

Will It Float?		Grade 2 and Properties of Solids and Liquids
Lesson Plan	Safety Notes	Make sure the items being tested are safe to put in water (no electronics). Watch out for water spills and slippery floors.
	<p>Description In this lesson, students will learn about what objects float by testing and making hypotheses using the scientific method.</p>	
<p>Materials</p> <ul style="list-style-type: none"> ● basin (sink, bathtub, bucket) for water ● water ● objects from around the house ● scientific method printout and pencil ● towel (for spills) 		
<p>Science Background</p> <p>Will it Float? Objects that float sit on the top of the water, and things that sink will fall to the bottom of water.</p> <p>How are objects that float in water different from those that sink? You tell me! We are going to use the Scientific Method to find out!</p> <p>The Scientific Method A big part of science is asking questions about how the world works and finding answers through experiments. Scientists go through a process called the Scientific Method to ask, test and think about their questions.</p> <p>There are 7 steps in the Scientific Method</p> <ol style="list-style-type: none"> 1. Question- what are you trying to find out? Scientific experiments have a goal, it can be big or small but you need to know what you are trying to find out. <i>How can I make the tallest tower out of my blocks?</i> 2. Hypothesis- what do you think will happen and why? A hypothesis is a guess at what will happen. But it is not a shot in the dark, it is a guess based on things that you have learned or seen in your life. <i>If I stack all my blocks on top of each other, with the rectangle blocks on the bottom, then the tower will be the tallest, because the rectangle blocks are the longest.</i> 		

3. **Experimental Design-** how are you going to test your hypothesis?
 This is the list of steps you will take to test your experiment. This is so that if someone else wanted to try your experiment, they could try the same thing.
I am going to stack blocks and draw each tower to see what happens!
If it falls down, I will try again, maybe stacking in a different way!
I can measure how tall the tower gets with a ruler!

4. **Data and Observations-** what did you try, what did you see?
 Observe means to watch or see. Observations are things that you detect with your senses or measurements you can take. What did it look like, smell like, sound like? Different experiments have different important information to record.
I drew each tower so I know what did not work and what did.
I measured the height of each tower.
Lots of towers fell, I know what designs did not work.

5. **Analysis-** what is your data telling you?
 In science we write down our results so we can explain it to others. Take a look at your observations, how does what you saw in your experiment answer your question?
The two tallest towers were the ones with the square and rectangle blocks at the bottom.
They were the same height.

6. **Conclusion-** was your hypothesis right?
 Take a look at your hypothesis that you made at the beginning. Based on your analysis, was your hypothesis right?
Having a rectangle at the bottom of a tower makes it really tall.
But a square block can make one just as tall.
So a rectangle at the bottom is not the only way to make the tallest tower out of these blocks.

7. **Next Step-** the science continues
 Most experiments raise new questions or more exact questions. Sometimes the experiment does not work. This is not a bad thing, this is a very important part of both science and play! When things do not work, we try again.
New Question: How can I stack the blocks to make the tallest stable tower?
New Question: How can I measure how stable something is?

Activity Procedure

Will it Float?

Set Up

1. Gather some objects from around the house, make sure that the objects can fit into your basin (sink, bathtub, bucket) of water.
2. Ask your parents if it is ok to get the objects wet. Get permission for 5 or more objects.

3. Fill a basin with water.

Scientific Method

Record your answers on the Scientific Method printout!

1. Question- what are you trying to figure out?
We gave you this one!
2. Hypothesis- what do you think will happen and why.
3. Experimental design- how are you going to test your hypothesis?
Draw how you will test the objects you collected.
Hint: all you need to do is put objects in water!
4. Data and Observations- this is where you do your test!
 - a. Write down or draw the object you are testing.
 - b. Describe the object, is it large or small, heavy or light, solid or hollow, soft or hard, what colour is it? You can put anything here that you think might be important to your question.
 - c. Make a hypothesis, do you think the object will float or sink?
 - d. Gently place the object into the water. Does it float or sink? Record your observations.
 - e. Clean up any water spills with the towel.Repeat testing steps a-e until all of the objects have been tested.
5. Analysis- what is your data telling you?
Look at your observations, how are the things that float different from the things that sank? Write down what you saw.
6. Conclusion- was your hypothesis right?
7. Next step (Optional)-The cycle of science continues!
Ask more questions, make a new hypothesis and test it out!

Debrief

The Scientific Method

Carrying out a proper scientific experiment can be difficult and frustrating. However, it is often just like playing! Both are about being curious, asking good questions and testing things!

It can be hard to slow down to record what you see or think about what happened. Patience is also a very important part of science.

Congratulations! You were a real scientist today!

To float or not to float

The ability to float is based on three things- how heavy something is, how much space they take up and what they are trying to float in. Say we have a marshmallow and a lump of plasticine the same size and shape as the marshmallow. Which do you think would float? The marshmallow will float and the plasticine will sink! This is because the plasticine is heavier than the marshmallow. Heavy, solid objects are less likely to float.

But we could make the plasticine float! If we shaped it into a boat it would float! This is because we are spreading out the weight of the plasticine! Objects that have their weight spread out over a large area are more likely to float. We can also test this out when swimming, floating on your back is easiest with your arms and legs stretched out. If you bring in your arms and legs, you will start to sink. Your weight does not change, but the amount of space your body takes up on the water does! Taking up more space on the surface of the water allows you to float, curling up so you take up less space causes you to sink. This is great for cannon balls!

The relationship between weight and the amount of space something takes up is called density. Things that are small and heavy are more dense and things that are large and light are less dense. Lots of objects are made out of several different materials. This can make it hard to guess if they will float.

For things to float, they need to be less dense than what they are floating in. So when we talk about floating in a pool, we are comparing the density of the object and water. Ocean water has salt in it that makes it more dense than freshwater. This means that it is easier to float large ships on the ocean than a lake. You might have felt this a tiny bit if you have ever been in a bath with a bath bomb and felt more floaty.

The Scientific Method

Question

What are you testing? What are you trying to figure out?

How are things that float in water different from things that sink?

Hypothesis

What do you think will happen and why?

Experimental Design

How are you going to test out your hypothesis? (You might not need all 6 spaces!)

Write or draw your steps:

1.	2.
3.	4.
5.	6.

Data and Observations

Carry out your experiment. Record the tests and what happens with words or pictures.

Object <i>What item are you testing?</i>	Describe the object <i>heavy/light/ large/small/ solid/hollow</i>	Hypothesis <i>Do you think it will sink or float?</i>	Observation? <i>Did it sink or float?</i>

Analyse

Look at your observations, how are things that float different from the things that sink?

Conclusion

Look at your analyses, is your hypothesis right?

Continue the Experiment

Sometimes your hypothesis is wrong or an experiment does not work. This is not a bad thing! It is an important part of science!

When things do not work out, scientists go back and try again! We change our hypothesis or adjust how we are running our tests. With each attempt we learn new things. Sometimes even when an experiment works, the testing continues because the scientist has a new question. Being curious is part of being a scientist!

Question 2

What are you testing? What are you trying to figure out?

Hypothesis 2

What do you think will happen? Why do you think that?

Experimental Design 2

How are you going to test out your hypothesis? Use only the boxes you need.

Write or draw your steps:

1.	2.
3.	4.

5.

6.

Data and Observations 2

*Carry out your experiment. Record the tests and what happens with words or pictures.
(Make your own table, you might need different columns than last time!)*

Analyse 2

Look at your observations, how do they answer your question?

Conclusion 2

Look at your analyses, is your hypothesis right?

Will it Float?

Grade 2: Properties of Liquids and Solids

1. If they are made of the same material why does the clay (or playdough) boat float but the ball sinks?
2. Do you think the boat will eventually sink if we add a lot of heavy items to it? Why?
3. Do you think the boat would still sink if it was placed in milk, soap or oil? Why? If you can, test this out!
4. Draw a picture of what you would do if you wanted to float in water?

5. Find 5 objects in your home (make sure you have permission to use them). Hypothesize (guess) whether it will sink or float. Fill a bowl with water and test it out! Fill in the chart below as you go!

Object	Hypothesis (What do you think will happen?) (It will float/It will sink)	Did it Float? (Yes or No)

6. Why do you think the objects that floated stayed above water? What made them different from the ones that sank?

Will it Float?

Grade 2: Properties of Liquids and Solids

1. If they are made of the same material why does the clay (or playdough) boat float but the ball sink?

The clay boat floats, while the ball sinks, because the weight of the clay in the boat is spread out over a larger surface area and has air in the middle which helps keep it afloat.

2. Do you think the boat will eventually sink if we add a lot of heavy items to it? Why?

Yes, because it will eventually be too heavy to float. Bonus: If we wanted it to continue to float we would have to make the surface area of the boat larger so that the weight would be spread out more.

3. Do you think the boat would still sink if it was placed in milk, soap or oil? Why? If you can, test this out!

Example: I think the boat will float in soap because soap is thicker than water. When I tested it, the boat was able to float.

4. Draw a picture of what you would do if you wanted to float in water?

Should draw a person lying down (like a Starfish), taking up as much surface area as possible.

5. Find 5 objects in your home (make sure you have permission to use them). Hypothesize (guess) whether it will sink or float. Fill a bowl with water and test it out! Fill in the chart below as you go!

Object	Hypothesis (What do you think will happen?) (It will float/It will sink)	Did it Float? (Yes or No)
Example: Marble	It will Sink	No

6. Why do you think the objects that floated stayed above water? What made them different from the ones that sank?

This answer should be based on the objects they chose and the results they got, therefore, answers may vary.

Example: Almost all the objects that were heavier sank and all the ones that were lighter were able to float.