



The Magic Trick with Ice

materials

- 3 clear glasses the same size
- Rubbing alcohol
- Ice cubes
- Funnel
- Tap water

background

Everyone loves a discrepant event! Students are surprised when ice does not always float in a clear liquid that looks like water. Why does ice float in the first place? Water expands as it freezes and the molecules are farther apart, or less dense. Water's density is 1.0 and the density of ice is .92. The molecules in the water, since they are closer together, actually hold up the ice so it will float.



directions

To make this surprise "magic" prepare the glasses before class or use water bottles that contain rubbing alcohol or water so as to "seem" like water.

1. Before class prepare 3 clear glasses, each glass at equal levels:
 - one with tap water
 - one with rubbing alcohol
 - one with $\frac{1}{2}$ alcohol added first, then $\frac{1}{2}$ water which is poured slowly through a funnel- **do not move this glass!**
2. Tell students you are going to put an iceberg (or cube) in the glass. Ask what will happen.
3. Ask the same question with each glass as you put the ice in carefully.

activity time:
15 minutes



discussion

- Why did the ice float in the first glass? (water expands when it freezes so it is less dense than its liquid form)
- What happened in the second glass?
- What liquid is in the second glass?
- Why did the ice sink in the second glass? (alcohol is not as dense as water-alcohol molecules are farther apart and can't hold up the ice- so ice sinks to the bottom)
- If water's density is 1.0 and ice is .92, what would you guess is alcohol's density? (.78)
- What was in the last glass?
- Why was the ice stuck in the middle? (The water is denser so when it was funneled through the alcohol, it stayed on the bottom. The alcohol moves to the top and is less dense than the ice cube. The water "holds up" the ice, but the alcohol can't.)
- Which liquid is on the bottom? (water)
- Demonstrate how to make the third glass of liquid. Why is the water on the bottom?



extension

Try to float other objects in these solutions and predict the outcomes. The half alcohol and half water solution needs to be made again for each try.



related activities

"Water Molecule Pockets"

alignment to national science standards

Unifying Concepts and Processes, Standards A, B, E

alignment to kansas science standards

Science as Inquiry: K-2: 1.1.1, 1.1.3, 1.1.4, 1.1.5; 3-4: 1.1.1, 1.1.3, 1.1.4; 5-7: 1.1.1, 1.1.3, 1.1.4, 1.3.1

Physical Science: K-2: 2.1.1, 2.1.3; 3-4: 2.1.3, 2.1.4, 2.2.1; 5-7: 2.1.1, 2.3.1

History and Nature of Science: K-2: 7.1.1; 3-4: 7.1.1