

Sinking, Floating & Buoyancy

Summary

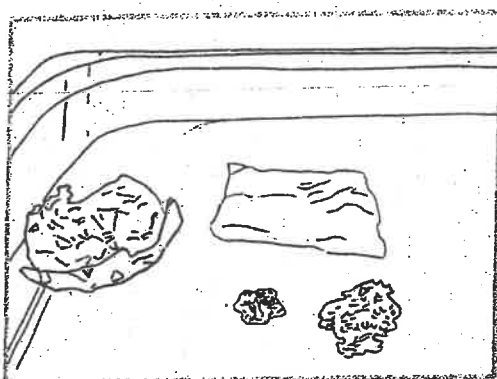
Use free-play and directed challenges to explore age-appropriate concepts of sinking, floating, density and buoyancy.

New Chemistry Curriculum links

Properties of Materials (gr. K, 1, 3, 7), Atoms, Molecules, Elements and Compounds (gr. 3, 7), Density and Buoyancy (gr. 3, 7).

Curricular Competencies

Curiosity, observation, manipulation, questioning, predicting, comparing observations and predictions, inferring, controlling variables and fair testing, hypothesizing, concluding, consideration of alternatives.



Materials

- | | | |
|---|--|--|
| • collection of materials that sink and float e.g. sponges, straws, | ping-pong balls, modelling clay, tin foil, wood, nails, styrofoam, marbles | • roll of aluminium foil
• modelling clay
• trays of water |
|---|--|--|

Materials Cost

Few dollars per tray, or use found trays. A few dollars for tin foil and modelling clay. Use other found items, or purchase from dollar store.

Procedure

Distribute a tray of water and selected materials to each small student group.

Free-play procedure in brief:

Play: Allow students to experiment freely with the materials. Ask students to take notes - drawings or written.

Debrief: Students report findings and the teacher guides conversation to frame discoveries in terms of important concepts. Link similar observations, and help students design further experiments. Some may need more specific questions to pursue e.g. can you make a sinker float, or a floater sink? How can you change an object's shape to make it displace more water, so that it can float? How can you change an object's density to make it sink?

Replay: Students return to free experimentation, maybe in new groups, to investigate their questions and hypotheses.

Directed challenge ideas with aluminium foil or modelling clay:

Make a flat piece of foil sink or float. Make a crumpled piece of foil sink or float (air gets trapped in crumpled foil unless it is crumpled under water, or pressed together tightly). Make a boat shape from foil/clay and use it to float a marble/coin cargo. In each case ask students to explain what is happening in terms of weight/density/displacement/buoyancy.

Some age-dependent terms and concepts:

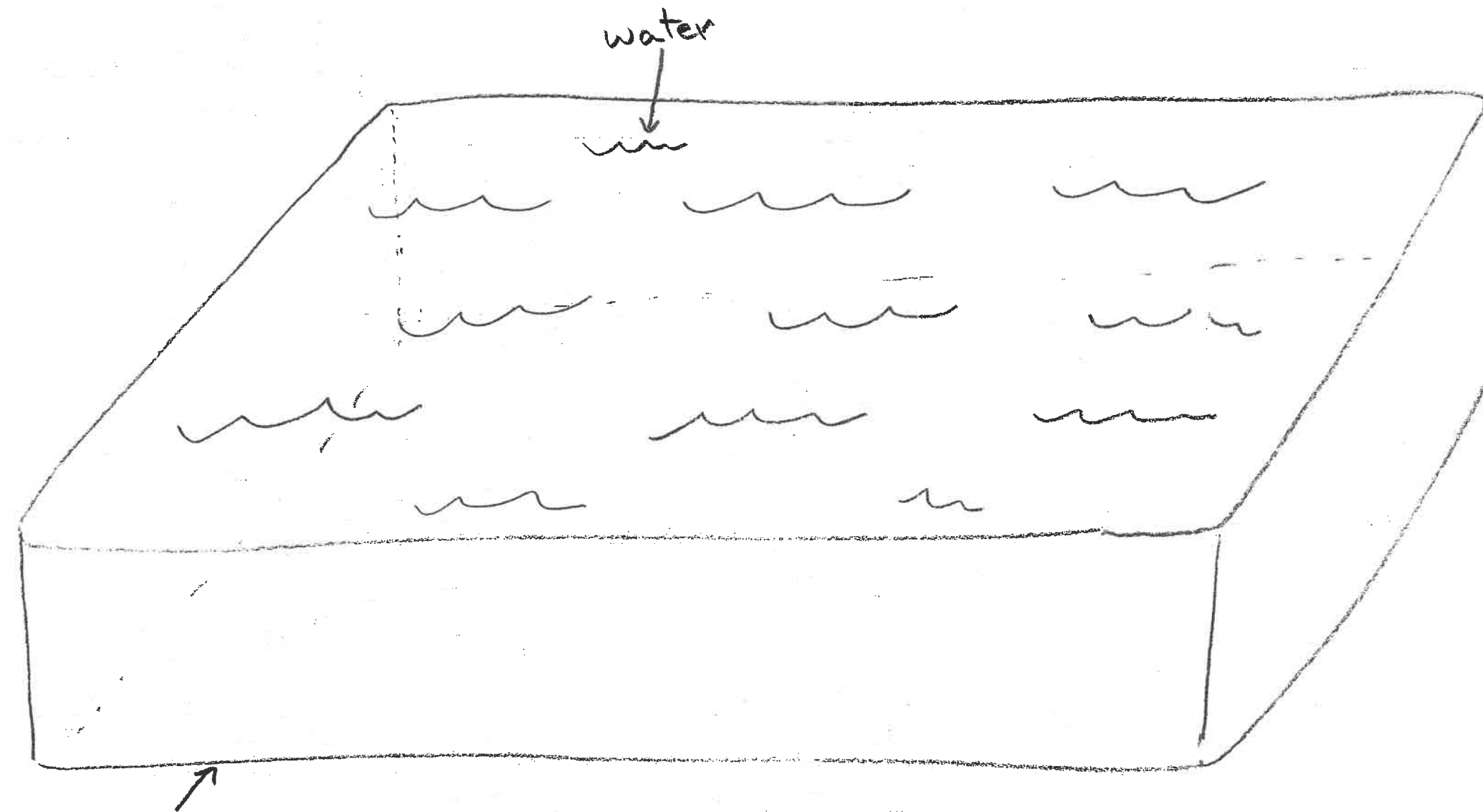
Heaviness, lightness, density of an object: Things that sink are "heavier" than things that float, or more specifically, they have a greater "density" (more mass for their volume; more particles packed into the same space). If an object has a greater density than the water it will sink - hence solids tend to sink (unless they have air in them); and gases float.

Weight, buoyancy, displacement: When an object is placed in water, its weight (the force of gravity pulling on its mass) pushes down on the water. The water pushes back up on it, called the force of "buoyancy" (or "upthrust"). The object rests at a level where these forces are balanced. The force of buoyancy equals the weight of the water displaced, so if the object is denser than water, the force of its weight will be greater than the force of buoyancy and it will sink.

More details and references

- This activity at www.ingridscience.ca/node/411 (with more details on Play-Debrief-Replay procedure).
- Play-Debrief-Replay from: *The New Teaching Elementary Science*, by Selma Wassermann and George Ivany. Teachers College Press 1996. Also www.seriousplayers.weebly.com/uploads/2/1/6/7/21679238/play-debrief-replay_handout.pdf

Draw objects floating or that have sunk to the bottom.



Container

what did we observe: heavy objects sink and
light objects float.