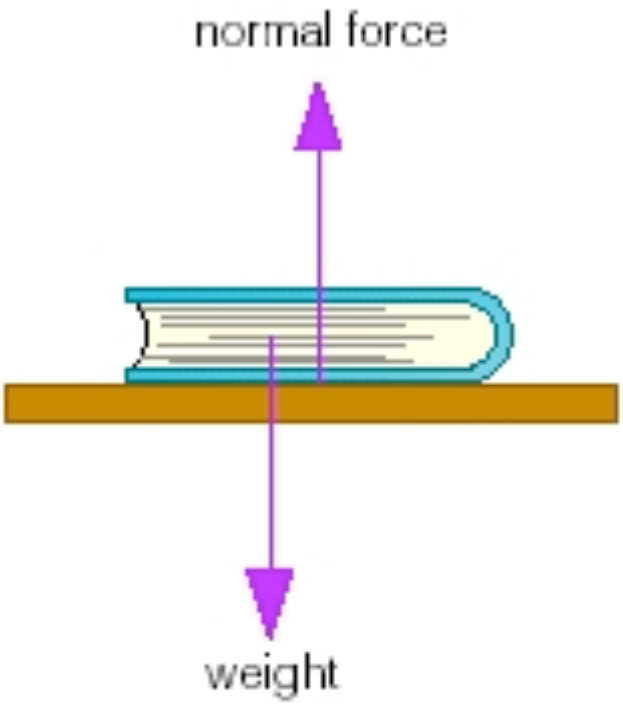
Law of inertia Section 6.1

- *Newton's first law* says that objects continue the motion they already have unless they are acted on by a net force.

- If the net force is zero, an object at rest will stay at rest.

- If an object is acted upon by *unbalanced forces*, its motion will change.
  - Table cloth demonstration

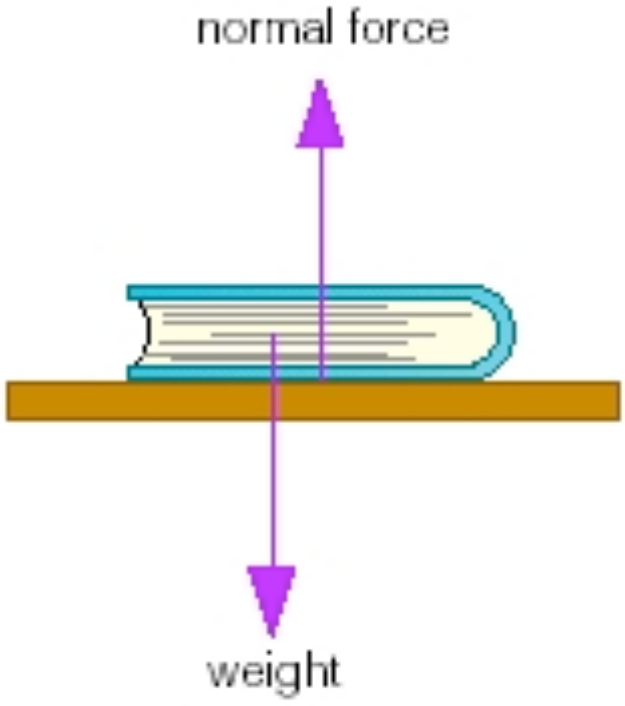
- The book is not moving. What is the net force on the book?
  - Zero
- If the book pushes down with 20 N of force, how much force is pushing up?
  - 20 N
- How much does the book weigh?
  - 20 N



Normal force

- A *normal force* is created whenever an object is in contact with a surface.

- The normal force has <u>equal strength</u> to the force pressing the object into the surface, which is often the object's weight.



Inertia

- The tendency of an object to resist any change of motion
- Mass: the amount of matter an object has
- More mass = more inertia

- **Which has more inertia: a beach ball or a bowling ball?**

Bowling ball – because it has more mass

- **Which one would take more force to stop if it were rolling toward you: the beach ball or the bowling ball?**

Bowling ball – because it has more inertia

- **Which has more inertia: a chair or a couch?**

Couch – because it has more mass

- **Which one would take more force to throw: a chair or a couch?**

Couch – because it has more mass

- If there is no friction acting on an object, how much force is needed to keep it going at a constant velocity?
  - None

- A block is dragged at a constant velocity . If the force of friction on the block is 20 N, how much force is required to keep the block moving at a constant velocity?
  - 20 N

- A cart is pushed at a constant velocity. What is the net force on the cart?
  - Zero
- The cat is pushing on the cart with 25 N of force. What is the force of friction?
  - 25 N
- The normal force on the cart is 55 N. How much does the cart weigh?
  - 55 N

Snow video