Grade 5 Science

WINTER BREAK PACKET
December 2014 – January 2015

STUDENT EDITION

Student Name

Teacher Name

Students return to school Monday, January 5, 2015
Note to Students and Parents

This homework packet for the Winter Break has been created to provide practice for students to work through selected response and brief constructed response items related to previously learned earth/space science and current physical science concepts. It is intended to be used for review purposes in preparation for the Maryland State Assessment (MSA) in Science and therefore students are encouraged to return a completed packet to their science teacher when they return from winter break.

The Winter Break Packet contains a technical passage, selected and brief constructed response items (SRs and BCRs), graphs, charts and a scoring rubric for brief constructed response items (BCRs).

Please write your response to the SRs and BCRs on the space provided in this booklet.

Enclosed in this packet, is a copy of the Maryland State Assessment Rubric for scoring BCRs. It can also be found online at Maryland State Department of Education (MSDE) website mdk12.org. It is highly recommended that this rubric be used when responding to BCRs.

<table>
<thead>
<tr>
<th>Overall score</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 points</td>
<td>A</td>
</tr>
<tr>
<td>18 + points</td>
<td>A</td>
</tr>
<tr>
<td>15-17 points</td>
<td>B</td>
</tr>
<tr>
<td>10-14 points</td>
<td>C</td>
</tr>
<tr>
<td>9 points</td>
<td>D</td>
</tr>
<tr>
<td>8 – 0 points</td>
<td>E</td>
</tr>
</tbody>
</table>

*Grading Scale

*Each Selected Response question is worth 1 point. The Brief Constructed Response Questions (numbers 4 and 12) is worth a maximum of 3 points each.

Approximate time: The allocated amount of time required to complete this Winter Break Packet is 120 minutes.
1. A student mixed 25 grams of salt into 1,000 grams of water.
   What is the mass of the saltwater mixture?
   A 975 grams
   B 1,000 grams
   C 1,025 grams
   D 2,500 grams

2. The motion of Earth is responsible for several celestial events.
   Which of the following events is caused by Earth revolving around the sun?
   A the days in a year
   B the hours in a day
   C the changes in the atmosphere of Earth
   D the position of the constellations in space

3. In October, the constellations Gemini and Orion appear in the sky after midnight. In January, Orion appears at sunset.
   At which time will Gemini most likely appear in January?
   A at noon
   B at sunset
   C after midnight
   D before sunrise
4. A student mixes water, a powdered drink mix, and sugar to make a flavored drink.

Explain what happens when the materials are combined to make a mixture. In your explanation, be sure to include:

- the properties before they are mixed
- how the properties were affected
Write your answer in the spaces provided.

Properties Before Mixing

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Properties After Mixing

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Science students observed the physical properties of different materials. They recorded their observations in the data table below.

<table>
<thead>
<tr>
<th>Material</th>
<th>State of Matter</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt</td>
<td>Solid</td>
<td>White grains</td>
</tr>
<tr>
<td>Sand</td>
<td>Solid</td>
<td>Brown and white grains</td>
</tr>
<tr>
<td>Vinegar</td>
<td>Liquid</td>
<td>Clear liquid</td>
</tr>
<tr>
<td>Baking Soda</td>
<td>Solid</td>
<td>White, powdery</td>
</tr>
<tr>
<td>Glass marbles</td>
<td>Solid</td>
<td>Many colors; hard, round</td>
</tr>
<tr>
<td>Steel marbles</td>
<td>Solid</td>
<td>Shiny metal, round, hard</td>
</tr>
</tbody>
</table>

The students then combined baking soda with some of the materials. Their observations are in the data table below.

<table>
<thead>
<tr>
<th>Material</th>
<th>State of Matter</th>
<th>Observations When Materials Were Mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baking soda + salt</td>
<td>Solid</td>
<td>White, powdery</td>
</tr>
<tr>
<td>Baking soda + sand</td>
<td>Solid</td>
<td>White, powdery; brown grains</td>
</tr>
<tr>
<td>Baking soda + vinegar</td>
<td>Liquid and gas</td>
<td>Bubbles and foam; clear liquid</td>
</tr>
</tbody>
</table>

5. What happened to the properties of the baking soda and the salt after the two materials were mixed together?

A The properties of the baking soda and salt changed.
B The properties of the baking soda and salt did not change.
C The properties of the baking soda changed, but the properties of the salt did not change.
D The properties of the baking soda did not change, but the properties of salt changed.

6. What happened to the baking soda and vinegar when the two materials were mixed together?

A The baking soda and vinegar did not change.
B The baking soda mixes with vinegar to form a gas.
C The baking soda changed, but the vinegar did not change.
D The baking soda did not change, but the vinegar changed.
A teacher conducted an investigation that demonstrated changes in matter. Three beakers were used in the investigation. Each empty beaker had a mass of 400 grams. Beaker W and Beaker X each contained 25 grams of sugar. Beaker Z contained 500 milliliters of water at 60° Celsius.

![Beaker W, Beaker X, Beaker Z](image)

The teacher poured the sugar from Beaker W into Beaker Z. The teacher stirred the sugar and water until the sugar was not visible.

Next, the teacher slowly heated the sugar in Beaker X on a hot plate. Within a few minutes, the sugar melted. The melted sugar turned brown and began to smoke. Finally, the melted sugar turned black and became a solid.

7. What property of the water most likely changed after the teacher added the sugar?

   A color  
   B flavor  
   C hardness  
   D odor
8. Stars are organized into patterns called constellations. One constellation is named Leo.

Which statement best explains why Leo appears in different areas of the sky throughout the year?

A Earth revolves around the sun.
B The sun revolves around Earth.
C The constellations revolve around Earth.
D Earth revolves around the constellations.


The best way to prove that no mass was lost during this reaction is to

A use equal masses of baking soda and vinegar
B determine the masses of all the substances before and after the reaction
C determine the mass of the carbon dioxide and water that is produced
D compare the mass of the vinegar and water to be certain they are equal

10. On Earth, water can be a solid, a liquid, or a gas.

Which energy source has the greatest influence on the state of matter of water?

A the sun
B the wind
C ocean currents
D the metal core
Directions
Use the information below to answer Numbers 11 and 12.

A student is investigating changes in the states of matter. The student fills a graduated cylinder with 50 milliliters of packed snow. The graduated cylinder has a mass of 50 grams when empty and 95 grams when filled with the snow.

11. The packed snow changes to liquid water when the snow is put in a warm room.

Which statement best describes this process?

A Cooling causes the snow to melt.
B Cooling causes the snow to freeze.
C Heating causes the snow to freeze.
D Heating causes the snow to melt.
12. Explain how snow changes to form water vapor (gas). In your explanation, be sure to include:

• changes in the state of matter
• the processes needed to change the states of matter

Write your answer in the space provided.
13. The mass of a jar and lid with white marbles and black marbles is 1,500 grams. The mass of the marbles alone is half the total mass of the jar, lid, and marbles.

Which statement best explains the difference between the mass of the jar with the marbles and the total mass of only the marbles?

A The mass of the jar and lid is equal to the mass of the marbles alone.

B The mass of the jar and lid is equal to the mass of the white marbles.

C The mass of the white marbles is less than the mass of the black marbles.

D The mass of the white marbles is more than the mass of the black marbles.
Use the information below to answer Numbers 14 and 15.

Students visited the Morris W. Offit telescope located at the Maryland Space Grant Observatory in Baltimore. They learned about the stars, planets, and moon.

The students recorded the information below.

- Star patterns stay the same, but their locations in the sky seem to change.
- The sun, planets, and moon appear to move in the sky.
- Proxima Centauri is the nearest star to our solar system.
- Polaris is a star that is part of a pattern of stars called the Little Dipper.

14. The apparent change in the location of a star pattern is related to
   A sun flares
   B the season
   C the weather
   D moon phases

15. Which statement best explains why the sun appears to move across the sky each day?
   A The sun revolves around the Earth.
   B Earth rotates around the sun.
   C The sun revolves on its axis.
   D Earth rotates on its axis.
Directions

Use the passage below to answer Numbers 16 and 17.

Making a Splash on Mars

Scientists have known for years that water exists on Mars. There are small amounts of water vapor in the atmosphere, and at the Martian North and South poles there are frozen water ice caps. The north polar cap is mostly water ice (and there is also some frozen carbon dioxide, like dry ice) that is about 1 mile¹ thick! Scientists believe even more water lies deep under the Martian surface.

In June 2000 scientists held a press conference to announce some new pictures of Mars. These pictures showed gullies² that looked like flash flood channels³ on Earth. Scientists already knew that water had once flowed on the red planet, but that was billions of years ago. (We know this because NASA satellites have taken pictures of ancient dried-up riverbeds.) But these channels look like they were made recently, and this surprised the scientists.

One reason they were surprised is that Mars is very cold. It is so cold that the ground should be frozen. Any water in this area should be solid ice.

A second reason that liquid water is surprising is that Mars is so dry. There is so little water vapor in the atmosphere that any pool of water would quickly evaporate. Even on Earth, ocean water evaporates into the sky as part of the water cycle. On Mars, water evaporates more quickly than it would anywhere on Earth.

So: how could there be liquid water on such a planet? Well, this is a very interesting point. On Earth, we talk about the boiling point of water, where it turns into steam or vapor. We also talk about the freezing point of water, where liquid water turns to a solid called ice. Well, it turns out that there is a “triple point” of water. When the temperature and air pressure are just right, water can exist in all three states at once: solid, liquid, and gas—all at the same time!

Oddly, the atmospheric pressure⁴ on Mars is very close to the triple point pressure for water (6.1 millibars). All over the red planet, water can change from liquid to solid to gas with just a slight change in pressure.

¹1 mile – 1.6 kilometers
²gullies – ditches
³channels – long, narrow waterways
⁴atmospheric pressure – air pressure; about 1013.0 millibars on Earth
16. Why were scientists surprised to observe recently formed liquid water channels on Mars?

A Liquid water is only found below the surface of Mars.
B The surface of Mars is hard rock that cannot be eroded.
C Mars is so hot that all water is in the form of water vapor.
D Mars is too cold for liquid water to flow on the planet surface.

17. On Mars, 100 grams of ice changes into a liquid.

When compared to the mass of the solid ice, the mass of the liquid water is

A greater than the mass of the ice
B one half the mass of the ice
C equal to the mass of the ice
D twice the mass of the ice
MSA SCIENCE RUBRIC

LEVEL 3
There is evidence in this response that the student has a full and complete understanding of the question or problem.

- The supporting scientific evidence is complete and demonstrates a full integration of scientific concepts, principles, and/or skills.
- The response reflects a complete synthesis of information, such as data, cause-effect relationships, or other collected evidence.
- The accurate use of scientific terminology strengthens the response.
- An effective application of the concept to a practical problem or real-world situation reveals a complete understanding of the scientific principles.

LEVEL 2
There is evidence in this response that the student has a general understanding of the question or problem.

- The supporting scientific evidence is generally complete with some integration of scientific concepts, principles, and/or skills.
- The response reflects some synthesis of information, such as data, cause-effect relationships, or other collected evidence.
- The accurate use of scientific terminology is present in the response.
- An application of the concept to a practical problem or real-world situation reveals a general understanding of the scientific principles.

LEVEL 1
There is evidence in this response that the student has minimal understanding of the question or problem.

- The supporting scientific evidence is minimal.
- The response provides little or no synthesis of information, such as data, cause-effect relationships, or other collected evidence.
- The accurate use of scientific terminology may not be present in the response.
- An application, if attempted, is minimal.

LEVEL 0
There is evidence that the student has no understanding of the question or problem.

- The response is completely incorrect or irrelevant or there is no response.

* On the Maryland School Assessment, the application of a concept to a practical problem or real-world situation will be scored when it is required in the response and requested in the item stem.