

Key Terms:

Aerodynamics- study of how things move through the air.

Mass- the amount of matter an object contains.

Matter- anything that takes up space or has mass or volume. Everything is made of matter!

Gravity- an attracting force that pulls objects together.

Introduction to Aerodynamics Activity #2: Bernoulli's Principle

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Part A- Basics of Bernoulli's Principle

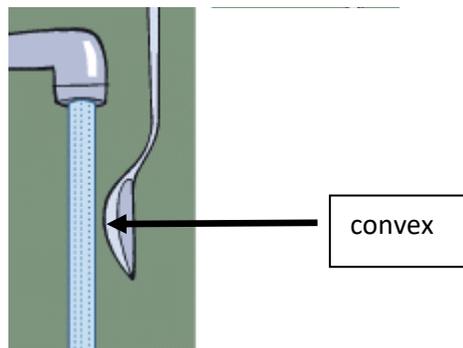
Make sure to check out Part B below to take *flight* with Bernoulli!

1. Materials and Set up:

- a. 1 soup spoon
- b. Kitchen sink faucet

2. Instructions:

- a. Turn on the faucet. Run the water at a steady medium rate. The temperature does not matter.
- b. Hold the top of the spoon handle using your thumb and pointer finger with the convex side parallel to the stream of water. See image below.



Let's
predict!

- i. What will happen when you slowly move the spoon into the stream of water and then slowly remove it from the water?

NOW, do the experiment! Slowly move the spoon into the stream of water. Wait 5 seconds and remove the spoon from the stream. Repeat and carefully observe the dynamics of the spoon and water.

3. What happened?

Was your prediction correct?

The spoon was pulled into the stream of water and was stuck there! Could you feel the attraction? To release the spoon from the stream, you needed to apply force to the spoon to free it from the stream!

What's going on?

The Bernoulli Principle explains why this occurs. As the water rushes over the convex side of the spoon, an area of low pressure occurs beneath it on the bottom of the convex side. Instead of the water splashing away, it maintains contact with the spoon and flows down the curve.

Extension: Try this experiment again, this time making the stream of water stronger and then weaker. Does this change the result?

More on Bernoulli's Principle!

Another example of Bernoulli's Principle in action is the path, and more importantly the physics, of the famous curve ball, used to strike out baseball players for decades! A curve ball occurs when a pitcher throws the baseball with an incredible amount of spin. The pitch starts by traveling in a straight path after leaving the pitcher's fingers. Almost immediately, however, the path of the ball begins to curve and cut to the left (for a right-handed pitcher). This is due to Bernoulli's Principle! The bottom of the ball immediately starts to accelerate downward faster than the top of the ball. At the same time, due to the spin of the ball, an area of high pressure occurs on the top of the ball. This creates the downward and inward motion of the pitch, which confuses batters and makes the pitch look almost magical!

