2018 Shanghai High School International Division

**SCIENCE PROJECT PROPOSAL**

**Due: March 13th Name: Jessie 6(5) Score:**

1. **Topic of my project:**

Which type of container traps the most heat: paper cup covered in aluminum foil, plastic wrap, or wall paper?

1. **My hypothesis of the question:**

According to my research, aluminum foils are conductors, while plastic wraps and wall papers are insulators. An insulator is something that prevents the passage of heat, electricity, or sound. If I cover a paper cup with an insulator, the heat would move out in more time than it would move out if the wrapping was a conductor. Therefore, plastic wrap and wall paper would trap more heat than aluminum foil. But wall paper is much thicker than plastic wrap, so I predict that wall paper would trap the most heat when wrapped around a paper cup, compared to plastic wrap and aluminum foil.

1. **How to verify the hypothesis:**
2. What is the control group?

The control group of my experiment is temperature outside cup,

temperature and amount of water poured into cup,

and cup. (same brand, size, thickness, etc.)

What is the experimental group?

The experimental group of my experiment is the temperature of water

inside each cup. (cup covered in aluminum foil, cup covered in plastic wrap, cup covered in wall paper.)

1. What is the independent variable?

The independent variable of my experiment is the material wrapped outside each paper cup. (Aluminum foil, plastic wrap, or wall paper.)

1. What is the dependent variable?

The dependent variable of my experiment is the temperature of water inside each cup after being in the freezer.

1. How to test the dependent variable?

I would test the dependent variable of my experiment by putting a thermometer inside each cup.

1. **Materials List:**

**※** Three identical paper cups ※ hot, boiled water (20 cups)

**※** Three thermometers ※ a freezer -4 degrees

**※** Aluminum Foil **※** Plastic Wrap

**※** Wallpaper

**5. Detailed Procedure:**

1) Boil 20 cups of water. When the water is boiling, do some preparations.

 2) Take out the cups, plastic wrap, aluminum foil, and wallpaper. Put a thermometer inside each cup.

3) Use each material to wrap each cup (with the thermometers inside). Wrap three layers, so that the results would show more clarity. Wrap the whole thing, including the opening at the top. Just leave a small hole (at the top) for the water to pour in.

4) After water is fully boiled, pour water to each cup until completely filled in.

 5) Use tape to make a transparent small “window” on each hole on each cup.

 7) Put the cups alongside each other into a freezer.

8) Wait for 10 minutes.

 9) Take the cups outside. Cut open each “lid”.

 10) Look at the thermometer inside each cup. Record the temperatures on the piece of paper.

11)Look at my data. Ask myself: which kind of material traps the most heat? Which kind of material traps the least heat?

 12)Ask myself: was my hypothesis correct? Why and how?

 13) Write my conclusion.

1. **Prediction of the result**

I predict that the temperatures in each would be:

1. Aluminum foil: 10 degrees Celsius
2. Plastic wrap: 15 degrees Celsius.
3. Wall paper: 18 degrees Celsius
4. **Reference list**

 *What Type of Covering Traps the Most Heat: Aluminum Foil, Plastic Wrap, or Wax Paper? - Not Sure How to Do the Experiment?? Any Ideas? :: 1st Class Answers*, www.1st-class-software.com/qna/What\_type\_of\_covering\_traps\_the\_most\_heat\_aluminum\_foil\_plastic\_wrap\_or\_wax\_paper-qna113314.html.

“Aluminium Foil.” *Wikipedia*, Wikimedia Foundation, 28 Feb. 2018, en.wikipedia.org/wiki/Aluminium\_foil.

“Plastic Wrap.” *Wikipedia*, Wikimedia Foundation, 2 Mar. 2018, en.wikipedia.org/wiki/Plastic\_wrap.

“Wallpaper.” *Wikipedia*, Wikimedia Foundation, 2 Mar. 2018, en.wikipedia.org/wiki/Wallpaper.