



# Science Virtual Learning

## MPI Physics

### Gravity 5: Orbit Examples

April 17, 2020



Lesson: MPI Gravity 5 - Orbit Examples  
April 17, 2020

**Objective: To practice calculating the velocities and periods of orbiting objects**

1. The International Space Station (ISS) orbits the Earth at an altitude of 400 km above the surface. Find its orbital speed and period.

Video: <https://youtu.be/dG9ptx5yak8>

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## Orbit Example 1



2. Ganymede is the largest moon of Jupiter. It orbits Jupiter once every 7.15 days in a circle of radius  $1.07 \cdot 10^9$  m. From that, calculate the mass of Jupiter.

Part 1: <https://youtu.be/mBOp8H8xcJA>

Part 2: <https://youtu.be/BTIYNtZD2Fw>

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## Orbit Example 2



# Homework 1

Earth orbits the Sun at a distance of  $1.50 \cdot 10^{11}$  m, with a period of one year.

a) What is the orbital speed of the Earth?

b) From that, calculate the mass of the Sun.

- Try to solve the problem yourself, then watch the solution video:
- <https://youtu.be/RTmKxJVfnXs>

## Homework 2

Astronomers estimate that when the Moon formed, it orbited in a circle of  $4.8 \cdot 10^7$  m, which is only  $1/8$  of its current distance. Calculate its orbital speed and period at that time.

- Try to solve the problem yourself, then watch the solution video:
- <https://youtu.be/SHJxKQG9NQ>



That's it!

