

Lesson plan title

Mechanism of rocket launch

Institution

JAXA Space Education Center

Subjects

Science

School Grade

Elementary / Junior high / High school

Learning Unit

Air and Water or Action and reaction

Session No. / Total Session Times

1/1

Materials & Equipments

- PCs (For using Google Earth. Installing Chrome browser is required.)
- A projector and a screen
- Internet access
- Materials to build film canister rockets

Lesson Summary

- Using the launch of rockets to motivate the participants to learn
- Understanding how rockets launch through experiments

Google Earth Usage Overview

- Google Earth Voyager "Riding a rocket"

Learning Objects

- Learning how to devise better ways through experiments
- Understanding the scientific mechanism for launching rockets

Inquiry

- What can you do to make rockets launch further?

Culminating Task

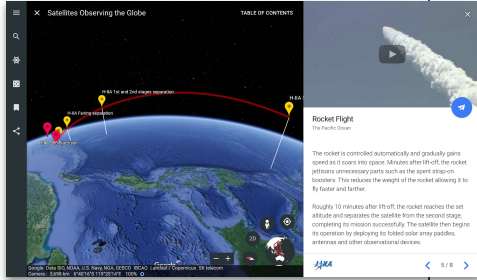
- Whether or not the participants can devise a way to launch a rocket by understanding how it works

Lesson Outline with Estimated Time Allotment

- Total time: 50 mins
 - Introduction - 5 mins
 - Development - 30 mins
 - Summary - 15 mins

Lesson Scenario

Introduction - 5 mins

Time	Path	Students' activities	Teacher's guide
5 mins	Understanding the process of launching rockets	Watching the videos in "Riding a rocket" by Google Earth Voyager 	Setting the PCs up and giving a brief explanation

Development - 30 mins

Time	Paths	Students' activities	Teacher's guide
20 mins	Building film canister rockets	Building film canister rockets ✂Refer to the URL in the Additional Resources section	Reminding the participants of common mistakes: turning a rocket upside down, etc.
10 mins	Launching film canister rockets	Launching film canister rockets	Instruction: "Try to launch your rocket well" Preparing to change the conditions for the experiments ✂Tips: freely change the water temperature, the size of foaming bath salts, etc.

Summary - 15 mins

Time	Paths	Students' activities	Teacher's guide
10 mins	Devising better ways	Discussing within each group what conditions would help launch rockets further and devising better ways	Inquiry: "What can you do to make rockets launch further?"
5 mins	Impressions, wrap-up	Writing down the participants' impressions of the lesson, what they have learned, and what they have noticed	

Evaluate: Exemplar Response and/or Rubric

- ☐ Using self-assessments and group evaluation

Additional Resources

- ☐ [JAXA Space Education Center: Build and launch film canister rockets](#)

Options for Differentiation

- ❑ This lesson is not about playing with rockets. It's important to leave room for the participants to experiment with their ideas and devise better ways. Let them come up with many ideas, including the use of different kinds of aqueous solutions.

Connect

- ❑ Depending on the age of the participants, some of them might need one hour to build a film canister rocket. It would be great if the teachers could conduct preliminary experiments.