Instructor Notes

Beware! This experiment, although fun, is **really** messy. Please cover your table space with paper. If you do this multiple times during the day, just lay another layer of paper on top of the dirty one – the sticky food will glue the layers of paper together!

For this experiment, you will need 4 types of sticky food (e.g. peanut butter, hot fudge sauce, marshmallow sauce, honey, jam, …), a spoon for each jar, 4 small paper cups with flat bottoms per group, 4 small paper plates per group, pennies or washers (weights), string, rulers, paper clips, tape, 1 zip-lock bag per group, and an assortment of other assorted "normal" classroom items. The students should work in small groups on this project.

The lesson begins with my placing a spoonful of sticky food on the bottom of a cup, and then sticking the cup to a plate. While moving around the cup/plate in different orientations, I explain that the students need to figure out how to unstick the plate from the cup by using washers (or other weight) without pushing, pulling, twisting, etc, or by shoving the washers between the cup and plate. They are to use the washers as passive weights to unstick the cup from the plate. **The question I want to know the answer to is "Which food is stickier?" – and it needs to be reported in quantitative terms of how many washers it took to unstick the cup from the plate.** They are welcome to use anything in the room – and in fact are encouraged to use anything in the room to devise their "sticky-o-meter".

Feel free to give extra credit to groups for creative ways of deciding how many washers it takes to unstick the cup from the plate. The most "common" way of proceeding is to place the washers on the plate and lift the cup, adding washers until the food can no longer sustain the weight. You could reward students for creativity in successful quantitative determination of how sticky foods are.

I hope that you enjoy this experiment. It satisfies the following California Standards:

Standards	**Grade 5**	**Grade 6**	**Grade 7**	**Grade 8**
Science	6g, 6h, 6i	7a-e	7a, 7c-e	2c-f, 9a, 9e
Math	Algebra: 1.1; Statistics: 1. 2	Mathematical reasoning: 2.4-2.5	Number Sense: 1.3*; Algebra: 1.5	
Visual Arts		2.1, 2.4, 2.6*		
Language Arts		Writing: 1.1, 1.2, 1.6, 2.3b, 2.5a, 2.5b; Written and Oral: 1.1-1.5; Listening and Speaking: 1.3, 1.5	Writing: 1.2, 1.4, 1.6*, 1.7, 2.3a-c; Listening and Speaking: 1.1, 1.5	Writing: 2.3d, 2.6a, 2.6b
ELL: Listening and Speaking, Reading, Writing				

If you would like more information about these standards, please contact me.

If you use this experiment, please let me know what you and your students think of it.

Enjoy,

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Name _____

Sticky Things
by Jodye Selco, CEEMaST – Cal Poly Pomona

Introduction:
What does it mean to be sticky? Materials like glue, paste, and tape are called **adhesives**. Some materials stick to themselves well, like water molecules. However, it takes a different type of stickiness for a material to be able to act as a glue – where the chemical sticks two different objects to each other. For an adhesive to work, it must stick well to both materials being stuck together. If you use paste to stick a feather to a piece of cardboard, the paste must stick to the feather and the cardboard.

What makes glue, paste, or tape stick to things? Wood, paper, and many other materials have tiny cracks and holes in them that are so small you can't see them without a magnifying glass or microscope. When you glue these materials together, the glue seeps into their tiny openings and then hardens so that the materials get stuck together. Sometimes the molecules in an adhesive and the molecules in the things being glued get tangled together and are hard to get apart; they may even undergo a chemical reaction and get stuck together.

Most adhesives stick to some things better than others. Some glues work well with paper or wood, but not with glass or plastic. If you look on the label of a container of glue, it will tell you the different things to which it can stick.

Part A: In your group, discuss how you will test the stickiness of foods. You will need to have a number value associated with how sticky the food is.

List the people in your group.

Describe how you will test the stickiness of foods. What is your plan of action?

Part B: Design your own STICKY-O-METER!

List the materials that you need to build your sticky-o-meter.

Record your data here:

Give step-by-step directions of how you actually measured the stickiness of different foods.

Draw your sticky-o-meter in action.

Describe how it works – in other words, how do the pennies or washers let you separate the cup from the plate?

Part C: Graph your data using two different types of graphs. Discuss why you chose the type of graph you used.

Which type of graph do you think best shows which food is the stickiest? Why do you think that type of graph shows it best?

Verbally describe what your graph shows about the stickiness of the foods you tested.

Which food was the stickiest?

How do you know?