

A photograph of a large, dark, swirling storm cloud over a rural landscape. In the foreground, a dilapidated wooden barn is partially destroyed, with debris flying through the air. The scene is set in a field of tall grass and corn. The sky is overcast and grey.

BERNOULLI'S PRINCIPLE

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an observation

- Try the following experiment:

1. Hang two pieces of paper straight down in front of you.
2. Blow hard between the two pieces of paper.
3. Notice what the pieces of paper do.

- What happens?

- **When you blow between two pieces of paper hanging down in front of you, they move together.**



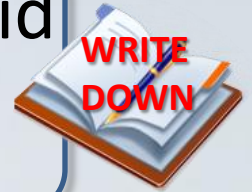
an explanation

- In order for the two pieces of paper to start moving together, there must be a net force in the direction of the movement.
- **Where does this force come from?**
- The only forces acting on the pieces of paper are:
 - gravity pulling them down,
 - your hands holding them up, *and*
 - air pressure pushing in all directions.
- All these forces are balanced before you start blowing between the pieces of paper (which is why the paper doesn't move until you blow).
- The direction of movement of the pieces of paper shows that the air pressure must become **lower** between the pieces of paper where you are blowing.

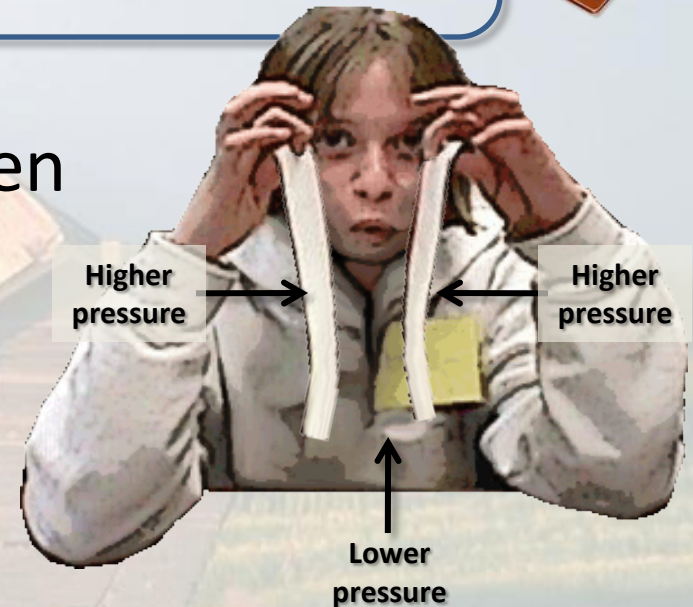


an explanation of the explanation

Bernoulli's principle = when the speed of a fluid increases, the pressure exerted by the fluid decreases.



- When you blow between two pieces of paper, the air between the papers increases speed.
- As a result, the pressure decreases.
- Since the pressure is lower between the pieces of paper than on the outside, the papers move together.



CONSEQUENCES

- Wind blowing past a chimney helps pull the smoke up because the air pressure becomes lower above the chimney than it is inside.



- Wind blowing past a house during a hurricane can cause the roof to come off because the air pressure above the roof becomes lower than the pressure in the house.



- And . . .

more consequences

- Air moving quickly over a plane's wing helps to lift the plane into the air by reducing the air pressure over the wing.



EXPLAIN THIS

- Look at the tornado pictured to the right.
- Why is the house leaning and twisting before the tornado even reaches it?



- **As predicted by Bernoulli's Principle, the air pressure around the house is reduced by the storm spinning rapidly near by.**