

ConceptTest 13.15a **Fluid Flow**



Water flows through a **1-cm diameter** pipe connected to a $\frac{1}{2}$ -**cm diameter** pipe.

Compared to the speed of the water in the **1-cm pipe**, the speed in the $\frac{1}{2}$ -**cm pipe** is:

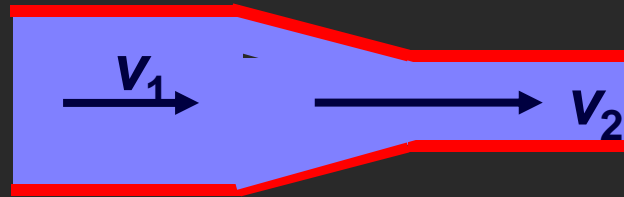
- (1) **one-quarter**
- (2) **one-half**
- (3) **the same**
- (4) **double**
- (5) **four times**

ConceptTest 13.15a Fluid Flow

Water flows through a 1-cm diameter pipe connected to a $\frac{1}{2}$ -cm diameter pipe.

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- (2) one-half
- (3) the same
- (4) double
- (5) four times



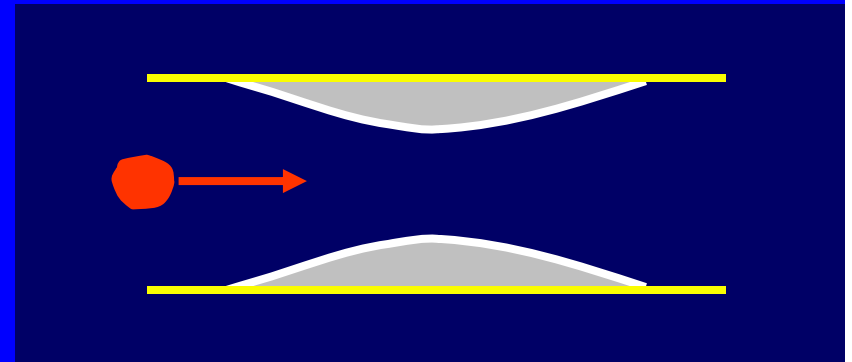
The area of the small pipe is less, so we know that the water will flow faster there. Because $A \propto r^2$, when the radius is reduced by one-half, the area is reduced by one-quarter, so the speed must increase by four times to keep the flow rate ($A \times v$) constant.

ConceptTest 13.15b **Blood Pressure I**



A blood platelet drifts along with the flow of blood through an artery that is partially blocked. As the platelet moves from the wide region into the narrow region, the blood pressure:

- 1) **increases**
- 2) **decreases**
- 3) **stays the same**
- 4) **drops to zero**

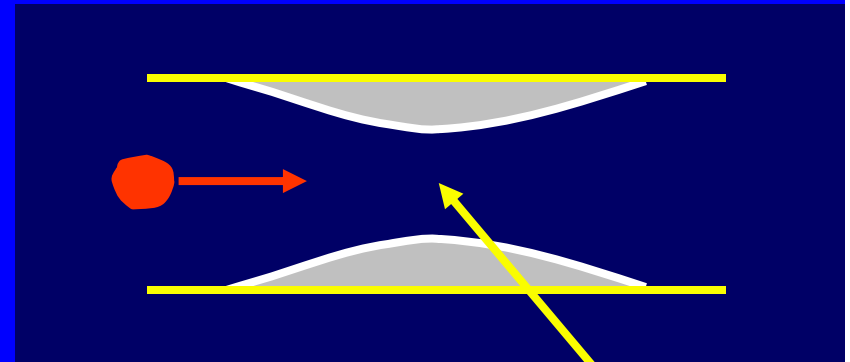


ConceptTest 13.15b Blood Pressure I

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- 1) increases
- 2) decreases
- 3) stays the same
- 4) drops to zero

The speed increases in the narrow part, according to the continuity equation. Because the speed is higher, the pressure is lower, from Bernoulli's principle.



speed is higher here
(so pressure is lower)

ConceptTest 13.15c

Blood Pressure II



A person's blood pressure is generally measured on the arm, at approximately the same level as the heart. How would the results differ if the measurement were made on the person's leg instead?

- 1) blood pressure would be lower**
- 2) blood pressure would not change**
- 3) blood pressure would be higher**

ConceptTest 13.15c **Blood Pressure II**

A person's blood pressure is generally measured on the arm, at approximately the same level as the heart. How would the results differ if the measurement were made on the person's leg instead?

- 1) **blood pressure would be lower**
- 2) **blood pressure would not change**
- 3) **blood pressure would be higher**

Assuming that the flow speed of the blood does not change, then Bernoulli's equation indicates that at a lower height, the pressure will be greater.

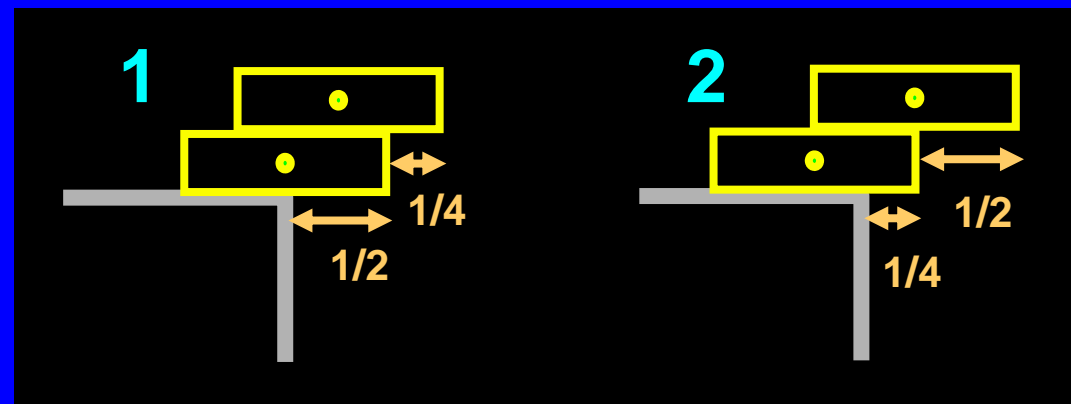
ConceptTest 12.3b

Tipping Over II



Consider the two configurations of books shown below. Which of the following is true?

- 1) case 1 will tip
- 2) case 2 will tip
- 3) both will tip
- 4) neither will tip



ConceptTest 12.3b

Tipping Over II

Consider the two configurations of books shown below. Which of the following is true?

- 1) case 1 will tip
- 2) case 2 will tip
- 3) both will tip
- 4) neither will tip

The CM of the system is midway between the CM of each book. Therefore, the CM of case #1 is not over the table, so it will tip.

