

Marshmallow Man

Purpose

To demonstrate the effect of a vacuum on a marshmallow.

Materials

marshmallows

bell jar

vacuum pump

Procedure

1. Place a marshmallow man on the platform of a vacuum pump.
2. Place the bell jar on the platform, seal it, and turn on the pump.
3. Observe the marshmallow man expand.
4. Turn off the pump, and equalize the pressure. Observe the decrease in size of the marshmallow.

Additional Information

1. To make the demonstration more eye-catching, you can construct a “marshmallow human” from marshmallows and toothpicks.
2. A small amount of shaving cream in a beaker produces an interesting mess in the vacuum jar at low pressures!
3. A small balloon can be placed in the vacuum jar and then the jar can be evacuated.
4. A beaker of water can be boiled at room temperature in the vacuum jar. Be sure to use a trap to protect the pump. This also requires a very good vacuum pump to see the effect.

Questions for the Students

1. Why does the marshmallow expand?
2. Why does the marshmallow contract at even lower pressure?
3. Why doesn't the marshmallow expand back to normal when it is placed at atmospheric pressure?
4. Ask students to predict what will happen if other objects (balloon, shaving cream) in the jar.

Disposal

Marshmallow man should be thrown in the trash after the demo.

Reference

Institute for Chemical Education, Mt San Antonio College, 1990.