

# Satellites and The Moon

## Rich Task 3 Activity 3

### Introduction:

This activity asks students to investigate both human made satellites and natural ones (Our Moon). In the first half students will explore current Irish science and its involvement with satellites used to better understand space. This activity has the option of a coding activity designed to teach basic programming ideas, it can be done alone or with the use of the physical activity Q2. A detailed description of the elements taught in the coding activity can be found in the [SURROUND python instructions](#). It is done through the website replit and more information can be found below.

The second half requires students to use a table of data, images, a model, and also graphing to understand how tides work. This activity scaffolds the next [Rich Task 3 Activity 4](#), which brings together what has been learned so far to see if the original questions from [Rich Task 3 Activity 1](#) have been answered.

### Preparation Required:

- Printing and cutting
- Computer/tablet access for students

### Downloadable Materials:

- [Worksheet 3.3](#)
- [Expected Student Responses to Worksheet 3.3](#)
- [SURROUND python instructions](#)
- [Moon Calendar](#)
- [Tides Model](#)

### Relevant Junior Cycle Learning Outcomes:

Students should be able to...

**PW LO 3:** Investigate patterns and relationships between physical observables.

**NOS LO 1:** Appreciate how scientists work and how scientific ideas are modified over time

**NOS LO 4:** Produce and select data (qualitatively/quantitatively), critically analyse data to identify patterns and relationships, identify anomalous observations, draw and justify conclusions.

**E & S LO 4:** Develop and use a model of the Earth-sun-moon system to describe predictable phenomena observable on Earth, including seasons, lunar phases, and eclipses of the sun and moon.

**E & S LO 8:** Examine some of the current hazards and benefits of space exploration and discuss the future role and implications of space exploration in society.

Learning Intentions:

Students will be able to...

- Analyse visual and numerical data to investigate the tides
- Plot data
- Identify the location of a space storm using python

Prior Knowledge/Horizon Content Knowledge:

- Plotting graphs
- Basic Python (plotting graph, labelling axes)
- Current Irish science

Differentiation and Accessibility Suggestions:

This activity requires some prior knowledge. Students can decide the depth of questioning and discussion in the class.

All questions/activities can be completed in small groups, pairs, or individually depending on the classroom layout.

In the case of limited student access to computers, the students can complete the activity without the python exercise.

Coding experience is not necessary but helpful.

The graphing activity could be used for a cross-curricular lesson.

Activity Outline:

<b>Activity Name</b>	Satellites & The Moon
<b>Alignment to ISLE investigation</b>	Investigating the hypothesis
<b>Rationale</b>	To provide an opportunity for students to work with numerical data and use python. Investigating the pattern of behaviour of the tides.
<b>Activity Description</b>	<i>(please see downloadable materials for the resources for this activity)</i>  <i>(Q1. Worksheet 3.3)</i> Students read and answer questions about

	<p>EIRSAT-1 Ireland's first satellite.  <a href="https://www.eirsat1.ie/comicbook">https://www.eirsat1.ie/comicbook</a></p> <p><b>NON-CODING OPTION</b>  <i>(Q2. Worksheet 3.3)</i>                  Students use the distance from each cubesat to the storm as the radius to create a circle where the storm should be. Do this with each cubesat to reveal the location of the storm.                  Find out more about the SURROUND mission <a href="#">here</a>.</p> <p><b>CODING OPTION (more info below)</b>  <i>(Q2. Worksheet 3.3)</i>  <a href="https://replit.com/@msclancy/Surround-triangulation?v=1">https://replit.com/@msclancy/Surround-triangulation?v=1</a>                  Click clone repl/ save project to start.                  Students, in pairs, follow the instructions to complete an activity identical to Q2 but through the language of code.</p> <p><i>(Q3. Worksheet 3.3)</i>                  Students model the tides by placing the Earth on top of the blue shape from the <a href="#">Tides Model</a>. As the Moon exerts a gravitational pull on Earth it is more visible with water and to the tide is highest along the horizontal.</p> <p>Graphing the data will give students peaks and dips that align with lunar events. This shows how the Sun can enhance or lessen the Moon's effect depending on if their gravitational forces work together or against each other.</p>
<p><b>Link to other activities</b></p>	<p>Scaffold for <a href="#">Rich Task 3 Activity 4</a></p>
<p><b>Link to current research in DIAS Dunsink Observatory</b></p>	<p>The Solar and Space Weather group at DIAS Dunsink consists of PhD students, postdocs and professors who study different aspects of the Sun and Space Weather.                  Through their research, scientists can get daily updates on the activity of the Sun (<a href="https://solarmonitor.org">https://solarmonitor.org</a>) and advise on precautions that can be taken to protect Ireland's power grid from potential solar storms.                  More information on specific projects can be found here:  <a href="https://www.dias.ie/solarphysics">https://www.dias.ie/solarphysics</a></p>