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## Battle Creek Area Mathematics and Science Center Summative Assessment - End of Unit Exam

Attached is the Summative Assessment for the Battle Creek Area Mathematics and Science Center Science Unit, *States of Matter*. This assessment includes a number of multiple-choice questions, one constructed response question, and several items from the unit's Student Journal. Summative assessment of targeted concepts and skills provides feedback to the individual student and the teacher on conceptual understanding, demonstration of achievement of selected content, and determination of readiness for refinement and application of new knowledge and skills. The inclusion of the Student Journal items provides the opportunity to determine the level of understanding and ability of key knowledge and skills targeted in this unit. The Student Journal items evaluate individual student learning and the effectiveness of instruction. Rubrics are included in the Summative Assessment to ensure consistent scoring of the items. All components of this assessment provide multiple opportunities to assess student understanding of each science content expectation addressed in the unit.

The BCAMSC Summative Assessments are in draft form and may change based on student performance and teacher feedback. The BCAMSC Outreach Staff will use data collected from participating districts to make adjustments for the following school year.

If you have any questions or suggestions regarding the Summative Assessment, please direct your calls to Nancy Karre at (269) 965-9584 or email: [nancy@bcamsc.org](mailto:nancy@bcamsc.org).



A S S E S S M E N T



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



Date: \_\_\_\_\_

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1. Matter is described as anything that:
  - a. has mass and is a solid.
  - b. can be measured.
  - c. can be felt and observed.
  - d. has mass and takes up space.
  
2. Choose the BEST tool to use to measure the volume of a paper clip, small marble, nail, and button.
  - a. balance
  - b. spring scale
  - c. metric measuring tape
  - d. graduated cylinder
  
3. Choose the method to use to measure the volume of any irregularly shaped objects.
  - a. Place the object in a graduated cylinder with water and measure how much water is displaced in milliliters.
  - b. Measure each side of the object and then add up all the sides to find the volume in centimeters.
  - c. Measure the length and width and multiply the length times the width in liters and milliliters.
  - d. Use a balance to measure and compare the objects with similar objects using grams.
  
4. Choose the BEST tool to measure the weight of an object.
  - a. balance
  - b. metric ruler
  - c. spring scale
  - d. grams and kilograms



States of Matter (cont.)

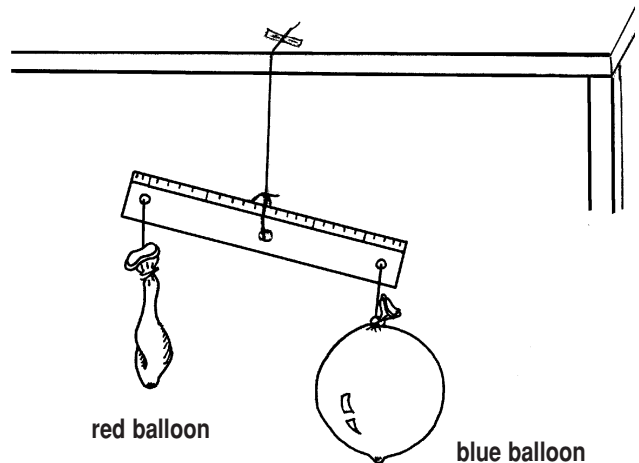


5. Choose the statement that BEST describes a liquid.
- a. Liquids are wet and are visible.
  - b. Liquids can be poured and take on the shape of their containers.
  - c. Liquids are clear, wet, and do not change their shape.
  - d. Liquids have volume but no mass.
6. Choose the BEST tools to measure the volume of a liquid.
- a. graduated cylinder and measuring cup
  - b. grams and milligrams
  - c. spring scale and balance
  - d. metric ruler and spring scale
7. Choose the statement that BEST describes a gas.
- a. Gases disappear into the air.
  - b. Gases have a distinct odor.
  - c. Gases have mass but no definite shape.
  - d. Gases are used for fuel to power engines.

8. Mrs. Clark's class built ruler balances. They filled one balloon half full with air and one balloon completely full with air. They attached one balloon to each end of the ruler. The class recorded the following observation:

Use the illustration to choose the BEST conclusion for Mrs. Clark's class.

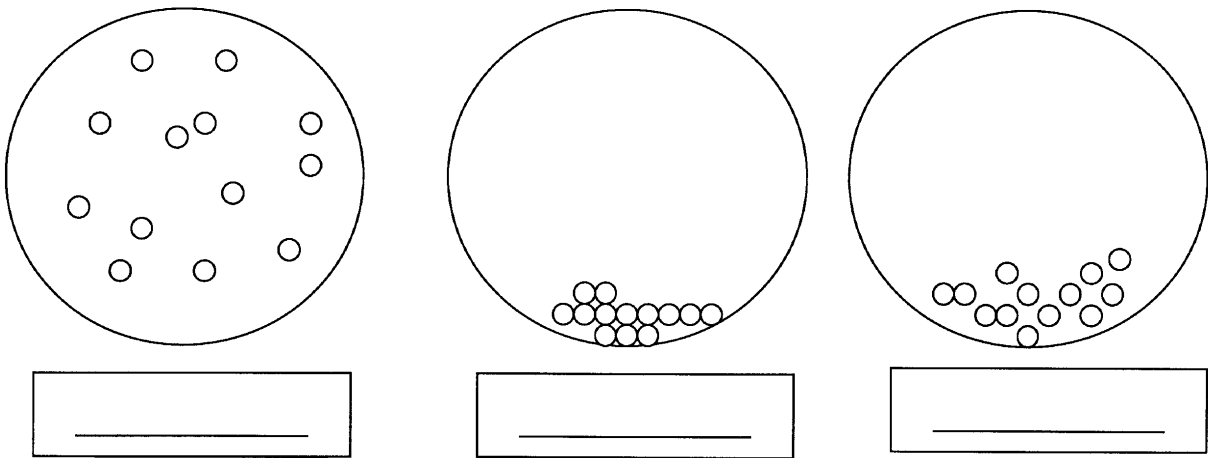
- a. The balloons have the same mass.
- b. Different colored balloons have different masses.
- c. Air does not have mass.
- d. Air has mass.





9. What evidence does Mrs. Clark's experiment provide to help you choose the BEST conclusion?
- a. One balloon is larger than the other.
  - b. One balloon has a greater volume.
  - c. The balloons are different colors.
  - d. The ruler of the balance is tilted down on one side.

10. Look at the pictures of models of the arrangement of molecules in three states of matter.



Choose the answer that correctly labels the state of matter represented by the models.

- a. gas, solid, liquid
  - b. solid, liquid, gas
  - c. liquid, gas, solid
  - d. gas, liquid, solid
11. If you add heat to a block of ice, it melts, or:
- a. changes from a solid to a gas.
  - b. changes from a solid to a liquid.
  - c. changes from a liquid to a solid.
  - d. changes in temperature and no change in state.



**States of Matter (cont.)**



12. Jack and Clyde wanted to investigate the temperature at which water changes phases from a solid to a liquid and a liquid to a gas. What will Jack and Clyde need to observe these phase changes?

- a. a heat source and thermometer to measure temperature
- b. a balance to measure mass at each phase change
- c. a change in the amount of sunlight
- d. a microscope to observe the motion of the molecules

13. Describe what happens to the motion and arrangement of molecules when water changes from a solid to a liquid by heating.

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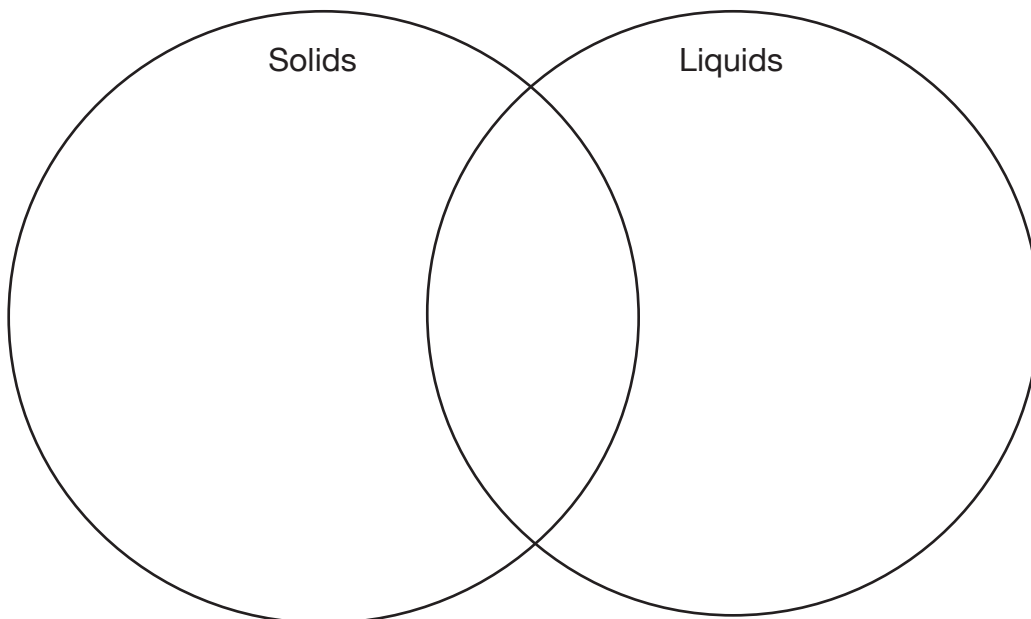
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14. Make a Venn diagram to compare the properties of solids and properties of liquids.





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15. Write a paragraph that describes how solids and liquids are the same and how they are different.

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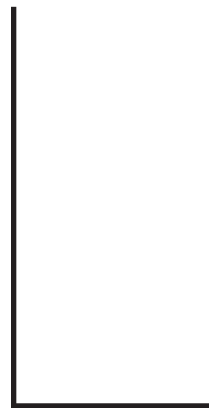
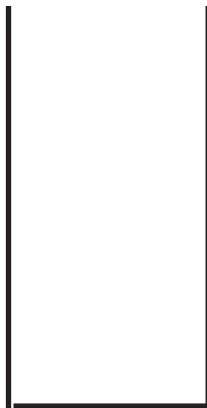
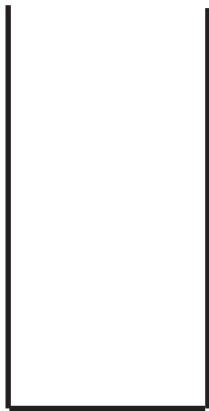
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16. Draw and label a model of the arrangement of the water particles in each state (solid, liquid, and gas) in each container.



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17. Explain how water can change from one state to another by heating and cooling.

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Rubric for States of Matter Summative Assessment

(Total Possible Points - 27)

Question #1: *Matter is described as anything that:* (P.PM.04.23)

Answer: d (1 point)

Question #2: *Choose the BEST tool to use to measure the volume of a paper clip, small marble, nail, and button.* (P.PM.04.17, S.IP.04.14, S.IP.04.15)

Answer: d (1 point)

Question #3: *Choose the method to use to measure the volume of any irregularly shaped objects.* (P.PM.04.17, S.IP.04.14, S.IP.04.15)

Answer: a (1 point)

Question #4: *Choose the BEST tool to measure the weight of an object.* (P.PM.04.16, S.IP.04.14, S.IP.04.15)

Answer: c (1 point)

Question #5: *Choose the statement that BEST describes a liquid.* (P.PM.04.23)

Answer: b (1 point)

Question #6: *Choose the BEST tools to measure the volume of a liquid.* (P.PM.04.17, S.IP.04.14, S.IP.04.15)

Answer: a (1 point)

Question #7: *Choose the statement that BEST describes a gas.* (P.PM.04.23)

Answer: c (1 point)

Question #8: *Mrs. Clark's class built ruler balances. They filled one balloon half full with air and one balloon completely full with air. They attached one balloon to each end of the ruler. The class recorded the following observation: Use the illustration to choose the BEST conclusion for Mrs. Clark's class?* (P.PM.04.16, P.PM.04.23)

Answer: d (1 point)



**States of Matter  
Answer Key (cont.)**



Question #9: *What evidence does Mrs. Clark's experiment provide to help you choose the BEST conclusion?* (P.PM.04.16, S.RS.04.15)

Answer: d (1 point)

Question #10: *Look at the pictures of models of the arrangements of molecules in three states of matter. Choose the answer that correctly labels the state of matter represented by the models.* (P.PM.04.23)

Answer: a (1 point)

Question #11: *If you add heat to a block of ice, it melts, or:* (P.CM.04.11)

Answer: b (1 point)

Question #12: *Jack and Clyde wanted to investigate the temperature at which water changes phases from a solid to a liquid and a liquid to a gas. What will Jack and Clyde need to observe these phase changes?* (P.CM.04.11)

Answer: a (1 point)

Question #13: *Describe what happens to the motion and arrangement of molecules when water changes from a solid to a liquid by heating.* (P.CM.04.11, P.PM.04.23)

Elements

- a. The motion of the molecules of the solid begin to move more rapidly.
- b. The molecules begin to move apart and move around more. (The ice loses its shape and the water begins to fill the shape of its container.)

Scoring (2 points)

- 2 - Response includes both elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer

Summative Assessment: Student Journal

Question #14 - Activity #4, Journal Entry Question #1: *Make a Venn diagram to compare the properties of solids and properties of liquids.* (P.PM.04.23)

Elements

- a. Solids keep their own shape.
- b. Solids and liquids have mass.
- c. Solids and liquids have volume (take up space).
- d. Force is needed to change shape of solids.
- e. Liquids take on the shape of their container.
- f. Liquids can be poured.



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Scoring (6 points)

- 6 - Response includes all six elements
- 5 - Response includes five elements
- 4 - Response includes four elements
- 3 - Response includes three elements
- 2 - Response includes two elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer

Question #15 - Activity #4, Journal Entry Question #2: *Write a paragraph that describes how solids and liquids are the same and how they are different.* (P.PM.04.23)

Elements

- a. Solids and liquids are similar in that they both have mass and volume.
- b. Solids and liquids differ in the shape that they take.

Scoring (2 points)

- 2 - Response includes both elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer

Question #16 - Activity #8, Journal Entry Question #1: *Draw and label a model of the arrangement of the water particles in each state (solid, liquid, and gas) in each container.* (P.CM.04.11)

Elements

- a. Drawing of a solid includes tightly packed molecules at the bottom of the container.
- b. Drawing of a liquid includes loosely packed molecules at the bottom of the container.
- c. Drawing of a gas includes molecules moving about the entire container.

Scoring (3 points)

- 3 - Response includes all three elements
- 2 - Response includes two elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer



Question #17 - Activity #8, Journal Entry Question #3: *Explain how water can change from one state to another by heating and cooling.* (P.CM.04.11)

Elements

- a. As the temperature increases, water changes from a solid -> liquid -> gas.
- b. As the temperature decreases, water changes from a gas -> liquid -> solid.

Scoring (2 points)

- 2 - Response includes both elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer