

Denser Down – Teacher Notes

When the Earth was younger it was hotter and more rocks were molten. The minerals, which come together to make rocks, could settle out according to density in the liquid magma. Even today, rock types can separate if there is some movement within the Earth.

Materials

- An empty clean and dry 2L clear cool drink bottle or a large transparent plastic jar
- A cup of Styrofoam bubbles or crumbs. If you are breaking up a large lump it is a good idea to do this inside a paper bag or pillow slip as the particles will become electrostatic and will stick to your hands and clothing. Some students may love doing this for you!
- A handful of marbles or any other dense objects that will fit through the mouth of the bottle (nails, nuts & bolts, washed pea gravel or small rocks)
- Water



Method

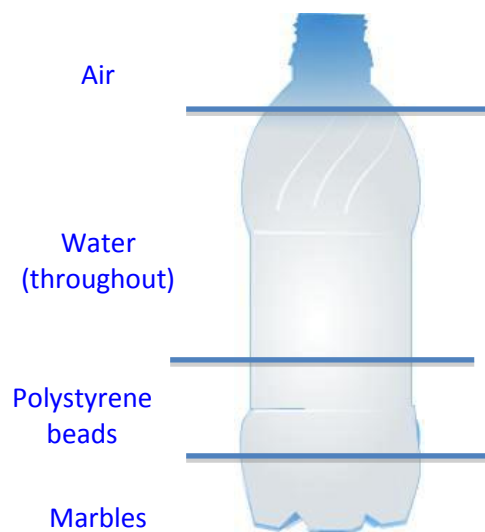
1. Place the solids in the container and fill with water until it is 2/3 full.
2. Replace the cap and ask a student to gently shake the materials in the bottle until they are well mixed (15 seconds).
3. Place container on a flat surface and allow everything to settle.

Observations

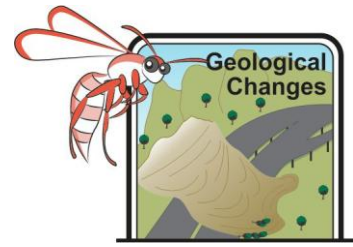
List the 4 substances in the bottle.

1. Air
2. Water
3. Polystyrene beads
4. Marbles

What did you observe when the materials in the bottle were allowed to settle.
Use the “bottle” provided to label the four layers.



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Explanation

Why do you think the materials formed layers? **The heavier/denser materials sank to the bottom. The lighter/less dense materials rose upwards. They separated because they had different characteristics.**

When materials can move freely the denser materials will sink to the bottom and the less dense will rise to the top. This is why denser material such as nickel and gold come from great depths within the Earth while less dense material such as granite and sand are found at the surface.

An analogy can be drawn with air representing the atmosphere, water the hydrosphere and marbles the lithosphere (rocks).

Conclusion The layers of our planet are a result of the competing processes of:

1. **Heat making rocks less dense and rise and cold making them denser and move towards the core.**
2. **The differing density of rocks. Silica rich rocks like sandstone and granite have low density and form the crust. Iron and nickel rich rocks have high density and form the core.**