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BASF
We create chemistry

WHAT YOU WILL NEED:

- $\frac{1}{4}$ c cornstarch
- $\frac{1}{4}$ c water
- A bowl for mixing
- Newspaper (to keep those countertops clean!)



VISCOCITY FIELD EXPERIMENT SOLID OR LIQUID?

INSTRUCTIONS:

1. Place a piece of newspaper on a table.
2. Put the mixing bowl in the middle of the newspaper.
3. Add $\frac{1}{4}$ c of dry cornstarch to the bowl.
4. Add about 2T of water to the corn starch and stir slowly.
5. Continue to add the remaining water until all powder is wet.

Try tapping on the liquid. When you tap, it shouldn't splash, but will become hard. If your mixture is still too liquid, try adding a little more cornstarch. Your goal is to create a mixture that feels like a stiff liquid when you stir *slowly*, but feels like a solid when you *tap* on it with your spoon or finger.

VISCOSITY is a term to describe the resistance of a liquid to flow. For most liquids, viscosity depends only on temperature. We call these fluids **NEWTONIAN**.

NON-NEWTONIAN is a term used when **VISCOSITY** also depends on the **force applied** to the liquid or how fast an object is moving through the liquid.

Scoop the mixture into your hand and it melts away. Pinch it firmly, and it feels and acts like a solid. Why does it behave this way?

Think of walking through a busy crowd. The easiest way to get through is to move slowly and find paths between people. If you just took a running start and headed right into the crowd, you just slam into people and not get very far. This is similar to what occurs with the cornstarch mixture. If you press slowly into the mixture, you allow the cornstarch to 'move out of the way.' Adding force or pressure does not allow the solid cornstarch particles to slide past each other and out of the way of your finger.





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EXERCISE:

1. Can you think of a fluid whose viscosity decreases under pressure?

HINT: One Newtonian fluid that has the opposite effect of the cornstarch mixture comes in a bottle that requires you to tap or strike to get the fluid to come out.

HINT: it tastes great on french fries!

2. Is quicksand a Newtonian or a Non-Newtonian liquid?

HINT: What impact does force (or movement) have on quicksand?

3. Is honey Newtonian or Non-Newtonian? What impact does temperature have on the viscosity of honey?

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