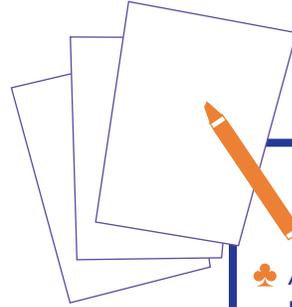


# Tub of Tears



At one point in her adventures, Alice's frustration at being so tall ends in tears of aggravation. Unfortunately, as she shrinks, she lands in the pool of tears she cried when she was a giant. In this activity, children make and test predictions about whether or not different materials will sink or float in a "tub of tears." As they begin thinking about material density, buoyancy, and shape, children are challenged to create a creature that will float on the surface or hover just beneath the pool of tears.



## Did You Know?

- ♣ *Buoyant* is the word used to describe a material that floats in a liquid.
- ◆ Salt in water helps things to float better.
- ♠ Your tears are made of salt and water.

## To Get Ready:

Cover tables with newspaper, fill the tubs with water and put out all the various materials. You may want to use trays or bowls to keep the materials organized.



## To Start, Ask:

*What types of things float and what types of things sink in your bathtub or swimming pool?*

## What you'll need:

- ♣ An assortment of materials with a range of buoyancies:  
**For example:** corks, wood blocks, feathers, foam, Styrofoam, nails, paperclips, buttons, spoons, clothespins, balls, sponges, small plastic bottles, film canisters, pipe cleaners, small plastic bowls
- ◆ Large, clear plastic tubs for water
- ♠ Fasteners, such as rubberbands, wire, twist-ties
- ♥ Newspaper, to cover tables

## Try It!:

- ♣ Examine the assortment of objects at the table. What materials are they made of? Are some materials heavier than others? What shapes and sizes are they? Make predictions about which objects might float and which might sink when placed in a tub of water.
- ◆ Try placing different materials on the surface of the water. What happens?
- ♠ Try pushing the objects to the bottom of the tub of water. What happens when you release the objects?
- ♥ Can you separate the materials into groups that sink, float, or might do both?
- ♣ Imagine an animal or a creature that you might find floating on the water. Using the materials available, can you create a creature that will float? Try using an item that sinks for each item that floats. Can you combine floating and sinking objects to make your whole creature float?
- ◆ Once you create a creature who can float, try to make a creature that hovers just below the surface of the water.



## Questions to think about and ask:

- Which materials seem to float easily? What do these floating items have in common?
- Which materials sink easily? What do these sinking items have in common?
- What seems to be different between the floating materials and sinking materials?
- Does the shape of a material or object seem to affect how it sinks or floats?



## Assess What Happened (Students reflect):

Ask students to think about objects that weren't available during their explorations that might be used to create a floating creature. Write a paragraph that explains why they would choose those objects to create a floating creature.



## Connect it to Standards:

In the physical sciences, students “should develop an understanding” that “objects have many observable properties, including size, weight, shape, ... and the ability to react with other substances” and that “objects can be described by the properties of the materials from which they are made, and those properties can be used to separate or sort a group of objects or materials.” (National Research Council Science Education Standards)

## Connect it to the Story!

While in the Hall of Doors, Alice, who is a very tall girl at this point, cries gallons of tears because she is so very frustrated from changing size so many times. Her frustrations are far from over because she drinks from a bottle and shrinks, landing in “the pool of tears which she had just wept when she was nine feet high.” As she swims in her own tears, she meets a mouse and strikes up a conversation with him. Eventually, “the pool [became] quite crowded with the birds and animals that had fallen into it: there was a Duck and a Dodo, and a Lory and an Eaglet, and several other curious creatures. Alice led the way, and the whole party swam to shore.” Can you make a curious creature that floats in a tub of tears?



## Career Corner:

**Oceanographers** need to use buoyancy to move themselves and their equipment safely to and from the ocean floor. If they made a machine float too quickly to the surface, it could explode from the pressure! If you enjoy swimming and thinking about animals that live in the ocean, you might consider a career as an oceanographer.