

Destination L1: A Thematic Unit

Studying Orbits About Bodies in Space

STUDENT REPORTING SHEET

PROCESS FRAME

Based on the student activity sheet, describe the process of finding the orbital period of a satellite.

Part 1: List the assumptions:

Part 2: List definitions to the following variables.

a:

F:

R:

A:

P:

Part 3: Write the equation to solve for P^2



Part 4: Describe the process for finding the period of a satellite in orbit about a planet using the above equation.

The first step of the process:

The second step of the process:

The third step of the process:

The fourth step of the process:

1. Based on the data you put into the [Kepler's Third Excel Calculation Using Macro](#) from the student activity, what is the period of a satellite at an altitude of 150 miles above the Earth?
2. Using this same spreadsheet, what is the period of a satellite at an altitude of 9950 miles above the Earth?
3. Using this same spreadsheet, determine the period of satellites at the 150-mile altitude above each of the planets. Remember to change the body radius, reference period, and starting (A+B) which equals body radius plus 150. Once you have completed the spreadsheet, fill in the table below.



Planet	Period of Satellite with an Altitude of 150 Miles Above the Surface (minutes)
Mercury	
Venus	
Earth	
Mars	
Jupiter	
Saturn	
Uranus	
Neptune	
Pluto	

- a) At an altitude of 150 miles above the planet, which planet's satellite would have the greatest velocity?
 - b) At an altitude of 150 miles above the planet, which planet's satellite would have the slowest velocity?
 - c) According to the table, which planet would have satellites with the most similar orbital velocity?
4. Compare the orbital periods of the moons of Earth and Mars. Make sure to change the information in the spreadsheet to kilometers as you enter the numbers. The spreadsheet will give you orbital period in minutes. Fill in the table below.

Moon (planet)	Altitude (kilometers)	Orbital Period (minutes)
Moon (Earth)	384,000	
Phobos (Mars)	9,370	
Deimos (Mars)	23,520	

- a) Based on the data in the data table, which moon has the shortest orbital period?
- b) Write a statement that describes the relationship between the altitude of a satellite and its orbital period.