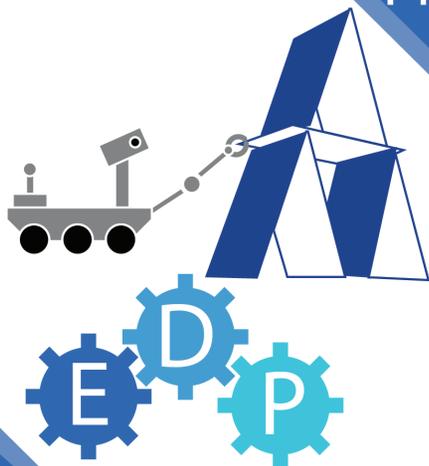


Learning Progression - Prep Activities

These activities introduce youth to engineering, an engineering design process (EDP), and the curricula's definition of technology. A video sets the context for the unit and demonstrates how engineers design process technologies that reuse water in extreme environments.

P1



**What is Engineering?
Teamwork & Tower**

Purpose

Youth engage in an engineering design challenge using an Engineering Design Process (EDP), criteria, and constraints.

Key Take Away

We are engineers.

Science Reflection

Today we used an EDP to solve problems with criteria and constraints.

P2

A	B	C	D
10	10	10	10
20	20	20	20
30	30	30	30



**What is Technology?
Trivia & Context Video**

Purpose

Youth consider the definition of technology as any thing or process humans (engineers) design to solve a problem. The Special Report Video sets the context for the entire unit.

Key Take Away

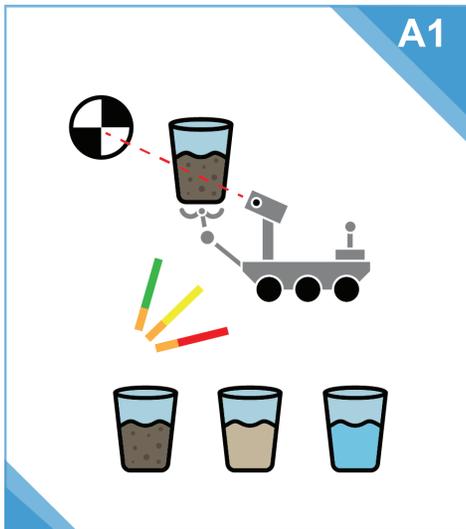
Processes designed by humans to solve problems are technologies.

Science Reflection

Today we investigated how engineers design water reuse technologies in places where water is scarce.

Learning Progression - Engineering

In these activities, youth investigate the contaminants, filter materials, and potential uses for filtered greywater for designing their own water reuse process in Activities 4 & 5.



A1

A Grey Area Water Samples & Quality Tests

Purpose

Youth test the quality of and categorize model water samples using real tools.

Key Take Away

We can test water quality and categorize it as pure, grey, or waste water.

Science Reflection

Today we investigated common household water contaminants and categorized model sample qualities as pure water, waste water, or grey water based on the contaminants we found.



A2

Investigating Filters Filter Water Samples

Purpose

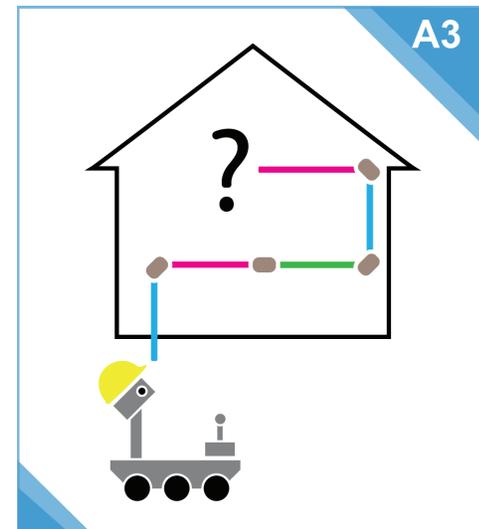
Youth explore how different water filter materials reduce contaminants.

Key Take Away

We can improve water quality with filters.

Science Reflection

Today we investigated different materials to see how well they removed or reduced different water contaminants.



A3

Order Up! Design a Water Reuse System

Purpose

Youth apply what they learned in Activities 1 & 2 to improve water quality at least one level so it can be reused for a different purpose.

Key Take Away

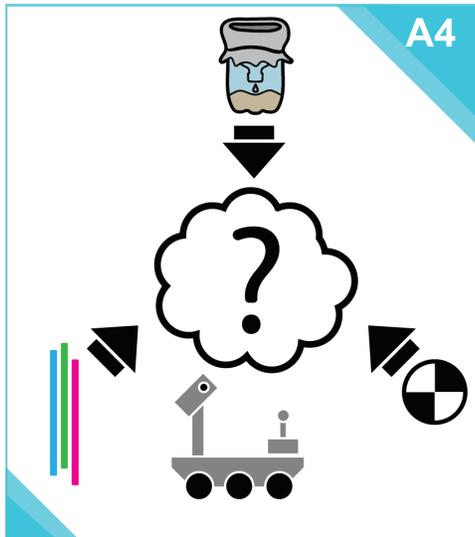
When water is limited, it can be filtered to remove contaminants/improve quality so it can be reused for different purposes.

Science Reflection

Today we engineered a process to filter a limited amount of water so it could be reused for different purposes.

Learning Progression - Engineering

In these activities, youth apply what they learned in Activities 1-3 to design, improve, and share their water reuse process.



A4

Create a Process Plan, Create, Test

Purpose

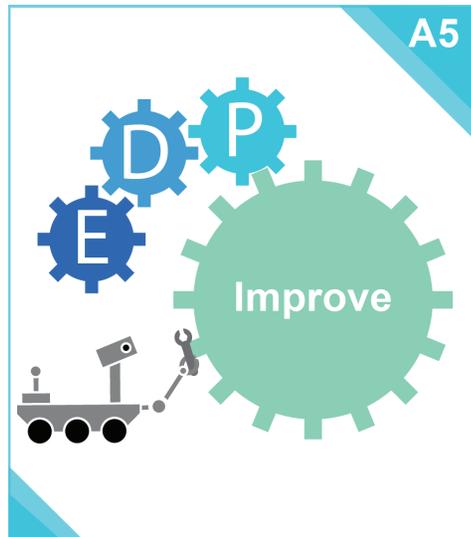
Youth apply what they learned in prior activities to design and test a water reuse process using filter materials and home piping reconfiguration.

Key Take Away

We can engineer a process to improve water quality so it can be reused for other purposes.

Science Reflection

Today we used data from prior investigations to imagine, create and test a water reuse process for an extreme environment where water is scarce.



A5

Improve Improve a Process

Purpose

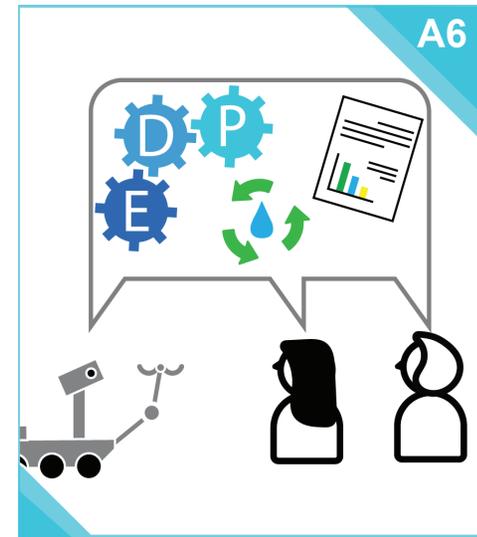
Youth improve their process to better meet the criteria of their extreme environment.

Key Take Away

We can improve technologies we have designed.

Science Reflection

Today we improved our water reuse process. Not getting it the first time helps make technology better.



A6

Engineering Showcase Communicate Results

Purpose

Youth prepare presentations to communicate their water reuse process to others.

Key Take Away

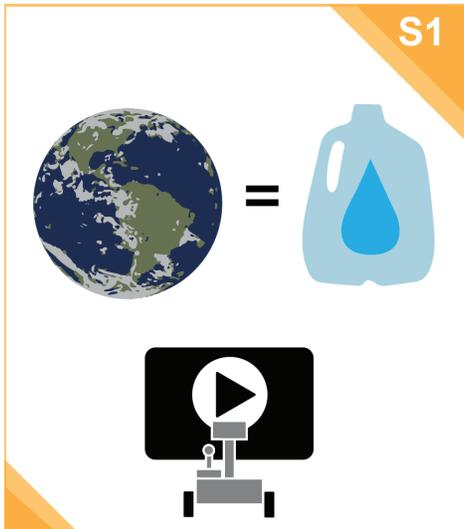
We can communicate how we designed our water reuse process using an EDP.

Science Reflection

Today we communicated our water reuse process and how we used an EDP to design it.

Learning Progression - Science

In these activities, youth explore how much, how accessible, and how usable water is on earth and elsewhere in our solar system. Youth also consider if water is potentially habitable on other planetary bodies. Youth also propose a planetary body to explore based on evidence of water.



Earth's Water Experiment & Videos

Purpose

Youth explore the concept of water availability, accessibility, and usability on earth.

Key Take Away

Water is abundant on earth, however humans can access and use only a tiny fraction of the water. Other organisms can access and use water in ways that humans cannot.

Science Reflection

Today we investigated how various factors can make earth's water reservoirs inaccessible or unusable for humans but other organisms can access and use water in ways humans cannot.



Water in the Solar System PLANETS cards

Purpose

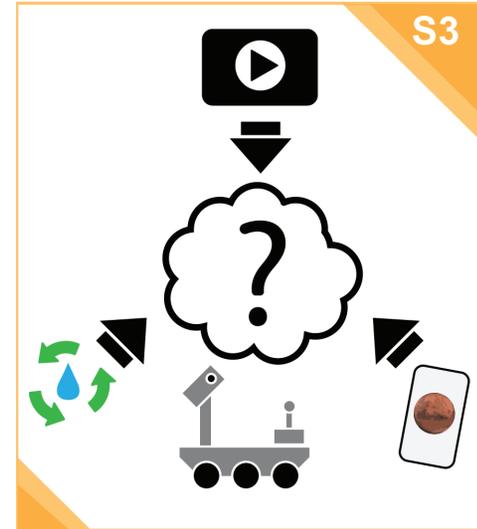
Youth explore where water is available in the solar system and begin to consider its accessibility and usability.

Key Take Away

Water is abundant in the solar system and exists in similar reservoirs and phases as earth.

Science Reflection

Today we learned that water elsewhere in the solar system exists in similar reservoirs to earth and have similar accessibility and usability considerations.



Exploration Potential Choose a Water Reservoir & Share

Purpose

Youth propose a planetary body to explore based on the availability, accessibility and usability of water and present their choice.

Key Take Away

We can use what we learned about earth's water and evidence of water in the solar system to make an argument about what to explore.

Science Reflection

Today we explored how we can use data about water from elsewhere in the solar system to make recommendations for future exploration.