

Montana Comprehensive Assessment System (MontCAS CRT)

GRADE 8
COMMON RELEASED ITEMS
SPRING 2016



opi.mt.gov

Montana
Office of Public Instruction
Denise Juneau, State Superintendent

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Printed in the United States of America.

Science Directions

This Science test contains three test sessions. Mark or write your answers in the Answer Booklet. Use a pencil to mark or write your answers.

This test includes two types of questions: multiple-choice and constructed-response questions.

For the multiple-choice questions, you will be given four answer choices—A, B, C, and D. You are to choose the correct answer from the four choices. Each question has only one answer. After you have chosen the correct answer to a question, find the question number in your Answer Booklet and completely fill in the circle for the answer you chose. Be sure the question number in the Answer Booklet matches the question number in the Test Booklet. The example below shows how to completely fill in the circle.

CORRECT MARK 	INCORRECT MARKS 
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If you decide to change your answer to a question, erase the wrong mark completely before filling in the circle of the new answer. Be sure you have only one answer marked for each question. **If two circles are bubbled in for the same question, that question will be scored as incorrect.**

If you are having difficulty answering a question, skip the question and come back to it later. Make sure you skip the circle for the question in your Answer Booklet.

For the other types of questions in the Test Booklet, you will be asked to write your answers in the box provided. Read the question carefully. If a question asks you to explain your answer or to show your work, be sure to do so.

You may make notes or use highlighters in your Test Booklet, but you must bubble or write your final answers in your Answer Booklet. **Do not make any stray or unnecessary marks in your Answer Booklet.**

Let's work through a sample question together to be sure you understand the directions.

Sample Question

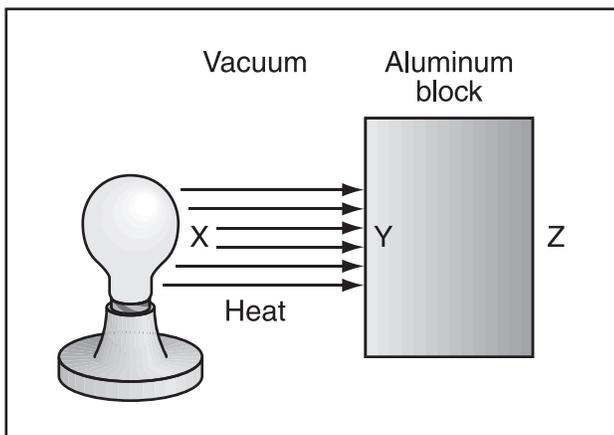
1. What is the state animal of Montana?
 - A. elephant
 - B. grizzly bear
 - C. zebra
 - D. giraffe

Science

1. What substance found on Mars led scientists to think there is or was life on the planet?

- A. carbon dioxide
- B. nitrogen
- C. oxygen
- D. water

2. The diagram below represents a light bulb giving off heat that travels through a vacuum and through an aluminum block.



What methods of heat transfer take place from point X through to point Z?

- A. Heat transfers by convection from X to Y and by radiation from Y to Z.
- B. Heat transfers by radiation from X to Y and by conduction from Y to Z.
- C. Heat transfers by conduction from X to Y and by convection from Y to Z.
- D. Heat transfers by radiation from X to Y and by convection from Y to Z.

3. What type of model illustrates the flow of matter and energy in an ecosystem?

- A. pie chart
- B. food web
- C. stream table
- D. population line graph

4. A group of students studied the effects of fabric softener on plants. The students divided 16 identical plants into 4 equal groups. All of the plants received the same amount of water. The students added different amounts of fabric softener to the soil in each group of plants. The table below shows the results.

Effects of Fabric Softener on Plant Growth

Group	Amount of Fabric Softener Added to Soil (drops)	Average Weight of Plants after 3 Weeks (g)
1	6	.030
2	12	.009
3	18	.010
4	24	.006

Which action would **most** improve this investigation?

- A. deleting the results for 18 drops because the average weight does not follow the pattern
- B. repeating the investigation using a different brand of fabric softener
- C. including a group of plants in soil without any fabric softener
- D. giving each group of plants a different amount of water

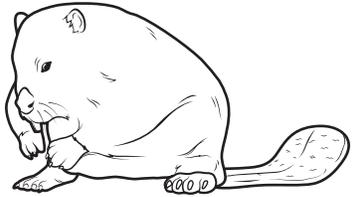
5. Physicists would **most likely** be involved with which project?

- A. designing rocket engines
- B. genetically engineering plants
- C. researching infectious diseases
- D. protecting endangered wildlife

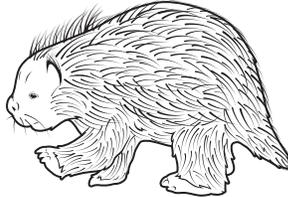
6. A paleontologist examines a rock sequence with layers that contain fossils. The top layer contains reptile fossils, the middle layer contains fish fossils, and the lowest layer contains trilobite fossils. What can the paleontologist infer about the rock sequence?

- A. The trilobite fossils are found in the oldest layer in the rock sequence.
- B. The environments represented by the rock sequence were landmasses.
- C. The fish fossils in the rock sequence are younger than the reptile fossils.
- D. The organisms represented in the rock sequence lived at the same time.

7. The images below show animals in the order Rodentia that are found in Montana.



Beaver



Porcupine



Mouse



Squirrel

- a. Identify one trait that can be used to separate one of the animals from the other three. Explain your answer.
- b. Starting with the information you identified in part (a), construct a dichotomous key to classify all four organisms based on visible traits.

Scoring Guide

Score	Description
4	Response demonstrates a thorough understanding of classification schemes and similarities between organisms. Response identifies a trait that can be used to separate one of the animals from the other three. Response includes a dichotomous key of the student's own design that correctly classifies organisms based on their observable characteristics. Response contains no errors or omissions.
3	Response demonstrates a general understanding of classification schemes and similarities between organisms. Response identifies a trait that can be used to separate one of the animals from the other three. Response includes a dichotomous key of the student's own design that correctly classifies organisms based on their observable characteristics. Response contains one error or omission.
2	Response demonstrates a limited understanding of classification schemes and similarities between organisms. Response identifies a trait that can be used to separate one of the animals from the other three. Response includes a dichotomous key of the student's own design that correctly classifies organisms based on their observable characteristics. Response contains two errors or omissions.
1	Response demonstrates a minimal understanding of classification schemes and similarities between organisms. Response identifies a trait that can be used to separate one of the animals from the other three. Response includes a dichotomous key of the student's own design that correctly classifies organisms based on their observable characteristics. Response has one correct piece of information and contains several errors or omissions.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Training Notes

- a. Porcupines are different because they have quills and the other animals don't. <1 point>
- b. Students should construct a dichotomous key based on the characteristics they can observe in the line art of each animal. Keys may look similar to this:
- | | |
|---|---------------|
| 1. a. The animal is covered in soft fur. | Go to Step 2. |
| b. The animal is covered in fur and quills. | PORCUPINE |
| 2. a. The animal has a flat, scaly tail. | BEAVER |
| b. The animal does not have a flat, scaly tail. | Go to Step 3 |
| 3. a. The animal has a long, bushy tail. | SQUIRREL |
| b. The animal has a long, thin tail. | MOUSE |

<3 points>

Example of Score Point 4

a.) a porcupine has long needle-like spines and the other three don't.

b.) 1: needle-like spines ... Porcupine
no needle-like spines ... go to 2

2: paddle-like tail ... Beaver
no paddle-like tail ... go to 3

3: bushy tail ... Squirrel
non-bushy tail ... mouse

Example of Score Point 3

Spikes that cover the body can be used to separate the porcupine from the beaver, mouse, and squirrel.

1a If the Rodenita is covered in spikes it is a porcupine.

1b If the Rodenita is covered in fur go to 2.

2a. If the Rodenita stands on its two back feet go to 3.

2b. If the Rodenita stands on all four it is a mouse.

3a. If the Rodenita's tail is rectangle-like and lays flat it is a beaver.

3b. If the Rodenita's tail is covered in fur and stands up . . . it is a squirrel.

Example of Score Point 2

A.) Size, because the squirrel and the mouse are the smallest ones out of the four.

B.) 1. a. Small in size... Go to step 2
b. large in size... Go to step 3

2. a. long furry tail... squirrel
b. long hairless tail... mouse

3. a. quills... porcupine
b. no quills... beaver

Example of Score Point 1

The porcupine has spikes all over its body for defense and the other animals only have fur.

	Tail	Fur	teeth or claws	4 feet	whiskers	long front teeth	spikes	swimming
Beaver	✓	✓	✓		✓	✓		✓
Porcupine	✓	X		✓	✓	✓	✓	✓
Mouse	✓	✓		✓	✓	✓		
Squirrel	✓	✓	✓		✓	✓		

Example of Score Point 0

a.) Their tail separates them from each other. They all have different tails.

b.)

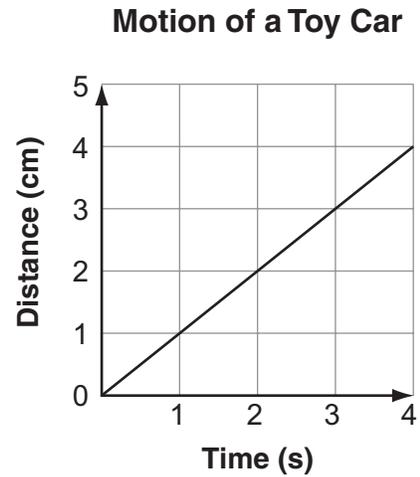
8. The Punnett square below shows a cross between two parents for a particular trait.

	D	d
d		
d		

Which statement describes the expected gene pairs for the offspring that result from the cross?

- A. All of their gene pairs will be **Dd**.
- B. All of their gene pairs will be **dd**.
- C. Half of their gene pairs will be **DD**.
- D. Half of their gene pairs will be **Dd**.

9. The motion of a toy car is graphed below.



What does this graph show about the motion of the toy car?

- A. The toy car is moving 1 cm every second.
 - B. The toy car is moving 2 cm every second.
 - C. The toy car is moving 3 cm every second.
 - D. The toy car is moving 4 cm every second.
10. The composition of seawater is different depending on where and when a sample is obtained. Which term describes seawater?
- A. compound
 - B. element
 - C. mixture
 - D. pure substance

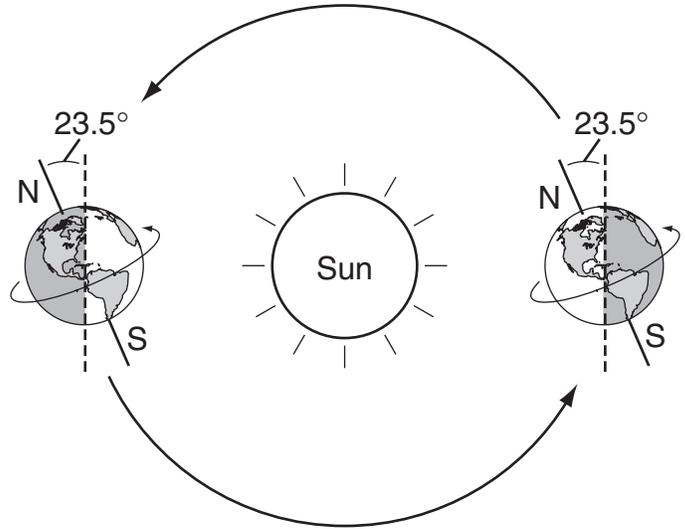
11. What can cause a theory to change?
- A. The majority of scientists support a new theory.
 - B. Public opinion of the theory is negative.
 - C. A scientist collects evidence that contradicts the theory.
 - D. A new hypothesis is introduced based on the original theory.

12. A national conservation program has teamed with some Montana American Indian tribes to identify and grow culturally important native plants, such as prairie coneflower and western yarrow. These plants were once used by some Montana American Indians to treat snakebites and wounds, reduce fevers, and make healing teas.

How did the Montana American Indians **most likely** gain knowledge about these native plants?

- A. by studying about the plants in school
- B. by performing chemical analyses of the plants
- C. by visiting other tribes to learn about the plants
- D. by noticing the effects the plants have on the human body

13. The diagram below shows Earth's motion around the Sun.



As Earth orbits the Sun, it also rotates or spins on its axis. How many times will Earth rotate on its axis during one complete orbit around the Sun?

- A. 1
- B. 29
- C. 365
- D. 730

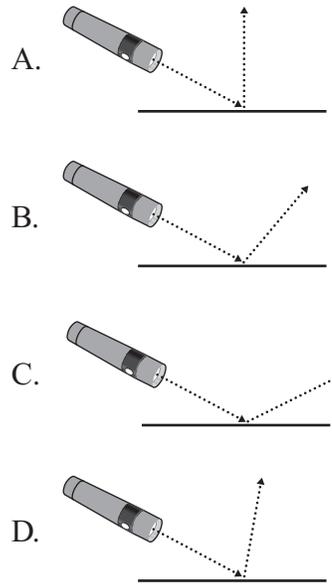
14. Several different species of seed-eating finches are found on the Galapagos Islands. One way the finch species differ is by the shape and size of their beaks. On island A, there is only one finch species. On island B, there are several finch species. Which characteristic of island B **best** explains why it has more finch species than island A?
- A. Island B has more nesting sites than island A.
 - B. Island B has more kinds of seeds than island A.
 - C. Island B has fewer predators of finches than island A.
 - D. Island B has fewer kinds of other animals than island A.

15. A student investigates how long it takes four different soil samples to settle in a clear container. The student's experimental design is described below.
1. Get four soil samples made up of different percentages of sand, gravel, clay, and compost.
 2. Add 100 g of one type of soil to four identical clear containers. Each container should have only one soil type.
 3. Add 1000 mL of water to each container.
 4. Measure how long it takes the soil to settle.

What is one **weakness** of this experimental design?

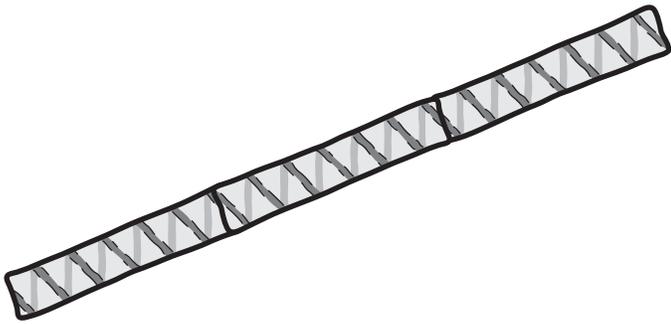
- A. Too much data will be collected.
- B. The experiment will take too long to complete.
- C. More than one variable should be tested.
- D. More than one sample of each soil type should be used.

16. A student points a flashlight at a mirror. Which picture **best** shows how the mirror reflects the beam of light?



17. Which statement **best** explains why fossils of the same species of dinosaurs were found on the eastern coast of South America and the western coast of Africa?
- A. The continents were once a single land mass.
 - B. The same species of dinosaurs evolved in both places.
 - C. Dinosaurs used a land bridge to cross the Atlantic Ocean.
 - D. Rocks containing fossils melted and reformed in different locations.

18. The picture below shows a type of green photosynthetic algae cell that grows in connected chains, but each cell is able to live by itself.



How is a chain of algae different from a blade of grass?

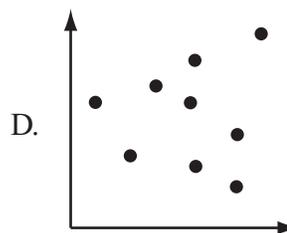
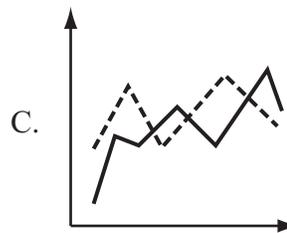
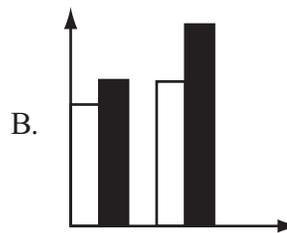
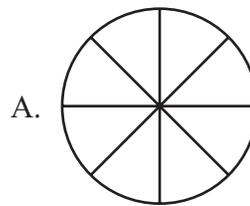
- A. The cells in the algae are part of a larger organism and the cells in grass are not.
- B. The cells in the algae use oxygen for photosynthesis and the cells in grass do not.
- C. The cells in a blade of grass are arranged into tissues and the cells in algae are not.
- D. The cells in a blade of grass have chloroplasts and the algae cells do not.
19. Food webs show the flow of energy through an ecosystem. Which question can be answered by using a food web?
- A. Which populations will become extinct?
- B. Which organisms have the shortest life span?
- C. Which organism requires the largest number of calories?
- D. Which populations will be affected by a change in another population?

20. The table below shows data that a student collected about tides.

Tide Data

Day 1		Day 2	
Time	Height (m)	Time	Height (m)
1:00 A.M.	10.5	1:42 A.M.	10.2
6:59 A.M.	3.0	7:31 A.M.	3.3
12:10 P.M.	11.2	1:39 P.M.	11.2
7:28 P.M.	2.0	8:05 P.M.	2.0

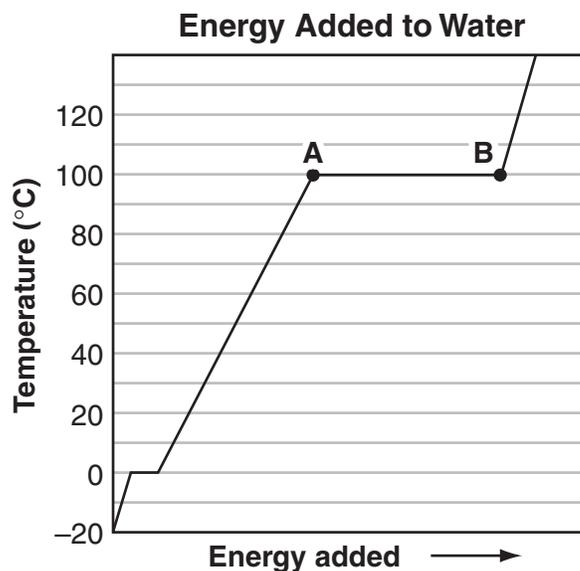
Which format is **most** appropriate to help the student analyze the data?



21. A scientist wants to determine whether a bar of gold is pure. Which information would best show the scientist that the bar is made of pure gold?
- A. The bar is heavy.
 - B. The bar is a gold color.
 - C. The atoms making up the bar are identical.
 - D. The compounds making up the bar are identical.

22. Which change could occur if Earth's rotation slowed?
- A. The length of a day would increase.
 - B. The length of a day would decrease.
 - C. The length of a year would increase.
 - D. The length of a year would decrease.

23. The graph below shows how the temperature of water (H_2O) changes as energy is added to the water.

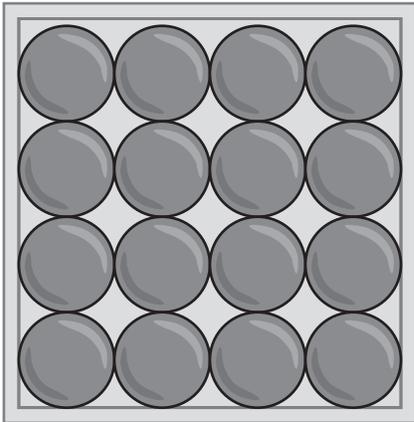


What happened between points A and B on the graph?

- A. The water molecules lost most of their energy and nearly stopped moving.
- B. The energy caused the water molecules to separate into hydrogen and oxygen.
- C. The energy of the water molecules remained constant until the water became a solid.
- D. The water molecules acquired enough energy to spread out and become a gas.

24. Scientists conducted research to determine the size of the grizzly bear population in northwestern Montana. Members of the CSKT and Blackfeet nations helped the scientists with the research. Which tribal knowledge was **most** helpful to the efforts of the scientists?
- A. their knowledge of weather prediction
 - B. their knowledge of how to use GPS systems
 - C. their knowledge of the land and movement of the bears
 - D. their knowledge of computer software to help analyze the data from the bears

25. A student creates a model to show the behavior of atoms in a solid. She packs a layer of small metal beads into a glass dish, as shown below.



How could the student change the model to represent a gas?

- A. use larger beads
- B. use a circular dish
- C. remove most of the beads
- D. add a second layer with twice as many beads

26. The properties of a substance are shown in the box below.

Properties of a Substance

- solid at room temperature
- does not dissolve in water
- surface is shiny
- attracted to a magnet
- conducts electricity

Which substance is **most likely** described by the information in the box?

- A. metal
- B. plastic
- C. rubber
- D. wood

27. The table below lists the classification information of four plants native to Montana.

Classification of Montana Plants

Idaho Blue-Eyed Grass	Tapertip Onion	Chives	Fairy Slipper
Liliales	Liliales	Liliales	Orchidales
Iridaceae	Liliaceae	Liliaceae	Orchidaceae
Sisyrinchium	Allium	Allium	Calypso
idahoense	acuminatum	schoenoprasum	bulbosa

According to the table, which organisms have the most similarities?

- A. chives, fairy slipper
- B. fairy slipper, Idaho blue-eyed grass
- C. Idaho blue-eyed grass, tapertip onion
- D. tapertip onion, chives

