

The scenario

Subject	Mechanics / Cart with a fan – Newton’s laws of motion
Length	1:57
Main goals	Get familiar with III law of dynamics
Detailed goals	Newton’s laws of motion, inertia, acceleration, and action-reaction
Structure and description of experiments:	
1. Introduction	If there is no wind, can crew of a yacht move the yacht by blowing onto the sail?
2. Main subject	Cart with a fan – Newton’s laws of motion
Experiments	We start with a hairdryer and show that it blows air. Then we try to set in motion a cart with a plastic „sail” by blowing with the hairdryer – it starts to move (as a yacht goes with the wind). Second experiment includes small fan mounted in front of the sail. Even when turned on and blowing air onto the sail, it cannot set it in motion. Why? If the fan pushes air, the air pushes fan backwards. In magnitude this is the same force as the air pushed pushes sail, so the two forces, acting on the fan and on the sail, cancels. Question is, can we use this fan to propel cart? Yes, if we remove sail! We use simple recoil – the air pushed by fan pushes the fan backwards and gives us motion.
3. Summary, evaluation and remarks	We neglect changing angle of the sail in this experiment, which can be used to move the cart anyway. Level: primary school