Student Handout

Experiment: Cookie Shipping Challenge - Which packing material provides the most protection.

Objective: To determine which packing material best protects an Oreo cookie from breaking when dropped.

Test Plan

How will you test your packaging method and how will you measure how “complete” the cookie is?

(Example: I will measure the weight of the cookie before packaging it.
Next I will drop it 2 times from a height of 5 feet.
I will measure the mass of the cookie that is in 1 piece.
This will be repeated for 3 cookies.)

Methods and Materials

Materials Used:	For each material used explain why you selected the material:

Draw and Label how you plan to wrap the cookie:

Design 1

Design 2

Hypothesis

Your prediction on what the outcome of your testing will be.
(Example: I think the bubble wrap will protect the cookies the best as it is commonly used for shipping fragile packages.)

Data Collection

Take the measurements below before you perform your testing/trials

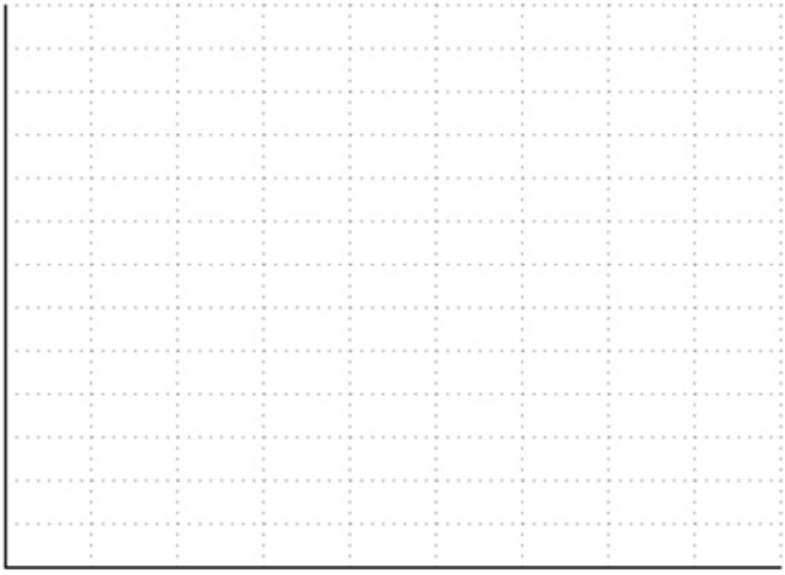
Mass of just the box, no packaging materials or a cookie. *(include units)*	

Mass of the Cookie in the box with your selected packing materials. *(include units)*	
Design 1 Trial 1:	Design 2 Trial 1:
Design 1 Trial 2:	Design 2 Trial 2:
Design 1 Trial 3:	Design 2 Trial 2:

Mass of Cookie <u>before</u> Drop *(include units)*	Mass of Cookie <u>after</u> Drop *(include units)*	Mass Difference (before - after)	Observations after drop testing:Cracked, Major breaks, totally crumbled or damaged, slightly damaged, or intact.
Control Trial 1:	Control Trial 1:		
Control Trial 2:	Control Trial 2:		
Control Trial 3:	Control Trial 3:		
Design 1 Trial 1:	Design 1 Trial 1:		
Design 1 Trial 2:	Design 1 Trail 2:		
Design 1 Trial 3:	Design 1 Trial 3:		
Design 2 Trial 1:	Design 2 Trial 1:		
Design 2 Trial 2:	Design 2 Trail 2:		
Design 2 Trial 3:	Design 2 Trial 3:		

Graph

Plot your data from the trials, include: title, x-axis label and units, y-axis label and units.

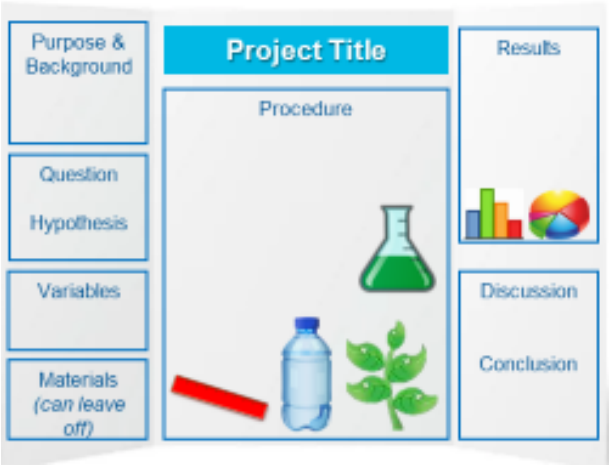


Conclusion

What you learned from your experiment. It explains whether your results answered your question or solved the problem you were investigating.

Example: “The bubble wrap worked best to protect the Oreo cookie. This means that bubble wrap is a great packing material for keeping fragile items safe when they are dropped.

A poster board should have:
Title
Name(s)
Introduction
Materials
Procedure
Results
Conclusion
Discussion
Bibliography



Poster Explanation and Examples

1. Title - Name of your experiment or project. It should tell you what you are trying to find out.
   Example: "Testing Different Packing Materials to Protect an Oreo Cookie"

2. Introduction - Explain what you are going to do in your experiment and why it's important. It sets up the problem or question you are trying to solve.
   Example: "In this experiment, we want to find out which packing material keeps an Oreo cookie from breaking when it is dropped. We will test bubble wrap, cotton balls, and other materials to see which one works best. This is important because good packing helps keep things safe when they are shipped."

3. Materials - All the things you need to do your experiment. It lists everything you will use.
   Example:
   - Oreo cookies
   - Bubble wrap
   - Cotton balls
   - Paper towels
   - Small boxes
   - Tape
   - Scissors
   - Ruler

4. Procedure - Step-by-step guide on how to do the experiment. It tells you exactly what to do from start to finish.

    Example:

    1. Wrap each Oreo cookie in a different packing material.
    2. Place each wrapped cookie into a small box.
    3. Drop each box from the same height onto a cushioned mat.
    4. Check if the cookie is broken or not after the drop.
    5. Record the results.

5. Results - What you found out from doing your experiment. This section tells you what happened when you tested the packing materials.

    Example: “The cookie wrapped in bubble wrap did not break at all. The cookie wrapped in cotton balls had a few cracks, and the cookie wrapped in paper towels broke into pieces.”

6. Conclusion - What you learned from your experiment. It explains whether your results answered your question or solved the problem you were investigating.

    Example: “The bubble wrap worked best to protect the Oreo cookie. This means that bubble wrap is a great packing material for keeping fragile items safe when they are dropped.”

7. Discussion - Your results in more detail. Explain why you think the results turned out the way they did and what you might do differently next time.

    Example: “Bubble wrap works well because it has air pockets that cushion the cookie from impact. Cotton balls were not as effective because they didn't provide as much cushion. Next time, we could try testing more materials or dropping the cookies from different heights.”

8. Bibliography - a list of any books, websites, or other sources you used to help with your experiment. It shows where you got your information.