

Grade 8 Science – Fluids **Compressibility of Liquids and Gases**

Name: _____ Date: _____

Investigation of Compressibility

Properties of fluids must be understood in order to use them properly. How they behave under certain conditions lets us know how they can be used. Whether the fluid is a gas, or a liquid has different characteristics.

For this activity, we will be using a syringe as pictured here. It has no attached needle and must be used with care. Follow all instructions and if you fail to do so, your syringe will be taken away and you will have to only watch as others complete the activity. Listen carefully!



Step one

Fill the syringe about halfway with air.

Step two

Plug the open end with your finger and press in the plunger end.

What happens to the plunger when trying to compress the air?

Initially, the plunger moves from 15mL to a volume of about 5mL before it becomes too difficult to depress further.

What happens if you release the plunger end and keep the open end plugged?

When the plunger is released, the plunger is pushed back to about 14mL before it stops.

What happens if you release the open end after compressing the air?

There is a pop/hissing sound as the compressed air escapes from the syringe.

Step 3

Keep the open end plugged and pull the plunger out to create a negative pressure in the syringe.

What happens to the plunger when trying to create a vacuum?

Starting at the 15mL position, one can pull the plunger with enough force to the 30 mL position. If the force is reduced, the plunger will be forced back from the 30mL position to the 16mL position (these measures vary depending on the make and quality of the syringe). If sufficient force is applied to the plunger, it can be pulled completely from the syringe body (with a delightful popping sound).

Step four

Fill the syringe about halfway with water.

Step five

Plug the open end with your finger and press in the plunger end. (Caution- do not let go of the open end – your syringe will be taken away from you.)

What happens to the plunger when trying to compress the water?

There was no measurable change in position of the plunger even with great force applied.

What happens if you release the plunger end and keep the open end plugged?

There was no change since there was no change initially in the position of the plunger (no compression occurred).

Step 6

Keep the open end plugged and pull the plunger out to create a negative pressure in the syringe.

What happens to the plunger when trying to create a vacuum?

Air came out of the water – like it was boiling. With the plunger starting at 15mL, it was able to draw it to 30mL with some effort and then when the force was reduced, the plunger was drawn back to the original 15mL position. There did appear to remain a small air bubble within the syringe after creating the vacuum.

Summary/Conclusion

Which type of fluid is easier to compress? Explain how you came to that conclusion.

Since the air was able to be compressed quite easily and compressed quite a bit with a lot of effort, and the water was not able to be compressed at all, it appears that gasses are much more compressible than liquids.
