



## WOW Program Lesson Plan

# Materials Matter!

**Program Duration:**

10-15 minutes

**Recommended Grade Levels:**

Grades 2-5, but all ages could participate (gum could be chewed by an older child for younger grades to participate)

**Materials Needed:**

- One piece of chewing gum
- Ice cold glass of water
- Piece of paper
- A lamp/light (we will use the warm light bulb as a heat source!)

**Learning Objectives**

1. Students will be able to identify general characteristics about materials and substances.
2. Students will be able to decide what different types of materials would be best in different situations.

**Preparation**

- Discuss how fabrics feel different (compare a cozy set of PJs with slick rain boots).
- Discuss the benefits of different materials for different situations.
- For younger students, it might work best to focus on two very different materials.

**Background**

How are the clothes and shoes that we wear designed? What makes something a “good” shoe or a “warm” coat? How do people know what materials to use to make these items? All kinds of materials have different characteristics. Some are good for warm days, and some are good for wet days. It is important that the correct material is used for the appropriate setting. This is often the job of material science and chemical engineers as they work to design and discover the best properties for a variety of different circumstances. Today, we will investigate the different properties that can be observed from just one substance – chewing gum!

**Activity**

1. Participants should be given one piece of bubble gum that they are allowed to chew for around 10 minutes.
2. Place the chewed gum into a freezing cold glass of water and allow it to soak for 1 minutes.
3. Remove the chewing gum from the cold water and feel it – what does it feel like? Record their observations.
4. Take the same piece of gum and stick it onto the piece of paper. Allow it to warm to room temperature.
5. Take the piece of paper over to a lit lightbulb and hold it close so it warms up. There are other ways to warm the gum up, but this is probably the safest. Record observations of the warm piece of gum.

### **Additional Questions**

1. Would the gum be a good material for winter boots? Think of how it felt after you removed it from the cold water.
2. Would the gum make a good raincoat? Why or why not?
3. What about a black top on the playground? Why or why not?
4. What qualities would be good for the above examples?

### **Summary**

What things are made of is important! We used gum as an example of a material that wouldn't be well-suited for a lot of jobs. We explored the different qualities of gum and why they would not be beneficial as any type of clothing or shoes. It is important that scientists think about how products will act in real life environments, like if it is 90 degrees Fahrenheit outside or 25 degrees Fahrenheit outside or if the product can be used in both outdoor conditions.

#### ***Extended Exploration***

- Have students connect how state of matter may affect properties or functions of different materials.
- Explore other materials such as plastic, glass, or aluminum foil around the house and how their properties affect their purpose.
- Explore how to engineer materials to best catch a bubble:  
[https://www.sciencebuddies.org/science-fair-projects/project-ideas/MatSci\\_p045/materials-science/materials-catchbubbles](https://www.sciencebuddies.org/science-fair-projects/project-ideas/MatSci_p045/materials-science/materials-catchbubbles)
- Explore additional materials and their unique properties at the following link:  
<https://www.science-sparks.com/ideas-learning-materials-properties/>

Experiment adapted from <http://polymerambassadors.org/pdf/chewinggum.pdf>.