

**CODE/MOE/UOIT Makerspaces Project**

**Lesson Plan: Grade 5 Science, Mathematics & Social Studies: Drinking Water, Part 4**

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| **Lesson 4**  **BIG IDEAS:**  Chemical change implies the formation of a new substance. ***(Overall expectations 2 and 3)***  The properties of materials determine their use and may have an effect on society and the environment. ***(Overall expectation 1)***  Human activity and the environment have an impact on each other.  Human activities should balance environmental stewardship with human needs/ wants.  When studying interrelationships between groups of people, it is important to be aware that each group has its own perspective on those interrelationships.  **Science and Technology Overall Curriculum Expectations:**  **1.** evaluate the social and environmental impacts of processes used to make everyday products;  **2.** conduct investigations that explore the properties of matter and changes in matter;  **3.** demonstrate an understanding of the properties of matter, changes of state, and physical and chemical change.  **Mathematics**  1. describe, through investigation, how a set of data is collected (e.g., by survey, measurement, observation) and explain whether the collection method is appropriate.  **Social Studies**  A1.3 explain some of the ways in which interactions between and among First Nations and Europeans in New France are connected to issues in present-day Canada *(e.g., land claims, treaty rights, environmental stewardship, resource ownership and use)* | |
| **Learning Goals:**  “We are learning to and about:  How the lack of clean drinking water infrastructure impacts on First Nations communities in Canada.  The importance of clean water for human health.  How water is treated in order to make it potable.  How to create, test, evaluate and improve upon a portable water filtering device of our own design.  How to use data collection to inform our assessment of our filters, and to guide us on how to improve our designs. | **Success Criteria:**  “We will be successful when…”  We can tell you about the various factors that have led to many First Nations not having access to clean drinking water.  We can identify many of the different reasons why the water in not potable. (Bacteria, metal contamination, etc.)  We can tell you about the processes in the human body that rely on water, and describe the ill effects of water deprivation.  We can tell you about the health effects that can occur from drinking non-potable water.  We use research skills to research ways to treat water in order to make it potable.  We design, build and test a portable water treatment unit out of found materials.  We use our data analysis to see if we have successfully cleaned water.  We use what we have learned to improve upon our initial design. |
| **Lesson Overview:**  **Reflect on our filters and the testing data. Decide how to improve our designs.** | |
| **Materials and Technology:**  **Our data from our water filter tests. The TDS (total dissolved solids rating and bacteria counts)** | |
| **Student Accommodations/Modifications:**  **EA for students on the Autism Spectrum.** | **Lesson will be differentiated by:**   * **Content, specifically: None** * **Process, specifically: Some students will use voice to text to record results** * **Product, specifically:** * **Environment, specifically: none** |
| **MINDS ON: Getting Started** | |
| During this phase, the teacher may:  • activate students’ prior knowledge;  • engage students by posing thought-provoking questions;  • gather diagnostic and/or formative assessment data through observation and questioning;  • discuss and clarify the task(s). | During this phase, students may:  • participate in discussions;  • propose strategies;  • question the teacher and their classmates;  • make connections to and reflect on prior learning. |
| Describe how you will introduce the learning activity to your students. What key questions will you ask? How will you gather diagnostic or formative data about the students’ current levels of understanding? How will students be grouped? How will materials be distributed?  We will share our test data and discuss how well our filters worked.  Assessment may take the form of peer- and/or self-assessment. | |
| **ACTION: Working on it** | |
| During this phase, the teacher may:  • ask probing questions;  • clarify misconceptions, as needed, by redirecting students through questioning;  • answer students’ questions (but avoid providing a solution to the problem);  • observe and assess;  • encourage students to represent their thinking concretely and/or pictorially;  • encourage students to clarify ideas and to pose questions to other students. | During this phase, students may:  • represent their thinking (using numbers, pictures, words, manipulatives, actions, etc.);  • participate actively in whole group, small group, or independent settings;  • explain their thinking to the teacher and their classmates;  • explore and develop strategies and concepts. |
| Describe the task(s) in which your students will be engaged. What misconceptions or difficulties do you think they might experience? How will they demonstrate their understanding of the concept? How will you gather your assessment data (e.g., checklist, anecdotal records)? What extension activities will you provide?  We will reflect on our results and what we’ve learned about filtration to improve upon our designs. Assessment may be done in the form of a checklist or rubric.  **Extensions: Use our 3-d printer to create an updated water filter.** | |
| **CONSOLIDATION: Reflecting and Connecting** | |
| During this phase, the teacher may:  • bring students back together to share and analyse strategies;  • encourage students to explain a variety of learning strategies;  • ask students to defend their procedures and justify their answers;  • clarify misunderstandings;  • relate strategies and solutions to similar types of problems in order to help students generalize concepts;  • summarize the discussion and emphasize key points or concepts. | During this phase, students may:  • share their findings;  • use a variety of concrete, pictorial, and numerical representations to demonstrate their understandings;  • justify and explain their thinking;  • reflect on their learning. |
| How will you select the individual students or groups of students who are to share their work with the class (i.e., to demonstrate a variety of strategies, to show different types of representations, to illustrate a key concept)? What key questions will you ask during the debriefing?  All students will write up their findings and present them to the class. Key questions will be:  Where you successful? How do you know? Would you want to drink this water? Why?  What research do you need to do? What do you need to find out? In order to improve upon your prototype? | |