

A. Put your finger on the end of the syringe and push in the plunger.

1. What happened?

The plunger will not go in all the way. It is hard to push it in.

2. Could you push in the plunger all the way or only part of the way? _____

only part of the way

Explain why. (The air inside has nowhere to go.)

3. Is there any matter inside the syringe? Yes! What

evidence do you have? The plunger won't go in - there must be air in there (matter)

4. When you push in the plunger at the end and cover the other end with your finger, what happens to the matter inside the syringe? It gets squeezed

into a smaller space.

B. When you cover one end and push in the plunger, you increase the pressure inside the syringe. **Pressure** is caused by the air particles bumping against each other and the sides of the container.

5. Why is there more pressure when you push in the plunger? There is

less room for the particles so they bump into each other more.

6. Push the plunger in all the way without your finger on the end. Can you do

it? Why does it go all the way in this time? Yes, the air goes out the end.

7. When you don't have your finger over the end and you push in the plunger, have you increased the pressure inside the syringe? NO

Explain. The particles are not trapped in a small space. They leave the syringe & stay far apart from each other.

C. Push the plunger all the way in. (No finger on the end.) Once the plunger is all the way in, put your finger on the end and then try to pull out the plunger.

8. What happened when you tried to pull out the plunger? It won't move. It is too hard to pull it out.

9. Explain why you could not pull out the plunger. My finger is blocking the air from getting in. (Difficult to create a vacuum)

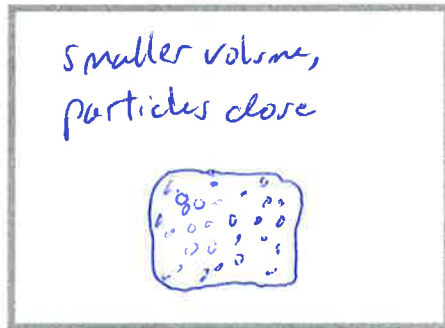
D. Remove your finger from the end of the syringe. Remove the plunger. Drop a marshmallow into the syringe. Let the marshmallow fall to the tip. Put the plunger back in place, and push it in to the top mark. Do not move the plunger close to the marshmallow.

10. Put your finger over the tip of the syringe and try to push in the plunger. Keep your finger over the tip. Observe what happens to the marshmallow inside. It shrinks! It looks wrinkled.

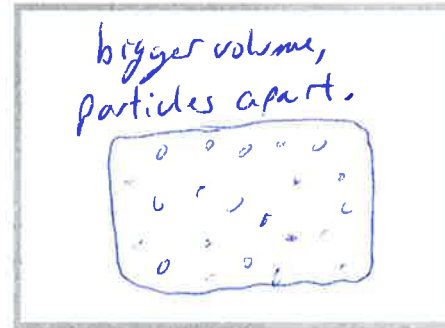
11. Explain why the marshmallow seems to shrink. It is getting squished. The particles are pushed closer together.

12. A marshmallow is made of different kinds of particles. Most of the ingredients are gelatin, water, and sugar. But what makes the marshmallow fluffy? The (air) inside it.

13. Draw a picture showing the particles in the marshmallow when they are under pressure. Then draw a picture of the particles as they normally are.



Marshmallow particles
under pressure.



Marshmallow particles
under normal conditions.

E. Summary

14. Explain how to ^{increase} change the pressure inside the syringe.

Push in the plunger with finger over the end. Force particles
into a smaller space, causing more collisions.

15. Explain what happens when you increase the pressure on a gas (the air inside the marshmallow.) Gas particles move closer together.

Extension ideas:

Try different substances - cap eraser, M+M candy,
wood (mulch), crumpled paper,
etc...

A balloon will do the same as the marshmallow but you
will need a bigger syringe.