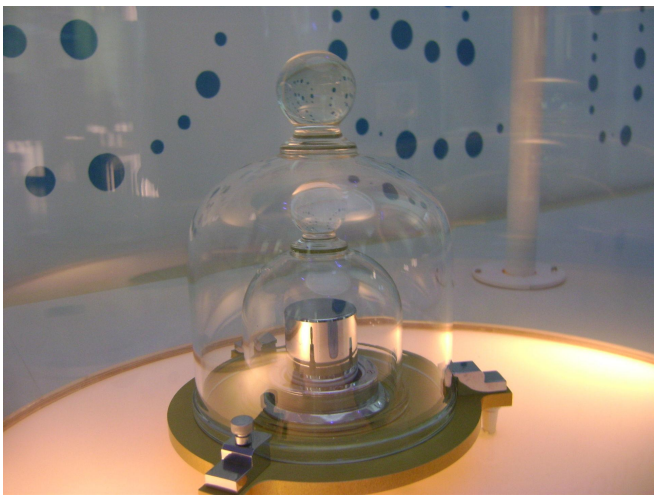
WEEK 10: MEASUREMENT

Science in the News



The International Prototype of the Kilogram, stored under 2 bell jars.
Photo credit: Wikipedia

Parents:

For primary learners, work through our 'measurement' lesson with your child. It is based around the national curriculum learning objectives found in the year 5/6 'working scientifically' section. Download here - Science Creates Outreach

For secondary learners, the contents can be discussed in more depth using the original online information. **

THE KILOGRAM'S REPLACEMENT

The **International Prototype of the Kilogram** (IPK) is a metal cylinder that ***had*** a mass of exactly 1 kilogram. It is impossible to make two objects that weigh exactly the same, so in 1889 it was internationally agreed this single item was the master mass standard which every mass measurement on earth refers to. Even though storage in airtight containers in a basement vault in Paris reduced pollution sticking to its surface increasing its mass, special cleaning was required before use. For enhanced security, three separate keyholders had to unlock the vault.

However, last year was a landmark year in the world of measurement because on 20 May 2019, the way we define mass changed. The new definition replaces the single item with extremely accurate balances that use electricity, magnets and gravity. These balances (invented by NPL scientist Bryan Kibble) can give more accurate results than by comparing against the IPK, and of course there can be many 'Kibble Balances' rather than having to rely on just one IPK.

Try it at home - Temperature bounce!

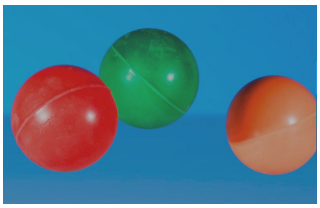
What do you need?

- Flat hard floor next to a wall
- Tape measure or ruler
- Blu-tack
- One or more balls - tennis, ping pong etc.
- Pencil and paper
- Plastic bag

What am I learning?

You are learning to take accurate measurements and repeat readings which are very important skills when being a scientist.

If you want to learn more about the science behind this, check out our lesson on our website - Science Creates Outreach



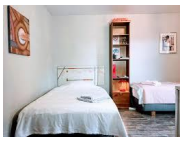
Instructions:

1. Mark a point 1 metre from the ground on a wall.
2. Hold a ball so its lowest point is at the 1 metre point.
3. Drop the ball and mark where the lowest part of the ball is after the first bounce. Top tip - When looking at the bounce height, keep your head in the same place each time.
4. Repeat 6 times to obtain 6 marks.
5. Measure (and write down) the average of the 6 tests, and also the range. If the range is 3 cm, write it as +/- 1.5cm.
6. Repeat using as many balls as you wish (and have space to store in your freezer).
7. Put tested balls into a plastic bag and store them in the freezer overnight.
8. After a night in the freezer, repeat the bounce tests with the balls. Make sure you test each one immediately after removing from the freezer, so it doesn't have time to warm up. Again, record the average and the range.
9. Make a comparison - how does temperature affect bounciness?

WEEK 10: MEASUREMENT

Match the object to the measurement!

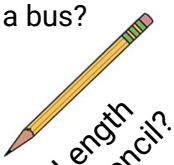
A) Weight of a car?



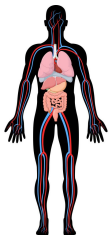
B) Room temperature?

C) Length of a bus?

D) Volume of a mug?



E) Length of a pencil?



G) Body temperature?

F) Volume of a bathtub?

H) Weight of an apple?

1500 kg.

14 m.

37.2 °C.

100 g.

19 cm.

20 - 22 °C.

300 l.

350 ml.

Answers: A) 1000-2000 kg. **B)** 20–22 °C. **C)** 14 m. **D)** 350 mL. **E)** 19 cm. **F)** 300 L. **G)** 37.2 °C. **H)** 100 g.

Read, Watch, Ask

Have a read of our lesson to learn more about measurement.

What are some ways of measuring? Watch here to find out.*

Got any questions about todays topic? Email us at info@sciencecreates-outreach.co.uk and we'll answer them!

Did you know...

A year measures how long it takes the earth to travel round the sun. This was used in the original definition of the second. So, when we say a second has passed, we mean 'the Earth has moved about 1/31,500,000th of its annual journey round the sun!' So, in a way the definition of time comes from how fast the earth moves.

Competition Time

Can you fly a piece of A4 paper exactly 3 metres? This week get involved in NPL's Launch and Land competition. The challenge is to design and build a launcher, this could be any material e.g wood, card or Lego etc and your piece of paper can be flat or folded. Check out the video and more information here.

Rules:

1. The challenge is to launch and land an A4 piece of paper as close as possible to 3 metres from start position three times.
2. The mass of the paper plus whatever's carrying it should not exceed 30 g.
3. The paper, and whatever's carrying it, must not be connected to anything as it flies.

Finally, send your photos and videos to #NPLRocketChallenge or email to outreach@npl.co.uk.

The deadline for this competition is 30th June 2020 so get building this weekend!

COMPETITION NOW CLOSED

Last week's winner!

As last week we paired with University of Bath, you all sent your entries directly to them. We therefore don't have an announcement for a winner but don't forget to keep entering!

NPL is the UK's National Measurement Institute. NPL develops and maintains the UK's most accurate measurement standards. Science, engineering, healthcare, manufacture and trade all depend on its measurements. Their work helps develop new medicines, faster internet, and the most accurate clocks in the world. Check out their website for loads more learning and challenges around measurement.