Student Name:
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Montana Comprehensive Assessment System (MontCAS CRT)

Grade 8
Common Released Items
Spring 2009

OPI

OFFICE OF PUBLIC INSTRUCTION

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General Directions

This test contains nine sessions: three in reading, three in mathematics, and three in science. The sessions are made up of multiple-choice questions and questions for which you must show your work or write out your answers. Write your answers to all of the questions in your Student Response Booklet. For the reading parts of the test, read each selection before answering the questions.

For each multiple-choice question, choose the best answer. Fill in the bubble in your Student Response Booklet that corresponds to your answer choice for that question.

Some questions ask you to show your work or to write out your answers. Write your answers to these questions in the spaces provided in your Student Response Booklet. Your answers must fit in the spaces provided. Any part of an answer outside the box might not be scored.

Be sure to answer all parts of each question, and to answer completely. For example, if a question asks you to explain your reasoning or show your work, be sure to do so. You can receive points for a partially correct answer, so try to answer every question.

For information, contact Measured Progress, P.O. Box 1217, Dover, NH 03821-1217.
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Reading
Session 1

No items released from this session in 2008/2009.

Please STOP. Do not go on to the next page.

Reading
Session 2

This test session includes reading selections and multiple-choice questions. After you read each selection, answer the questions about it in the spaces provided in your Student Response Booklet. You may not use a dictionary or any other reference tool during this session.

Read this article with a recipe from the Netherlands. Then answer the questions that follow.

Hutspot Met Klapstuck (Meat and Vegetable Stew)

Carole Lisa Albyn and Lois Sinaiko Webb

The land of tulips, windmills, canals, and wooden shoes is the Netherlands, also known as Holland. The Hollanders, also referred to as the Dutch, live in a fish-lover's paradise. The Netherlands (which means "lowland") is built on land reclaimed from the sea. With miles of coastline, fishing is a very important industry.

The Dutch are very proud of the tulips they grow and ship all over the world. They love their flowers, and in the cities, on every street corner, push carts overflow with a mosaic of fresh cut blossoms. They are sold next to street vendors peddling their daily catch of herring, still glistening from the cold waters of the North Sea.

Fruits and vegetables are primarily grown under hothouse conditions. (They are grown in large glass buildings, where they are sheltered from the cold.) Thus fresh produce is available year round. Grains, potatoes, and sugar beets are main crops. Livestock include chickens, pigs, cattle, sheep, horses, and ponies.

3

The cheeses, Dutch chocolates, and pastries of the Netherlands are some of the world's best. Edam and Gouda are two of the most well-known Dutch cheeses, which the Dutch like to nibble on at the conclusion of their meals.

Dutch cooking is similar in many ways to that of its neighboring countries in Europe, yet it has an international flavor, combining foods native to northern Europe with the exotic spices and rice that were introduced from its former tropical colonies, such as Indonesia.

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Hutspot Met Klapstuck

(Meat and Vegetable Stew)

The tradition of eating a special dish or food to commemorate a historical date is common practice in many countries of the world. The *hutspot* became a national dish of the Dutch, honoring their victory in 1574 against Spain, who had ruled the area for over a century. In Holland, before serving the *hutspot*, the vegetables are mashed to a pulp with the back of a spoon or potato masher.

6

Yield: serves 6

Ingredients:
2 pounds brisket of beef
2 to 4 cups water
3 bay leaves
4 carrots, finely sliced
4 potatoes, peeled and cubed
2 onions, finely chopped
salt and pepper to taste

Equipment: Large-size saucepan with cover or Dutch oven, mixing spoon

1. Put meat in saucepan or Dutch oven and add 2 cups water and bay leaves. Bring to a boil over high heat, reduce heat to simmer, cover, and cook for about 1 ½ hours or until meat is tender. Add more water if necessary to prevent sticking.
2. Add carrots, potatoes, onions, and salt and pepper to taste. Stirring frequently, cook uncovered until vegetables are tender (about 30 minutes). Remove bay leaves and discard before serving.

To serve *hutspot*, remove and slice the meat. Put the vegetables in the middle of the platter with the meat slices around it. Serve with prepared mustard.

Please go on to the next page.

Mark your answers in the section marked "Reading—Session 2" in your Student Response Booklet.

28. The herring are described as "still glistening from the cold waters of the North Sea" to show that the fish are

A. expensive.
B. fresh.
C. plentiful.
D. popular.

29. In paragraph 3, the second sentence is in parentheses because it

A. introduces a concept in the third sentence.
B. summarizes the information in the paragraph.
C. clarifies the information in the first sentence.
D. contains an opinion of the article's author.

30. What is the **main** purpose of paragraph 6?

A. to describe how *hutspot* is usually prepared
B. to explain why *hutspot* is considered special
C. to show how Spain influenced the Dutch culture
D. to compare Dutch traditions to other national traditions

31. In the recipe, the words "to taste" mean the amount of salt and pepper

A. will vary based on the cook's preference.
B. may increase as the stew cooks.
C. usually needs to be measured carefully.
D. is an essential part of the ingredients.

32. According to the recipe, what should be done immediately after the vegetables are fully cooked?

A. Add water to prevent sticking.
B. Simmer for an hour and a half.
C. Remove bay leaves and discard.
D. Serve with prepared mustard.

Please go on to the next page.

33. What is the **main** purpose of the map?

A. to help the reader learn about the landscape of the Netherlands

B. to show how important the coastline is to industry in the Netherlands

C. to show how the Netherlands compares in population to other countries

D. to help the reader understand where the Netherlands is located

34. Which would be the **best** source for more information about the battle of 1574?

A. a textbook about the culture and history of Spain

B. a documentary about the history of the fishing industry

C. a magazine article about countries bordering the North Sea

D. a news program about the challenges of living in lowlands

Please go on to the next page.

Read the two poems and then answer the questions that follow.

Beach Stones

When these small
stones
were
in clear pools and
nets of weed

tide-tumbled
teased by spray

they glowed
moonsilver,
glinted sunsparks on
their speckled
skins.

Spilled on the
shelf
they were
wet-sand jewels
wave-green
still <u>flecked</u> with
foam.

Now
gray stones
lie
dry and dim.

Why did we bring them home?

—Lilian Moore

Stone

Go inside a stone
That would be my way.
Let somebody else become a dove
Or gnash with a tiger's tooth.
I am happy to be a stone.

From the outside the stone is a riddle:
No one knows how to answer it.
Yet within, it must be cool and quiet
Even though a cow steps on it full weight,
Even though a child throws it in a river;
The stone sinks, slow, <u>unperturbed</u>
To the river bottom
Where the fishes come to knock on it
And listen.

I have seen sparks fly out
When two stones are rubbed,
So perhaps it is not dark inside after all;
Perhaps there is a moon shining
From somewhere, as though behind a hill—
Just enough light to make out
The strange writings, the star-charts
On the inner walls.

—Charles Simic

Please go on to the next page.

Mark your answers in the section marked "Reading—Session 2" in your Student Response Booklet.

35. Lines 1 through 12 of "Beach Stones" are **mostly** about how

A. beach stones can be found in clear pools.
B. stones can be collected from the beach.
C. stones have a special beauty on the beach.
D. beach stones are tossed around in the tide.

36. In line 18 of "Beach Stones," the word flecked means

A. colored.
B. spotted.
C. surrounded.
D. tumbled.

37. In the last line of "Beach Stones," what is the **main** purpose of the question?

A. to show a sense of regret about the stones
B. to provide a clear description of the stones
C. to emphasize how important the stones are
D. to suggest that the stones have been forgotten

38. In line 11 of "Stone," the word unperturbed suggests that the stone is

A. angry.
B. astonished.
C. dissatisfied.
D. indifferent.

39. In "Stone," the speaker **most likely** compares the stone to a riddle to suggest that the stone is

A. challenging.
B. clever.
C. mysterious.
D. silent.

40. In "Stone," the line "Perhaps there is a moon shining" **mainly** shows that the speaker is

A. confused.
B. curious.
C. surprised.
D. suspicious.

41. In both "Beach Stones" and "Stone," stones are

A. admired by the speaker.
B. collected for their beauty.
C. gathered from ocean shores.
D. described as having feelings.

Please STOP. Do not go on to the next page.

Reading
Session 3

This test session includes a reading selection, multiple-choice questions, and a question for which you must write out your answer. After you read the selection, answer the questions about it in the spaces provided in your Student Response Booklet. You may not use a dictionary or any other reference tool during this session.

Read this passage about Billy Mills, who won an Olympic gold medal and set a new world record at the Olympic Games in 1964. Then answer the questions that follow.

Billy Mills
Oglala Lakota Olympic Athlete

Susan Avery and Linda Skinner

At the 1964 Olympic Games in Tokyo, an unknown American distance runner, an Oglala Lakota named Billy Mills, set a world's record in the 10,000-meter race. It was a spectacular upset—one of the most memorable victories in the history of international athletic competition.

Television cameras followed thirty-six of the world's best runners as they competed for the gold. Just as the runners neared the homestretch, one accidentally bumped into Billy Mills, causing him to fall back. In an incredible recovery, Billy pulled back up and then ahead of the others to win. Setting a new record time, Billy Mills became the first and only American to win an Olympic gold medal in this event. The drive and determination that made him a champion in 1964 are still with him today, channeled into other activities. Billy Mills travels to Indian communities across the country to inspire young people and encourage physical fitness, pride, and self-reliance. He has learned from his own experiences about the need for such messages.

Billy Mills was born on the Pine Ridge Reservation in South Dakota. He and his seven brothers and sisters were orphaned when he was twelve. Left without much money, Billy was sent away to a government boarding school for Indians.

3 He attended high school at the Haskell Institute in Kansas, where he discovered running. Because of his athletic abilities, he won a full scholarship to the University of Kansas.

After graduating with a degree in education, Mills joined the Marines. For a while, he didn't give much thought to competitive running. However, when people

4 began encouraging him to run, he began to train seriously. He qualified for the Olympic trials, and from there ran to his astonishing victory in Tokyo.

Billy was admired by young American Indians. The Lakota honored him with ceremonies and gifts, including a special ring made of gold from the Black Hills—an area that the Lakota, Dakota, and Cheyenne hold sacred. He still wears the ring. Billy recalls that when he received the ring, a Lakota chief reminded him that with his achievement and good fortune came a responsibility to give back something in return. Since then, he has tried to meet that responsibility.

Please go on to the next page.

Billy continued to run competitively for several years after Tokyo, and he set other track records. But when the team for the next Olympic Games was selected, injuries and disagreements about his eligibility edged him out of a slot. Although the spotlight of publicity was fading, Billy Mills was still in demand for
6 public appearances. Besides making public appearances, however, Billy also was establishing himself in the insurance business. He briefly took a job with the Bureau of Indian Affairs, speaking to Indian students in government schools, but decided that he could be more effective on his own. As his athletic career wound down, he focused more on his insurance business and being an independent advocate for Indian interests and physical fitness.

Billy is now president of Billy Mills Enterprises, a thriving California insurance and public relations firm. In the course of his speaking activities over the years, he has visited nearly every reservation and urban Indian community in the country. He listens to people and shares lessons he has learned in his own life. His talks are meant to support and inspire people and encourage them to pursue better opportunities in their lives. Physical fitness, as a means of understanding oneself, is a central theme in all of his speeches.

In 1983, Billy's story was made into an award-winning movie, *Running Brave*. Billy thinks of it as a small part of what he can give in return for the opportunities he was given on the road to his success.

Billy Mills breaks an Olympic record at the 1964 Summer Olympics in Tokyo.

Please go on to the next page.

Mark your answers in the section marked "Reading—Session 3" in your Student Response Booklet.

69. Why do the authors **most likely** begin the passage with a description of Billy Mills's Olympic victory?

A. to describe how Billy learned how to be a distance runner
B. to explain why Billy decided to start his own business
C. to tell why people were surprised by Billy's ability
D. to show how this event shaped Billy's later achievements

70. How is the information in paragraphs 3 and 4 **mainly** organized?

A. by relating events in chronological order
B. by identifying problems and solutions
C. by stating a series of causes and effects
D. by listing main ideas and supporting details

71. The **main** purpose of paragraph 4 is to

A. describe where Billy received his education.
B. explain why Billy decided to join the Marines.
C. show what led Billy to competitive running.
D. tell how Billy prepared for the Olympics.

72. What was the **most** important reason why receiving the ring from the Lakota chief was an honor?

A. The ring was made from expensive material.
B. The gold in the ring came from a sacred place.
C. The ring was given only to successful athletes.
D. The chief gave the ring to Billy after he won a race.

73. In paragraph 6, the phrase "edged him out of a slot" means Billy was

A. excluded from the Olympic team.
B. encouraged to participate in other events.
C. determined to set another Olympic record.
D. persuaded to withdraw from distance running.

74. In paragraph 6, the word <u>advocate</u> means someone who is a

A. historian.
B. protester.
C. student.
D. supporter.

Please go on to the next page.

75. Why was Billy **mainly** in demand for speaking appearances?

A. His achievements were an inspiration to young American Indians.

B. Many people were interested in owning an insurance business.

C. Students were interested in hearing his views about education.

D. He encouraged young American Indians to become distance runners.

76. What do the authors **most likely** mean when they say "physical fitness, as a means of understanding oneself, is a central theme" in all of Billy's speeches?

A. This is what is most important to Billy.

B. This is what is needed to run a successful business.

C. Most people who listen to the speeches are athletes.

D. Most people have not had the same opportunities as Billy.

77. Which would be the **best** source for more information about Billy?

A. a Web site about the city of Tokyo in the 1960s

B. a biography series on American Indian athletes

C. a documentary about the Pine Ridge Reservation

D. an Internet article on how to qualify for the Olympics

78. Which statement **best** reflects the authors' opinion?

A. "It was a spectacular upset—one of the most memorable victories in the history of international athletic competition."

B. "Television cameras followed thirty-six of the world's best runners as they competed for the gold."

C. "Setting a new record time, Billy Mills became the first and only American to win an Olympic gold medal in this event."

D. "Billy continued to run competitively for several years after Tokyo, and he set other track records."

79. With which statement would the authors **most likely** agree?

A. Giving back to the community is a worthy achievement.

B. All people should take part in athletic competitions.

C. Starting your own business is always successful.

D. Most people are interested in learning about sports.

80. This passage is **best** classified as a biography because it describes the

A. sport of distance running.

B. achievements of a real person.

C. advantages of athletic competition.

D. story behind an award-winning movie.

Please go on to the next page.

Mathematics
Session 1 (No Calculator)

This test session includes multiple-choice questions and questions for which you must show your work or write out your answer. You may NOT use a calculator during this session.

Mark your answers in the section marked "Mathematics—Session 1 (No Calculator)" in your Student Response Booklet.

1. Helium freezes at –272.05°C. Krypton freezes at a temperature that is 114.83°C warmer than the freezing point of helium. What is the freezing point of krypton?

   A. –386.88°C
   B. –157.22°C
   C. 157.22°C
   D. 386.88°C

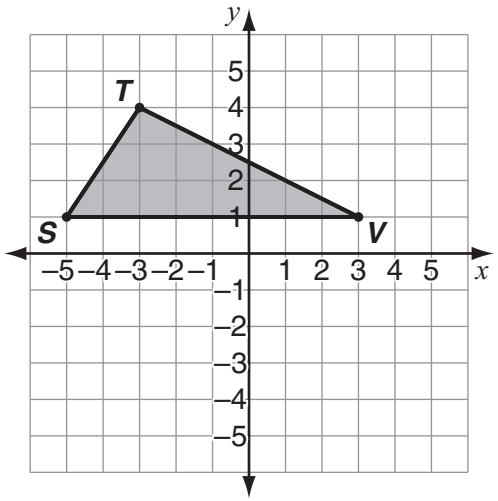
3. Use the numbers below to answer the question.

   $$3.8 \quad \sqrt{12} \quad \frac{11}{3}$$

   Which list shows the numbers ordered from **least to greatest**?

   A. $\sqrt{12}, \frac{11}{3}, 3.8$
   B. $\sqrt{12}, 3.8, \frac{11}{3}$
   C. $3.8, \sqrt{12}, \frac{11}{3}$
   D. $3.8, \frac{11}{3}, \sqrt{12}$

9. Study triangle *STV* below.



   What is the length of the altitude (height) drawn from vertex *T*?

   A. 3 units
   B. 4 units
   C. 6 units
   D. 8 units

10. The population of China is approximately 1.3 **billion** people. Finland has a population of approximately 5.2 **million** people. Approximately how many more people live in China than in Finland?

    A. 3,900,000,000
    B. 1,295,000,000
    C. 129,500,000
    D. 3,900,000

Please go on to the next page.

16. The books in a library are being moved to a new location. The library contains approximately

- 13,800 fiction books,
- 11,600 nonfiction books, and
- 2,280 resource books.

Approximately 30 books can be packed into each packing carton. Which is the **best** estimate for the number of packing cartons needed to pack all of the library books?

A. 100
B. 200
C. 1,000
D. 2,000

Write your answers in the spaces provided in your Student Response Booklet. Show all of your work.

19. What is the value of the expression below when $t = 3$ and $v = 80$?

$$16t^2 + vt$$

20. Solve for b:

$$5b - 10 = 55$$

23. Sample 1 of a silver alloy weighs 100 ounces and contains 20% pure silver.

a. How many **ounces** of pure silver does sample 1 contain?

b. Sample 2 of a silver alloy weighs 320 ounces and is 75% pure silver. How many ounces of sample 2 are **not** pure silver?

c. Sample 3 is made by combining 60 ounces of pure silver with sample 1. What is the **percent** of pure silver in sample 3? Show or explain how you found your answer.

Please STOP. Do not go on to the next page.

Mathematics
Session 2 (Calculator)

This test session includes multiple-choice questions. You may use a calculator during this session.

Mark your answers in the section marked "Mathematics—Session 2 (Calculator)" in your Student Response Booklet.

24. The student ratio of **men to women** at a university is 3 to 7. There are currently 2135 women at the university. Which proportion could be used to determine the number of men at the university?

A. $\frac{3}{7} = \frac{2135}{x}$

B. $\frac{3}{7} = \frac{x}{2135}$

C. $\frac{3}{2135} = \frac{7}{x}$

D. $\frac{7}{2135} = \frac{x}{3}$

25. Study the statement below.

> A diagonal of a quadrilateral always divides the quadrilateral into two congruent triangles.

Which quadrilateral will prove this statement false?

A. rectangle

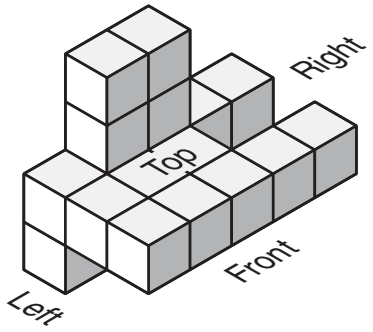
B. rhombus

C. square

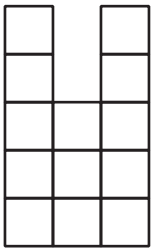
D. trapezoid

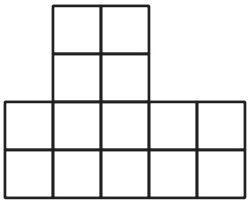
Please go on to the next page.

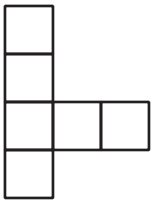
28. Study the figure below.

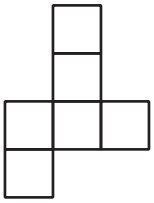


Which view is the **left side** of the figure?

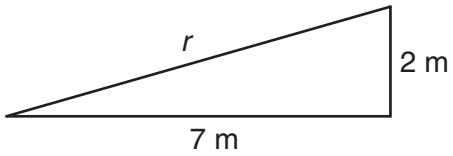
A. 

B. 

C. 

D. 

30. Tyrone built the ramp shown below.



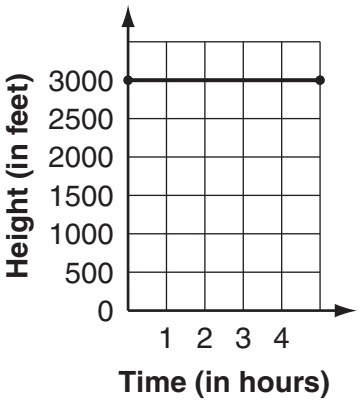
To the nearest tenth of a meter, what is the length, *r*, of the ramp?

A. 6.7 m
B. 7.3 m
C. 9.0 m
D. 18.0 m

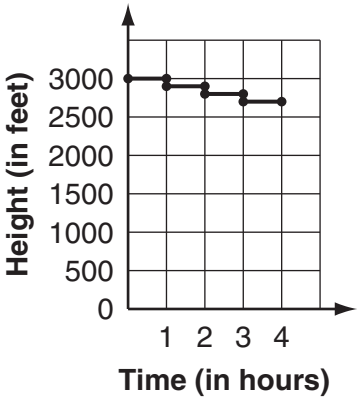
Please go on to the next page.

35. A hot-air balloon is 3000 feet high in the air. It will descend at a constant rate of 100 feet per hour. Which graph **best** represents the height of the balloon over time?

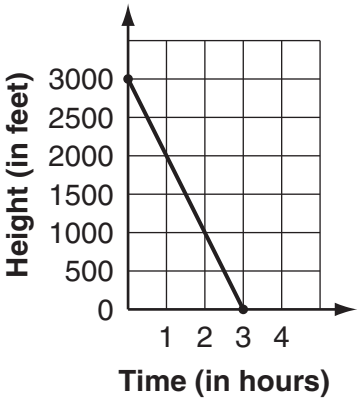
A.



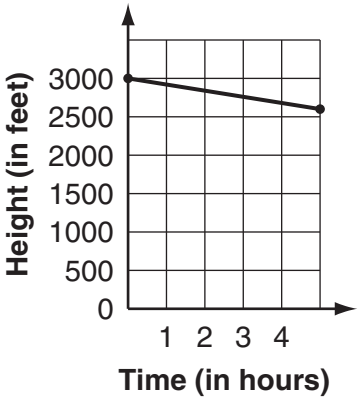
B.



C.



D.



39. At Brodie's fitness club, there is a monthly $25 fee and an additional $5 charge for each class he takes. Which equation represents the monthly cost, m, if Brodie takes x classes?

A. $m = 5x - 25$

B. $m = 25 + 5x$

C. $x = 25 + 5m$

D. $x = 25m - 5$

40. Study the pattern in the table below.

x	y
1	1
2	0.5
3	0.25
4	0.125
5	

What is the value of y when $x = 5$?

A. 0.00125

B. 0.0125

C. 0.0625

D. 0.625

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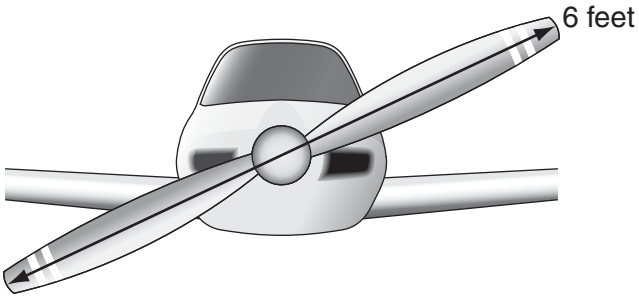
41. The distance from tip to tip of the airplane propeller shown below is 6 feet.



To the nearest foot, what is the circumference the tips of the propeller cover when the propeller is spinning? [$\pi = 3.14$]

A. 19 feet
B. 28 feet
C. 38 feet
D. 113 feet

42. Which expression is equivalent to $12x + 16$?

A. $2(6x + 16)$
B. $3(4x + 4)$
C. $4(3x + 4)$
D. $12(x + 16)$

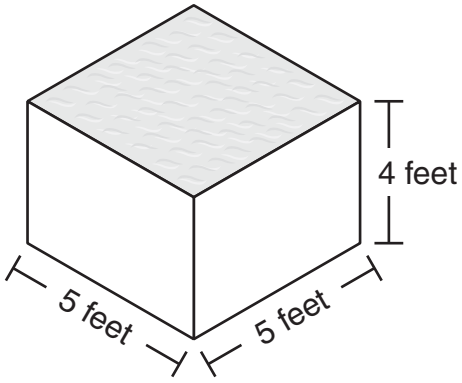
44. Students at a local college were asked how many hours they slept the night before. The chart below shows these data.

Hours of Sleep	Number of Students
6	14
7	26
8	28
9	15
More than 10	6

A bar graph of these data will be made on a grid that is 20 units by 20 units. Which scale would be **most** appropriate for the axis labeled "Number of Students"?

A. 1 unit = 1 student
B. 1 unit = 2 students
C. 1 unit = 10 students
D. 1 unit = 28 students

45. The measurements of a container are shown below.



How many **gallons** of water does the container hold?
(Hint: 1 cubic foot = 7.48 gallons)

A. 100 gallons
B. 105 gallons
C. 748 gallons
D. 972.4 gallons

Please STOP. Do not go on to the next page.

STOP

Mathematics
Session 3 (Calculator)

This test session includes multiple-choice questions. You may use a calculator during this session.

Mark your answers in the section marked "Mathematics—Session 3 (Calculator)" in your Student Response Booklet.

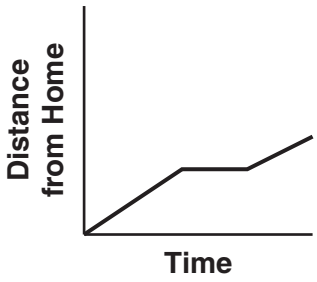
50. Which solid does **not** have at least one pair of parallel faces?

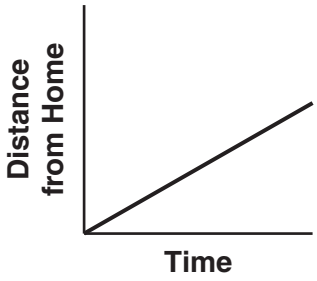
    A. cube
    B. cylinder
    C. rectangular pyramid
    D. triangular prism

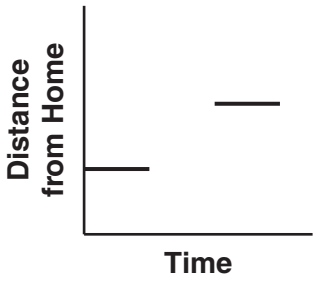
51. A model of an aircraft carrier was made using the scale 1:350. The length of the model is 36 inches. What is the actual length, **in feet**, of the aircraft carrier?

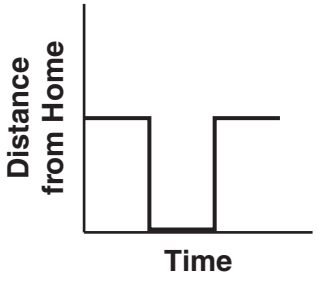
    A. 12,600
    B. 4,200
    C. 1,386
    D. 1,050

53. Jeremy drove for three hours heading away from home, stopped for one hour, and then drove for another two hours in the same direction. Which graph **best** represents Jeremy's distance from home over time?

A.


B.


C.


D.


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57. What is the greatest number of lines of symmetry a rhombus can have?

A. 2
B. 3
C. 4
D. 8

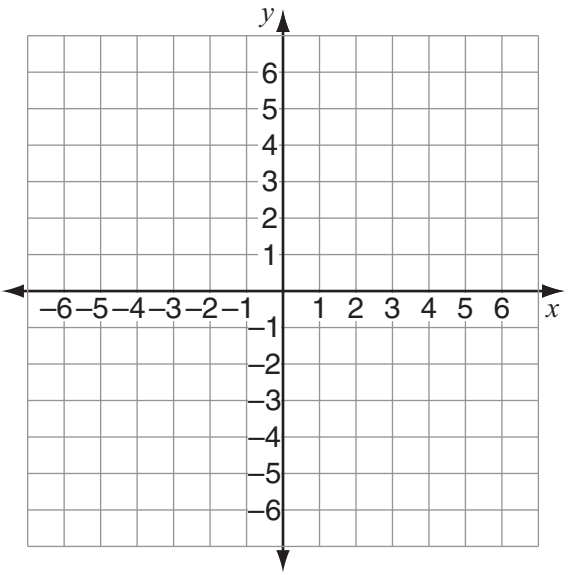
58. Bill has a bag containing red marbles, blue marbles, and green marbles. He pulled one marble out of the bag, recorded the color, and then replaced the marble in the bag. Bill did this several times. During this experiment, he pulled out

- a red marble 40 times,
- a blue marble 80 times, and
- a green marble 140 times.

Based on the data, what is the probability that Bill will pull out a blue marble on the next try?

A. $\frac{4}{13}$
B. $\frac{4}{9}$
C. $\frac{9}{13}$
D. $\frac{9}{4}$

61. You may use the coordinate grid below to answer this question.



Point L is located at (–3, –5). Point L is reflected over the y-axis. What are the coordinates of the image of point L?

A. (3, 5)
B. (3, –5)
C. (–3, 5)
D. (–3, –5)

62. A survey was taken to determine the favorite books read by the middle school students in Montana. The survey used a sample of 25 students in one eighth-grade class as the basis for its findings. Which statement **best** describes what was wrong with the survey?

A. The sample was too small.
B. One eighth-grade class didn't represent all middle school students.
C. The sample was too small and didn't represent the entire state middle school population.
D. The survey didn't provide a list of books to choose from.

Please go on to the next page.

65. The table below shows the daily sales record for a fruit stand.

Day	Sales
Monday	$28
Tuesday	$32
Wednesday	$47
Thursday	$14
Friday	$55
Saturday	$70

If the lowest number in the table is dropped, by how much will the median change?

A. $ 5.40
B. $ 7.50
C. $39.50
D. $47.00

68. A spinner has an area of 80 square inches. The table below shows the amount of the spinner's area covered by each of four colors.

Color	Amount of Spinner Area (in square inches)
Red	16
Blue	32
Green	12
Yellow	20

If the spinner is spun 50 times, which is the **best** estimate for the number of times it will land on blue?

A. 18 times
B. 20 times
C. 32 times
D. 40 times

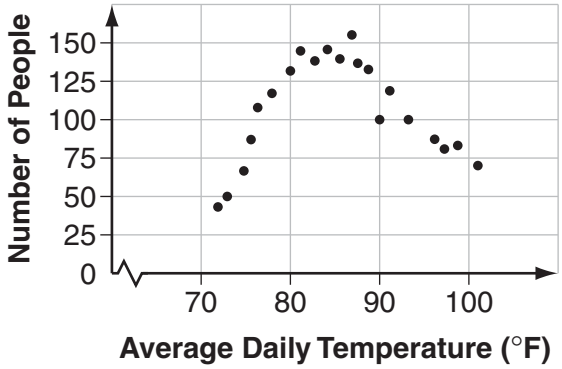
70. Study the table below.

Term (t)	Number
1	22
2	24
3	26
4	28

Which expression represents the number for Term t?

A. $t + 2$
B. $2t$
C. $2t + 20$
D. $20t + 2$

71. The scatter plot below shows the attendance at a municipal pool for various average daily temperatures.



Based on the scatter plot, when the average daily temperature is 95°F, which is the **best** prediction for the number of people who will use the municipal pool that day?

A. 50
B. 80
C. 110
D. 150

Please STOP. Do not go on to the next page.

STOP

Science
Session 1

This test session includes multiple-choice questions and a question for which you must write out your answer. Be sure to answer all parts of the question.

Mark your answers in the section marked "Science—Session 1" in your Student Response Booklet.

1. As part of an investigation, students in a science class placed the same type and amount of bacteria in each of five test tubes. Different chemicals were added to four of the test tubes. After two days, the test tubes were checked for the presence (cloudy) or absence (clear) of bacteria. The table below shows the results of the investigation.

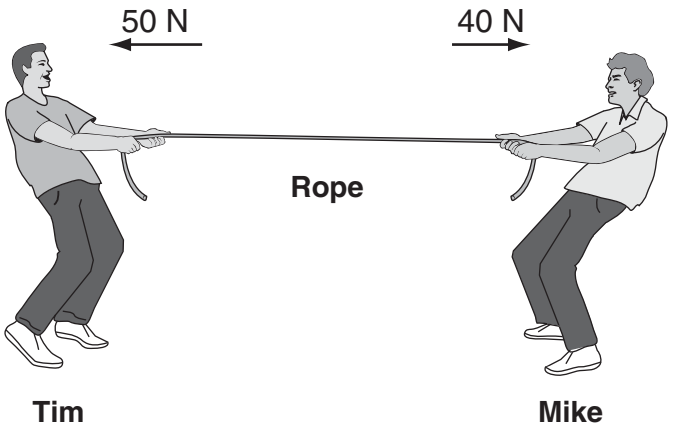
Test Tube Number	Appearance of Liquid at Start	Bacteria Present	Chemical Added	Appearance of Liquid after Two Days	Bacteria Present
1	Cloudy	Yes	Alcohol	Clear	No
2	Cloudy	Yes	Bleach	Clear	No
3	Cloudy	Yes	Soap solution	Clear	No
4	Cloudy	Yes	Mouthwash	Clear	No
5	Cloudy	Yes	None	Cloudy	Yes

Which test tube was the control in the investigation?

A. Test Tube 1
B. Test Tube 2
C. Test Tube 4
D. Test Tube 5

Please go on to the next page.

2. Tim pulls on a rope with a force of 50 N and Mike pulls on the same rope with a force of 40 N, as shown below.



Which statement describes the motion of the rope?

A. The rope moves toward Tim.
B. The rope does not move at all.
C. The rope moves toward Mike.
D. The rope sags toward the ground.

3. Which group of organisms changes solar energy into chemical energy that living things use?

A. decomposers
B. first-level consumers
C. producers
D. second-level consumers

4. A geologist would **most likely** work for a company that manufactures which product?

A. clothing
B. gasoline
C. tanning lotion
D. vaccines

5. A student wants to test how a ball's mass affects its speed as it rolls down a slide. He times a small metal ball as it rolls down a slide. He then times a basketball as it rolls down the same slide. Each ball has a different mass.

How can the student **best** improve the experiment?

A. by having the same metal ball roll down the slide five times
B. by having two metal balls with the same mass roll down the slide once
C. by having two metal balls with different masses roll down the slide three times each
D. by having the same metal ball roll down five different slides

Please go on to the next page.

8. The table below shows characteristics of four organisms.

Organism	Nutrition	Organization
W	Producer	Multicellular
X	Consumer	Multicellular
Y	Consumer	Unicellular
Z	Producer	Unicellular

In current scientific classification systems, which organism would definitely be classified as a plant?

A. Organism W
B. Organism X
C. Organism Y
D. Organism Z

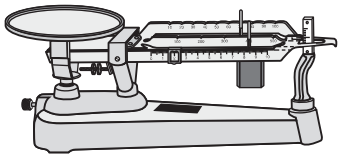
9. When a person gets off a swing, the swing loses energy as it slows down and then stops moving. Which event is **most** similar?

A. an object falling down when dropped
B. a rolling ball's speed decreasing to zero
C. a person getting tired at night and going to sleep
D. a bird flying through the air by flapping its wings

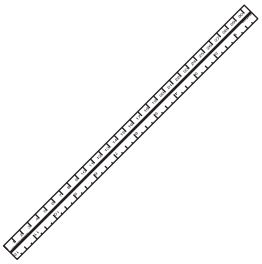
10. Which phrase describes Earth's crust and the layer directly below it?

A. a shell of solid rock supported by a core of metal
B. sections of soil, sand, or snow covering solid rock
C. large plates of solid rock floating on liquid rock
D. oceans of water covering plates of solid rock

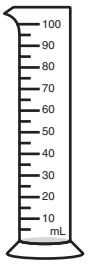
11. Four tools and a small rock sample are shown below.



Balance



Meterstick



Graduated cylinder

Thermometer

Small rock sample

Which two tools could be used to determine the density of the rock sample?

A. balance and graduated cylinder
B. balance and meterstick
C. graduated cylinder and thermometer
D. meterstick and thermometer

Please go on to the next page.

15. A student collected soil samples from the school yard, the park, and his backyard. Which question about the samples could the student **best** answer by using a microscope in a classroom investigation?

A. What are the chemical characteristics of each soil sample?

B. Which soil sample took longest to form from bare rock?

C. Which soil sample contains the most different kinds of living organisms?

D. How much soil of each sample type is in the school yard?

16. What happens to the motion of a moving object when the net force (sum of the forces) acting on it is zero?

A. The object travels in a straight line at a constant speed.

B. The object comes to rest due to opposing forces.

C. The object speeds up in the direction of the greater force.

D. The object changes direction while moving at a constant speed.

17. The table below shows different types of relationships that occur in a community.

Type of Relationship between Two Organisms	One Organism	The Other Organism
Mutualism	Helped	Helped
Commensalism	Helped	Unaffected
Parasitism	Helped	Harmed
Predation	Helped	Harmed (killed)

Ants protect a tree from plant-eating animals, and the tree provides food for the ants. How would this relationship be classified?

A. mutualism

B. commensalism

C. parasitism

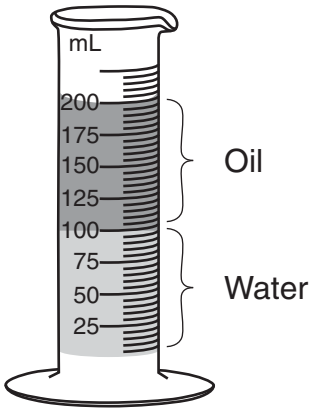
D. predation

Please go on to the next page.

18. Which material was **most** useful in supporting scientific theories about the age of Earth?

A. air
B. rocks
C. soil
D. water

19. The graduated cylinder shown below contains 100 mL of water and 100 mL of oil.



Why does the oil stay on top of the water?

A. The water was added before the oil.
B. The oil is thicker than the water.
C. Oil has less mass than an equal volume of water.
D. Oil has more mass than an equal volume of water.

23. A student designed the experiment below to investigate whether salt affects the melting rate of ice cubes.

- Fill each of two 250 mL beakers with 125 mL of cold water.
- Place three ice cubes of the same size in each beaker.
- Place 10 g of salt in one beaker.
- Observe and record how long it takes the ice cubes in each beaker to melt.

Which statement describes a strength of this investigation?

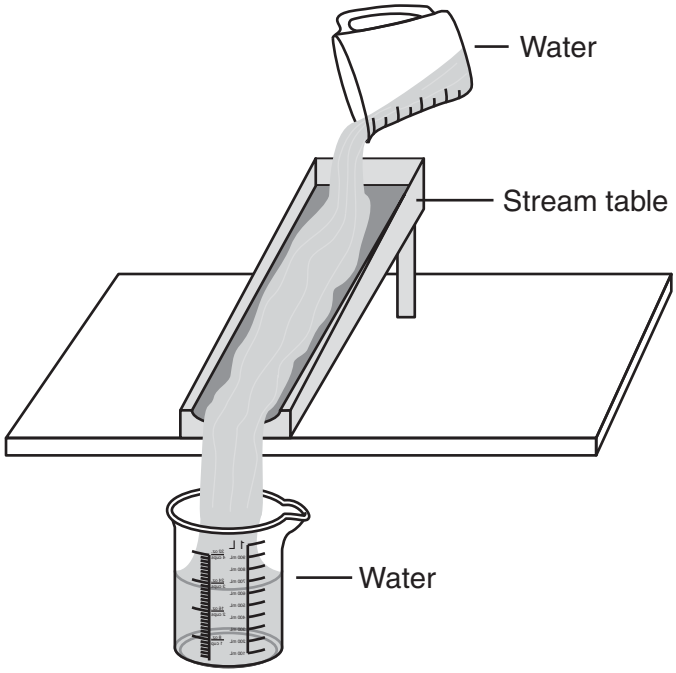
A. The student used 250 mL beakers.
B. The student changed only one variable.
C. The student used cold water.
D. The student filled each beaker with only 125 mL of water.

24. Which biotic (living) factor most directly affects the size of a deer population in an ecosystem?

A. air temperature
B. annual precipitation
C. number of birds
D. number of plants

Please go on to the next page.

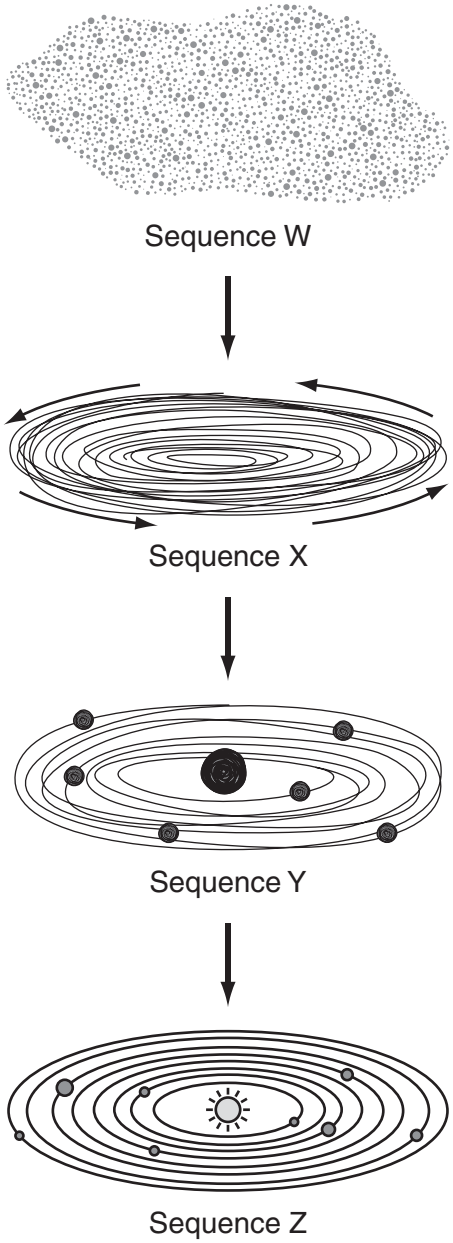
25. A student is using the setup shown below to model the behavior of a river.



Which feature of the setup can be changed to show how water flows from very steep mountains?

A. the slope of the stream table
B. the amount of sediment on the stream table
C. the amount of water poured on the stream table
D. the types of sediment on the stream table

26. The diagram below illustrates the nebular theory, the sequence of events scientists think occurred as our solar system was formed.



Which force caused matter to pull together and form the early proto-sun and proto-planets shown in Sequence Y?

A. air pressure
B. buoyancy
C. friction
D. gravity

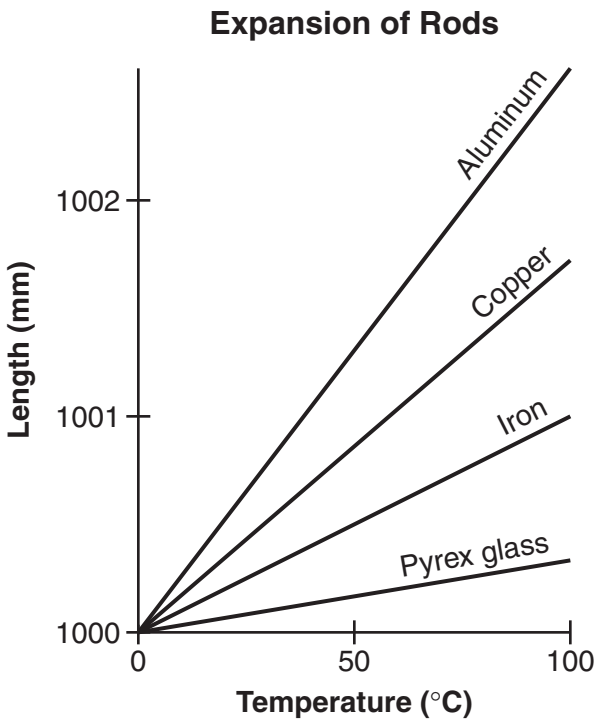
Please go on to the next page.

Science
Session 2

This test session includes multiple-choice questions.

Mark your answers in the section marked "Science—Session 2" in your Student Response Booklet.

28. The graph below shows the results of an investigation in which four rods made of different materials were heated to determine which materials expand the most in response to heat.



Which statement correctly compares copper with the other materials?

A. Copper expands more than both Pyrex glass and iron.
B. Copper expands more than Pyrex glass but less than iron.
C. Copper expands the most of all the materials.
D. Copper expands more than aluminum but less than iron.

29. A team of scientists has created a new compound. An article about the compound will be published **most likely** in which type of journal?

A. astronomy
B. chemistry
C. genetics
D. medicine

30. Which food chain shows the correct order in which food and energy move through the chain?

A. grass → grasshopper → sparrow → hawk
B. owl → snake → mouse → corn
C. snake → grasshopper → corn → hawk
D. corn → hawk → snake → sparrow

31. Which sentence **best** explains how oceans impact weather patterns?

A. Ocean water reflects sunlight.
B. Ocean currents heat or cool the air.
C. Waves transfer energy toward land.
D. Tides move water back and forth.

Please go on to the next page.

35. Students in a science class conducted the experiment described below.

- They obtained 20 bean seeds.
- They placed 10 seeds and a moist paper towel into each of two separate, identical containers.
- They placed container 1 in a refrigerator and container 2 in a closed cabinet.
- After one week, the students examined the seeds. None of the seeds in container 1 had sprouted. Eight of the seeds in container 2 had sprouted.

What variable is being tested in this experiment?

A. light
B. moisture
C. temperature
D. time

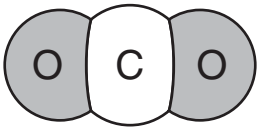
36. Three technological advances related to forms of energy are listed below.

1. powering machines with electricity
2. creating a self-sustaining nuclear reaction
3. using a steam-powered internal combustion engine

Which sequence lists these technological advances from oldest to newest?

A. 1, 2, 3
B. 2, 1, 3
C. 3, 1, 2
D. 1, 3, 2

37. A model of carbon dioxide is shown below.



Which statement describes the formation of carbon dioxide?

A. One atom of carbon combines with two atoms of oxygen to make one atom of carbon dioxide.
B. One atom of carbon combines with two atoms of oxygen to make one molecule of carbon dioxide.
C. One atom of carbon combines with two molecules of oxygen to make one molecule of carbon dioxide.
D. One molecule of carbon combines with two molecules of oxygen to make one molecule of carbon dioxide.

38. How do sedimentary rocks form?

A. Liquid rock material hardens at or below Earth's surface.
B. Uplifting forms mountains of rock.
C. Grains of soil are deposited in layers and then become compacted and cemented.
D. Increasing temperature and pressure cause chemical and physical changes to existing rocks.

Please go on to the next page.

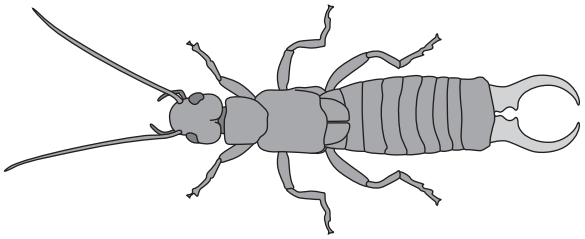
42. A classification key and a picture of an insect are shown below.

Classification Key

1a. Insect has wings . . . . . **Go to 2**
1b. Insect has only wing stubs or no wings . . . . . **Go to 3**

2a. Outer wings hard and leathery . . **tiger beetle**
2b. Wings transparent, with veins clearly visible and held high over back . . . . . **mayfly**

3a. Insect with pincerlike tail . . . . . **earwig**
3b. Insect with thin waist, no pincerlike tail . . . . . **ant**

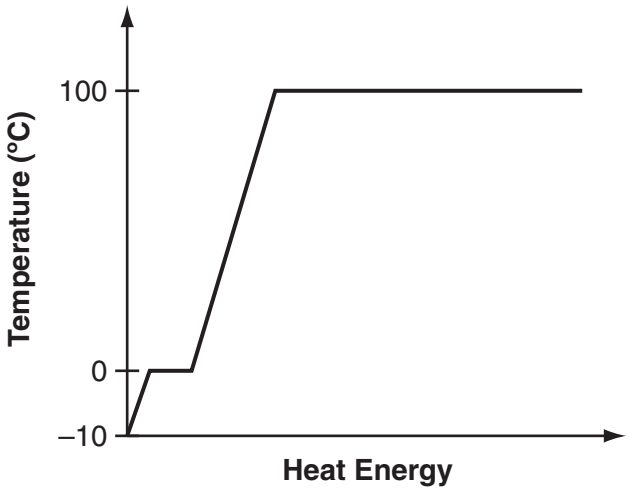


not drawn to scale

Which insect is shown in the picture?

A. ant
B. earwig
C. mayfly
D. tiger beetle

43. The graph below shows the temperature of water as it is heated from ice (–10°C) to steam (100°C).



Which statement describes what happens as the water is heated?

A. The number of particles increases, the energy of the water increases, and the temperature increases.
B. The number of particles stays the same, the energy of the water decreases, and the temperature increases.
C. The number of particles stays the same, the energy of the water increases, and the temperature increases.
D. The number of particles decreases, the energy of the water decreases, and the temperature decreases.

44. What is determined by the speed of Earth's rotation on its axis?

A. the number of hours in a day
B. the length of a year
C. the changes in climate
D. the seasons of the year

Please go on to the next page.

45. In what reproductive process are genes randomly assigned to an egg or a sperm?

A. binary fission
B. budding
C. regeneration
D. sexual reproduction

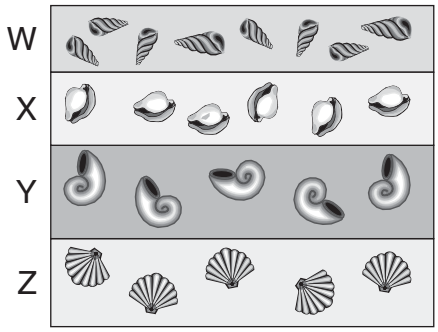
46. A student recorded the speed of a ball in the table shown below.

Time (seconds)	Speed (meters per second)
0	0.0
1	0.9
2	1.8
3	2.7
4	3.6

Since the speed of the ball kept increasing, the student concludes that someone must have been pushing it. Which statement **best** supports an alternative conclusion?

A. The ball's maximum speed was 3.6 meters per second.
B. The ball may have been rolling down a ramp.
C. The student measured the speed at one-second intervals.
D. The ball could have been a basketball or tennis ball.

50. The diagram below shows fossils in four rock layers.



Which rock layer contains fossils of the organisms that lived **most** recently?

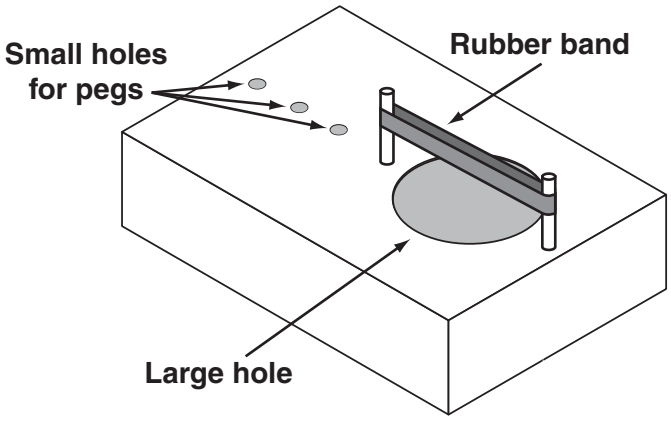
A. layer W
B. layer X
C. layer Y
D. layer Z

51. Which machine is **most** appropriate to split, spread, or cut objects?

A. an inclined plane
B. a lever
C. a pulley
D. a wedge

Please go on to the next page.

52. A student has a rubber band stretched across a box with a large hole, as shown below.



The student is plucking the rubber band to make a sound. Which question would be **best** for him to use in a scientific investigation?

A. How long and wide is the box?

B. How much do the materials cost?

C. How does the color of the box affect the pitch?

D. How does the length of the rubber band affect the pitch?

Please STOP. Do not go on to the next page.

STOP

Science
Session 3

This test session includes multiple-choice questions and a question for which you must write out your answer. Be sure to answer all parts of the question.

Mark your answers in the section marked "Science—Session 3" in your Student Response Booklet.

55. Why does an astronaut who weighs 180 pounds on Earth weigh only 30 pounds on the Moon?

A. Earth has an atmosphere, and the Moon does not.

B. Earth revolves around the Sun, but the Moon revolves around Earth.

C. The force of gravity on Earth is greater than the force of gravity on the Moon.

D. Earth rotates faster on its axis than the Moon.

56. Which organism has the simplest structure?

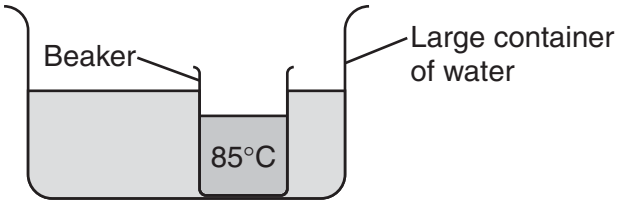
A. bacterium

B. human

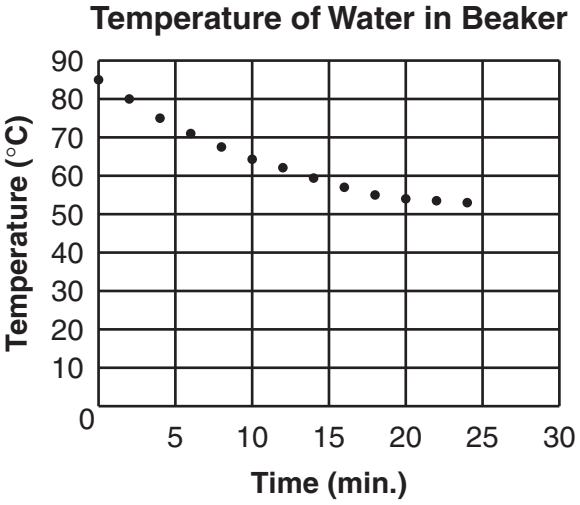
C. mold

D. tree

57. A beaker of water with a temperature of 85°C is placed in a larger container of water, as shown in the diagram below.



The graph below shows how the temperature of the water in the beaker changes over time.



Based on the graph, which is the **best** prediction for the temperature of the water in the beaker at 28 minutes?

A. 0°C

B. 25°C

C. 52°C

D. 85°C

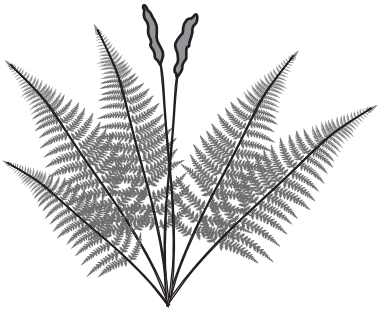
Please go on to the next page.

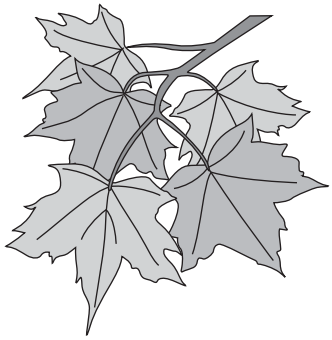
58. The description below is from a classification key.

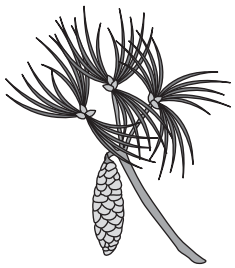
Leaves are in the form of long needles in groups of five. Leaves have large cones.

Which plant fits the description from the classification key?

A. 

B. 

C. 

D. 

59. In December 2004, a series of tsunamis (giant waves) raced across the Indian Ocean in all directions. When these tsunamis reached shore, they washed far inland. What caused these tsunamis?

A. a sudden increase in gravitational pull
B. a sudden shift of tectonic plates
C. a sudden rise in water temperature
D. a sudden change of polar magnetic forces

62. Which item is an example of a mixture?

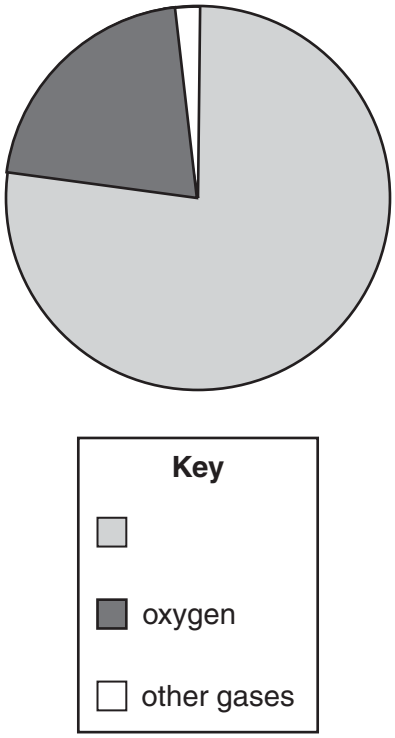
A. sugar
B. saltwater
C. an atom of sodium
D. a diatomic molecule of oxygen

Please go on to the next page.

63. Which medical advancement is the **newest** method doctors have for treating patients?

A. using X-rays to view bones
B. transplanting human organs
C. prescribing antibiotics
D. using anesthesia when performing surgeries

64. A student constructed the pie chart below to show the composition of the atmosphere. She forgot to label one of the gases in the key.



Which gas is represented by the shaded box in the key?

A. carbon dioxide
B. hydrogen
C. nitrogen
D. water vapor

Please go on to the next page.

65. A student conducted a one-month study to investigate how the amount of sunlight a plant receives affects its growth. Plants 1 and 2 were placed in sunlight. Plant 3 was placed under a sunlamp. The table below shows the data collected in the study.

Plant	Time (months)	Water (mL per week)	Amount of Sunlight (hours per day)	Growth (cm)
1	1	120	5	5.0
2	1	120	12	9.2
3	1	120	24	15.0

The student concluded that plants receiving constant sunlight grow larger than plants that do not. Which statement describes a weakness in the study?

A. One plant received artificial light.
B. All three plants received different amounts of sunlight.
C. One plant was given a different amount of water.
D. The study was conducted for one month.

69. Some students want to make a weather station in their school yard. Which tools should they use?

A. balance, hand lens, graduated cylinder, beaker
B. barometer, thermometer, anemometer, rain gauge
C. compass, rock hammer, paper and pencil, hand lens
D. thermometer, graduated cylinder, balance, microscope

70. The pictures below show four energy changes.

Flashlight

Campfire

Tennis player

Automobile

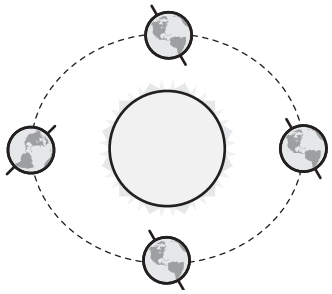
What do all of these energy changes have in common?

A. They all produce light energy.
B. They all use electrical energy.
C. They all produce magnetic energy.
D. They all use chemical energy.

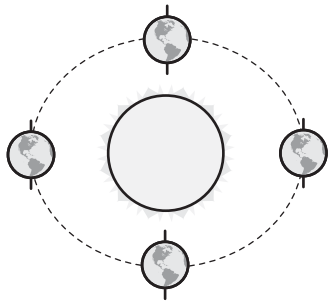
Please go on to the next page.

71. Which diagram shows the correct positions of Earth as it orbits the Sun?

A.



B.



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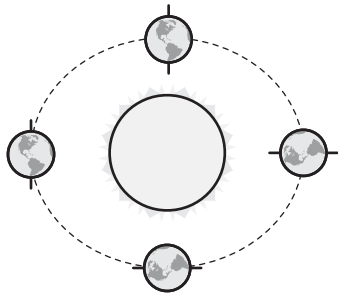
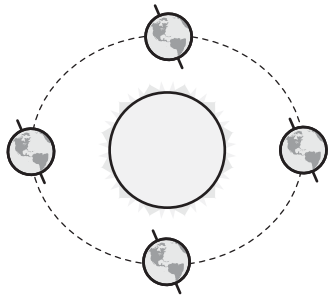


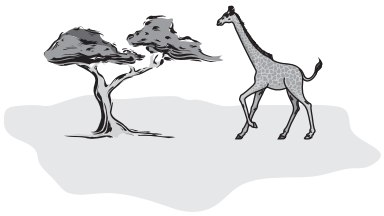
D.



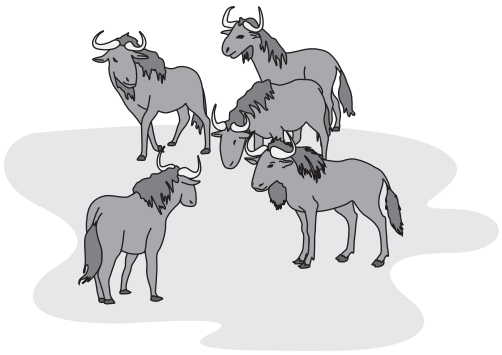
72. Which diagram **best** represents a population?

A.

B.



C.



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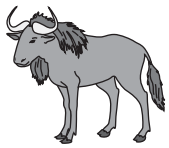

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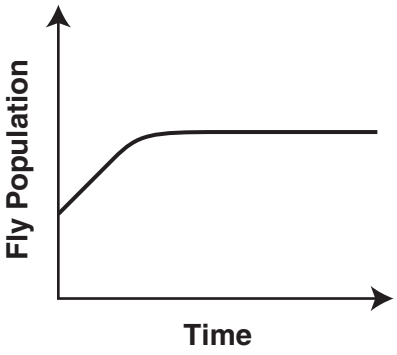
73. Students in a science lab conducted the investigation described below.

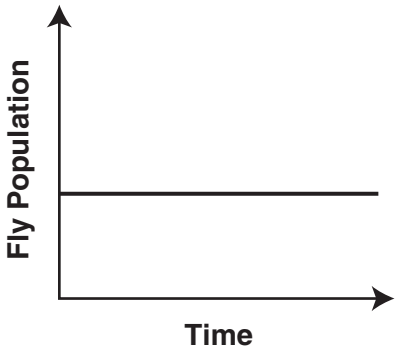
- They placed 10 male and 10 female flies in a closed container with food.
- They noticed that the flies reproduced.
- They observed that the fly population increased to a certain number, leveled off, and then maintained the same population size for the remainder of the study.

Which graph represents the data collected in this investigation?

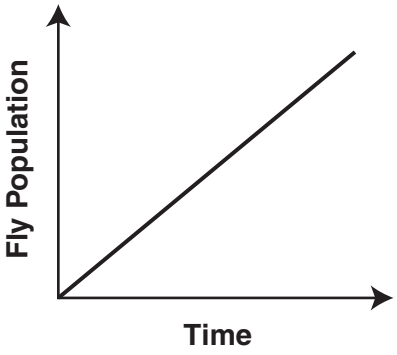
A.



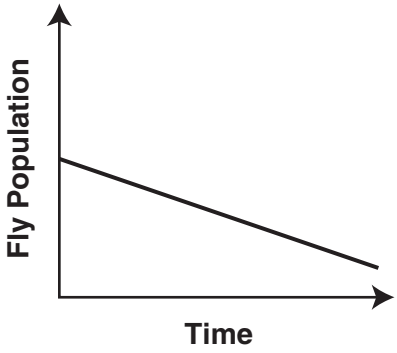
C.



B.



D.



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77. Why can an open bottle of perfume be detected at the opposite end of a room?

A. The perfume particles lose energy and slow down, staying closer to the floor.

B. The perfume particles gain energy and become a gas, filling the room.

C. The perfume particles lose energy and become a gas, moving slowly around the room.

D. The perfume particles gain energy and move faster, rising to the ceiling.

78. Study the table below.

Igneous Rocks

Crystal Size	Rocks with Mostly Quartz	Rocks with Mostly Iron-magnesium Minerals
Larger than 10 mm	Pegmatite	None
1 mm to 10 mm	Granite	Gabbro
Less than 1 mm	Rhyolite	Basalt

A rock contains mostly iron-magnesium minerals that have crystals about 5 mm in size. Which type of igneous rock is this?

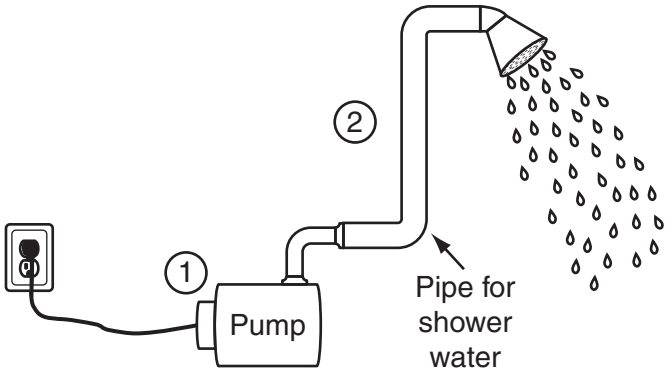
A. basalt

B. gabbro

C. granite

D. pegmatite

79. In the diagram below, the shower system has a pump that sends water up the pipe to the showerhead. Two energy conversions involved in this process are numbered.



Which statement about the numbered energy conversion is correct?

A. In conversion 1, electrical energy is converted to mechanical energy.

B. In conversion 1, mechanical energy is converted to gravitational potential energy.

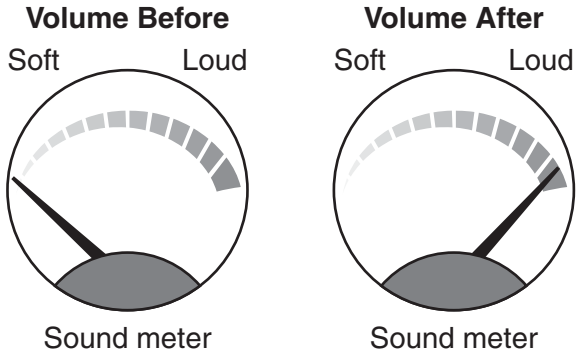
C. In conversion 2, chemical energy is converted to gravitational potential energy.

D. In conversion 2, mechanical energy is converted to chemical energy.

Please go on to the next page.

80. The diagrams below show two different wave changes.

Change 1



Change 2

Which wave characteristic changed in both instances?

A. amplitude
B. frequency
C. speed
D. wavelength

Write your answer in the space provided for it in your Student Response Booklet.

81. Plant and animal cells have similarities and differences.

a. Describe in detail **two** ways plant and animal cells are similar.

b. Describe in detail **two** ways plant and animal cells are different.

Please STOP. STOP

Acknowledgments

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