



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

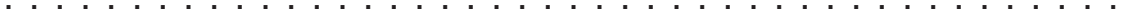
Attached is the Summative Assessment for the Battle Creek Area Mathematics and Science Center Science Unit, *Light and Sound*. This assessment includes a number of multiple-choice questions, one constructed response question, and several items from the unit's Student Journal. Summative assessment of 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 e-mail: nancy@bcamsc.org.



A S S E S S M E N T



Name: _____



Date: _____

.....

1. Bob searched in the back of the dark closet for his lost shoes. What could Bob do to help him find his shoes?
 - a. Ask his mom to look for the shoes.
 - b. Look under the bed for his shoes.
 - c. Get a flashlight and shine it into the back of the closet.
 - d. Close the closet door.

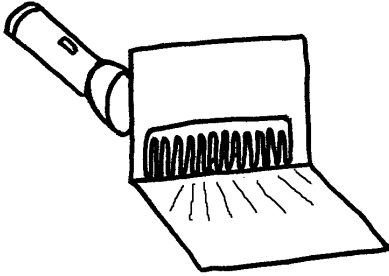
2. Jane and her mother walked to the store to buy some milk. Jane observed that her shadow was in front of her all the way to the store. On the way home Jane's shadow was behind her. Why did the position of the shadow change?
 - a. Jane's shadow was tired and walked behind Jane and her mother on the way home.
 - b. The sun was in the sky behind Jane on the way to the store and in front of Jane on the way back from the store.
 - c. The sun moved to the other side of Jane and her mother when they walked home.
 - d. Jane and her mother took a different route home.

3. Denzel wanted to light a dark area around a corner. Choose the BEST tool to use with a flashlight.
 - a. hammer
 - b. screwdriver
 - c. mirror
 - d. lamp shade

4. Jeanie and her father were building a tree house. Jeanie wanted to cover some of the windows with material that would allow light to shine into the tree house, but not allow anyone to see in the tree house. What material should Jeanie use on the tree house windows?
 - a. waxed paper
 - b. plastic wrap
 - c. aluminum foil
 - d. black construction paper



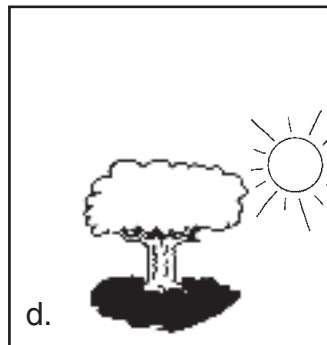
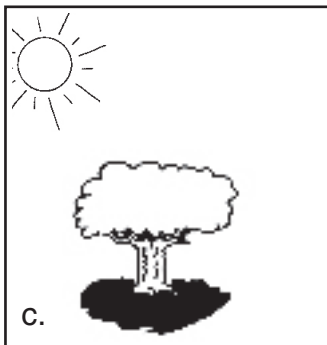
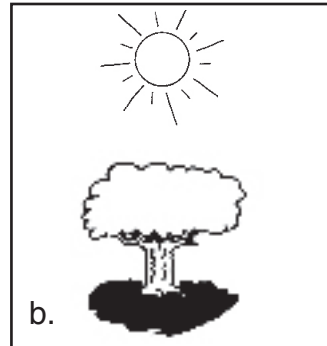
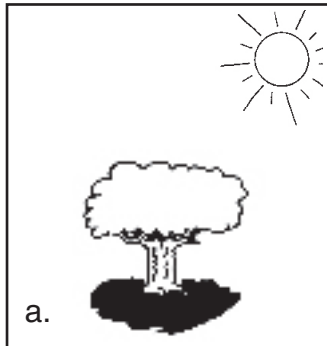
5. Tony and Ralph were investigating how light travels. They set up the following demonstration:



Tony thought that the light traveled around the teeth in the comb to make the pattern of light and shadow on the paper. Ralph thought that the light passed through the spaces and was blocked by the teeth in the comb. Which student do you agree with?

- a. Tony, because the combination of the space and teeth of the comb changes the direction of the light to make the pattern.
- b. Tony, because the space between the teeth allowed light to pass through and the teeth changed the direction of the light.
- c. Ralph, because the space between the teeth of the comb allows light to pass through and the teeth block the light.
- d. Ralph, because the angle of the light changes the pattern of the light and shadow on the paper.

6. Choose the picture that BEST illustrates the position of the sun to make the shadow of the tree.





.....

7. Carla and Greg were testing the temperature of different colors of t-shirts when placed in the sun. They collected the following data in their investigation:

Color of t-shirt	Temperature
white	75° C
red	81° C
yellow	78° C
black	86° C

Based on the data table, which color of shirt would be the warmest shirt on a sunny day?

- a. white
 - b. red
 - c. yellow
 - d. black
8. Choose the BEST explanation for the difference in the temperature of the shirts.
- a. Darker colors absorb more light energy that transfers to heat energy.
 - b. Darker colors reflect more light energy that transfers to heat energy.
 - c. Lighter colors are naturally cooler colors in the sunlight.
 - d. Lighter colors absorb the most heat energy from the sun.
9. Sounds are produced when objects, or some part of them, begin to vibrate. The sound an object makes changes when the speed of vibration changes. If an object begins to vibrate very fast, what will happen to the sound?
- a. The pitch will stay the same.
 - b. It will have a higher pitch.
 - c. It will have a lower pitch.
 - d. It will not have a pitch.

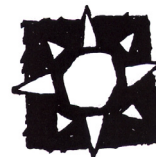


10. Lori and Trevor wanted to build straw instruments that made sounds of different pitches. Lori wanted her instrument to make a high pitch and Trevor wanted his instrument to make a low pitch. Choose the BEST answer that will help Lori and Trevor make their instruments.

- a. Lori and Trevor should use the same sized straws and Trevor should blow harder to make the instrument sound lower in pitch.
- b. Trevor should use a shorter straw than Lori to make the instrument sound lower in pitch.
- c. Trevor should use a longer straw than Lori to make the instrument sound lower in pitch.
- d. Lori should make holes in the top of the straw to make the instrument sound higher in pitch.

11. Jamal made a musical instrument out of different lengths of pipe. He wanted enough pipes to play a tune but found he needed one more pipe to make a low pitch. Circle the picture of the pipe that would give Jamal the lowest pitch when he struck the pipe with a pencil.



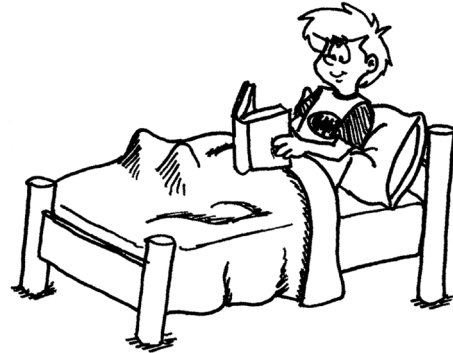
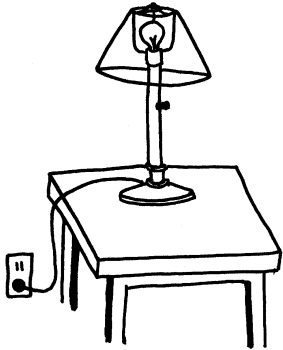


.....

12. While Brian was shopping for clothes for a spring break in warm, sunny Florida, Matthew was shopping for clothes for a ski trip in cold, sunny Colorado. Brian looked for clothes that were light in color and Matthew looked for clothes that were dark in color. Explain why Brian wanted light colored clothes and Matthew wanted dark colored clothes. (Include the terms light energy, heat energy, absorb, reflect, and temperature in your response.)



13. Look at the picture and draw where you would place the lamp to help Jack see his book better. Write why your placing of the lamp is better than where Jack had the lamp.



14. Look at the data table that shows the length of shadow at different times of day. Use the data from the table to explain what time of day the shadow was the longest.

Time of Day	Length of Shadow (cm)	Shape of Shadow	Direction of Shadow
Morning - 9:00 a.m.	110 cm.	narrow	west
Noon - 12:00 p.m.	48 cm.	oval - short	north
Afternoon - 5:00 p.m.	143 cm.	long - narrow	east



.....

15. Use the data from the table to explain what time of day the shadow was the shortest.

16. Draw a shadow of a tree in the early morning.



17. Write why you think the shape and size of a shadow changes at different times of the day?

18. Write how instruments with strings make sounds.



Rubric for Light and Sound Summative Assessment

(Total Possible Points - 25)

Question #1: *Bob searched in the back of the dark closet for his lost shoes. What could Bob do to help him find his shoes? (P.EN.03.21)*

Answer: c (1 point)

Question #2: *Jane observed that her shadow was in front of her all the way to the store. On the way home Jane's shadow was behind her. Why did the position of the shadow change? (P.EN.03.21)*

Answer: b (1 point)

Question #3: *Denzel wanted to light a dark area around a corner. Choose the BEST tool to use with a flashlight. (P.EN.03.21)*

Answer: c (1 point)

Question #4: *Jeanie and her father were building a tree house. Jeanie wanted to cover some of the windows with material that would allow light to shine into the tree house, but not allow anyone to see in the tree house. What material should Jeanie use on the tree house windows? (P.EN.03.21)*

Answer: a (1 point)

Question #5: *Tony thought that the light traveled around the teeth in the comb to make the pattern of light and shadow on the paper. Ralph thought that the light passed through the spaces and was blocked by the teeth in the comb. Which student do you agree with? (P.EN.03.21)*

Answer: c (1 point)

Question #6: *Choose the picture that BEST illustrates the position of the sun to make the shadow of the tree. (P.EN.03.21)*

Answer: b (1 point)

Question #7: *Carla and Greg were testing the temperature of different colors of t-shirts when placed in the sun. They collected the following data in their investigation...Based on the data table, which color of shirt would be the warmest shirt on a sunny day? (P.EN.03.11)*

Answer: d (1 point)

Question #8: *Choose the BEST explanation for the difference in the temperature of the shirts. (P.EN.03.11)*

Answer: a (1 point)



.....

Question #9: *The sound an object makes changes when the speed of vibration changes. If an object begins to vibrate very fast, what will happen to the sound?* (P.EN.03.31, P.EN.03.32)

Answer: b (1 point)

Question #10: *Lori and Trevor wanted to build straw instruments that made sounds of different pitches. Lori wanted her instrument to make a high pitch and Trevor wanted his instrument to make a low pitch. Choose the BEST answer that will help Lori and Trevor make their instruments.* (P.EN.03.31, P.EN.03.32)

Answer: c (1 point)

Question #11: *Jamal made a musical instrument out of different lengths of pipe...Circle the picture of the pipe that would give Jamal the lowest pitch when he struck the pipe with a pencil.* (P.EN.03.32)

Answer: c (1 point)

Question #12: *While Brian was shopping for clothes for a spring break in warm, sunny Florida, Matthew was shopping for clothes for a ski trip in cold, sunny Colorado...Explain why Brian wanted light colored clothes and Matthew wanted dark colored clothes.* (P.EN.03.11)

Elements

- a. Light colored clothes reflect the light energy.
- b. Dark colored clothes absorb light energy.
- c. Light energy transfers to heat energy.
- d. The temperature of the lighter clothes is cooler than darker clothes.

Scoring (4 points)

- 4 - Response includes all 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



Summative Assessment: Student Journal

Question #13 - *Activity #3, Journal Entry Questions #1 and #2: 1. Look at the picture and draw where you would place the lamp to help Jack see his book better. 2. Explain why your placing of the lamp is better than where Jack had the lamp. (P.EN.03.21)*

Elements

- a. The lamp is placed to the side of Jack in bed.
- b. Light travels in a straight path from the lamp to Jack's book.

Scoring (2 points)

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

Question #14 - *Look at the data table that shows the length of shadow at different times of day. Use the data from the table to explain what time of day the shadow was the longest. Activity #7, Journal Entry Question #1: Use your data from your shadow chart to explain what time of day the shadow was the longest. (P.EN.03.21)*

Answer: The shadow was longest early in the morning and/or late in the afternoon. (1 point)

Question #15 - *Use the data from the table to explain what time of day the shadow was the shortest. Activity #7, Journal Entry Question #2: Use your data from your shadow chart to explain what time of day the shadow was the shortest. (P.EN.03.21)*

Answer: The shadow was shortest in the middle of the day, or noon. (1 point)

Question #16 - *Activity #7, Journal Entry Question #3: Draw a shadow of the tree in the early morning. (P.EN.03.21)*

Elements

- a. Drawing includes a picture of a tree.
- b. Drawing includes the position of the sun.
- c. Drawing includes the correct position of the shadow.

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 #7, Journal Entry Question #4: Why do you think the shape and size of the shadow changes at different times of the day?* (P.EN.03.21)

Elements

- a. The position of the light source (sun) determines the size and shape of the shadow.
- b. As the sun appears to change positions in the sky, the size and shape of the shadow changes.

Scoring (1 point)

- 1 - Response includes element a and/or b
- 0 - No response, no elements, can't read the answer

Question #18 - *Activity #12, Journal Entry Question #1: Write how instruments with strings make sounds.* (P.EN.03.31, P.EN.03.32)

Elements

- a. Strings vibrate by moving back and forth.
- b. The motion of the vibrating strings makes sound waves (moves the air around the vibrating strings).

Scoring (2 points)

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