Physics 131- Fundamentals of Physics for Biologists I

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- Quiz 7
- Buoyancy
- Fluid Flow

More on simple liquids!

- Buoyancy
- Fluid Flow

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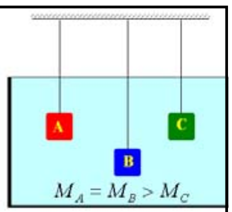
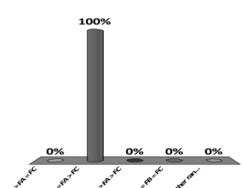
Three cubes of equal volume are hung on strings. A and B have the same mass and block C has less. The blocks are lowered into a fish tank and they hang at rest as shown.



How do the buoyant forces exerted by the water on the three cubes rank?

1. $F_B > F_A = F_C$
2. $F_B = F_A > F_C$
3. $F_B > F_A > F_C$
4. $F_A = F_B = F_C$
5. Some other ranking



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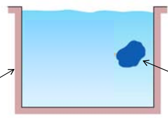
Making sense of Buoyant Forces

- Draw system schema for the system below and then a free body diagram for the bag of water

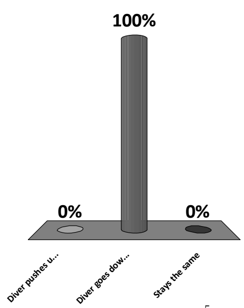


- Replace the bag a water with a rock of equal volume in the system schema and free body diagram
  - What changed?

4

What happens when you squeeze the bottle?

1. Diver pushes up harder
2. Diver goes down
3. Stays the same



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Buoyancy of floating objects

V_{ice} is the total volume of the ice

V_{water} is the volume of the water displaced

- Equal to the volume of the ***submerged fraction of the iceberg*** (89% of the ice is below water)

$V_{water}=0.89*V_{ice}$

Buoyancy force: $\rho_{water}V_{water}\mathbf{g}$

= Weight of iceberg: $\rho_{ice}V_{ice}\mathbf{g}$

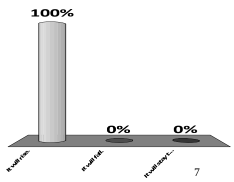
$\rho_{water}V_{water}\mathbf{g} = \rho_{ice}V_{ice}\mathbf{g}$

$\rho_{water}*0.89*V_{ice} = \rho_{ice}V_{ice}$

$\rho_{water}*0.89 = \rho_{ice}$

There is a lot of talk about the north polar ice cap melting. When it melts what will the result be on sea level?

1. It will rise.
2. It will fall.
3. It will stay the same



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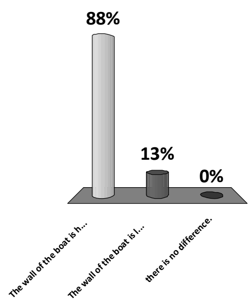
A boat carrying a large boulder is floating on a lake.The boulder is thrown overboard and sinks. After the boulder is thrown overboard

1. The wall of the boat is higher above the water
2. The wall of the boat is lower above the water
3. there is no difference.



A boat carrying a large boulder is floating on a lake.The boulder is thrown overboard and sinks. The water level in the lake (with respect to the shore)

1. rises.
2. drops.
3. remains the same.