Year 8 Space: Space Mission Worksheet

**LESSON OBJECTIVES:**

* Understand and apply the concepts of gravity, and fuel consumption in space travel.
* Use Python to calculate gravitational forces and analyse their impact on space missions.
* Collaborate in groups to solve complex problems and present findings effectively.

**Introduction:**

In this worksheet, you will explore key concepts related to space missions. You’ll start by investigating gravity on Earth, in space, and on your assigned planet. Then, you'll calculate how these gravitational forces impact the mission, particularly in terms of weight and fuel consumption. Finally, you'll apply these concepts to real-world scenarios that astronauts must consider during space travel.

# Setting Up

 **Go to this link:**  
[Google Colab Notebook](https://colab.research.google.com/drive/1tbVj_lsLQ_51pESrkmIyD40xQpYRn3eY).

 **Save a copy to your Google Drive:**

* Click on "File" in the top left corner.
* Select "Save a copy in Drive."
* This will create your own copy of the document where you can make changes.

 **Running the code:**

* Each grey box contains code. To run the code, click the "Run" button (it looks like a play button) in the top left of the grey box.
* **Important:** Run the boxes in order, starting from the top. If you skip a box or run them out of order, you might see an error message.

# Section 1: Discovering Gravity Across Your Mission

What is gravity on Earth? Include units

What is gravity in space?

What is gravity on your destination planet?

What is the formula for weight?

Compare the weight of the spacecraft on each of these locations (assume a mass of 100 kg)

# Section 2: Fuel consumption

What is the equation to work out how quickly fuel will be consumed?

How long would 5000 kg of fuel last a 100 kg spacecraft with a burn rate of 0.5?

Draw a diagram illustrating the spacecraft’s fuel consumption over time. Be sure to label the axes and key points.

How much fuel would be needed to reach your assigned planet assuming a consistent burn rate of 0.5 and a 100kg spacecraft.

# Additional Activities:

Assuming you have endless fuel and are traveling at a constant speed of 17,500 mph, calculate how long it would take to reach your assigned planet. Show your calculations and include the distance to the planet in your work.