Data Set #10

Type of response:	Source Dependent Response
Grade level:	8
Subject:	Science
Training set size:	1640
Final evaluation set size:	548
Average length of responses:	60 words
Scoring:	Score1, Score2
Final score:	Final score is score 1. Score 2 is for inter-rater reliability purposes.
Rubric range:	0-2

Prompt—Doghouse Item

Brandi and Jerry did the following controlled experiment to find out how the color of an object affects its temperature.

Question: What is the effect of different lid colors on the air temperature inside a glass jar exposed to a lamp?

Hypothesis: The darker the lid color, the greater the increase in air temperature in the glass jar, because darker colors absorb more energy.

Materials:
glass jar
lamp
four colored lids: black, dark gray, light gray, and white
thermometer
meterstick
stopwatch

Controlled Experiment Setup

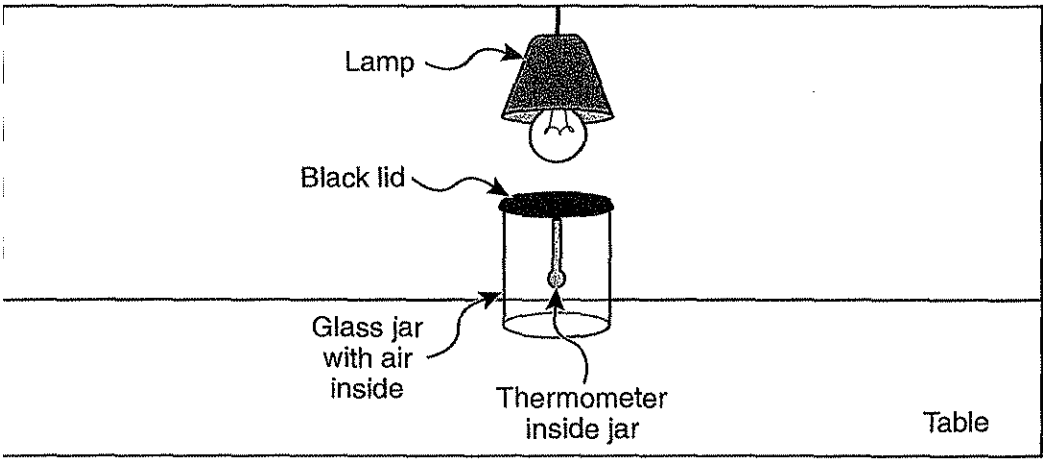

Diagram not to scale

Procedure:

1. Put the black lid with the attached thermometer on the glass jar.
2. Make sure the starting temperature inside the jar is 24° C.
3. Place lamp 5 centimeters away from the lid and turn on the lamp.
4. After 10 minutes measure the air temperature inside the glass jar and record as Trial 1.
5. Turn off lamp and wait until the air in the jar returns to the starting temperature.
6. Repeat steps 2 through 5 for Trials 2 and 3.
7. Repeat steps 1 through 6 for the dark gray, light gray, and white lids.
8. Calculate and record the average air temperature for each lid color.

Data:

Lid Color vs. Air Temperature Inside Glass Jar

Lid Color	Air Temperature Inside Glass Jar After 10 Minutes (° C)			
	Trial 1	Trial 2	Trial 3	Average
Black	54	52	54	53
Dark gray	48	48	48	48
Light gray	44	45	46	45
White	42	43	41	42

Note: Starting temperature was 24° C for every trial.

Brandi and Jerry were designing a doghouse. Use the results from the experiment to describe the best paint color for the doghouse.

In your description, be sure to:

- Choose a paint color.
- Describe how that color might affect the inside of the doghouse.
- Use results from the experiment to support your description.

Choose a color:

○ Black ○ Dark gray ○ Light gray ○ White

Rubric for Doghouse

2 points

A 2-point response demonstrates the student understands the Content Standard APPE: Scientists and engineers often work together to generate creative solutions to problems and decide which ones are most promising. Item Specification 2: Describe a reason for choosing a solution given possible solution(s) and a problem that can be solved using a technological design process.

The response uses the results from the experiment to describe the best paint color for the doghouse by choosing a color and:

- Describing how that color might affect the inside of the doghouse
  --AND--
- Using results from the experiment to support the description.

Examples:

Choose a color	**Describes how that color might affect the inside of the doghouse**	**Uses results from the experiment**
Black	The doghouse will be warmer.	The black lid made the jar warmest.
Dark gray	The inside will be a little warmer, but not too hot.	The dark gray lid increased 6º C more than the white.
Light gray	The inside will stay cooler, but not too cool.	The light gray lid was 8º C cooler than the black.
White	The inside will be cooler.	The white lid only went up to 42º C.

1 point

A 1-point response demonstrates the student has partial understanding of the Content Standard.
The response chooses a color and describes how that color might affect the inside of the doghouse BUT the results from the experiment are missing
--OR--
The response chooses a color and includes results from the experiment BUT the description of how that color might affect the inside of the doghouse is missing.

0 points

A 0-point response demonstrates the student has little or no understanding of the Content Standard.