Conclusions

The students mark on their worksheets the direction in which objects are pulled, i.e. toward the center of the planet.

Hand out worksheets with a diagram of people standing on the Earth and ask them to mark the direction in which all objects located on or near the planet fall (are pulled).

Conclusion: all objects are pulled toward the centre of the Earth.

Instructions

Discussion

Talk about the factors that influence this force of attraction (gravitational pull).

Supporting questions:

Why is that objects fall downward on Earth (or close to our planet) while deep in space they don't?

- Why does a human being weigh so much on earth but almost nothing in space?

You can use as an example a rocket launched from Earth, where objects fall downward, and which gradually moves away from Earth until it reaches orbit where there is almost no gravity (as the students saw in the film at the beginning of the lesson).

Conclusion: it depends on the distance from Earth. The further it is from Earth, the weaker is its force.

Instructions

Video/ Slide show

The students watch a film and draw conclusions on how gravitational force is determined by the mass of a body.

Ask the students:
Why does a human beings weigh less on the moon than on Earth? After all, the astronaut is "close" to the Moon – he is on its surface.
Write down the students' ideas on the blackboard – you can go back to them at a later stage of the lesson.
To give them a hint, you could show them a chart comparing the sizes of the Earth and the Moon:
http://astronomy.org/programs/moon/moon.html

Analyzing

The students use an online calculator to calculate their weight on other planets.

If the students have access to computers or tablets during the lesson they can calculate their weight on selected planets themselves using the online calculator below:
http://www.exploratorium.edu/ronh/weight/
They can then look at a diagram comparing the size of different planets:
https://www.flickr.com/photos/47222633@N05/15783348542/in/pool-boingboing and consider what determines our weight on different planets.

Based on their calculations and after comparing the sizes of different planets the students reach the conclusion that gravitational force depends on the mass of a body and that the larger the planet the more powerfully it attracts objects and people to it.
This means that the greater the mass of a body, the stronger the attraction (the Earth has a greater mass than the moon, and thus has a stronger gravitational pull on us. The larger planets have an even stronger gravitational pull than the Earth),

Experiment

The students determine the direction of movement of objects on Earth – downward.

Divide students into small groups (3-4 members) and give each group a tennis ball. The students observe the direction in which the ball moves in the following situations:

1. They release the tennis ball with a hand stretched outwards.
2. They throw the ball straight up.
3. They throw the ball horizontally (to the side), e.g., by passing it to a classmate.

Based on their observations the students draw a line on a sheet of paper showing the path taken by the ball in the air – the flight path of the ball.

Then, discuss the results of the experiment with your students. Ask them: what direction do objects move in on our planet when they are released?

Make sure the students reach the conclusion that objects on Earth always fall down, i.e. a force pulls them in a downward direction.