

## SCIENCE FESTIVAL FACILITATOR'S GUIDE



### Balloon Skewers

#### BEFORE THE EVENT

#### 1. Make sure you have the materials you need.

- Balloons (can use rubber or latex balloons. 1-2 for each adult-student pair, extra for multiple demonstrations)
- Bamboo skewers (one for each adult-student pair, these can be reused)
- Vaseline (Cooking Oil or Mineral Oil work as well, they can just be messier)
- Safety glasses (enough for everyone who will be at the station at once)
- **Optional:** ice pack for cold balloons and/or heating pad for warm balloons

#### 2. Watch this video on your smartphone:

<https://youtu.be/8G-l1uhGimo>

#### 3. Prepare your station.

- Distribute balloons and bamboo skewers, one each per student-adult pair.
- Place the Vaseline jar in an accessible place so it will be easy for the students to dip their skewers. (If you use oil, pour some of it into a small cup or bowl, so it will be easy for students to dip their skewers.)
- **Optional:** If using warm/cold option place balloons on cold or hot pack

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## DURING THE EVENT

### Questions to ask participants before they start:

- Has anyone ever pierced a balloon?
- What usually happens when you stick something sharp into a balloon?
- Who thinks that they can put this skewer into an inflated balloon without popping it?
- How would you do it?

### Instructions:

Please read each set of instructions out loud. Make sure that you direct the correct person to complete each assigned task.

- **Both:** Put on safety glasses.
- **Adult:** Blow up a balloon and tie it off. Don't over-fill it—if you let a little air out of the balloon, it will be easier to skewer.
- **Student:** Dip the tip of the wooden skewer into Vaseline (or oil).
- **Adult (or student):** Use a gentle twisting motion to insert the skewer into the thick end of the balloon, opposite the knot. Continue pushing on the skewer until it emerges from the other side, directly next to (but not in) the knot. The balloon should not burst.
- **Student:** Place your hand over the holes to feel any air leaking out.
- **Optional:** Follow the same steps with a cold or warm balloon.

### Questions to ask participants after:

#### K-2<sup>nd</sup> Grade:

- What happened when you pierced the balloon with the skewer?
- Why do you think that happened?

#### 3<sup>rd</sup>-5<sup>th</sup> Grade:

- Why do you think the balloon did not pop?
- Do you think it would work if you pierced the balloon in another location, why or why not?
- Does it matter what temperature the balloon is?

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## How It Works:

Balloons are made from thin sheets of rubber or latex. If you could see this at a microscopic level, you would see many long strands or chains of molecules. These long strands of molecules are called **polymers**, and the elasticity of these polymer chains causes them to stretch. When the balloon is blown up, the middle area of the balloon stretches more than the ends. A sharp, lubricated point can be pushed through the material at either end because the lubricating substance helps the polymers stick together so the rubber or latex can stretch around it. A sharp, lubricated point pushed through the side of the balloon will pop the balloon because in those areas, the material is already stretched.

## Vocabulary:

**Elasticity:** The ability of a material to stretch and then go back to its normal shape.

**Polymer:** A molecule made from joining together many small molecules or units. 'Poly' means many and 'mer' means units

## Real-World Application:

Knowing the elasticity of different materials helps scientists and engineers decide what kinds of materials to use when building things, so that they can withstand the right amount of pressure without breaking. Understanding polymers is very useful in many STEM fields from understanding DNA to designing new types of smartphones.

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