

How can I make my own weighing scale?



Explore how to make a simple spring scale.

Setting: Indoors

Time: < 30 minutes

Concepts: gravity, weight

Skills: measuring, comparing & contrasting

Subject(s):

- ✓ Physics
- ✓ Mathematics

Ages:

- ✓ 9 -11
- ✓ 12 - 14

Materials:

- Small plastic yogurt cup
- Rubber band
- ~45 cm thin string
- Nail or thumbtack, to make holes
- Paper clip
- Objects that will fit inside the yogurt cup (to weigh it down)
- Scissors
- Ruler
- Piece of card or paper
- Pen
- Thin stick or craft stick
- A horizontal surface, above the ground, like a table top or desk
- Tape



Safety First!

Be careful using thumbtacks or nails when making holes in the yogurt cup and card.

What to do!

1. Make three evenly spaced holes in the rim of the yogurt cup using the nail or thumbtack.
2. Cut three pieces of string, approximately 15 cm long. Thread each piece of string into a hole around the rim of the yogurt cup and tie at the end. Tie the other ends of the string together to form a handle.
3. Loop the paper clip through the string handle.
4. Loop the other end of the paper clip through the rubber band and use the nail or thumbtack to hang the balance on some vertical surface. A thin stick or craft stick can also be passed through the rubber band and the end of the stick taped to the table top to make your own private work area.
5. Create a scale using a piece of card with horizontal lines marked every centimetre and numbered. The card should be placed behind the balance, with the first line at the bottom of the paper clip.

How can I make my own weighing scale?

- Place objects in the cup and note how far down the scale they go. Order the objects from lightest to heaviest.



What's happening?

The spring scale works because all objects have weight due to the gravitational pull on them. The greater the pull of gravity, the more the object weighs. The rubber band will stretch as more weight is placed on it. By using a scale, we can measure how heavy something is in terms of how far it will stretch the rubber band. If the rubber band is stretched a long way there is more weight, if it isn't stretched very far there is less weight.

Rubber bands of different thicknesses will give different readings. Comparison of weights should always be done on the same instrument.

Why does it matter?

Comparing and contrasting the weight of objects, helps us to use the object more efficiently. Trying to lift something that is too heavy could cause a person to hurt him/her-self. If you know how much weight an object has, you can decide which simple machines you can use to help you lift the heavy object.



Investigate further!

- Try replacing your rubber band with one of a different thickness. How does it affect your scale?
- Design another scale that can hold heavier objects. Think about how each of your building materials will need to change.