

Science in the early years: Floating and sinking

Activity description

In small groups, children use their senses to observe what happens when they drop solid objects into a bucket of water. They sort the objects into two groups: the ones that fall to the bottom of the bucket (sink) and the ones that float. They then experiment to look more closely at the objects to find out if the reason an object floats or sinks is because of its size or what it is made of (its material).

Links to the EYLF

Outcome 4

Children are confident and involved learners.

Key components

Children develop dispositions for learning curiosity, cooperation, confidence, creativity, commitment, enthusiasm, persistence, imagination and reflexivity.

Children develop a range of skills and processes such as problem solving, enquiry, experimentation, hypothesising, researching and investigating.



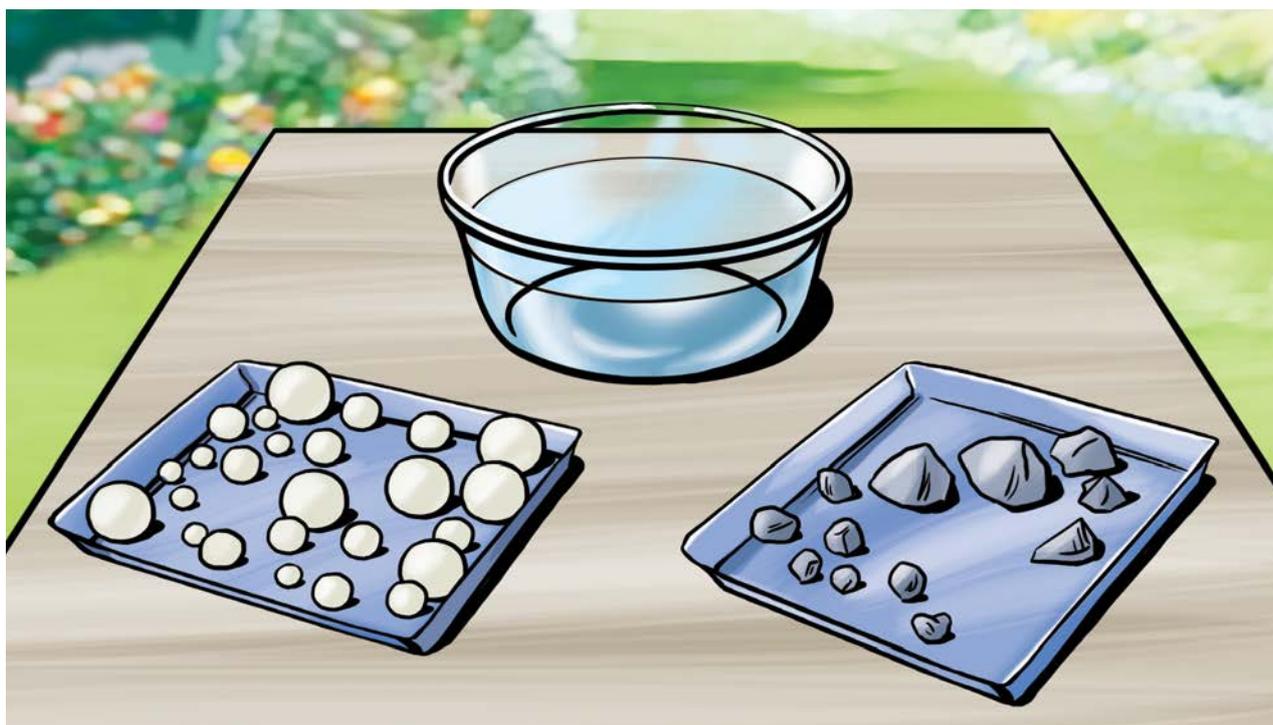
Science in the early years is a series of papers about the learning and monitoring of science in the early years to support early years educators.

All related content is available from research.acer.edu.au/earlyyearsscience [↗](#)

Link to the Australian Curriculum (Foundation to Year 2)

	Foundation	Year 1	Year 2
Science Understandings	Chemical science Objects are made of materials that have observable properties (ACSSU003)		
Science Inquiry Skills	Questioning and predicting Pose and respond to questions about familiar objects and events (AC SIS014)	Questioning and predicting Pose and respond to questions, and make predictions about familiar objects and events (AC SIS024)	Questioning and predicting Pose and respond to questions, and make predictions about familiar objects and events (AC SIS037)
	Planning and conducting Participate in guided investigations and make observations using the senses (AC SIS011)	Planning and conducting Participate in guided investigations to explore and answer questions (AC SIS025)	Planning and conducting Participate in guided investigations to explore and answer questions (AC SIS038)
	Processing and analysing data and information Engage in discussions about observations and represent ideas (AC SIS233)	Processing and analysing data and information Use a range of methods to sort information, including drawings and provided tables and through discussion, compare observations with predictions (AC SIS027)	Processing and analysing data and information Use a range of methods to sort information, including drawings and provided tables and through discussion, compare observations with predictions (AC SIS040)
		Evaluating Compare observations with those of others (AC SIS213)	Evaluating Compare observations with those of others (AC SIS041)
	Communicating Share observations and ideas (AC SIS012)	Communicating Represent and communicate observations and ideas in a variety of ways (AC SIS029)	Communicating Represent and communicate observations and ideas in a variety of ways (AC SIS042)

Source: <https://www.australiancurriculum.edu.au/f-10-curriculum/learning-f-2>



Notes about floating and sinking

Whether or not a solid object floats or sinks depends on the density of the material of the object compared to the density of water.

Density is measured by calculating the mass of an object for a standard amount of volume (one cubic centimetre). The density of water is 1 gram per cubic centimetre.

So for this activity, it is the density of an item that determines if it will sink:

- A granite rock that sinks has more mass in one cubic centimetre than one cubic centimetre of water.
- For polystyrene balls, one cubic centimetre of polystyrene has less mass than one cubic centimetre of water, so polystyrene floats on water.

It is important to use solid objects, because when air is trapped in a hollow object, its overall density is reduced. For example, a glass ball such as a marble will sink, but a drinking glass that contains air might float. While this is a worthwhile activity in itself to investigate with the children, the focus in this activity is on solid objects to help make the link between the material itself and floating/sinking behaviour.¹

What to provide?

- A bucket (or other similar container) full of water.
- Solid objects for the children to drop into the bucket of water: these must be of two different materials, for example, three granite rocks or pebbles that will sink (one large, one medium, one small); and three polystyrene foam or solid plastic balls or blocks (one large, one medium, one small) that will float. The floating objects must be solid, not hollow.
- Waterproof wear for the children (optional).

¹ A more in-depth analysis of similar studies in floating and sinking can be found in Kallery, M. (2015). Science in early years education: Introducing floating and sinking as a property of matter. *International Journal of Early Years Education*, 23(1): 31–53.



Learning intention

- To understand that the size of an object does not affect its ability to float (EYLF, F-2)
- To understand that what an object is made of determines whether it can sink or float (F-2)

Success criteria

- I can explain that big and small objects can float or sink depending on what they are made of (EYLF, F-2)

object that is the reason it sinks or not, rather than the material it is made of. See 'Notes about floating and sinking'.)

Children are to take objects from the tray and drop them into water one at a time. If they drop several at once, suggest that it is easier to see what happens if they are dropped singly. This also mirrors good scientific method.

Which objects floated on the top of the water? Which objects sank (fell to the bottom)?

(SIS: Planning and conducting)

Affirm all correct observations (all three rocks fell to the bottom; all three polystyrene/plastic balls floated).

Responses to look for: Children might be surprised that the largest polystyrene ball floats because it is large compared to other balls of the same material, so direct them to think about what is the **same** about the three balls (i.e. what they are made of, not their size); or likewise, if they are surprised that even the smallest rock sank, direct them to think about what is the same about the three rocks (i.e. what they are made of, not their size).

What to do?

Organise children to work in small groups so they can cooperate to test all of the objects and share their observations.

What do you think will happen when you put these different-sized objects into the bucket of water?

(SIS: Questioning and predicting)

Listen to gauge children's understanding of the behaviour of objects in water.

Responses to look for: Some will fall to the bottom; some will stay on the top of the water; some will float/sink; the biggest ones will sink and the smallest ones will float (this picks up on a common misconception that children might have as they think that the size/volume of an

At the end of the activity, ask:

What is more important about whether one of these objects will float or sink? Is it its size or what it is made of?

(SIS: Processing and analysing data and information, Communicating)

Responses to look for: What it is made of.

If some children are still uncertain, they can try dropping the objects into the bucket again; or if they are clear, they can confirm their observations (completing this additional step also will support persistence). If children use the terms 'weight' or 'mass', check that they understand that when comparing two materials of the same size, heavier (more dense) objects have more mass compared to lighter (less dense) objects. Mass and weight are not the same thing: 'weight' should only be used when gravity is pulling a mass downwards. The mass of an object is always the same, but weight can vary depending on the force of gravity.

What to record?

(SIS: Evaluating, Communicating)

Children record their findings using an age-appropriate method, this may mean that an adult scribes for them, children draw what they have found or write out their findings. Have children discuss their findings as a group to see if they have the same observations. Make a note of whether or not the children's thinking shifted from 'the larger objects will always sink' to 'it depends on what the object is made of, not its size'. It would be worthwhile repeating this activity at a later date to see if children retain their new way of thinking about floating and sinking, as misconceptions can persist.

What comes next?

Extend the learning by children exploring the outdoors area to find other objects made of *different* materials to drop into the bucket. The children predict, then test out, record what happens, compare results with others and communicate their findings.

