**Procedure: Fracking with Jello**

**Question:** How does a liquid behave when injected into a solid under pressure?

**Teacher Prep** prior to the lab:

1. Gelatin blocks need to be **prepared and can be refrigerated a few days** prior to the activity.
2. The instructions below will prepare 2-3 blocks of gelatin. **Adjust the recipe as needed** for the number of groups.
3. **Gelatin block instructions**: \*\*In large measuring cup, place ½ cup of water. \*\*Sprinkle 3 packets of gelatin over the water and swirl to mix. \*\* Add boiling water to the gelatin to fill to 4 cups. \*\*Whisk to dissolve the gelatin. \*\*Spray the bottom f the loaf pan with cooking spray and pour the hot gelatin solution into the loaf pan. \*\*Refrigerate overnight. \*\* Cut up each loaf of gelatin into 2-3 blocks.

**Materials:**

|  |  |
| --- | --- |
| **Each Lab Group:**   * 20 cc syringe * Breakfast syrup * 2 pieces of Plastic wrap (duct tape may be used) * Push pin * Ruler * Large disposable plate * 2 Flexible straws | **Teacher Prep**   * Large (1quart) measuring cup * Loaf pan (9x5) * Spatula * Unflavored gelatin (Knox Gelatin) * Wire whisk * Plastic knife |

**Procedure:**

1. Place a block of gelatin on your paper plate.
2. 1st straw: Insert the straw into the side of the gelatin block, parallel to the plate, about 2/3 of the way into the gelatin. Discard this straw.
3. Bore out the hole with the straw, so a hole is left in the gelatin where the straw was.
4. Poke holes into the end of the 2nd straw as follows:
   1. Use the end AWAY from the flexible end.
   2. Use the push pin to make 5 holes in a line. \*\***The holes should be about 5mm apart, and about 10mm in from the end of the straw.**
   3. Make a 2nd line of 5 holes parallel to the 1st line on the opposite side of the straw. (Same end, but ½ way around the straw.)
5. Cover the end that has the holes with a small piece of plastic wrap.
   1. Make sure the plastic wrap tightly seals the end, but does NOT cover the holes.
6. Attach the flexible end of the straw to the syringe with another piece of plastic wrap. Wrap it around the straw and syringe several times to give a good seal.
7. Pull the plunger out of the syringe.
8. Fill the syringe with breakfast syrup, allowing it to run into the straw.
   1. Keep filling the syringe until the entire straw syringe assembly is full of syrup.
9. Quickly replace the plunger into the syringe. This will keep the syrup from running freely out of the straw, but it still might drip a bit.
10. Insert the straw, filled with syrup and attached syringe, into the bored hole in the gelatin block.
11. Using **very firm pressure**, **quickly** inject the syrup into the gelatin block and observe the fracturing pattern of the gelatin.
12. Pull the straw back out of the gelatin block.
13. Answer the questions on your data sheet.

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_

**Data Sheet: Fracking with Jello**

**Question:** How does a liquid behave when injected into a solid under pressure?

**Data:** Draw a picture of what you observe happening to the jello and the syrup.

**Post-Lab Questions**

**Note: The following resources may be needed to help you answer these questions.**

* The “Fracking Background Essay” on the last page of your note outline.
* Your answers to the “Fracking Background Essay” questions on page 5 of your note outline.

1. Describe what happened with the syrup and jello in this system.
2. Why did you have to apply pressure to the syrup?
3. How does this model represent hydraulic fracturing? Describe what each of the following parts of your model represent in real fracking:
   1. Gelatin block
   2. 1st straw
   3. Syringe
   4. 2nd straw
   5. Syrup
4. Do you think if you changed the density of the fluid, the fracture patters would be the same? Why?
5. Looking at the diagram of fracking on the last page of your note outline, in what major way does your “underground” 2nd straw differ from the diagram?
6. Describe the problems you had with this model that might have affected the fracturing pattern in the gelatin block. (You must describe at least one problem.)
7. Why do we hydraulically fracture wells?