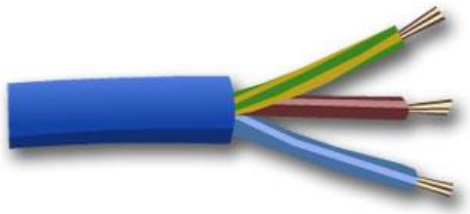
Conductors

Conductors are materials that carry electric current really well.

Metals like copper are good conductors - that's why they're used to carry the electricity in wires and electricity flexes.



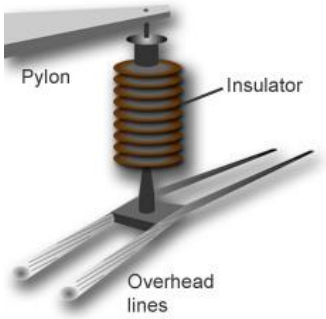
Electricity always tries to find a path for itself to reach the ground - and it will travel through any conductors it can find to get there - taking whatever shortcuts it can.

Water is a really good conductor. And, because your body is mostly water, electricity can easily travel through you to get to the ground. You could be seriously hurt or even killed. And remember, even if you are climbing a tree or a fence, you are still connected to the ground through the things you are standing on and can still be electrocuted.

Insulators

Insulators don't carry electric current very well. Some types of rubber, glass, ceramics and plastic are really good insulators.

Household wires and electricity flexes are covered in plastic so you cannot touch the metal core which carries the electricity - but the overhead lines carried by pylons and in substations are not insulated at all - so keep well away from them. Pylons have ceramic or glass insulators to support the overhead lines so the pylon itself does not become 'live'.



Even though some types of rubber are insulators, wearing rubber gloves or rubber-soled shoes or boots may not protect you from electric shock if the electrical current is strong enough.

Electricity to the home

A normal small battery releases its power at only 1.5 **volts.** The electricity supply to your home is at 240 volts. As your home power supply has a current (a bit like a strength) of 13 **amps**, this is enough to power nearly everything in a normal home. Just electric cookers use more current than any other normal household equipment, so they have to have a special wall socket.

When electricity travels along the overhead cables from power stations it is at around **300,000** volts! The job of a local electricity **substation** is to 'transform' that huge voltage down to the 240 volts for your home.

Quick questions with short answers

1. Which conductor is in most wires and cables?
2. Where is it that electricity is 'trying' to reach?
3. Is water a conductor or an insulator?
4. Is glass a conductor or an insulator?
5. Are overhead power cables coated in plastic?
6. Electricity from a power socket at home has what **voltage**?
7. It would take more than a hundred small batteries to power a kettle. True or False?

Now go and experiment with the electrical components in the virtual 'Lab' online at

https://phet.colorado.edu/sims/html/circuit-construction-kit-dc/latest/circuit-construction-kit-dc_en.html

Use the pictures for some of your attempts but use the proper circuit diagram symbols for others to practice using the symbols. Include a switch in every circuit.

Don't just make a light come on! Instead, try to do these things…
[and please answer each of these questions using a well-constructed proper full sentence.]

1. Make several bulbs light up. What else happens as you add more bulbs to the circuit?

2. What happens to the bulbs if you have more than one battery?

3. What happens if one of your batteries is facing the wrong way in the circuit?

4. What happens if you add in a resistor?

5. Can you make the components look as if they have caught fire? What made this happen?

6. Learn to use a voltmeter for measuring voltage. (Touch the two prongs to the wires on either side of a bulb).

7. Learn to use an ammeter for measuring current. (Put the ammeter anywhere along the wires in the circuit).

8. Search further down the left-hand side for a fuse. What does the fuse do as you add more batteries to a circuit?

9. If you are feeling particularly clever, build a circuit with two switches that lights two bulbs **separately**. Draw the circuit neatly (using a ruler).

10. Try and think of something (friendly and kind) to do with the Lab's virtual dog!

This week's **French** is the next in the series about Clothes:

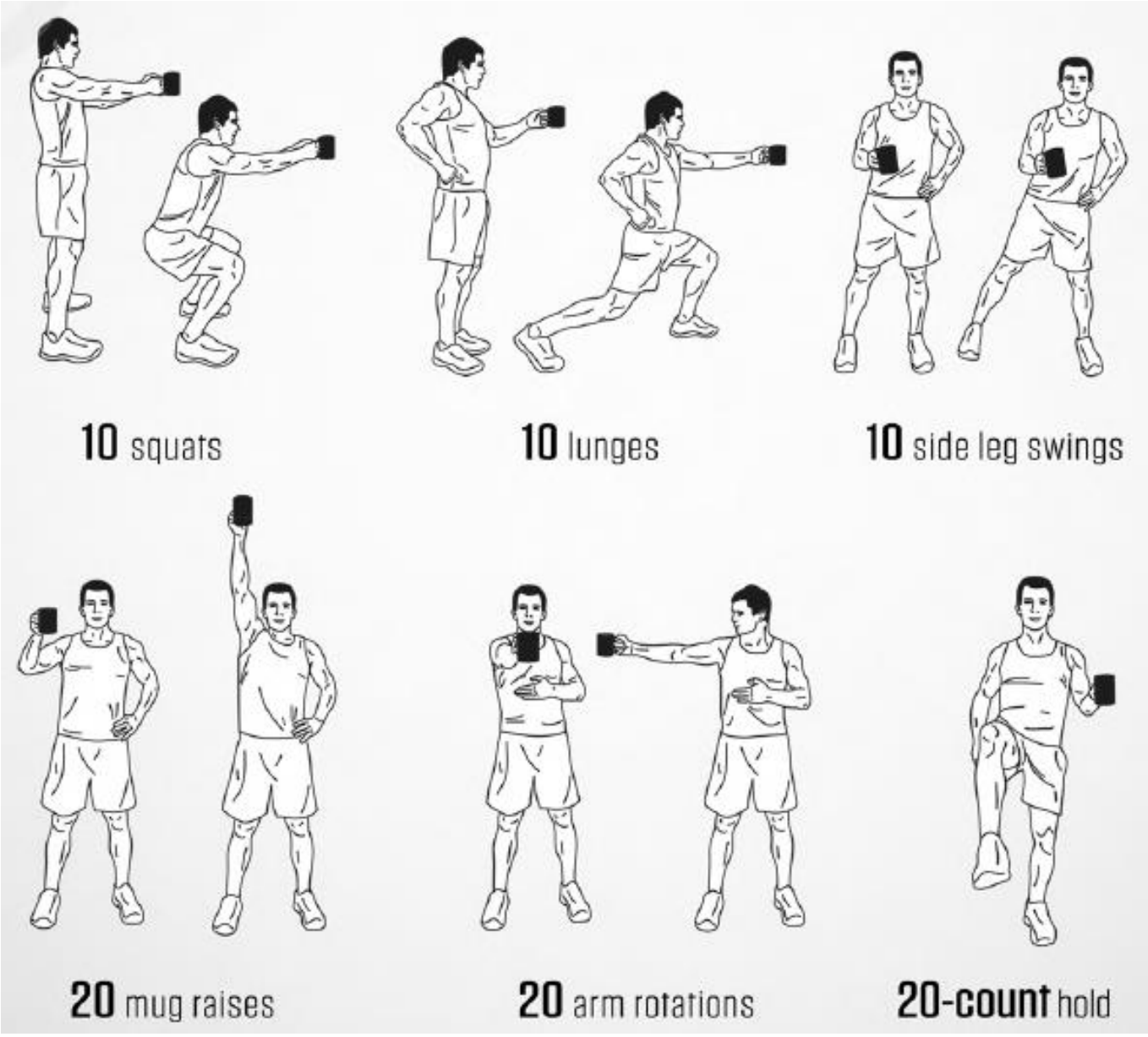
Saying clothes you have and using a conjunction

https://teachers.thenational.academy/lessons/saying-clothes-you-have-and-using-a-conjunction-71jk8c

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

Then, for some **P.E.**-type exercise, have a go at either this strange but clever workout or Miss Price's Challenge or both!

In this workout, the exercises themselves are easy but the catch is that you have to do everything **very** smoothly and steadily because you are carrying the weight of a **FULL** mug of water all the way through. Try and do the set of exercises twice. Remember to do both left- and right-handed versions of each exercise. You might find that your arms become quite tired. Try not to spill anything!



Miss Price's Circuit Training Challenge:
Friday 26th February

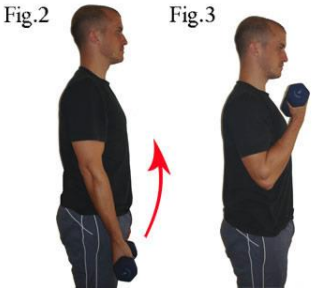
20 Shuttle runs

20 Star jumps

20 Step ups

20 Tricep dips

20 Bicep curls



Have a 1 minute rest between each exercise.
Can you do the circuit twice?