The background of the image is a dynamic, blue-toned splash of water with bubbles and ripples. Centered in the upper half is a blue graduation cap with a black tassel. Below the cap, the words "WATER" and "CLASS" are written in a large, white, bubbly font with thick black outlines. Underneath these two words, the words "ACTIVITY GUIDE" are written in a smaller, white, bold, sans-serif font, also with a thick black outline.

WATER
CLASS
ACTIVITY GUIDE

WATER CLASS WITH EXPERIMENTS:

1. RAINFALL - BUILD THE RAINBOW
2. WIND - ANEMOMETER
3. PRESSURE - BAROMETER
4. WEATHER SENSORS - THERMOMETER
5. LAND: ROCKS, SOIL, RUNOFF - DIY WATER FILTER
6. LAND SURVEYING - CLINOMETER
7. NUTRIENTS & ALGAE - ALGAE BLOOM
8. ECOSYSTEM BALANCE - ECOSYSTEM BALANCE
9. OCEAN SENSORS - CARTESIAN DIVER & SATELLITE MAP PRINTOUT
10. OCEAN ANIMALS & THEIR HABITATS - WAVES IN A BOTTLE

BUILD THE RAINBOW

Let's learn how water moves through the water cycle (evaporation → clouds → rain → runoff)



SUPPLIES NEEDED:

Craft Mat

Scissors

Crayons

Glue Stick

Cotton Pads

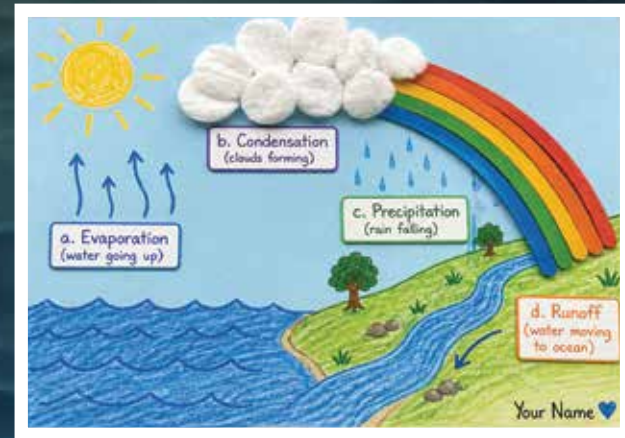
1 Cardstock

Rainbow Popsicle Sticks



STEPS:

1. Place your cardstock on the craft mat
2. Draw a big sun, cloud, and ocean using crayons
3. Glue cotton pads at the top to make clouds- for this, it may be easier to put the glue on the cardstock and then stick your clouds on
4. Use rainbow popsicle sticks to create a curved "rainbow" from cloud to land
5. Label your diagram:
 - Evaporation (water going up)
 - Condensation (clouds forming)
 - Precipitation (rain falling)
 - Runoff (water moving to ocean)
6. Add arrows showing how water moves
7. Put your name on it!



WHAT YOU LEARN:

You might notice that the colors in a rainbow always appear to have an order (red, orange, yellow, green, blue, indigo, violet) because sunlight is made of all of these colors mixed together. When sunlight passes through raindrops, the water bends and splits the colors at different angles based on their wavelength, red bends the least (outside color) and violet bends the most (inside color).

This is the start of the story: water carries everything from land to the ocean.

Where could pollution enter this system?



ANEMOMETER

Let's measure wind speed!



SUPPLIES NEEDED:

Craft Mat

Scissors

Crayons

Tape

4 Small Cups

1 Wooden
Rod

1 Wrapped
Blue Straw

2 Clear
Straws

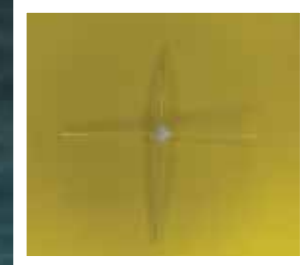
Timer

Binder clip



STEPS:

1. Place straws in a cross shape (like a +) and tape them in the middle
2. Take 4 small cups, color one of the cups with a bright color, write your name on another cup
3. Use tape to attach the cups to the ends of a cross shape in the direction seen in the photo
4. Tape the cross to the wooden rod
5. Clip the binder clip to the straw about half way up, pinching the straw as shown in the photo
6. Place the bottom of the wooden rod into the straw so it can spin
7. Make sure it spins freely
8. Go outside and pick 3 different places or the same place at 3 different times. If you can't go outside, you can blow on it.
9. Use a timer to count how many spins in 30 seconds (use 10 seconds if you are blowing on it)



WHAT YOU LEARN:

- Wind shapes landscapes, ocean currents, and helps cause upwelling, which brings nutrients to the ocean surface.

Wind Speed Estimates (in 30 seconds):

1-5 Rotations= 3 to 14 feet per minute

5-10 Rotations= 14-29 feet per minute

10-30 Rotations= 29-86 ft per min

30-60 Rotations= 86-173 ft per min

Location & time of day	Length of time	Number of Rotations	Wind Speed Estimate



BAROMETER

Let's find out how air pressure and weather are connected!



SUPPLIES NEEDED:

Craft Mat

Scissors

Crayons

Tape

1 6oz Jar

1 Balloon

1 Rubber
Band

1 Clear
Straw

Cardstock



STEPS:

1. Cut the neck off a balloon.
2. Stretch the balloon tightly over the top of the jar so there are no ripples (see photo).
3. Secure it with a rubber band.
4. Cut the very end of the straw at a 45 degree angle so the very end is a pointer.
5. Tape (with 2 pieces) the straw across the top (like a pointer).
6. Place cardstock behind it and draw a scale.
7. Watch the straw- take note where the pointy end of the straw points to and what the weather and temperature are like. Either:
 - a. Place your barometer in 3 different locations and mark where the straw points at each location
 - b. Place your barometer in one place and check it 3 different times marking where the straw points at each time



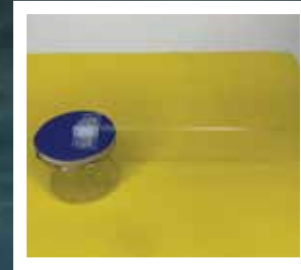
WHAT YOU LEARN:

High pressure → balloon pushes down → straw rises

Low pressure → balloon dips → straw falls

Low pressure systems create storms, wind, and ocean mixing.

Time of Day or Location	Reading	What is the weather like?



Thermometer

Let's find out how temperature affects fluids and density



SUPPLIES NEEDED:

Craft Mat

Crayons

1 16oz Bottle

1 Clear Straw

Blue Dye

Rubbing Alcohol
Bottle (100mL)

Block of Clay

8 oz Water



STEPS:

1. Fill bottle with:
 - Water (halfway)
 - Rubbing alcohol
2. Add 2 to 3 drops of Blue Dye
3. Put the cap on the bottle and gently invert the bottle to mix the blue dye
4. Remove cap and insert the straw into the bottle
5. Seal around straw with clay (no leaks!)
6. Mark starting level on bottle
7. Place in warm area watch liquid rise
8. Place in cool area watch it fall
9. Place your thermometer in one place outside and check it 3 times throughout the day, marking where the liquid is on your straw at each time



WHAT YOU LEARN:

- Air density → wind
- Water density → ocean layers

Remember: "Warm air and water rises, cold air and water sinks"

Time of Day or Location	Reading	What is the weather like?

DIY WATER FILTER

Let's see how the earth
(and humans) clean water!



SUPPLIES NEEDED:

Craft Mat

Scissors

Crayons

Tape

Water Bottle
that's provided

1 8oz Cup

6 oz Water

1 Stir Stick

Kitty Litter

3 Coffee
Filters

Gravel

Aquarium
Sand

Activated
Charcoal

Alum



STEPS:

1. With scissors, carefully puncture your water bottle about half of the way from the bottom
2. Cut the water bottle in half (hamburger style) starting where you pictured the bottle (use as funnel)
3. Put your finger in the middle of the coffee filter and wrap it around your finger
4. Place coffee filter in the top half of the bottle (see photo)
5. Open coffee filter to line the bottle (making a cup inside the top of the water bottle)
6. Now set the top of the bottle (your water filter) inverted into the bottom (where you will catch your filtered water)



STEPS:

7. Layer filter materials inside in the following order:

- Activated charcoal
- Sand (1/4-1/2 of the bag)
- Gravel
- Alum (makes particles clump together; just a bit, maybe use the popsicle stick to do a little scoop)

8. Mix dirty water using:

- Water + kitty litter + 1–2 drops of blue dye
- Then let the big particles fall and settle down to the bottom

9. Pour dirty water through the filter slowly so the clumps of kitty litter do not come out and make sure your dirty water goes inside the coffee filter and not in between the coffee filter and the bottle

10. Observe how water changes



WHAT YOU LEARN:

Color and clarity of dirty water	Notes on how you designed your filter	Color and clarity of water after going through your filter



WHAT YOU LEARN:

Water looks cleaner, but is it fully safe?

The soil and rocks below us do a lot to treat stormwater but sometimes stormwater is diverted to pipes or cannot absorb into the ground. Not all pollution is removed before reaching the ocean.

This connects directly to:

→ runoff → pollutants → ecosystems

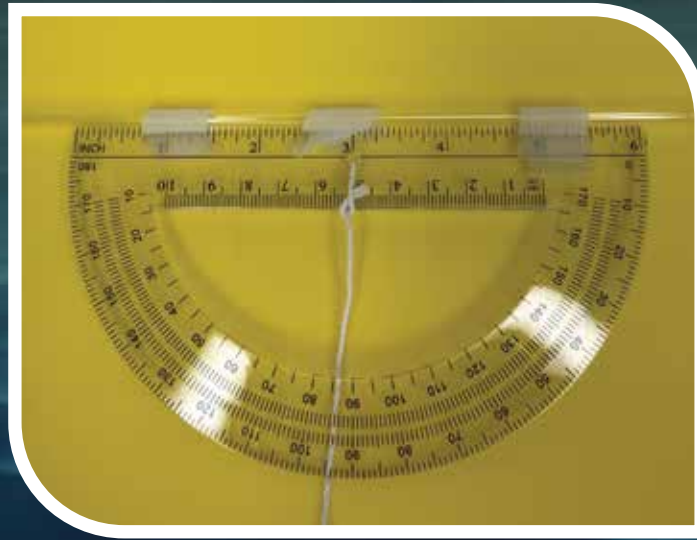
Our treatment plants take these processes further when treating our wastewater and treating water for drinking water by using advanced treatment which also removes harmful bacteria from water.

So...Would you drink this water you've filtered? Why or why not?



CLINOMETER

Let's measure angles and estimate the slope or height of something.



SUPPLIES NEEDED:

Craft Mat

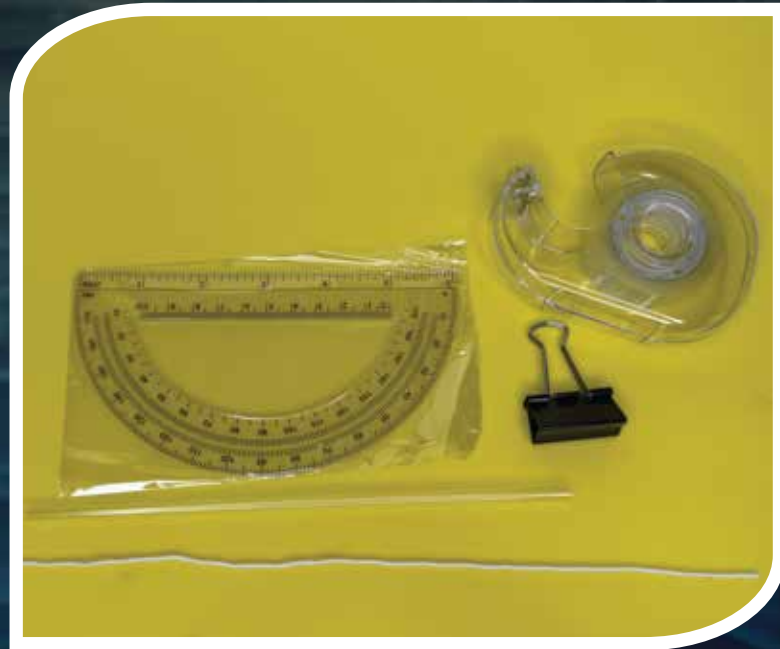
Tape

Protractor

String

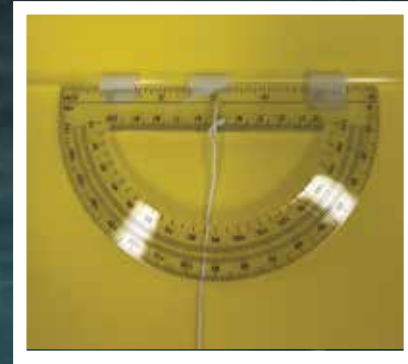
1 Clear Straw

Binder Clip



STEP-BY-STEP INSTRUCTIONS

1. Place your protractor flat on the craft mat
2. Tape the clear straw along the straight edge of the protractor. This is what you will look through.
3. Cut a piece of string about 6–8 inches long
4. Tie one end of the string through the small hole in the middle of the protractor
5. Attach the binder clip to the bottom end of the string. This acts like a weight.
6. Hold the clinometer so the straw is level with your eye
7. Look through the straw at the top of a tree, building, or wall
8. Keep the clinometer steady and let the string hang straight down
9. Read the number where the string crosses the protractor. That is the angle.
10. Compare angles from different objects or from different distances



WHAT YOU LEARN:

Location	Angle	Would water flow fast or slow?

WHAT TO WATCH FOR:

- A taller object usually gives a bigger angle if you are standing close.
- A steeper hill or slope means water will move faster downhill.

WHY IT MATTERS:

Scientists use tools like this to understand slope, and slope helps predict:

- runoff speed
- flooding
- erosion
- where pollution may travel

Let's see what happens when we have a

- a gentle slope
- a steep slope

Which one would flood faster?

ALGAE BLOOM

How extra nutrients can help living things grow very fast.



SUPPLIES NEEDED:

Craft Mat

Scissors

Crayons

2 6oz Jars

8 oz Water

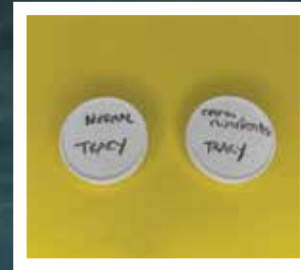
1 Yeast Packet
1 Yeast Packet

1 Plant Food Packet



STEP-BY-STEP INSTRUCTIONS

1. Put the two jars on the craft mat.
 2. Label one jar Normal and the other Extra Nutrients and put your name on them.
 3. Pour the same amount of water into both jars.
 4. Open the packet of yeast with scissors and pour 1/2 of the pouch into each cap, once about equal amount of yeast in each cap, then pour into each jar.
- The yeast is acting as a fast-growing living thing, like algae.
5. Open the packet of plant food with scissors and pour half of the plant food only into the Extra Nutrients jar.
 6. Cover each jar tightly



STEP-BY-STEP INSTRUCTIONS

7. GENTLY shake the jars
8. Place both jars in the same warm spot.
9. Observe the jars over time.
10. Compare the jars after 5, 10, and 15 mins
11. After your last observation, unscrew the jars to release built up pressure and reseal the jars.

Time	What do you see?	What are the differences?
0		
5		
10		
15		

WHAT YOU LEARN:

What to Watch For

- The jar with extra nutrients may grow cloudier or more active faster.
- More nutrients often mean faster growth.

In the ocean, too many nutrients can help algae grow too fast and create an algae bloom.

Remember, this is a model, not real ocean algae.

ECOSYSTEM BALANCE

Let's learn how ecosystems stay in balance and how changing one part can affect everything else.



SUPPLIES NEEDED:

Craft Mat

Tape

Glue stick

2 Jumbo
Popsicle Sticks

4 Small Cups

Wooden
Triangle

Marine Figures



STEP-BY-STEP INSTRUCTIONS

1. Place the wooden triangle on the craft mat.
2. Cross the popsicle stick (like a +) and glue first, then tape them to stay together in the middle (see picture)
3. Tape one small cup on the end of each side of each popsicle stick (see picture)
4. Fold a piece of tape and place it on the pointy peak of the wooden triangle
5. Balance the middle of the jumbo popsicle stick cross across the top of the triangle
6. Add marine figures to cups so the scale is balanced.
7. Talk about what the figures represent:
 - algae
 - fish
 - sea lions
 - other ocean life



STEP-BY-STEP INSTRUCTIONS

8. Now remove one figure from one side.
9. Watch what happens to the balance.
10. Add too many figures to one side and observe again.
11. Try different combinations.
12. Talk about how changing one part of the ecosystem affects the whole system.

Setup	Notes	Take away



WHAT YOU LEARN:

What to Watch For

- A balanced scale represents a balanced ecosystem.
- When one side changes too much, the system tips.

Ocean ecosystems depend on:

- enough food
- healthy habitats
- balance between species

If one part changes, many other parts can change too.

What happens if fish disappear?

What happens if algae grow too much?

What happens if predators get sick?

CARTESIAN DIVER

Let's learn how pressure can change whether something floats or sinks.



SUPPLIES NEEDED:

Craft Mat

Scissors

1 16oz Bottle

Magic
Jellyfish

16 oz Water

Blue Dye



STEP-BY-STEP INSTRUCTIONS

1. Fill the 16oz bottle almost all the way with water.
2. Add one drop of blue dye.
3. Place the magic jellyfish into the bottle.
4. Make sure the jellyfish floats near the top.
5. Put the cap on the bottle tightly.
6. Hold the bottle with both hands.
7. Gently squeeze the bottle.
8. Watch the jellyfish sink.
9. Let go of the bottle.
10. Watch the jellyfish rise again.



WHAT YOU LEARN:

What to Watch For

- Squeezing the bottle increases pressure.
- Increased pressure changes the air inside the diver, making it sink.
- When pressure is released, it floats again.

Pressure affects both air and water. It helps explain how fluids behave in science and nature.

What will happen before squeezing?

What will happen when pressure is released?

LEARN HOW TO READ A MAP:

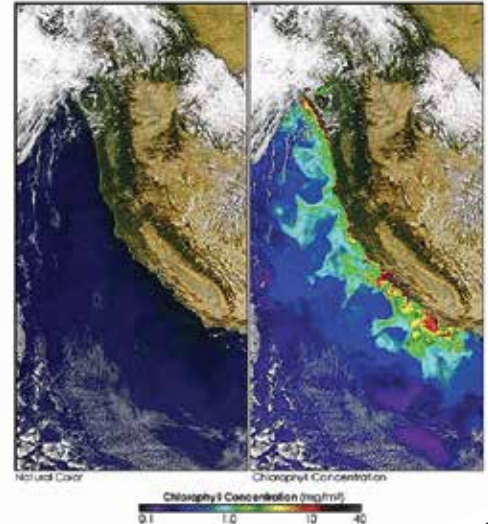
SUPPLIES NEEDED:

Printed satellite maps

WATER CLASS SATELLITE MAP ACTIVITY

Learn How to Read a Map!

Step 1: Look at the **satellite image** of the ocean: Colors show what's happening in the ocean.



WAVES IN A BOTTLE

Let's see how waves move through water and how different liquids can form layers.



SUPPLIES NEEDED:

Craft Mat

Blue Dye

1 16oz Bottle

8 oz Water

Bottle of Baby Oil



STEP-BY-STEP INSTRUCTIONS

1. Pour the bottle of baby oil into the bottle
2. Slowly pour in the water until the bottle is nearly full
3. Add a few drops of blue dye and swirl very gently so as not to mix the oil and water layer
4. Put the cap on tightly
5. If there was mixing of the oil and water layer, wait for the oil and water to separate
6. Hold the top of the bottle with one hand and the bottom of the bottle with the other and turn the bottle sideways
7. Gently rock the bottle back and forth
8. Watch the waves move through the liquids



WHAT TO WATCH FOR

9. Try making small waves

10. Try making bigger waves

11. Observe how the oil and water stay in layers

What to Watch For

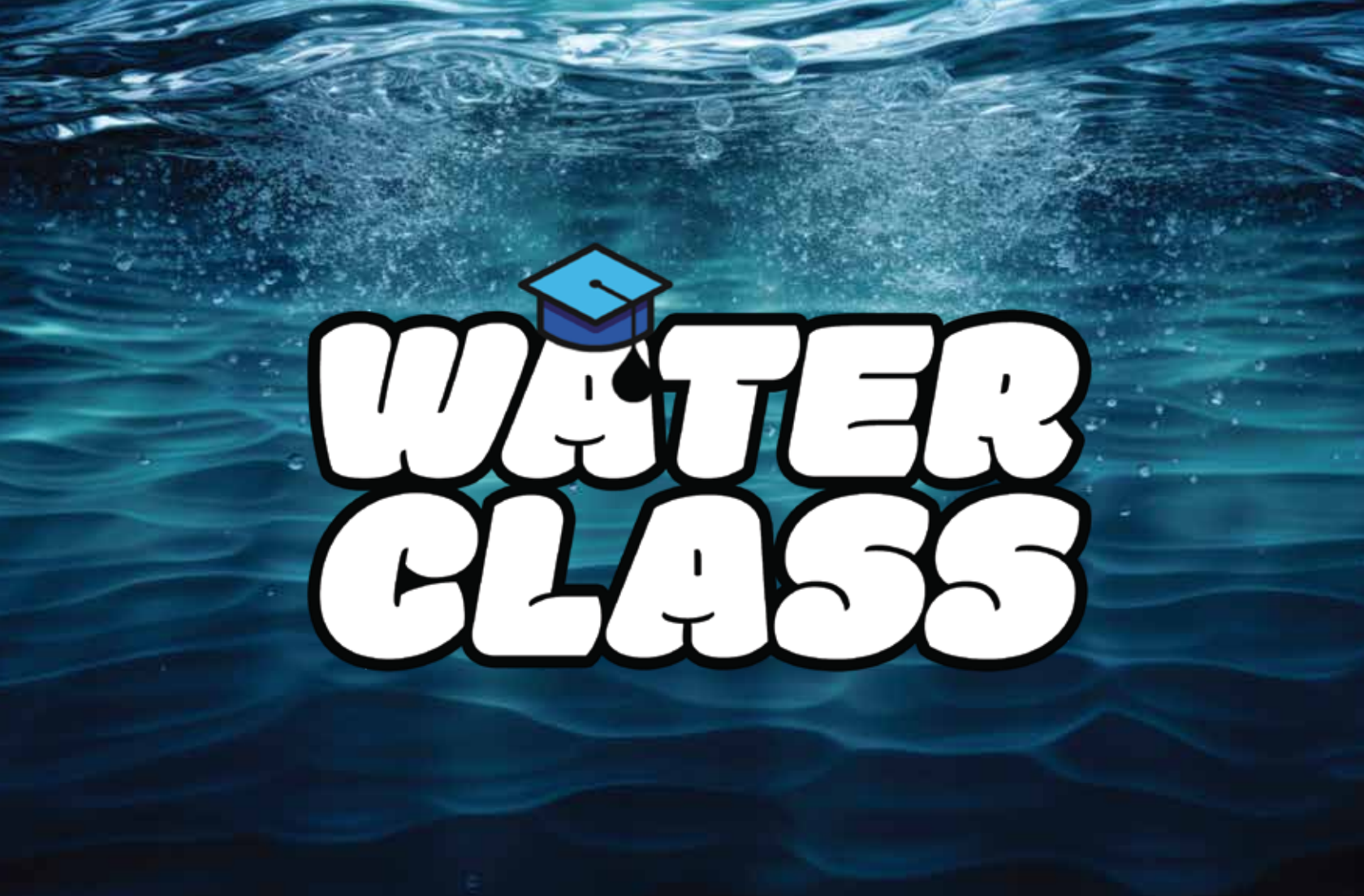
- Water and oil do not mix well.
- The wave shape changes depending on how fast you move the bottle.
- Waves carry energy through water.

In the ocean, wind transfers energy to the water and creates waves.

Did the water move more with gentle rocking or fast rocking?

What do real ocean waves need in order to form?



The background of the image is a dynamic, blue-toned water splash with numerous bubbles and ripples. In the center, the words "WATER CLASS" are written in a large, white, bubbly font with a thick black outline. A blue graduation cap with a black tassel is positioned above the letter 'A' in "WATER".

**WATER
CLASS**