



Lesson 5

Introduction – Water We Talking About?



Learning Standards & Assessment



Time



Resources



Activities



Handouts



Video





Science

Big Ideas

- ▶ Materials can be changed through physical and chemical processes.
- ▶ Water is essential to all living things, and it cycles through the environment.

Content

- ▶ The water cycle
- ▶ Physical ways of changing materials

Arts Education (Music)

Big Ideas

- ▶ Dance, drama, music, and visual arts are each unique languages for creating an communicating.

Content

- ▶ Elements in the arts
 - Music: beat/pulse, duration, rhythm, tempo, pitch, timbre, dynamics, form, texture
- ▶ Symbolism as a means of expressing specific meaning
- ▶ Personal and collective responsibility associated with creating, experiencing, or sharing in a safe learning environment



60-75 minutes, spread over approximately 5 days for observation purposes

Lesson 5c:

Water Actions: Evaporation, Condensation and Precipitation

As part of the exploration of the properties of water, this lesson builds on student knowledge of water states focusing on the processes that allow water to move from liquid to gas and vice versa. Instruction and activities may be separated into two parts and days.

NOTE: An evaporation experiment in Part 2 is designed to be conducted over 5 consecutive days; if you choose to use a different methodology, the corresponding student handout will also have to be modified.

Preparation

1. (optional) Chill the spoons (1/student). Spoons should be as cold as possible. If you don't have easy access to a refrigerator, use a cooler to keep them cold.
2. Photocopy student handout 'Water Changes' (1/student).
3. Prepare ice.
4. On each cup, affix a piece of masking tape vertically from rim to the bottom (for measuring level of water).

Procedure

PART A: Evaporation and Condensation



Video- Down the Drain and Back Again

1. Explain that there are names for the changes water goes through. In the video *Down the Drain and Back Again*, Dylan and Dana learned these words on their water adventure.
2. Tell students to listen for two words-
 - **Evaporate** - the change from liquid water (ocean) to water vapour (floating up to the sky)
 - **Condense** - the change from water vapour (floating up to the sky) to water droplets (in the cloud).
3. Replay the portion of the video where Dylan and Dana turned into vapour and join a cloud.
4. Discuss the terms and/or create Word Maps for 'evaporation' and 'condensation'.



Educator's Kits, including hardcopy lesson plans and support materials, are available for loan through the CRD. For pickup locations, print-friendly materials and multimedia tools see www.crd.bc.ca/teacher or contact the CRD at 250.360.3133.

Teacher Resources

- ▶ Assessment Tool: 'What is Water?' (provided with Lesson 5a)
- ▶ Assessment Tool: Answer Key 'Water Actions'
- ▶ Sounds of a Rainstorm

Student Resources

- ▶ Handout 'Water Actions' (1/student)

Lesson Resources

- ▶ Water Portfolio
- ▶ KWL chart
- ▶ Video, 'Down the Drain and Back Again' (optional)
- ▶ Condensation Experiments 1 and 2
 - metal spoon, chilled in refrigerator (1/student)
 - clear cups of ice water (1/group)
- ▶ Evaporation Experiment 3
 - clear cups of water (1/group)
 - masking tape and felt marker
- ▶ Precipitation Experiment 4 (teacher only)
 - Kettle
 - Plate

Experiment 1 - Cold Spoon (Condensation)

1. Remind students of the spoon experiment from lesson 5b or repeat the experiment with chilled spoons.
2. Distribute the "Water Changes" handout. Have students draw what they see and discuss as a class- What happens? Can they see water droplets on the spoon? This is called CONDENSATION – when water vapour changes into liquid water.

Experiment 2 - Cup of Ice Water (Condensation)

1. Distribute a clear cup of ice water to each student or group. Have students observe the cup and record any changes on their "Water Changes" handout.
2. Discuss - What do they see? Is the cup leaking? Where is the water coming from? What is the name of this change? *This is another example of condensation. If the room is warm enough, water vapour in the air will condense on the side of the cold cup, forming little droplets of water.*

Visualization - Dew (Condensation)

1. Ask students to close their eyes (if they feel comfortable doing so), and imagine the following scenario: *You go outside early in the morning. It's a beautiful day, and it hasn't rained for days, but still the ground is damp. There's water on all the grass, the flowers, cars, patio furniture, and everything else.*
2. Discuss- Where did this water come from? What this form of water called? What is the name of this change? *Water vapour in the air condenses at night when it's cool, and becomes the dew that we find in the early morning. It is another example of condensation.*

Transition- Ask students if they can think of another time that condensation occurs? E.g. after they take a hot shower, or when they breathe on a cold window.

Conclusion One

Is there a pattern? How are the water drops made from water vapour? Together draw a picture to show the steps to condensation. Have students add this to their handouts.

Water vapour — cold — condensation — tiny water drops (cloud)

Experiment 3 - Cup of Water (Evaporation)

1. Have students remove any ice from their cups of ice water and mark the level of the water with a felt pen, then place their cup on a sunny windowsill or near a source of heat.

2. Distribute the student handout, “Evaporation”. Have them observe the water over 5 days, recording the level each time.
3. Discuss the results: What happened to the water? Why? Did the water go down faster some days? Why? Compare with another group, did the water go down the same? Why or why not?

Demonstration - Kettle (Evaporation)

1. Draw students’ attention to your demonstration area.
2. Bring water to a boil until it is steaming. Darken the room and shine a flashlight on the steam to help students see it.

NOTE: If wanting to separate this lesson into two components, stop here and continue “Water Changes- Precipitation” another day. Save the cups of water.

PART B: PRECIPITATION AND RUN OFF

Warm Up- Sounds of a Rainstorm

1. Tell students that you are going to give them a clue about the next change in water, but you need their help to make it work. Without speaking, just listening, have them follow your lead through the stages on the “Sounds of a Rainstorm” teacher resource.
2. What is the clue? Rain.

Experiment 4 - Kettle and Plate (Precipitation)

1. Boil a kettle of water. Hold a metal tray or plate over the steam (be careful of the hot steam). The water vapour will condense into water drops. Eventually, these will fall—precipitation. Note: can put ice on top of the plate to speed up condensation.
2. Discuss what happened and compare kettle with water evaporating from a lake forming a cloud and raining. All types of water falling to Earth—rain, snow, or hail—is ‘precipitation.’

Have students complete their handout “Water Changes”.
vapour — cool — condensation — liquid or solid — precipitation

Word Map

1. Have students create a word map for “Precipitation”.

Assessment Opportunity

Use the assessment tool provided with Lesson 5a to note students’ abilities to make observations, form conclusions, and record details.

Have students add their completed handouts to their Water Portfolios.

Curricular Competencies

Look for evidence that students are able to:

Science

- ▶ Questioning and predicting
 - Demonstrate curiosity and a sense of wonder about the world
 - Observe objects and events in familiar context
 - Make simple predictions about familiar objects and events

- ▶ Planning and conducting
 - Make and record observations
 - Safely manipulate materials to test ideas and predictions
 - Make and record simple measurements using informal or non-standard methods
- ▶ Processing and Analyzing
 - Compare observations with predictions through discussion
 - Identify simple patterns and connections
- ▶ Evaluating
 - Compare observations with those of others
- ▶ Communicating
 - Communicate observations and ideas using oral or written language, drawing, or role-play

Arts Education

- ▶ Exploring and creating
 - Explore elements, processes, material, movements, technologies, tools, and techniques of the arts
 - Create artistic works collaboratively and as an individual using ideas inspired by imagination, inquiry, experimentation, and purposeful play

Extensions and Adaptations

- ▶ **Cups of water** - cover the tops of the cups, or use sealable containers (note condensation and precipitation could take a few hours)
- ▶ **Water Art** - On a sunny day, have students “paint” with water on the pavement outside. Ask them to predict how long it will take for the water to evaporate.
- ▶ **The Great Water Odyssey** - online game. ‘Help Hydro form water molecules to make a cloud and then make it rain. This game takes eye/hand coordination and speed to intercept the water molecules and form a cloud before the sun evaporates the molecules. This game is based on the water cycle and is a fun way to reinforce the concepts of evaporation, condensation and precipitation.’ by Floridaswater.com
www.sjrwm.com/odyssey/flash/cloudGame.swf

Curricular Integration

Mathematics

- ▶ Have students chart the temperature throughout the experiment. At the end of the experiment, have students measure the amount of water left in the cup. Have them fill to the next mark and measure again. Repeat until they have charted measurements for each day.
- ▶ Have students use a rain gauge to measure the amount of precipitation over a period of time. Students can create a chart of the results. Challenge them with simple arithmetic problems based on this data.



Water Actions

Name: _____ Date: _____

Experiment 1: Breath on a cold spoon.

Draw what you see.



Experiment 2: Cup of ice water

Draw what you see.



***1. How does water vapour change into tiny liquid water drops?
Write or draw the steps.***

2. This is called _____.



Name: _____ Date: _____





Experiment 3: Cup of water

1. How full is your cup?

Draw a line each day to show how much water is in the cup..



2. What was the weather like?

| Day |  |  |  |  |
|-----|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |

3. How much water is in the cup?

| Day | Amount of water |
|-----|-----------------|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |



4. Where did the water go?

5. How does liquid water turn into water vapour? Draw or write the steps.

6. This is called _____.

7. How much water is left?

8. How much water is gone?



Name: _____ Date: _____

Experiment 4: Kettle and Plate

Draw what you see.



1. How does water vapour change into raindrops, hail or snow? Draw or write the steps.

2. When raindrops, hail or snow fall to the Earth, this is called _____.



Water Actions - Answer Key

Part A Experiments 1 and 2 (Condensation)

1. How does water vapour become water drops? Write or draw the steps.
Water vapour — cold — condensation — tiny water drops
2. This is called *condensation*

Part B Experiment 3 (Evaporation)

3. Where did the water go? *into the air*
4. How does liquid water turn into water vapour? Draw or write the steps.
Liquid water — heat — evaporation — water vapour (steam)
5. This is called *evaporation*.

Experiment 4 (Precipitation)

1. How does water vapour change into raindrops, hail or snow? Draw or write the steps.
water vapour — cold — condensation — liquid or solid — precipitation
2. When raindrops, hail or snow fall to the Earth, this is called *precipitation*.



Sounds of a Rainstorm

To imitate the sounds of a rainstorm from beginning to end:

1. Silence. (sun shining, clouds forming)
2. Rub hands together (rain in the distance)
3. Keeping palms together, lightly clap fingers together (pitter-patter rain)
4. Snap fingers (raindrops are becoming larger)
5. Clap hands together (large raindrops)
6. Slap desktops (rain is really coming down now)
7. REVERSE
8. Clap hands together (rain is passing)
9. Snap fingers (raindrops are further away)
10. Keeping palms together, lightly clap fingers together (further still)
11. Rub hands together (rain in the distance, and stopping)
12. Silence.
13. Palms still together, raise hands over head (sun shining)
14. Slowly drop arms to sides.

See it in action at 0:00-0:55

www.youtube.com/watch?v=qHsvG3VQ_PU