

This guide aims to present some suggestions for activities to promote science education during the A/B-weeks. These activities can be integrated into the A-week lessons if teachers choose, or children can simply use them on their own during B-weeks. Below are suggestions for integrating activities Prior, During and After student investigations.

STAGES	DESCRIPTION
Entry	Engage your students into the topic of water by gathering their initial ideas on the topic and asking guiding questions.
Extension	Depending on students' ideas, possible guiding questions are included.
Further	Depending on students' ideas, possible next investigations are included.
General	Include something fun and memorable to trigger interest on the topic.

→ Relation between stage and level of difficulty: **Entry** should be used as an initiation to the topic; **Extension** as a way to consolidate with a question that links the topic to the content; and **Further** implies a deepening of content and ideas for students to pursue further investigations.

PRIOR STAGE: PREPARATION IN THE CLASS

STEP 1 – WHOLE GROUP BRAINSTORMING		
INTRODUCING THE TOPIC		
Stages	Description	Suggestions
Entry	Engage your students into the topic of water by gathering their initial ideas on the topic and asking guiding questions	<ul style="list-style-type: none"> • Can you describe water? What are ways that we use water? Where do we find water? Why is water important? • Have you ever gone swimming? Have you ever used a float? Or swim arm bands? Why did you use them? How is it different than swimming without them?
Extension	Depending on students' ideas, it is possible to add extension questions.	<ul style="list-style-type: none"> • Have you ever put things in water and watched how they respond? For example, What happens when you try to submerge a balloon in water? What might the balloon do? And what if you try to submerge rock? What might the rock do?
Further	Ask questions that can serve to further guide discussion, depending on students' ideas.	<ul style="list-style-type: none"> • Discuss students' predictions about which things: float on water, mix with water, dissolve in water. Challenge children to test for themselves at home and report their findings .

General	Include something fun and memorable to trigger interest in the topic.	<ul style="list-style-type: none"> • Show children pictures or watch a video about people floating on the Dead Sea. Interesting to discuss is that this sea has a great amount of salt and, because of this, it was thought that nothing could live in it and thus it was “dead”. • Carry out buoyancy demonstrations using everyday objects and trying to submerge in two water glasses, with and without salt. Ask children for their predictions and challenge them to explain their observations.
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STEP 2 – WATER GAMES

STEP 2 – WATER GAMES		
EXPLORING TO THE TOPIC		
Stages	Description	Suggestions
Entry	Do you know any games you can play with water? Which ones?	
Extension	Children might have already discussed water activities which are related to the topics of buoyancy and surface tension: throwing a stone into a river in such a way that it jumps several times; floating on a tire-tube in a river; using a canoe; throwing water balloons; etc. If children don't mention these, you can also introduce them.	<ul style="list-style-type: none"> • Which stones are best for skipping on water? Why? • How do you throw stones so they “bounce” across the surface of water? • Why does a tire-tube stay on top of the water when floating on a river?
Further	You can watch videos of water sports: surfing, diving, snorkeling.	<ul style="list-style-type: none"> • Ask guiding questions such as: How is it that you can move over and through the water? What are surfboards made of? Why do people wear fins when snorkeling? How do you think divers are able to sink?

STEP 3 – INTRODUCE THE WEEK B ACTIVITIES

EXPLORING TO THE TOPIC
Explain to children that the topics of water and buoyancy will be the focus of scientific investigations that they will be doing independently during week B, and clarify the particular expectations for completion within the weekly plan. Be sure to let children know if there will be the opportunity for follow-up activities and discussion when they return to the school in the next week A so that there can be group connections made after the investigations have been completed individually.

USEFUL RESOURCES FOR THE PREPARATION STEPS

EXPERIMENT

You can challenge your kids to design a boat made out of aluminum foil than can carry the maximum number of coins. Children should document their design with a drawing and explain it to the other children.

USEFUL LINKS

An episode of Die Sendung mit der Maus about why a boat floats:

<https://www1.wdr.de/mediathek/video/sendungen/lokalzeit-muensterland/video-sachgeschichte-warum-schwimmt-ein-schiff-100.html>



WATER INVESTIGATION: WEEK PLAN

TASKS AND EXPERIMENTS							
ACTIVITY	TIMING	TYPE	MON	TUES	WEDN	THUR	FRI
DANCING RAISINS	approx. 20 minutes	Prediction, observation and interpretation					
FLOATING PAPER CLIP	approx. 20 minutes	Prediction, observation and interpretation					
LEMON BOAT	approx. 30 minutes	Prediction, observation and interpretation					
WATER BALLOONS	approx. 40 minutes	Prediction, observation and interpretation					
BUOYANCY IN WATER	At least 15 minutes – your student is free to try as many objects s/he wants to	Prediction, observation and interpretation					

ANY OTHER IDEAS?

AFTER WORK FOR WHEN CHILDREN COME BACK TO SCHOOL

STEP 1 – WHOLE GROUP BRAINSTORMING	
CONCLUSIONS ON THE TOPIC	
WHAT TO DO	HOW TO DO IT
Discussion of experiments	Whole group talk, difficulties, results, conclusions
Revise your boat design	You can ask children to revise the drawing they made of their design of a boat that could carry much weight and explain / write down which things would they keep and which ones would they change.
Elaborate rules for sinking and floating	Make a list of objects that sink and do not sink and discuss their similarities and differences. Can the children design ways to make the sinking objects float, and the floating objects sink?
Sharing (pictures, videos)	These can be sent to the teacher and she/he can project them in the classroom.
Discussing insects which walk on water	You can project pictures and children can document these insects with a drawing in which they can label the parts of these insects' body.

USEFUL RESOURCES
USEFUL LINKS
<p>Follow up videos and further investigations: Science.lu has numerous further extensions for discovering water phenomena that can provide interesting extensions, including:</p> <ul style="list-style-type: none"> • The technology behind water energy is the focus of an article from science.lu: https://science.lu/de/interview-mit-luc-bertemes-seo/wie-aus-wasser-strom-wird • Mr. Science introduces how water treatment plants work in this video: https://science.lu/de/nachhaltigkeit-klaeranlage/wie-funktioniert-eine-klaeranlage

DANCING RAISINS

You will need: 1 handful of raisins
Sparkling water
1 handful of raisins

What to do:

1. Fill the glass container with sparkling water.
2. Add the raisins carefully one by one into the glass container.
3. Observe the container closely for several minutes.

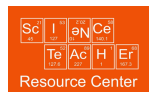
TIPS:

- If you do not have sparkling water, you can use water with baking soda.

AFTER THE INVESTIGATION

Write down your observations.

Draw your ideas.



LEMON BOAT

You will need: 1 unpeeled lemon 1 glass jug filled with water
1 peeled lemon

What to do: Take turns adding the peeled and the unpeeled lemon to the water jug.
What can you see? Does anything surprise you? Can you explain what you observe?

AFTER THE INVESTIGATION

Write down your observations.

Draw your ideas.

WATER BALLOONS

You will need: 4 water balloons

1 large bowl/basin filled with water

- What to do:**
1. Fill a water balloon with water and tie a knot to close it.
 2. Fill the second water balloon with water – but now use less water than you have used for the first water balloon. Additionally, blow some air into the water balloon and then tie a knot to close it.
 3. Fill the third water balloon with very little water.
 4. Do not put any water in the fourth water balloon.
 5. Put all the water balloons in the water bowl and observe what happens.

HOW DO YOU EXPLAIN THIS?

BUOYANCY IN WATER

You will need: Play dough 1 large bowl filled with water

What to do:	<ol style="list-style-type: none"> 1. Roll the play dough in your hands until it has formed into a ball. 2. Hold the ball close the water surface and let it drop into the water. Make sure to make a note beforehand of what you think might happen once you will drop it. 3. Change the shape of the play dough into a small bowl. 	<p>Hold the bowl close above the water surface and let it drop into the water.</p> <p>Again, make sure to make a note beforehand of what you think might happen once you will drop it.</p>
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HOW DO YOU EXPLAIN THIS?

AFTER THE INVESTIGATION

Describe your observations.

Draw your ideas.
