

Asteroid Avoidance - Gravity Force Lab

Part 1:

Watch this video (5 min): https://www.youtube.com/watch?v=IY3XV_GGV0M

What are three things about gravity you learned from this video?

- 1.
- 2.
- 3.

Navigate to: https://phet.colorado.edu/sims/html/gravity-force-lab/latest/gravity-force-lab_en.html (English version)
https://phet.colorado.edu/sims/html/gravity-force-lab/latest/gravity-force-lab_es.html (Spanish version)

Take 5 minutes to explore the simulation. Record at least two observations:

What are two ways you can change the amount of force (gravity) the objects are experiencing?

Which way do you think has the biggest effect on the amount of force (gravity)?

Part 2:

Reset your simulation by clicking the orange circle arrow in the bottom right:



Complete the table:

| Mass of 1 (kg) | Position of 1 (m) | Mass of 2 (kg) | Position of 2 (m) | Force (1 on 2) (N) | Force (2 on 1) (N) |
|----------------|-------------------|----------------|-------------------|--------------------|--------------------|
| 10 | 0 | 10 | 10 | | |
| 10 | 0 | 10 | 5 | | |
| 100 | 0 | 100 | 10 | | |
| 100 | 0 | 100 | 5 | | |
| 1000 | 0 | 1000 | 10 | | |
| 1000 | 0 | 1000 | 5 | | |
| 140 | 3 | 200 | 7 | | |
| | | | | | |
| | | | | 0.000000720801 | 0.000000720801 |

What do you notice about Force (1 on 2) and Force (2 on 1) for each scenario? Why do you think that is the case?

What do you think has a stronger effect on the amount of force (gravity)? Use data from your table to support your reasoning:

Part 3:

Determine whether these statements are True or False. If the statement is false, write the correct version of the statement below.

☐ The force of gravity increases when two objects move closer together.

☐ The force of gravity increases when the mass of an object decreases.

☐ The two objects have different masses, the more massive object pulls with a greater force.

☐ The force of gravity depends on the mass of objects and the distance between them.

The Earth's gravity is pulling you down. Are you pulling up on the Earth? Explain your reasoning (3-5 sentences):

Gravity is a force of attraction based upon the mass of two objects and the distance between them. Why aren't other objects, like the pencil on your desk, being pulled toward you right now? Explain your reasoning (at least 4 sentences):

Write down three more things about gravity you learned from this simulation:

- 1.
- 2.
- 3.

You are trying to protect Earth from incoming Asteroids. What do you think are important factors to consider when designing a plan to save us?

An Asteroid weighing 10,000,000 kg is coming toward Earth. Using the things you learned from this simulation, design a way to save us.