Pure Substances and Mixtures in Code	Grade 7 Pure Substances and Mixtures

Lesson Plan

Description

Students will code and remix a scratch algorithm to explore and understand the differences between pure substances and mixtures.

Learning Outcomes

- A pure substance contains only one element or compound
- A mixture consists of two or more different substances that are not chemically joined.
- An algorithm is a series of steps used by a computer program to perform a task
- Conditional statements to help computers make decisions and provide

Specific Expectations

Strand A: STEM Skills and Connections

A2.1 write and execute code in investigations and when modelling concepts, with a focus on decomposing problems into smaller steps

Strand C: Matter and Energy

C2.2 distinguish between pure substances (e.g., distilled water, salt, copper pipe) and mixtures (e.g., salad dressing, chocolate chip cookies)

Introduction

Substances are made up of particles that are invisible to the unaided eye. These substances can be classified into pure substances whose sub-classifications are compounds and elements, and mixtures with sub-classifications of homogenous and heterogeneous.

Pure substances are substances in which all particles look alike (e.g., water). Compounds are pure substances in which all particles are the same type of molecule (e.g., salt). Elements are pure substances in which all particles are the exact same type of atom. (e.g., carbon).

Mixtures are made up of combinations of pure substances e.g., trail mix. Homogenous mixtures have the same appearance throughout (e.g., lemonade). Heterogeneous mixtures have different appearance throughout (e.g., cereal with milk).

For this exercise, students will consider the first large classifications of pure substances versus mixtures. Students will consolidate their knowledge by running a premade scratch program.

To further extend their knowledge of classification, students will remix the premade program to complete the code and finalize the classification by composition program.

Action

To do this activity, students will need to run the associated Scratch program by following this link: https://scratch.mit.edu/projects/722954028

Once the program is opened, students can run the program by clicking on the green flag at the top right of the screen.

Students are to complete the program and follow the prompt until they are asked to press "9".

Students will then be tasked with remixing the program to continue classify the other objects displayed.

To do this, students will need to select each sprite by locating it in the bottom right-hand corner and creating a block sequence that will continue with the classification of substances.

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The outcome should be to have a program that allows a user to explore all the classifications of pure substances and mixtures and provides feedback for user inputs.

The code for each of these items can be found with the solutions handout.

Consolidation/Extension

- To extend the activity, have students add or change the existing sprites to classify different pure substances and mixtures
- If students have chosen to select their own sprites, students can trade devices with their peers to run through the program and practice classifying the different substances
- To make it more challenging, ask students to prompt for the subclassifications of each pure substance or mixture (compound, element, heterogeneous, and homogeneous)

Accommodations/Modifications

- Students can save their programs to their computers to review the different types of classifications later.
- Students may work in strategic groups to further facilitate the activity.
- The program can be modified to read the text for the learners as needed (use the Text to Speech Add on)

Assessment

- Assess your student's ability to classify the different type of substances.
- Assess your student's ability to create block-based sequences using conditional statements.

Additional Resources

Materials Needed:

- Personal electronic device with access to Scratch
- Student handout
- Solutions handout

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