SCIENCE EXPERIMENT: Preparing the Pad

EST. TIME: 2 days

OVERVIEW Climate change is causing NASA to make changes to preserve the future use of their launch pads. Using the Google Earth story, **"We are 'Go' for Launch"** explore this history of the launch pads, the challenges the organization faces, and changes they are making to become climate resilient.

After reading the story, this short science experiment can be used to explore the issues NASA is facing with the seaside launch pads.

SUBJECT/TOPIC Science - Physical Science

AGE RANGE: 9ys - 16yrs

Learning Objectives

Students will plan and conduct an experiment related to metal oxidation.

The experiment is inspired by the claim in the story that that seasalt from the ocean is causing metals to rust.

Depending on the student's age, possible lessons could include

- Oxidation and Reduction
- Experiment Planning
- Chemical Reactions

Lesson Summary

The following activity will help explore why the location needs to be adapted to compete with the environmental issues

This activity can be scaled depending on the age and skill level of the participants. At the most basic level, students can plan an experiment to see what happens when metal is placed in salt water versus fresh water.

Sustainable Development Goals

Goal 13 -Climate Resilience
https://sustainabledevelopment.un.org/sdg13

Target: 13.2

Integrate climate change measures into national policies, strategies and planning.

Suggested Standards
Next Generation Science Standards

MS-PS1- Matter and its Interactions
https://www.nextgenscience.org/dci-arrangement/ms-ps1-matter-and-its-interactions

High School Chemical Reactions
https://www.nextgenscience.org/topic-arrangement/hschemical-reactions

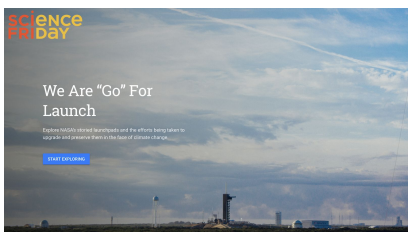
Materials Needed

Paper cups- at least 2
Fresh water- at least 1 cup.
Salt (kind and amount should be decided by the student)
Spoon

Miscellaneous small metal objects (this can be chosen by the student as well):
paper clips, iron nails, a penny, wire
*paper clips work especially well!

Writing utensils for recording observations

Plan for a safe way to dispose of your items.



Lesson Summary

Read through the story "**We are 'Go' for Launch**" and ask your students:

- Where are NASA's launch pads located?
- Why are they located in this specific location?
- What are the complications related to this location?
- How is NASA addressing these problems?

For the experiment, students will need to decide:

- The amount of water in each cup
- Temperature of the water (this will increase the rate of corrosion.)
- The amount of salt- measured out and decided by the student based on their experiment design.

Begin the experiment:

1. Prepare identical cups of water.
2. Use one as the control cup with fresh water and place the a determined amount of salt in the second cup. Label each cup.
3. Place your metal item into your cup.
4. Stir the water both cups.

(If you are testing more metal objects, students will prepare 2 cups for each test.)

Observe:

Make observations on the items making sure to take detailed notes on the color and changes to the item.

- What changes did you notice?
- How long did it take to change?
- How might this rate vary if more salt was placed in the cup?
- How might the rare vary if the water was warmer?

After notes on the experiments and observations have been shared across the students, pose the question:

- What problems could rust have on equipment left near the sea?
- How might the solution presented in the Google Earth story support the resilience of the metal on the launch pad?

Credits

Google Earth Education Expert Peg Keiner
Connect with her and learn more about her work at bit.ly/EarthEdu