Dear families,

As our community works to understand and respond to the effects of COVID-19, the Mukilteo School District sincerely appreciates your patience as we navigate this period of unprecedented school closures.

Attached to this letter is a packet of materials to help you supplement your child’s education while away from the formal school environment. Please feel free to use the grade-level packets to review and practice previously taught skills in English/Language Arts, Mathematics and Science. They are not required, nor will they be graded. Answer keys are included in the packets so that your child can check their own work. Students are encouraged to skip around and find topics of interest and practice rather than complete them from beginning to end. If you find that your child’s grade level is too challenging, or not challenging enough, you are welcome to work outside of their current grade level.

It is highly encouraged that your child continues to review and practice previously taught skills and remain engaged in learning. We hope these packets add to what you are already doing to support your child in learning during this challenging time.

Sincerely,

The Curriculum and Instruction Department
Mukilteo School District
Topic 1: Waves Transfer Energy

Read each question. Circle the letter of the correct answer.

1. A water wave is traveling toward the shore of a lake. In which direction does the wave transfer energy?
   A. up and down
   B. in all directions
   C. toward the shore
   D. opposite its movement

2. The wave pulses of a tsunami become closer as the wave approaches shore. What are other ways the wave changes?
   A. It speeds up and increases in height.
   B. It speeds up and decreases in height.
   C. It slows down and increases in height.
   D. It slows down and decreases in height.

3. A local surf report provides the height of the wave from the trough to the crest of the wave. How does this relate to the wave’s amplitude?
   A. It is less than the wave’s amplitude.
   B. It is equal to the wave’s amplitude.
   C. It is about twice the wave’s amplitude.
   D. It is about half of the wave’s amplitude.

4. What measurement is usually determined by measuring the crest of one wave to the crest of another wave?
   A. amplitude
   B. frequency
   C. range
   D. wavelength

5. The figure shows a wave.

What is the amplitude of the wave?
   A. 2 m
   B. 4 m
   C. 6 m
   D. 8 m

6. One wave pulse occurs at a certain point every three seconds. Which property of the wave is this measure?
   A. amplitude
   B. frequency
   C. wavelength
   D. wave speed

7. Suppose the amplitude of a wave increased by a factor of 4. By what factor did the energy of the wave increase?
   A. 2
   B. 4
   C. 8
   D. 16
Read each statement. Write your answer on the lines.

8. A cork is sitting in a tray filled with water. A wave moves through the water. Describe what will happen to the cork as the wave passes.

Describe what the cork’s position will be after the wave has moved past.

9. A student is modeling a wave by setting a spring toy on a table, holding one end, and pushing the spring away and pulling it closer, over and over. What type of wave is the student modeling?

What are places where the coils are close together and places where the coils are far apart called?

10. Describe the amplitude of a wave.
Topic 2: Waves Interact with Matter

Read each question. Circle the letter of the correct answer.

1. What must be present in order for a mechanical wave to travel from one place to another?
   A. air
   B. any gas
   C. a vacuum
   D. any matter

2. Which property of a sound wave is related to the pitch of the sound?
   A. period
   B. frequency
   C. amplitude
   D. wavelength

3. Through which of these media do sound waves travel most slowly?
   A. air
   B. iron
   C. wood
   D. water

4. A transverse wave travels to the right through a medium. In which direction do the particles of the wave move as the wave moves past?
   A. left and right
   B. up and down
   C. to the right, along with the wave
   D. to the left, opposite the wave’s direction

5. The diagram shows possible paths of mechanical waves from the source of an earthquake.

   The waves change speed, direction, and shape as they move through the different materials that make up Earth. Assume that the four labeled waves all have the same energy when they leave the earthquake source. Which wave has the least effect on Earth’s surface?
   A. wave 1
   B. wave 2
   C. wave 3
   D. wave 4
<table>
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<tr>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>6. What happens to a wave that allows you to hear sound on the other side of a wall?</td>
<td>A. reflection</td>
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<td>B. refraction</td>
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<td>C. absorption</td>
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<td>7. What must happen to a wave in order for an echo to occur?</td>
<td>A. reflection</td>
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<td>C. absorption</td>
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Read each statement. Write your answer on the lines.

8. What happens when a mechanical wave encounters a boundary between two different media?

9. When a mechanical wave is partially reflected and partially transmitted, it becomes two waves. What happens to the energies and amplitudes of the two waves?

10. A room where musicians practice is designed with walls made of dense materials. Describe what happens to a sound wave moving through these walls that makes a dense material a good choice.
Topic 3: Light Can Be Modeled as a Wave

Read each question. Circle the letter of the correct answer.

1. Which of the following is not an example of a mechanical wave?
   A. a light wave  
   B. a sound wave  
   C. a water wave  
   D. a seismic wave

2. What are the two primary colors of light that combine in equal amounts to produce the second color magenta?
   A. red and blue  
   B. green and red  
   C. blue and green  
   D. yellow and green

3. What causes white light that passes through a prism to split into different colors?
   A. reflection  
   B. refraction  
   C. absorption  
   D. transmission

4. How is an electromagnetic wave different from a mechanical wave?
   A. An electromagnetic wave travels slower than a mechanical wave.  
   B. An electromagnetic wave has a larger amplitude than a mechanical wave.  
   C. An electromagnetic wave can travel through a vacuum, but a mechanical wave cannot.  
   D. An electromagnetic wave has no wavelength, but a mechanical wave has a wavelength.

5. A beam of light is shined on two different objects in the same area. It reflects off object one and is absorbed by object two. Which statement describes why the light behaved differently on each of the two objects?
   A. Each of the objects was a different shape.  
   B. Each of the objects was made of different material.  
   C. The light traveled a different distance before hitting each object.  
   D. The light was traveling at different speeds before it hit each object.
6. Which statement correctly describes a path light can take as it travels?
   A. Light bends as it goes through the air.
   B. Light will bend as it crosses from air into glass.
   C. Light will change directions as it travels through space.
   D. Light continues on a straight path as it crosses from air into water.

7. A light wave is traveling from air to water at an angle other than 90°. Which of these best describes what happens to the light wave as it enters the water?
   A. The light wave will completely bounce off the water.
   B. The light wave will bend as it enters the water from the air.
   C. The light wave will continue to travel in a straight line.
   D. The light wave will be completely absorbed by the water.

Read each statement. Write your answer on the lines.

8. You notice that on a bright summer day you feel hotter in a black T-shirt than you do when you wear a white T-shirt.
   What happens to light waves as they hit your black T-shirt that would make you feel warmer?

9. A green filter is placed between your eyes and a red apple. Identify the color that the apple will appear and explain your answer.

10. A ray of light is traveling through air and is about to cross through a glass window at an angle of 60°.
    What will happen to the light as it crosses from air into the glass?
Topic 4: Energy from Sunlight Causes Earth’s Seasons

Read each question. Circle the letter of the correct answer.

1. Kevin travels from the United States to Australia for the winter, but when he gets there it feels more like summer. Which statement explains this?
   A. The Northern Hemisphere is experiencing an equinox.
   B. The Southern Hemisphere is experiencing an equinox.
   C. The Southern Hemisphere is tilted toward the sun, so it is summer in Australia.
   D. The Southern Hemisphere is tilted away from the sun, so it is summer in Australia.

2. When it is winter, the United States receives the least direct solar energy, as compared with the rest of the year. Why does this happen?
   A. The Northern Hemisphere is closer to the sun.
   B. The Northern Hemisphere is farther from the sun.
   C. The Northern Hemisphere is tilted toward the sun.
   D. The Northern Hemisphere is tilted away from the sun.

3. How do the temperatures at Earth’s equator compare with the temperatures at the poles during the year?
   A. The equator is generally cold.
   B. The poles are generally warm.
   C. There is less variation in temperature at the equator.
   D. There is more variation in temperature at the equator.

4. In addition to changes in the number of hours of daylight, what other factor contributes to Earth’s seasons?
   A. time of the day
   B. angle of the sun’s radiation
   C. energy as heat from the moon
   D. warm air blowing from the oceans

5. Which characteristic is associated with winter as compared to summer?
   A. noon sun lower in the sky
   B. higher daytime temperatures
   C. more daily hours of sunlight
   D. longer days and shorter nights

6. Examine the diagram of Earth’s orbit.

   The position labeled ‘1’ represents the season of summer __________.
   A. at the poles
   B. at the equator
   C. in the Southern Hemisphere
   D. in the Northern Hemisphere

Note: Diagrams are not to scale.
7. Vesna is studying seasons on Earth. She drew a diagram of Earth to show how it is tilted on its axis. Vesna wants to include the label of Earth’s tilt on her diagram. What angle should Vesna add?
   A. 15.5°  B. 23.5°  C. 30°  D. 45°

Read each statement. Write your answer on the lines.

8. Describe the position of Earth’s axis during the winter solstice. How does this affect seasons in the Northern Hemisphere and in the Southern Hemisphere?

Note: Diagrams are not to scale.
10. The diagram shows the position of Earth at four different times during the year. According to this diagram, what season(s) in the United States do Position C and Position D represent, respectively?

Describe at least one effect that Earth’s position in space will have on the United States during Position B.
# Answer Key

## Topic 1: Waves Transfer Energy

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| 8      | Correct sample answers:  
  - The cork will move up and down as the wave moves past.  
  - After the wave has passed, it will be in its original position. |
| 9      | Correct sample answers:  
  - The student is modeling a longitudinal wave.  
  - The coils are close together at a compression. They are far apart at a rarefaction. |
| 10     | The amplitude of a wave is the distance from the center line of a wave to the bottom of a trough or the top of a crest. |

## Topic 2: Waves Interact with Matter

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| 8      | Correct sample answer:  
  - The wave is not entirely reflected or transmitted. Some of the wave can be transmitted into the new medium. The remaining portion of the wave is reflected back into the original medium. |
9 Correct sample answer:
• Each of the new waves will have less energy than the original wave. Amplitude depends on the medium, so the two new waves' amplitudes could be very different from each other and from the original wave's amplitude.

10 Correct sample answer:
• A sound wave moving through the dense material moves a lot of particles and loses a lot of energy due to absorption. Losing energy will make the sound harder to hear outside the room.

**Topic 3: Light Can Be Modeled as a Wave**

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| 8      | Correct sample answer:  
• Light waves will be absorbed by your dark shirt. |
| 9      | Correct sample answer:  
• The apple will appear black because all colors except green are filtered out. The apple usually reflects red wavelengths and absorbs green, but no red wavelengths of light are reflected to your eyes with the filter. |
| 10     | Correct sample answer:  
• The ray of light will slow down and refract as it enters the glass. |

**Topic 4: Energy from Sunlight Causes Earth’s Seasons**

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8 Correct sample answer:
• During the winter solstice, Earth’s axis tilts away from the sun and the sun’s rays strike the Northern Hemisphere at a low angle. As a result, solar energy spreads over a larger area and is less concentrated. The tilt also produces fewer hours of daylight. This season is winter in the Northern Hemisphere. In the Southern Hemisphere at the same time, Earth’s axis is tilted toward the sun, so the sun’s rays strike Earth at a higher angle. Thus, the area receives a higher concentration of solar energy. The tilt also produces more hours of sunlight. It is summer in the Southern Hemisphere.

9 Correct sample answer:
• Earth’s revolution around the sun causes the seasons and the part of Earth that is tilted toward the sun receives the most direct rays from the sun and is therefore warmer (e.g., It is summer in the Southern Hemisphere when the Southern Hemisphere is tilted toward the sun and winter in the Southern Hemisphere when it is tilted away from the sun.)

10 Correct sample answers:
• Position C represents spring. Position D represents summer. • Position B represents winter, so compared to other positions in space, the United States will experience fewer hours of daylight and lower temperatures.