# *It's Black and White!*

**Subject: Absorption Based on Color**

**Science Fact: The more sunlight an object absorbs, the warmer it will become.**

***Experiment Question: Which color absorbs more sunlight, black or white?***

## MATERIALS

2 transparent plastic bags (sealable sandwich size)
4 pieces of black construction paper cut the same size as bag
4 pieces of white construction paper cut the same size as bag
2 thermometers
timer
notebook and pencil
graph paper

## DIRECTIONS

## Preparing your Notebook

Write the Experiment Question in your notebook.
Write a hypothesis - an educated guess to the Experiment Question.
Create a table in your notebook like the one below.

| | Black | White |
|---|---|---|
| Starting Temperature | | |
| Temperature after____ min | | |
| Temperature after____ min | | |
| Temperature after____ min | | |

## Conducting the Experiment

*Until they are ready to be used, keep your thermometers in the shade so the sun does not strike them.

Work with a partner.

1. Place two pieces of black construction paper inside one of the bags.

2. Place two pieces of white construction paper inside one of the bags.

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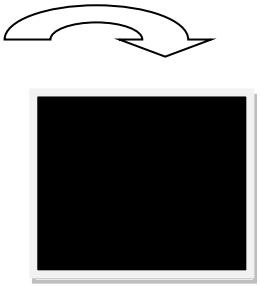
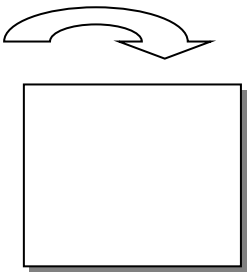
2 PIECES OF BLACK 

2 PIECES OF WHITE 

3. Seal the bags and place them in the shade while you prepare the thermometers.

4. Take the thermometers from the shade and record the starting temperature on each one.

5. Place a thermometer inside each bag slipping it between the two pieces of construction paper. Reseal the bags and place them in the sun next to one another. (You should not be able to see the thermometers.)

6. Watch the timer. In five minutes take the thermometers out and record the temperature on each one. Do this as quickly as you can and place the thermometers back in the bags. Seal the bags and place in the sun again.

7. Repeat this step every five minutes two more times.

## In Your Notebook

*Discuss the activity and data with your partner.*

1. Compare how the temperature changed in the black bag with how it changed in the white bag.

2. What difference did you notice?

3. Which color do you think absorbed the most sunlight? Explain your answer.

4. Using the data from your table, create a line graph with time plotted on the x axis and temperature plotted on the y axis.

## Conclusion

This is the answer to the Experiment Question. It is based on your data, diagrams and observations. Write a Conclusion.

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## Standards Met

PHYSICAL SCIENCE / ENERGY

MS-PS3-3.

- Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

MS-PS4-2.

- Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.

CCSS.MATH.CONTENT.6.EE.C.9

- Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

CCSS.ELA-LITERACY.RST.6-8.3

- Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

CCSS.ELA-LITERACY.RST.6-8.7

- Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).