- AGENDA: Students will be able to understand Bernoulli's Principle and be able to apply it's concepts to everyday events such as a curveball and an airplane wing.
- STANDARD 1: Recognize, interpret, and describe what is Bernoulli's Principle
- STANDARD 2: Explain the applications of Bernoulli's Principle on everyday objects and events, such as an airplane wing and curveball
- STANDARD 3: Present and explain data findings. Record their observations and see how Bernoulli's Principle relates to specific phenomenon
- Time Frame: 1 class period (45 min)
- Materials: Part 1 two stacks of books and a piece of scrap paper, straw (optional) Part 2 - two plastic cups
- 1) Activator: Discussion session of Bernoulli's Principle, and it's applications
- (No more than 10 minutes)
- 2) Instruction/Interaction:
- a) Form teams. Part 1: Lay a sheet of paper across two books on a table as shown below:



- b) Have one student hold the paper down on the books. Blow underneath the paper and record your observations (the paper should start to bend downwards)
- c) Part 2: Have two plastic cups inside of each other. Blow across the TOP, NOT BOTTOM of the cup, record your observations (the inside cup should rise and fall out)

(ideally approx 20 min)

3) Discussion/Results: Students should observe as the velocity of the air speeds up, the air pressure decreases. Thus, when you blow underneath the paper, you decrease the air pressure on the bottom side of the paper. The air pressure on top of the paper pushes it down. The harder you blow, the more firmly the paper is pushed downwards. The greater the speed of a gas, the less is its pressure.
The same is true for the cup activity. As you blow across the top of the cup, the velocity of at the top of the cup increases, resulting in a decrease in the pressure, thus forcing the inside cup out of the other cup.

(approx 10min)

4) Wrap Up / Assessment: Complete Worksheet (approx 5min)

- 5) Worksheet Questions:
- a) Explain Bernoulli's principle.
- b) Explain why the paper starts to bend downwards as you blow beneath it.
- c) Explain why when you have two cups in each other that when you blow across the top, the inside cup "floats" out of the other cup.