

Marshmallow Smashies

On of our favorite demonstrations! Students of all ages will love watching the marshmallows in the vacuum flask!

Materials

- Büchner Flask (Vacuum Flask)
- Marshmallows
- Vacuum Pump
- Racquetball
- Partially Inflated Balloon

Safety Precautions

Please see the General Safety section of the [Demonstration Safety](#) page before doing this demonstration.

Demonstration

Preparation

connect the vacuum flask to the hose for the pump. Draw faces or animals on the marshmallows that you will use, or set out the ones you plan to use with some markers so you can have volunteers draw on them.

Presentation

1. Show the marshmallows to the audience. If they do not have faces yet, and if you have a younger audience, call up a few volunteers to draw on the marshmallows. Ask the audience or the volunteers to give the marshmallows names.

2. Place the marshmallows inside the vacuum flask, and put the racquetball on top. Ask the audience for ideas on what will happen to the marshmallows if you removed the air inside the flask.
3. Ask for a countdown, and at the end of the countdown turn on the pump. Hold up the flask so the audience can see the marshmallows expanding!
4. The marshmallows will expand for a few seconds, and then stop and start to shrink slowly. When they start to shrink, turn off the pump and pull the racquetball off the top, letting out a loud popping noise and smashing the marshmallows!
5. Show the smashed marshmallows compared to regular sized ones. Ask the audience for ideas on what happened, then explain the demo, using the balloon to show how air will expand in a vacuum.

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Why This Works

This introduces Air Pressure, which is the force of the air applied on everything around it. Air pressure is pretty strong, but we don't normally notice it because our bodies push back against it. Marshmallows also push back, because they have a lot of little air pockets in them. When we put the marshmallows in the vacuum flask and sucked the air out, there was a lot less air pushing on them. We put the marshmallows in a Vacuum, or an area with a lot of empty space, including no air! The air inside the marshmallows then was able to take up a lot more space, which caused them to expand. However, the marshmallow could only expand so far until the bubbles started to pop! The marshmallows then lost a lot of the air inside them, which caused them to shrink in the vacuum, and less air inside them meant that they could not push back as much. This is why, when we let the air back in, the marshmallows were smashed!

Revision #1

Created 8 September 2024 00:30:20 by Admin

Updated 13 September 2024 12:41:20 by Admin