Decoding the Water Cycle	Grade 2: Air and Water In The Environment

Lesson Plan

Coding Tool	Binary (Base 2 code)
Cross-curricular	Math : Data-representation

Big Ideas

- Air and water are a major part of the environment.

Overall Expectations

2. investigate the characteristics of air and water and the visible/invisible effects of and changes to air and/or water in the environment;

3. demonstrate an understanding of the ways in which air and water are used by living things to help them meet their basic needs.

Specific Expectations

2.4 investigate the stages of the water cycle, including evaporation (e.g., heat water in a kettle), condensation (e.g., collect the water vapour from the kettle on an overturned mirror), precipitation (e.g., allow the water vapour on the overturned mirror to collect, cool, and drop), and collection (e.g., let the dripping water accumulate in a container)

2.6 use appropriate science and technology vocabulary, including solid, liquid, vapour, evaporation, condensation, and precipitation, in oral and written communication

3.4 identify sources of water in the natural and built environment

3.5 identify the three states of water in the environment, give examples of each (e.g., solid – visible as ice, snow, sleet, hail, frost; liquid – visible as rain, dew; gas – visible as fog, water vapour), and show how they fit into the water cycle when the temperature of the surrounding environment changes (e.g., heat – evaporation; cooling – condensation and precipitation)

Description

Using a binary code alphabet data set, students will decode various terms and vocabulary in order to discover the water cycle. This lesson places the students in the role of water as they travel through the various steps in the water cycle.

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Materials	**Computational Thinking Skills**
• Binary reference sheet handout • Water Cycle phase binary worksheets (with answer key) • Phase codes sheets (with answer key) • Alternatively, activity sheets (can be printed on posters/ bristol board stations in the classroom)	• Generalising and patterns • Data representation

Introduction

Discuss how computers, tablets, etc. use code to remember and understand the things around them. The most basic form of this code is called binary, where there are two options, a 1 or 0. In this lesson, binary is represented by two different colours of water droplets.

The students will take on the role of water living in the water cycle. They will have the challenge of decoding key words to move to the next level. They will read and use the coded water alphabet

Explore the alphabet code sheet with the students. This will be the tool they will use to accomplish the task of decoding the water cycle. Explain that each letter of the alphabet has a specific code. Place a code for the word Water Cycle on the board. With the students, decode the word using the chart to demonstrate the process.

Action

Task: Students, in groups (or individually), will each begin their journey at different stages in the cycle. They will complete the worksheet by revealing all the words in a given station. Example, for COLLECTION the keywords are, lakes, oceans, rivers etc. Once completed, the teacher will give them the advancement word, to move onto the next phase. Example, EVAPORATION will bring the group into water in the form of vapour, leading them to CONDENSATION in the clouds and finally to PRECIPITATION as rain.

Optional: Create exploration stations at every phase of the cycle. Example: boiling water onto a spoon to see condensation.

The steps are as follows:
- COLLECTION: Lakes, rivers, oceans, ponds, pools, wells, drains etc.
- EVAPORATION: Heat, sun, gas, vapour, boiling,

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- CONDENSATION: Cooling, Clouds, fog
- PRECIPITATION: Rain, snow, dew, sleet, hail

Consolidation/Extension

As a class discuss:
- Can we list off the steps in the water cycle?
- In what forms do we find water in our environment
- How do we benefit from the collection phase in the cycle?
- Was it difficult to decode the information? Why?

- **Extension:**
  - The water cycle continues, but what if we forget the information we collected?
    - Link: Coding uses stored patterns to be used again later (like the water collecting to restart the cycle). CYCLE possible link with loops in coding.

Assessment

Observe the students as they decode the information. Look for their ability to match and recall the patterns. Note if they are able to notice and correct errors in their decoding?

Use the class discussion to assess students' understanding of the water cycle. Verify their understanding of the cyclical nature.

Additional Resources

- Binary Water Alphabet Decoder Handout
- Sample phase worksheets
- Sample phase codes
- Binary phase code answer sheets

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