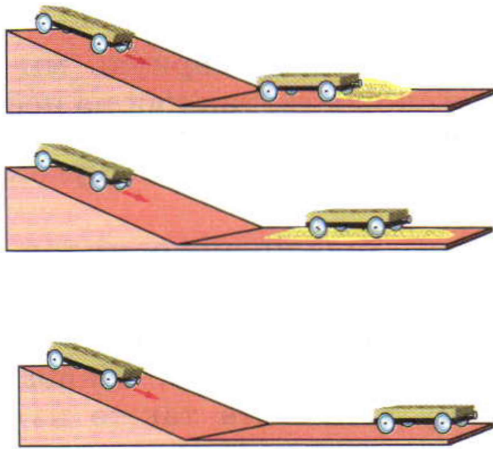


***Inertia.***

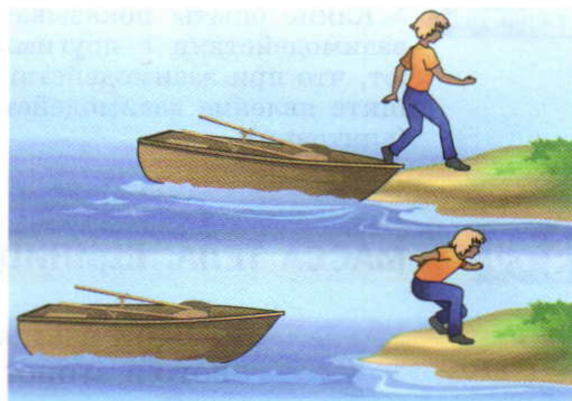
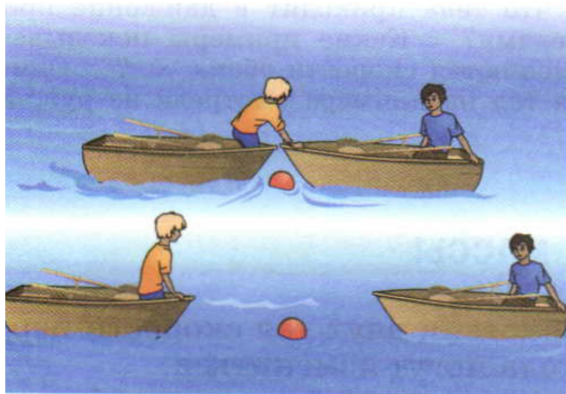
*Inertia* means “preservation of the velocity of a body when nothing influences it”.



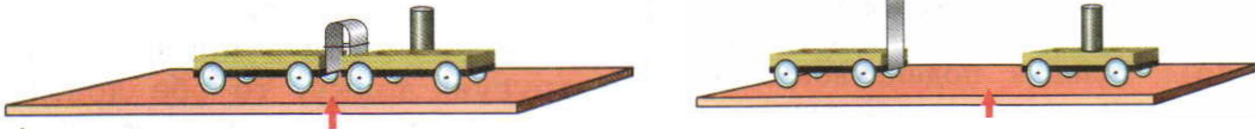
In this experiment on the right, the weaker is the obstacle (the smaller is the sand-pile), the longer the body keeps moving, the closer is this motion to the uniform motion – motion with constant velocity.

***Interaction.***

The velocity of a body (puck, ball) change as the result of the other body (hockey player, soccer player) acting on it.



Look at examples above – they illustrate that the action of one body to another cannot be “one way” – if two bodies interact, they act on each other!

**Mass**

*Mass* is a physical quantity that quantifies the notion of inertia. This quantity is also sometimes called “*inertial mass*”.

The experiment with carts above: the mass of the cart on the right is twice the mass of the mass on the left. As a result, the velocity of the right cart is twice smaller than the velocity of the left cart.

It would seem that gravitational mass (responsible for “the weight”) and inertial mass should have nothing to do with each other. But then it seems like these two things are equal for all the bodies – the heavier is the body, the harder it is to make it move. This is called “***Equivalence Principle***”, and this is one of the main assumptions of General Relativity theory.

**Homework problems.**

- (1) *Discuss why do we use seat-belts when we ride the car.*
- (2) *A boy jumps from the boat with a speed 2 m/s. Mass of the boat is 80 kg, mass of the boy is 40 kg. What speed is gained by the boat?*
- (3) *A bullet has mass of 10 g and it leaves the gun with the speed 700 m/s. The gun gains the speed of 1.6 m/s in the opposite direction. What is the mass of the gun?*