Black in the Spotlight

Name: _____

Date: _____

Student worksheet

Directions: Answer the questions below in preparation for the experiment.

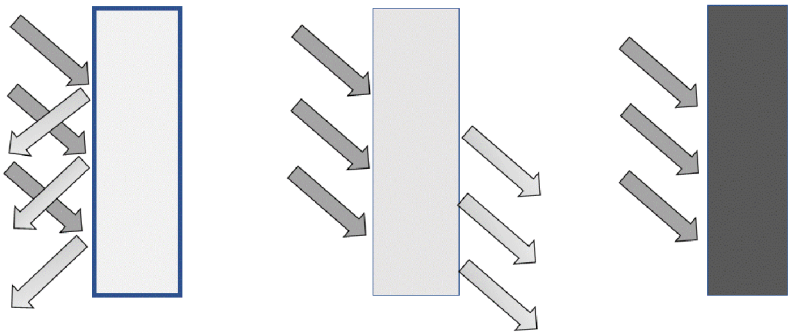
1. Write down explanations of the following phenomena.

   Transmission of light

   Reflection of light

   Absorption of light

2. Using the words "transmission," "reflection," and "absorption," label each figure below with the word that represents the phenomenon shown.



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Name _____

Directions: Investigate reflection, absorption, and transmission by measuring light intensity.

3. With your team, prove that a material transmits light.
   a. Choose a material from the box that is likely to transmit light and brainstorm ideas for ways to demonstrate that it transmits light.
   b. Make a sketch of your setup. Clearly label the light source, the material being tested, and the light sensor or phone.

   c. What will you change in the experiment, or what is the independent variable?

   d. What will you measure, or what is the dependent variable?

   e. What will you keep the same during the experiment, or what are the control variables?

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Name _____

Directions: Investigate reflection, absorption, and transmission by measuring light intensity.

f. Make measurements with the light sensor using the sensor app on your phone and complete the data table. You can either use the "graph" or the "simple" option provided by the app to record your data. The graph option will present your sensor readings in a graph, whereas the simple option will show you the current measurement as a number. Note that on some devices the light sensor is only updated when there is a coarse change of illuminance. This means that you might not see data being recorded if the light intensity does not change significantly. If you need help with the app ask your teacher.

Experiment:	
Steps in the experiment:	Light intensity measurement (Unit:)

g. Briefly explain how your data proves that the material transmits light.

h. Show and explain your experiment to the other team in your group.

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Name _____

Directions: Investigate reflection, absorption, and transmission by measuring light intensity.

4. With your team, prove that a material reflects light.
   a. Choose a material from the box that is likely to reflect light and brainstorm ideas for ways to demonstrate that it reflects light.
   b. Make a sketch of your setup. Clearly label the light source, the material being tested, and the light sensor or phone.

   c. What will you change in the experiment, or what is the independent variable?

   d. What will you measure, or what is the dependent variable?

   e. What will you keep the same during the experiment, or what are the control variables?

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Name _____

Directions: Investigate reflection, absorption, and transmission by measuring light intensity.

f. Complete the data table.

Experiment:	
Steps in the experiment:	Light intensity measurement (Unit:)

g. Briefly explain how your data proves the material reflects light.

h. Show and explain your experiment to the other team in your group.

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Name _____

Directions: Investigate reflection, absorption, and transmission by measuring light intensity.

5. With your team, prove that a material absorbs light.
   a. Choose a material from the box that is likely to absorb light and brainstorm ideas for ways to demonstrate that it absorbs light.
   b. Make a sketch of your setup. Clearly label the light source, the material being tested, and the light sensor or phone.

   c. What will you change in the experiment, or what is the independent variable?

   d. What will you measure, or what is the dependent variable?

   e. What will you keep the same during the experiment, or what are the control variables?

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Name _____

Directions: Investigate reflection, absorption, and transmission by measuring light intensity.

f. Complete the data table.

Experiment:	
Steps in the experiment:	Light intensity measurement (Unit:)

g. Briefly explain how your data proves the material absorbs light.

h. Show and explain your experiment to the other team in your group.

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Name _____

Directions: Investigate reflection, absorption, and transmission by measuring light intensity.

6. With your team, prove that a combination of at least two of the three phenomena occurs when light interacts with a material.
   a. Choose a material from the box that is likely to interact with light in several ways and brainstorm ideas for ways to demonstrate that a combination of at least two phenomena occurs.
   b. Make a sketch of your setup. Clearly label the light source, the material being tested, and the light sensor or phone.
   c. What will you change in the experiment, or what is the independent variable?
   d. What will you measure, or what is the dependent variable?
   e. What will you keep the same during the experiment, or what are the control variables?

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Name _____

Directions: Investigate reflection, absorption, and transmission by measuring light intensity.

f. Complete the data table.

Experiment:	
Steps in the experiment:	Light intensity measurement (Unit:)

g. Briefly explain how your data proves that two phenomena occur when light interacts with this material.

h. Show and explain your experiment to the other team in your group.