

Arizona's Instrument to Measure
Standards
AIMS Science

Sample Test
Grade 8



Arizona Department of Education
John Huppenthal, Superintendent of Public
Instruction

Assessment Section

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- 1 A ball was attached to the end of a string and spun in a circle as shown in Figure 1 below. The ball moved in a counter-clockwise direction when seen from above as shown in Figure 2.

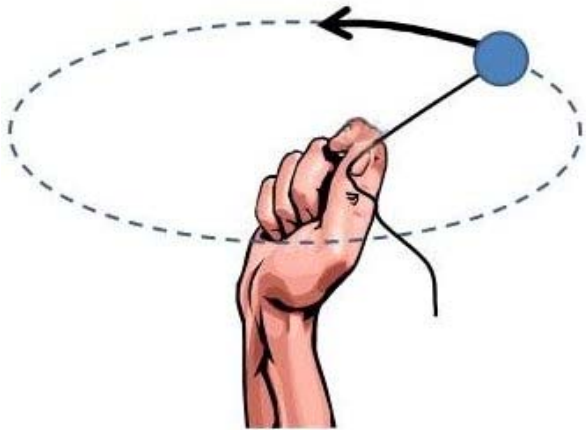


Figure 1 (view from side)

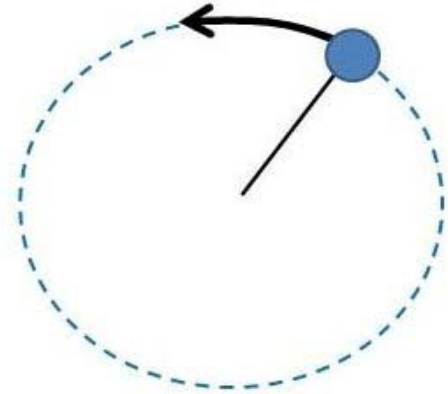
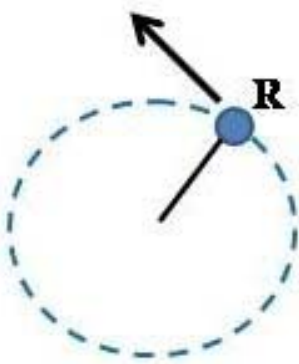
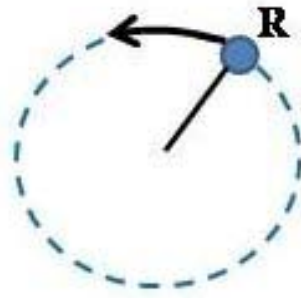


Figure 2 (view from above)

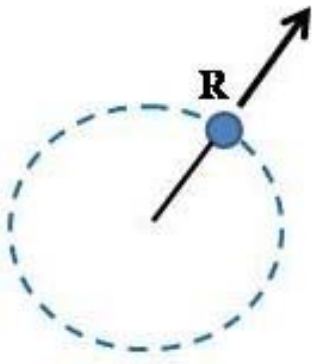
After several spins, the string was released when the ball was at point R. Which diagram shows the direction that the ball would fly the instant the string was released?



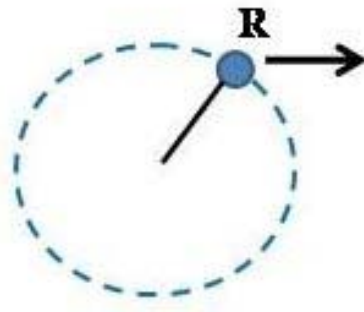
A



C

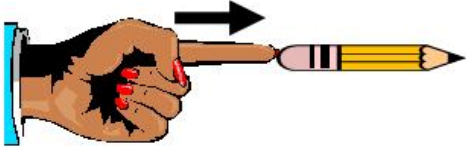


B

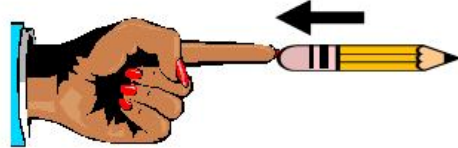


D

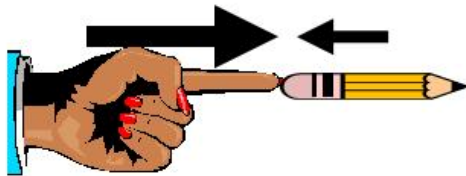
- 2 Susan gently pushes the tip of her finger against the eraser on her pencil and the pencil does not move. Which of the following figures **best** illustrates the interaction of forces between Susan's finger and her pencil?



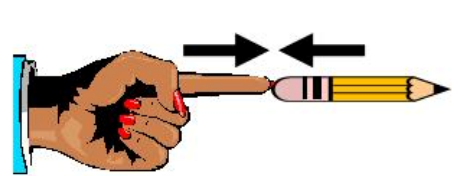
A



C



B



D

- 3 Jack bought a small turtle. Three months later, the turtle had grown to twice its original size. Which of the following statements **best** describes why Jack's turtle got bigger?
- A Parts of the turtle stretched out as it grew larger.
 - B The number of cells in the turtle's body increased.
 - C The turtle's body absorbed the food it ate and water it drank.
 - D The size of each cell in the turtle's body got bigger as it got older.
- 4 Steven went to a farm and picked a bright red tomato from a broken branch on the plant. The tomato had a rotten spot with a worm inside of it. Instead of eating the tomato, Steven decided to plant the seeds and grow new tomato plants.

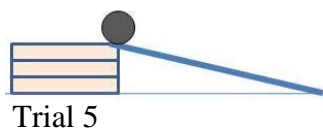
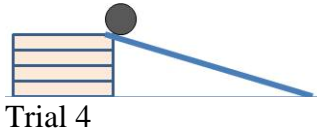
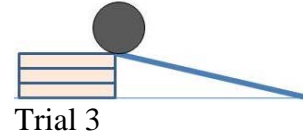
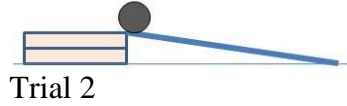
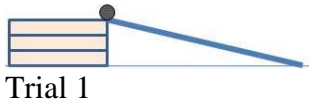
Which characteristic of the tomato plant is inherited and could change over several generations?

- A color of the skin
- B size of rotten spots
- C length of worms inside
- D number of broken branches

Directions

Read the information about Linda's tests then answer questions 5 – 8.

The diagrams below show five different tests Linda carried out using steel balls of three different sizes and masses. She used the same ramp for all trials.



- 5 Linda wants to test this idea: if the ramp is placed higher, the ball will travel to the bottom of the ramp faster. Which three trials should Linda compare to test this idea?

- A Trials 1, 2, and 3
- B Trials 1, 3, and 5
- C Trials 2, 3, and 4
- D Trials 2, 4, and 5

- 6 After selecting the three trials to compare, Linda measured the time it took for the ball to travel to the end of the ramp. She repeated each trial 10 times and recorded her data.

What is the main reason Linda collected 10 measurements for each of the three trials?

- A to increase the reliability of her data
- B to list all the results in a table or graph
- C to change the experimental conditions
- D to check that the equipment is working

- 7 Which graphic representation would be the **best** way for Linda to display data from the three trials she tested?

- A histogram
- B line graph
- C double bar graph
- D stem and leaf plot

- 8 What is another question that Linda could test if she used the same materials as trials 1-5?
- A Do balls of different metals roll down the ramp faster?
 - B Would increasing the friction on the ramp decrease the speed?
 - C Would increasing the length of the ramp change the speed of the ball?
 - D Does the size of the steel ball affect the time it takes to reach the bottom of the ramp?
- 9 Many scientists think that burning fossil fuels has increased the amount of carbon dioxide in the atmosphere. What effect would the increase of carbon dioxide **most** likely have on the planet?
- A a cooler climate
 - B a warmer climate
 - C lower relative humidity
 - D more ozone in the atmosphere
- 10 Steel is a metal that is made from iron and carbon. During the steel making process, iron and carbon are melted, blended together, and then allowed to harden into a solid. The iron and carbon do not chemically react with each other. After steel was made, 20 samples were taken from one piece and tested. Each sample contained 98% iron and 2% carbon.
- Which of the following terms **best** describes steel?
- A element
 - B compound
 - C homogeneous mixture
 - D heterogeneous mixture
- 11 Which is an example of a chemical reaction?
- A nails rusting
 - B glass melting
 - C sugar dissolving
 - D alcohol vaporizing

- 12** Maria wanted to measure the amount of time it took for a ball to roll down a ramp. She had never used a stopwatch before. Kevin gave her the following directions, but they were in the wrong order.

- Step 1: Hold the stopwatch in one hand.
- Step 2: Press the button once to start the clock.
- Step 3: Press the button twice to clear any old times.
- Step 4: Press the button to stop the clock.
- Step 5: Let the watch run until it is time to stop it.
- Step 6: Record the amount of time.

How should she arrange Kevin's steps so they are in the correct order?

- A** 1, 5, 2, 3, 4, 6
 - B** 1, 2, 3, 5, 4, 6
 - C** 1, 3, 2, 4, 5, 6
 - D** 1, 3, 2, 5, 4, 6
- 13** Henry read a web site that claimed that creatures from other planets landed on Earth. Which scientific skill should Henry first use after reading the web site?
- A** communicate this news to everyone he knows
 - B** generate a hypothesis to explain how the creatures got to Earth
 - C** ask questions and try to find other resources that support this claim
 - D** identify the variables that would allow the creatures to survive on Earth
- 14** Bromine (Br) is a liquid at room temperature. Oxygen (O) is a gas at room temperature. Room temperature is 25° C.

Which of the following statements is true?

- A** The boiling point of oxygen is colder than room temperature.
- B** The boiling point of bromine is colder than room temperature.
- C** The melting point of oxygen is warmer than room temperature.
- D** The melting point of bromine is warmer than room temperature.

15 Genetic engineering in corn allows genes from bacteria to be added to the genetic material of corn. In traditional breeding, genes of only closely related types of corn can be exchanged.

What is one risk of genetically engineering corn plants?

- A** decreases the amount of pesticide needed to grown corn.
- B** increases the length of time corn can be stored before it rots
- C** increases the chance of adding a trait to corn that causes allergies
- D** decreases the number of corn plants a farmer can grow in a season

16 Which statement **best** explains why bears are found in very cold regions of the world but lizards are not?

- A** Bears and lizards depend on external sources of heat, but bears have fur to keep themselves warm.
- B** Bears increase their body temperature to keep themselves warm when the outside temperature gets colder.
- C** Bears maintain a constant body temperature through internal processes, but lizards depend on external sources of heat.
- D** Bears and lizards maintain a constant body temperature through internal processes, but lizards get too cold when they shed their skins.

17 How did the work of Gregor Mendel change the scientific explanation about how traits were inherited?

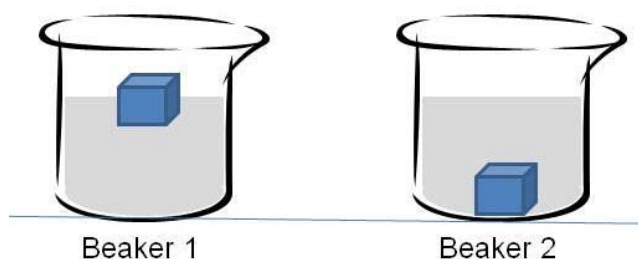
- A** Mendel showed that every trait is controlled by two inherited elements.
- B** Mendel showed that an organism contains miniature forms of its future offspring.
- C** Mendel showed that traits skip a generation and are inherited grandparent to grandchild.
- D** Mendel showed that tiny particles from every part of the body of each parent became blended and produced an individual with the characteristics of both.

Directions

Read the information about Mr. Jones' experiment then answer questions 18 – 20.

Mr. Jones set up a demonstration for his science class using two beakers. Each beaker contained 50 ml of a clear liquid. The temperature of each liquid was 25° C. Mr. Jones placed a cube into each beaker at the same time. Each cube measured 2 cm on all sides and had a mass of 5 grams.

The results of the demonstration are shown in the figures below.



18 What is the **best** question for students to investigate that would help explain the results of this demonstration?

- A How long did it take for the cube in Beaker 2 to sink?
- B Would a different sized beaker provide the same results?
- C Will the cube in Beaker 1 sink if more liquid was added?
- D What caused one cube to float and the other cube to sink?

19 Which of the following statements would **best** explain the results of this demonstration?

- A The cube in Beaker 1 has a lower density than the cube in Beaker 2.
- B The liquid in Beaker 1 has a higher density than the liquid in Beaker 2.
- C The cube in Beaker 1 is made from a different material than the cube in Beaker 2.
- D The liquid in Beaker 1 has the same chemical composition as the liquid in Beaker 2.

20 Which tool would Mr. Jones use to measure the mass of the cubes?



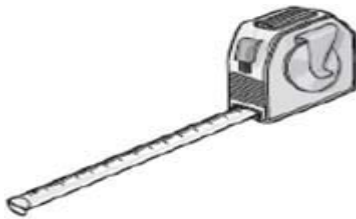
Graduated cylinder

A



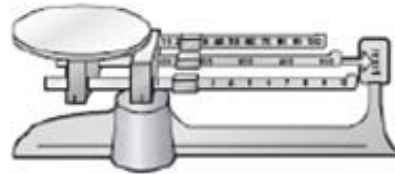
Thermometer

C



Tape measure

B



Balance

D

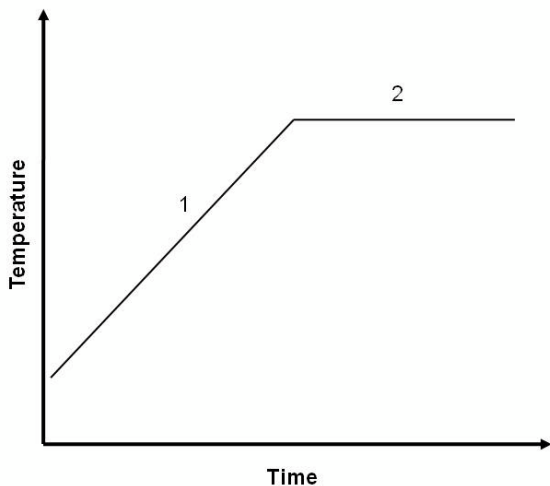
21 The bodies of many cars are designed to compress or crumple during an accident.



Why are cars built with a crumple zone?

- A The crumple zone is made from cheaper materials, so the car costs less to make.
- B The crumple zone is made from cheaper materials, so it costs less to repair after an accident.
- C The crumple zone absorbs the force of an impact, reducing the chance that passengers get injured.
- D The crumple zone transfers the force of an impact from the car to the object it hits, reducing the chance that passengers will get injured.

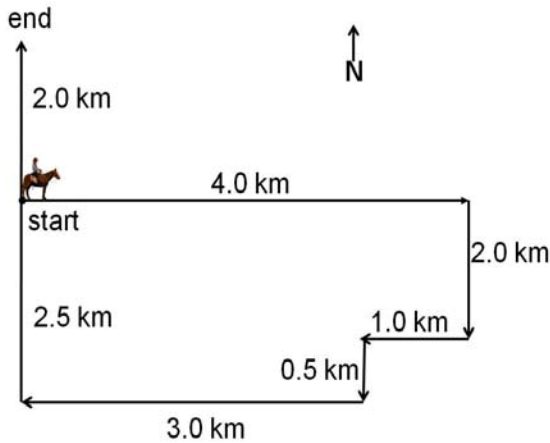
- 22 Alex placed a small beaker of cold water on a hot plate and heated it for 10 minutes. He took the temperature of the water several times during those 10 minutes and recorded his data. Alex claims that the graph below shows the relationship between temperature and time when water is heated.



Which statement **best** explains why the temperature leveled off in section 2 of the graph?

- A Alex turned off the hot plate so the water did not get any warmer.
- B The water reached the boiling point, so the temperature no longer increased.
- C An experimental error caused the graph to level off, because the water temperature should keep increasing over time.
- D Cold water heats faster than warm water, so once the cold water was room temperature, it took more than 10 minutes to make it hot.

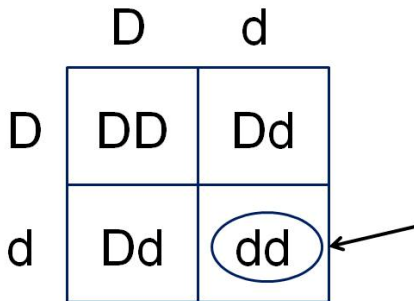
- 23 A rancher surveyed his property to make sure there were no breaks in his fence. He rode his horse around his entire property and then ended at home, as shown in the figure below. It took him 5 hours to complete this job from start to end.



Note: The figure is not drawn to scale

What was the rancher's average velocity? ($V=d/t$)

- A 0.4 km/h North
 - B 0.9 km/h North
 - C 2.6 km/h North
 - D 3.0 km/h North
- 24 The figure below shows a Punnet Square for an inherited trait.



The arrow is pointing to a circled genotype in the square. What genotype does the circled "dd" represent?

- A the genotype in the mother's egg
- B the genotype that only the girls will inherit
- C the genotype that any of the children could inherit
- D the genotype that exactly $\frac{1}{4}$ of the children will inherit

Directions

Read the information about Alice’s science project then answer questions 25 – 27.

Alice needed to design a science project. She decided that she wanted to focus her project on how an earthworm’s behavior helps it survive.

- 25 Before designing her experiment, Alice went to the library to learn more about earthworms. Which of the following resources would provide the **best** information for her to use?
- A poems and fictional stories about earthworms
 - B non-fiction books and science websites on earthworm adaptations
 - C science websites and magazine articles about how earthworms fertilize soil
 - D personal websites and interviews with friends about their experiences with earthworms
- 26 Alice wrote down four ideas about earthworm behavior that she wanted to test. Which idea can be tested experimentally?
- A Earthworms like the taste of dirt better than sand.
 - B Earthworms are happier in black dirt than red dirt.
 - C Earthworms exist to decompose decaying materials.
 - D Earthworms will move away from direct light sources.
- 27 Alice conducted a controlled experiment and tested a single variable. She used one earthworm for her experiment and conducted the experiment once. She typed her conclusion and glued it to her science project poster. The next day, Alice was surprised to find out that she received a low grade on her conclusion.

What could Alice do differently to increase her grade on her conclusion?

- A test more variables in her experiment
- B print her conclusion bigger and in brighter colors
- C collect more data by repeating the experiment or using more worms
- D copy information on earthworm behavior from the resource materials she used

28 Different arrangements of atoms are shown in the figures below.

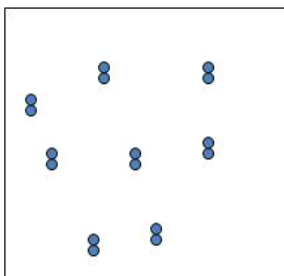


Figure 1

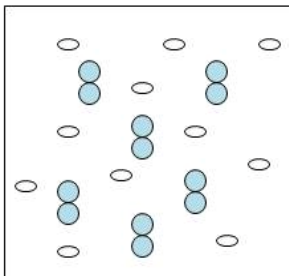


Figure 3

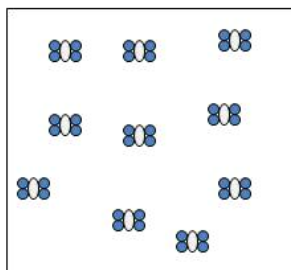
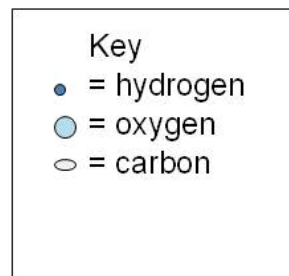


Figure 2

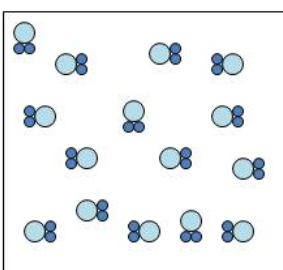


Figure 4

Which figure represents a mixture?

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

Answer Key

Item	Response	Alignment
1	A	S5C2-02
2	D	S5C2-04
3	B	S4C2-01
4	A	S4C4-03
5	D	S1C2-02
6	A	S1C3-05
7	B	S1C4-02
8	D	S1C3-08
9	B	S3C1-01
10	C	S5C1-05
11	A	S5C1-03
12	D	S1C4-04
13	C	S2C2-01
14	A	S5C1-01
15	C	S3C2-04
16	C	S4C4-02
17	A	S2C1-02
18	D	S1C1-01
19	B	S5C1-01
20	D	S1C2-04
21	C	S3C2-02
22	B	S1C3-02
23	A	S5C2-01
24	C	S4C2-02
25	B	S1C1-02
26	D	S1C1-03
27	C	S2C2-04
28	C	S5C1-04