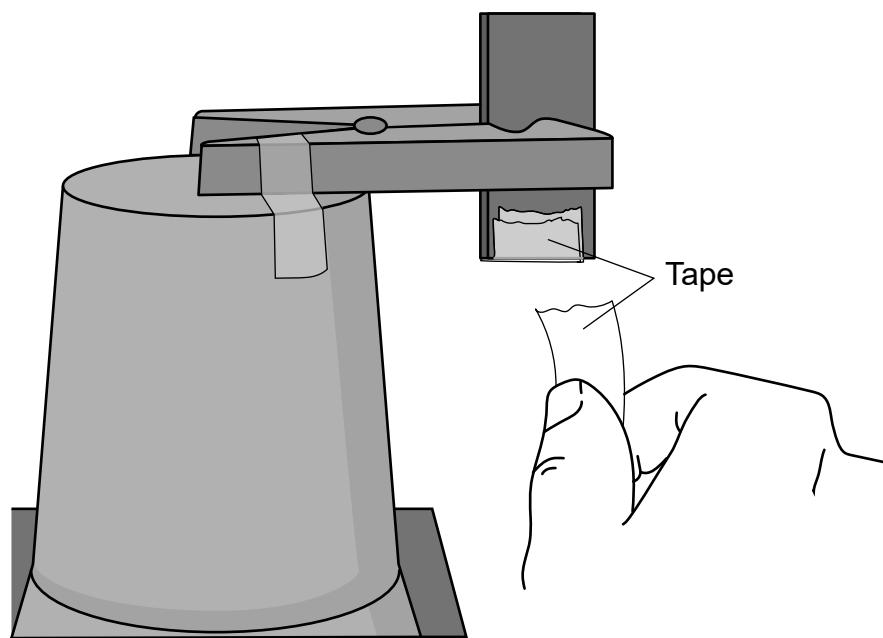


**Diagram 2**



The student then added different numbers of pieces of tape to the bottom of the magnet and repeated the investigation for each of these different numbers of tape (*Diagram 3*).

**Diagram 3**



The data collected in this investigation is shown below.

**Number of Paper Clips Held by One Magnet**

	No Tape on Magnet	One Piece of Tape on Magnet	Three Pieces of Tape on Magnet	Five Pieces of Tape on Magnet	Seven Pieces of Tape on Magnet
Number of Paper Clips Held by Magnet	17	10	5	4	2

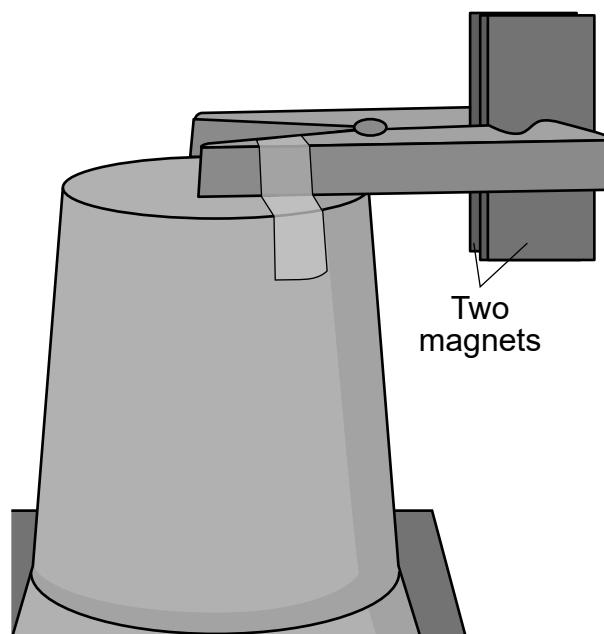
**30**

Which question is the student investigating?

- A How can the patterns of a magnet's motion in various situations be observed and measured?
- B How is the strength of the magnetic force acting on objects affected by the distance between the objects and a magnet?
- C How does the force of gravity affect the strength of the magnetic force on an object?
- D How do contact magnetic forces affect the energy transferred between objects?

The student repeated the investigation using two magnets  
(Diagram 4).

**Diagram 4**



31

Which table shows the most likely results of this new investigation using **two** magnets?

A

	No Tape on Magnet	One Piece of Tape on Magnet	Three Pieces of Tape on Magnet	Five Pieces of Tape on Magnet	Seven Pieces of Tape on Magnet
Number of Paper Clips Held by Magnet	17	10	5	4	2

B

	No Tape on Magnet	One Piece of Tape on Magnet	Three Pieces of Tape on Magnet	Five Pieces of Tape on Magnet	Seven Pieces of Tape on Magnet
Number of Paper Clips Held by Magnet	15	8	3	2	1

C

	No Tape on Magnet	One Piece of Tape on Magnet	Three Pieces of Tape on Magnet	Five Pieces of Tape on Magnet	Seven Pieces of Tape on Magnet
Number of Paper Clips Held by Magnet	20	14	6	6	4

D

	No Tape on Magnet	One Piece of Tape on Magnet	Three Pieces of Tape on Magnet	Five Pieces of Tape on Magnet	Seven Pieces of Tape on Magnet
Number of Paper Clips Held by Magnet	20	5	10	6	1

The student is designing a refrigerator magnet to display papers and photographs. Various types of refrigerator magnets are shown in the photograph below.



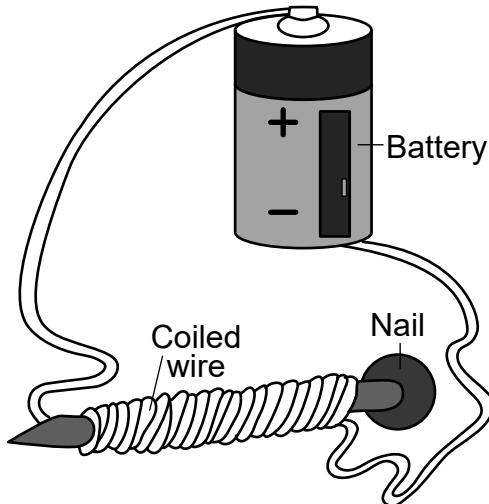
- 32** Based on what was learned in the investigations, identify **one** factor that needs to be considered when designing this refrigerator magnet. [1]

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An electromagnet is a magnet that is created using electricity. The diagram below is an example of a simple electromagnet — a single wire coiled around a nail. The wire is connected to a battery and has electric current flowing through it.

**Simple Electromagnet**



The electric current in the wire causes the electromagnet to act like a regular magnet. Engineers use electromagnets when they design and build motors. Motors are found in everyday objects, such as refrigerators and golf carts.

A student repeats the investigation using an electromagnet. The table below shows how the number of coils around a nail in an electromagnet affects the number of paper clips held when a 4-volt battery is used and when an 8-volt battery is used.

Number of Coils Around Nail	Number of Paper Clips Held	
	4-Volt Battery Connected	8-Volt Battery Connected
25	16	31
50	18	35
75	21	40
100	22	45

- 33** A student inspected the data to determine the relationship between the voltage of the battery and magnetic force exerted by the electromagnet. Which question was most likely being investigated?
- A How did changing the number of coils in the electromagnet affect the number of paper clips held by the electromagnet connected to a 4-volt battery?
  - B For the same number of coils around the nail, how did the number of paper clips held by the electromagnet connected to a 4-volt battery compare to the number of paper clips held by the electromagnet connected to an 8-volt battery?
  - C How does keeping the number of coils around the nail constant affect the number of paper clips held by the electromagnet connected to the 8-volt battery?
  - D For an increasing number of coils around the nail, how did the number of paper clips held by the electromagnet change for the electromagnet connected to the 4-volt and 8-volt battery?
- 34** The student wants to optimize the design of the electromagnet and needs accurate data. How would performing more trials in this investigation improve the reliability of the data collected?
- A More trials produce more data, which is used to reduce human error.
  - B More trials always produce the same data, which can be used to solve a problem.
  - C Averaging data from more trials can help determine which variables are controlled.
  - D Averaging data from more than three trials always increases the error in the data.

**THE STATE EDUCATION DEPARTMENT**  
**THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234**  
**2024 Elementary-level Science Test Map to the Standards**  
**Grade 5 Released Questions**

Question	Type	Key	Points	Performance Expectation	Subscore	Percentage of Students Who Answered Correctly (P-Value)
1	Constructed Response		1	4-LS1-2	LS	0.53
2	Multiple Choice	C	1	4-LS1-2	LS	0.48
3	Multiple Choice	B	1	4-LS1-2	LS	0.46
4	Multiple Choice	D	1	4-PS4-2	PS	0.37
5	Constructed Response		1	4-PS3-1	PS	0.15
6	Multiple Choice	B	1	3-PS2-1	PS	0.27
7	Multiple Choice	D	1	4-PS3-2	PS	0.45
8	Constructed Response		1	3-5ETS1-2		0.51
9	Multiple Choice	C	1	4-PS3-3	PS	0.54
10	Multiple Choice	B	1	3-ESS2-1	ESS	0.52
11	Constructed Response		1	3-ESS2-1	ESS	0.39
12	Constructed Response		1	3-ESS2-2	ESS	0.18
13	Multiple Choice	C	1	3-ESS3-1	ESS	0.37
14	Multiple Choice	D	1	4-ESS2-1	ESS	0.44
15	Multiple Choice	D	1	5-ESS3-1	ESS	0.39
16	Constructed Response		1	5-ESS3-1	ESS	0.25
17	Constructed Response		1	5-ESS3-1	ESS	0.07
18	Multiple Choice	B	1	4-ESS2-2	ESS	0.38
19	Constructed Response		1	5-PS1-3	PS	0.53
20	Multiple Choice	D	1	5-PS1-1	PS	0.34
21	Constructed Response		1	5-PS1-3	PS	0.66
22	Multiple Choice	C	1	5-PS1-4	PS	0.47
23	Constructed Response		1	5-PS1-3	PS	0.44
24	Multiple Choice	D	1	4-LS1-1	LS	0.53
25	Constructed Response		1	5-LS2-1	LS	0.40
26	Constructed Response		1	3-LS4-2	LS	0.07
27	Constructed Response		1	3-LS2-1	LS	0.09
28	Constructed Response		1	3-LS3-2	LS	0.23
29	Multiple Choice	D	1	3-LS4-4	LS	0.31
30	Multiple Choice	B	1	3-PS2-3	PS	0.47
31	Multiple Choice	C	1	3-PS2-3	PS	0.46
32	Constructed Response		1	3-PS2-4	PS	0.29
33	Multiple Choice	B	1	3-PS2-3	PS	0.36
34	Multiple Choice	A	1	3-5ETS1-3		0.34

\* This item map identifies the Performance Expectation with which each test question is aligned. All NYSP-12SLS Performance Expectations are three-dimensional (<https://www.nysesd.gov/sites/default/files/programs/curriculum-instruction/p-12-science-learning-standards.pdf>). The integration of these three dimensions provides students with a context for the content of science (DCI), the methods by which science knowledge is acquired and understood (SEP), and the ways in which the sciences are connected through concepts that have universal meaning across the disciplines (CCC).

**Elementary-level Science Test—Rating Guide  
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- 1** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Elephants receive vibrations through the ground in order to find mates far away, while bats process reflected sound vibration received through their ears in order to locate prey/distant objects.
  - Elephants receive sound information through their feet in order to find mates, while bats receive sound through their ears to find prey.
  - Elephants use sound information to find mates, and bats use sound information to find prey.
- 2** [1] Allow 1 credit for *C*.
- 3** [1] Allow 1 credit for *B*.
- 4** [1] Allow 1 credit for *D*.
- 5** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The speed of the ball increased from 4.43 to 6.26 m/s, and when an object is moving faster, it has more energy.
  - Balls dropped from an increased height of 1 m to 2 m have a greater speed, indicating a greater amount of energy.
  - Balls that bounce higher have a greater energy, and were the ones that had a greater speed at impact with the floor.
  - Balls with greater speed have more energy because they bounced higher.
- 6** [1] Allow 1 credit for *B*.
- 7** [1] Allow 1 credit for *D*.
- 8** [1] Allow 1 credit for indicating solution 2 and an acceptable explanation. Acceptable responses include, but are not limited to:
- Increasing the height of the ramp will solve the problem because the ball will gain more speed/have more energy to travel around the loop and get to the end of the track.
  - The ball is released from a greater height causing it to speed up more than the original set up.

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**9** [1] Allow 1 credit for *C*.

**10** [1] Allow 1 credit for *B*.

**11** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The air temperatures get lower/colder traveling north from Houston.
- Temperatures decrease moving northwards.
- As one moves north, air temperatures decrease.

**12** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Atlanta receives an average of 80 inches of rainfall and Los Angeles receives an average of 20 inches of rainfall. Atlanta’s average daily temperature is 77°–86° in July and Los Angeles is 68°– 77°.
- Los Angeles has less rainfall and, in July, cooler temperatures than Atlanta.
- Atlanta has higher temperatures in July and more rainfall than Los Angeles.
- In January, even though Los Angeles and Atlanta have the same average temperature range, Los Angeles has less annual rainfall.

**13** [1] Allow 1 credit for *C*.

**14** [1] Allow 1 credit for *D*.

**15** [1] Allow 1 credit for *D*.

**16** [1] Allow 1 credit for *both* a correct method and a supporting explanation. Acceptable responses include, but are not limited to:

Method: Limit the amount of menhaden that can be caught.

Explanation: This will keep the population of menhaden stable, providing enough food for other fish in the ecosystem.

Method: Identify menhaden as a keystone species.

Explanation: The population of menhaden is monitored and controlled because of its importance as a food source for other organisms.

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- 17 [1] Allow 1 credit for indicating industrial fisheries and acceptable numerical evidence. Acceptable responses include, but are not limited to:
- For that time period, industrial fisheries took from about 350,000 to about 145,000 metric tons, while bait fisheries took from about 15,000 to about 30,000 metric tons.
  - During that time period, industrial fishery catches decreased to about 150,000 metric tons, while bait fishery catches increased to about 30,000 metric tons.
  - During this time period, the metric tons of industrial catches were in the 100,000s, while bait fishery catches were only in the 10,000s.

18 [1] Allow 1 credit for *B*.

19 [1] Allow 1 credit for indicating baking soda.

20 [1] Allow 1 credit for *D*.

21 [1] Allow 1 credit for an accurately completed table, as shown below:

**Student Data Table**

Mineral	Color	Reflects Light (Yes or No)	Magnetic (Yes/No)	Hardness	Response to Vinegar
<b>Muscovite Mica</b>	yellow	yes	no	medium	none
<b>Talc</b>	white	no	no	low	none
<b>Calcite</b>	white	no	no	medium	bubble
<b>Pyrite</b>	yellow	yes	yes	high	none

**Note:** Allow credit if a student writes something other than yes or no that correctly identifies the mineral is magnetic or non-magnetic.

22 [1] Allow 1 credit for *C*.

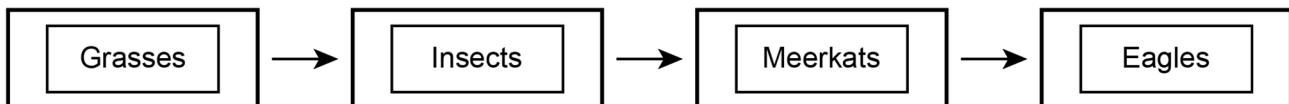
23 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Bubbles formed on the surface of Rock A so it probably has calcite in it, the other minerals would not form bubbles.
- Rock A bubbled when vinegar was added just like calcite.

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**24** [1] Allow 1 credit for *D*.

**25** [1] Allow 1 credit for the correct sequence of organisms, as shown below:



**26** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Meerkats with larger weights find more prey per hour.
- The greater the mass of a meerkat, the more prey they find per hour.
- More prey is found per hour by heavier meerkats.

**27** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Meerkat pups get more food and gain more weight when they are part of a mob with more helpers, so being a part of a larger group helps them survive.
- The graphs show that more helpers in the group allow pups to get more food and gain more mass, which help them survive.
- Pups with more helpers get more food and get heavier, which means they will be more likely to survive.

**28** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Meerkat pup masses have decreased/gone down in the last 20 years as the desert has become hotter.
- As temperatures have increased/gone up in the desert, the meerkat pups have been getting lighter/less mass.
- Meerkat pups are not able to gain as much weight as temperatures in the desert get hotter.

**29** [1] Allow 1 credit for *D*.

**30** [1] Allow 1 credit for *B*.

**31** [1] Allow 1 credit for *C*.

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**32** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- the strength of the magnet
- the thickness of paper/object held on refrigerator
- the weight/mass of object/paper held on refrigerator

**33** [1] Allow 1 credit for *B*.

**34** [1] Allow 1 credit for *A*.