Friday 12th February 2021

Let's start with a very short **Forces Revision Quiz**

1. In which direction does **gravity** exert force (as experienced by people or objects on Earth)?
   Up
   Down
   Both up and down
   Gravity can exert force in any direction
2. Which of the following would you use when **measuring** force?
   A ruler
   A hygrometer
   A forcemeter
   A thermometer
3. What causes a backpack full of books to feel **heavy** when you lift it?
   Friction
   Air resistance
   Upthrust and friction
   Mass and gravity
4. **In a diagram**, a force is represented by what?
   An X
   A circle
   A tick
   An arrow
5. What are forces **measured** in?
   Newtons
   Kilometres
   Millilitres
   Degrees Celsius
6. If you roll a ball across the carpet, **which forces will cause it to slow down and then stop**?
   The push from your hand and gravity
   Magnetic pull and upthrust
   Gravity, friction and air resistance
   Upthrust and air resistance
7. Which of the following is **not a force**?
   Electricity
   Gravity
   Upthrust
   Friction
8. Forces can **cause objects to change** what?
   Their speed
   Their direction
   Their shape
   All of the above
9. Which **unit** should be used to **measure mass** (the amount of matter an object contains)?
   Grams
   Newtons
   Centimetres
   Degrees Celsius
10. What **is** a force?
    A source of energy
    A push or a pull
    A magnet
    A measurement

On the next page is some real Science to have a go at…

Some more Practical Science tasks

You never see **Forces**:
you just see the effects they have on other things.

Let's start with two little experiments that follow on well from last week…

Bend the water

You need a smooth plastic pen – the tubes of felt tip pens are usually the right kind of plastic.

Turn a tap on so that it runs slowly but in a very smooth and steady trickle. Pick up your pen. Rub the tube of the pen against a sleeve of a sweater a few times. Without putting it under the water at all, hold it right next to the trickling flow. Describe what you see.

Point the arrow

Cut out a very small rectangle of paper, about 2.5cm x 1.5cm and draw a large arrow on it. Find a thick-ish coin such as a pound coin. Stand the coin on its edge and carefully balance the arrow on top of the coin. Find two smooth plastic pens. Hold one in each hand. Rub the tubes of the pens against the sleeves of your sweater. Don't let them touch each other. Now wave them very gently (like magic wands!) close to the paper arrow balanced on the coin. Put one pen close and then the other.

Both of those tasks were concerned with **static electricity**: another way of creating a force invisibly without even touching the object you are trying to move. Static electricity has a lot in common with magnetism. The links between electricity and magnetism (which we call electro-magnetism) are vital for the work of every electrically-powered moving object on the planet.

Now something a bit more skilful to do with Forces…

Balance the ruler

You need a 30cm ruler and just a few coins for this task. A tiny amount of blu-tack might make it easier as well but using large blobs of it will affect the results so keep any pieces of it ever so small. The task is easy enough but recording your results has to be done carefully.

Balance the ruler on the sides (not the tips!) of your two index fingers with the fingers underneath each end of the ruler. Slide your fingers gradually along the ruler towards the middle, keeping the ruler balanced all the time. If you are careful enough, the ruler should still be balanced when your fingers come together at the mid-point of the ruler.

Now put one coin (with or without blu-tack) on the very end of the ruler and repeat the process of moving your fingers gradually together. When your fingers meet, it should not be at the middle of the ruler. Where is it instead? (How far from the end of the ruler with the coin on it?)

Add another coin and try again. See if you can do this with any more coins than one or two. (Once the coins are too heavy compared to the mass of the ruler, the task will become impossible.

What you have been doing is finding the **centre of gravity** of the ruler – the middle of the force from it that pushes downwards due to gravity. Every object has a centre of gravity but adding weight on one side of an object moves the centre of gravity further in that direction.

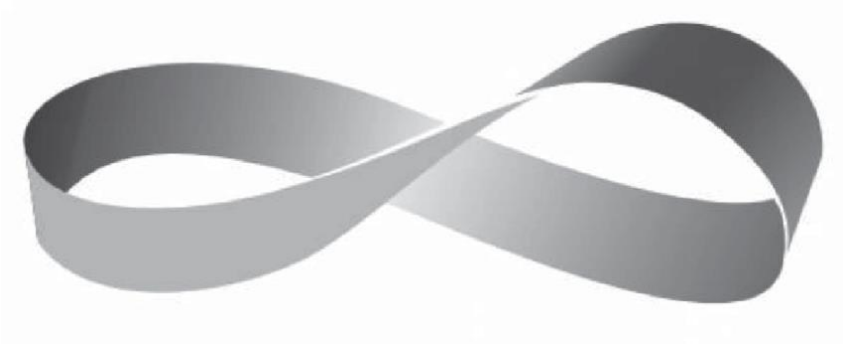
And finally for this morning…

Is this Science or is this Maths? Have a go and find out!

Cut three long, narrow strips of paper. Strips about 2cm wide from the long edge of a piece of A4 would do nicely. With a ruler, draw a line along the middle of each one, from end to end. Find some glue. You're going to make them into loops… but loops with a twist.

Strip A. Stick the one end smoothly to the other end so that your finger can drive round it smoothly following the line along the middle all the way round the outside.

Strip B. Twist the strip through half a turn at one end. Stick the ends just as you did with Strip A but keeping the half-twist in the strip as you do. Try driving your finger round the loop now. What happens? We know that paper has two sides but this strip seems to only have one!



Strip C. Twist the strip through a full turn (two half turns) before sticking the ends together to make the smooth loop. Again try driving your finger around the loop, following the line you drew.

Now, the bit where this becomes strange…

Without cutting across the strips so that they snap, cut carefully along the three lines you drew along the original strips. You should get three very different results. Describe them.

When making these strips, it's very difficult to imagine how the results will happen until you are holding those results in your hand.

These are called Moebius strips and are quite puzzling even when you have seen them many times. The important strip is the one with one half-twist which was investigated by a German mathematician (Moebius) in 1858. It has been used to develop clues about how dimensions might work – we are used to things being three-dimensional but how would a fourth or fifth or sixth dimension work?

The afternoon starts here…

French: Today we are moving on to describing clothes with colour **and** size.

Most French adjectives (like the colours) go after the noun, but words for size go before the noun.

https://teachers.thenational.academy/lessons/describing-clothes-with-colour-and-size-chhk2r

Don't forget to do the Intro quiz and the Exit quiz.

On the next page you will find Miss Price's Circuit Challenge for this week…

Miss Price's Circuit Training Challenge: Friday 12th February

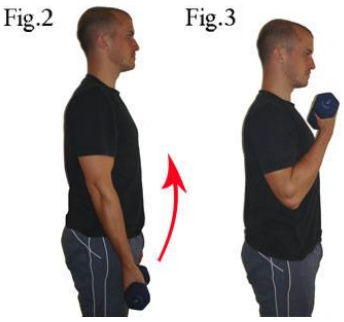
15 Shuttle runs

30 Star jumps

20 Step ups

20 Tricep dips

30 Bicep curls



Have a 1 minute rest between each exercise.

Can you do the circuit twice?

And here's something very comfortable to take you to the end of another busy school day.

It may be pleasantly relaxing but hold every position strongly and still for a full 30 seconds