Class 5: Task instructions for Friday 5th March 2021

Jobs for today…

1. Page 2 is a quiz about electrical circuits – 10 questions: multiple choice (A,B,C or D).

2. Which option you do depends on whether you can find the materials to do the experimenting:

   EITHER build and then report on building a simple electromagnet (page 3)
   OR complete the comprehension task about scientist Michael Faraday (pages 4 and 5).

3. Today is the **World Day of Prayer**, celebrated around the world. As such, a special Worship Time has been created by Helen Webb, Chair of Governors, Rev Julie Read and Wendy Maddocks, Foundation Governor. **Children should bring a stone or Lego / Duplo brick** to the Worship Time. Please follow this link: https://youtu.be/rdbSv-A7zH0

4. French: We have reached lesson 5 in the series about Clothes. This is the last of the set, which is quite good timing before our return to school. Remember, these lessons have **also** been about:
   - placing adjectives in the right places in sentences,
   - words which are feminine and masculine, and
   - how words and sentences are changed from singular (one) to plural (more than one)

   The latest session is to be found here: https://teachers.thenational.academy/lessons/saying-clothes-you-dont-have-and-using-conjunctions-6xh34r Don't forget the Intro and Exit quizzes!

   [By the way, if one of the quizzes gives you a score out of 4 instead of out of 5, even though there are 5 questions, don't worry – it did the same to me!]

5. Some exercises. Two sets of exercises seem particularly suitable for today. We're heading back to school next week so there will be less sitting on sofas and less lying down. On page 6 are some sitting-on-sofa and lying down exercises. The second set (for your lower back) is particularly good. Do them slowly and carefully and you will be glad you did them.

A Quiz about Electrical Circuits

1. Why might a circuit fail to work?
   A. It might have a dead battery
   B. It might have two leads connected to the positive pole of the battery and none connected to the negative
   C. It might have a break in the circuit
   D. All of the above

2.Why are electrical wires covered with plastic or rubber?
   A. Plastic and rubber are comfortable materials to touch
   B. Smooth materials keep wires from getting tangled
   C. Plastic and rubber are good electrical insulators
   D. Plastic and rubber can be made in different colours so people can tell different leads apart

3.A material which allows electrical current to pass through it is called what?
   A. An insulator
   B. A battery
   C. A connection
   D. A conductor

4.What is an electrical circuit?
   A. A collection of electrical equipment
   B. A path around which electrical current flows
   C. A series of conductors and insulators
   D. A light bulb and battery

5.What will a circuit with an open switch do?
   A. It will not allow electricity to pass through
   B. It will allow electricity to pass through
   C. It will resist electricity
   D. It will make a good electrical insulator

6.With which group of items could you **not** build a complete circuit?
   A. Crocodile leads, bulbs, switch, buzzer
   B. Bulbs, crocodile leads, battery
   C. Battery, switch, buzzer, crocodile leads
   D. Wires, bulb, battery

7.What symbol is used in a circuit diagram to represent a bulb?
   A. A circle
   B. Two parallel lines: one short and one long
   C. An X inside a circle
   D. The letter M inside a circle

8.Which of these materials would **not** be a good electrical conductor?
   A. Copper
   B. Glass
   C. Silver
   D. Iron

9.Besides cells, or batteries, what is another source of electrical power?
   A. Lightbulbs
   B. Motors
   C. Petrol
   D. A home mains socket

10.You have made a simple circuit with one bulb. If you wanted to add an extra bulb without the first bulb dimming, what would you need to design?
   A. A series circuit
   B. A parallel circuit
   C. A complex circuit
   D. An incomplete circuit

How do I make an electromagnet?

It is fairly easy to build an electromagnet. All you need to do is **wrap some insulated copper wire around an iron core**. If you attach a battery to the wire, an electric current will begin to flow and the iron core will become magnetized. When the battery is disconnected, the iron core will lose its magnetism. Follow these steps:

You will need:

- One large iron nail between ten and fifteen centimetres long
- Around 2 metres of insulated copper wire
- One or more simple 1.5v battery, the larger size the better
- A pair of wire strippers (or scissors of a kind that are easy to scrape with safely)

Remove some Insulation
Some of the copper wire needs to be exposed so that the battery can make a good electrical connection. With scissors or wire strippers, remove a few centimetres of insulation from each end of the wire.

Wrap the Wire Around the Nail
Neatly wrap the wire around the nail. The more wire you wrap around the nail, the stronger your electromagnet will be. Be sure to leave enough of the wire unwound so that you can attach the battery.

When you wrap the wire around the nail, make certain that you wrap the wire all in one direction. You need to do this because the direction of a magnet field depends on the direction of the electric current creating it. The movement of electric charges creates a magnetic field. (If you wrap some of the wire around the nail in one direction and some of the wire in the other direction, the magnetic fields from the different sections fight each other and cancel out, reducing the strength of your magnet).

Connect the Battery
Attach one end of the wire to the positive terminal of the battery and the other end of the wire to the negative terminal of the battery. If all has gone well, your electromagnet is now working!

Don't worry about which end of the wire you attach to the positive terminal of the battery and which one you attach to the negative terminal. Your magnet will work just as well either way. (All that would be changed is your magnet's polarity. One end of your magnet will be its north pole and the other end will be its south pole. Reversing the way the battery is connected will reverse the poles of your electromagnet).

To Make Your Electromagnet Stronger
The more turns of wire your magnet has, the better. Keep in mind that the further the wire is from the core, the less effective it will be.

- Caution! - Too much current can be dangerous! The more current that flows through a wire, the more heat is generated. Things can quickly become too hot to handle.

You could try experimenting with different cores. A thicker core might make a more powerful magnet but the core must be made from a material that can be magnetized. An aluminium bar, for example, is not a good choice for your magnet's core.

You should find that after a while your nail starts to act like a magnet even when the battery is not connected. This is because the electric current through the coil has rearranged all the atoms in the nail so that they are all facing the same way.

A Brief Biography of Michael Faraday

Read the passage below, watch these two short clips, then answer the questions on the next page using full, well-constructed sentences:

Faraday's Electric Motor: https://www.youtube.com/watch?v=fcb-zjbsmBk – 2 minutes

Michael Faraday Biography: https://www.youtube.com/watch?v=dNXdF12U4wo – 2 minutes

Michael Faraday was one of the great scientists of the 19th century (the 1800s) and one of the greatest British scientists there has ever been.

Faraday was born September 22nd 1791 in the village of Newington Butts in Surrey, near the edge of London. He was one of four children. Faraday came from quite a poor background. His father James was a blacksmith.

Faraday had only a very basic school education. In 1804, at the age of 13, he became an errand boy for a bookseller, taking messages and doing deliveries. When he was 14 he became an apprentice bookbinder.

However, from reading some of the books he worked on, Michael Faraday became extremely interested in science. He wrote letters to the scientist Humphrey Davy who was impressed by the questions he asked and his understanding of what he had read. In 1813, when he was 22, this helped him get a job as a laboratory assistant at the Royal Institution where the greatest British scientists would meet.

For nearly two years, Faraday toured France, Switzerland, Italy and Southern Germany with Humphry Davy who by now was one of Britain's most important scientists.

In 1821, when he was thirty years old, Faraday married Sarah Barnard. The couple did not have any children.

The same year, 1821, Faraday discovered electromagnetic rotation. This is when movement is created by combining magnets with electricity. Though very weak and difficult to use, it was the first electric motor.

Then, in 1831, using the same ideas but in reverse, Michael Faraday discovered electromagnetic induction – this uses the movements of magnets next to wires to actually make electricity. This was a really simple version of the way that most modern generators and even power stations still work today.

He was so successful in many types of scientific work that he had many different jobs – some of them at the same time as each other. In 1825, Faraday had been made director of the laboratory at the Royal Institution. As well as experimenting with electricity, Faraday was also skilled in chemistry. In 1825, he was the first to isolate (separate) the chemical called benzene. In 1830, Faraday became professor of chemistry at the Royal Military Academy in Woolwich and held this job until 1852. Another job he had was to be the scientific adviser to Trinity House, the organisation responsible for all the lighthouses around the coasts of Britain.

Michael Faraday was also a dedicated member of a small Scottish Church group which had been formed in Scotland in the 18th century.

Michael Faraday died on August 25th,1867. He was 75. Faraday was buried in Highgate Cemetery.

Today Faraday is remembered as a great chemist, a great physicist and one of the pioneers of the use of electricity.

Questions about the life and achievements of Michael Faraday

1. How did Michael Faraday learn about Science?

2. It was unusual for a boy with his background managed to get a job at the Royal Institution. How did he do this?

3. What was electromagnetic rotation?

4. What was the process called by which he actually made (generated) electricity?

5. One of his other jobs involved advising about the Science needed to make lighthouses work well to save ships crashing onto the coast. What do you think he would have been able to help them with?

6. His work in Science was about a lot more than just electricity and physics. What did he do in chemistry?

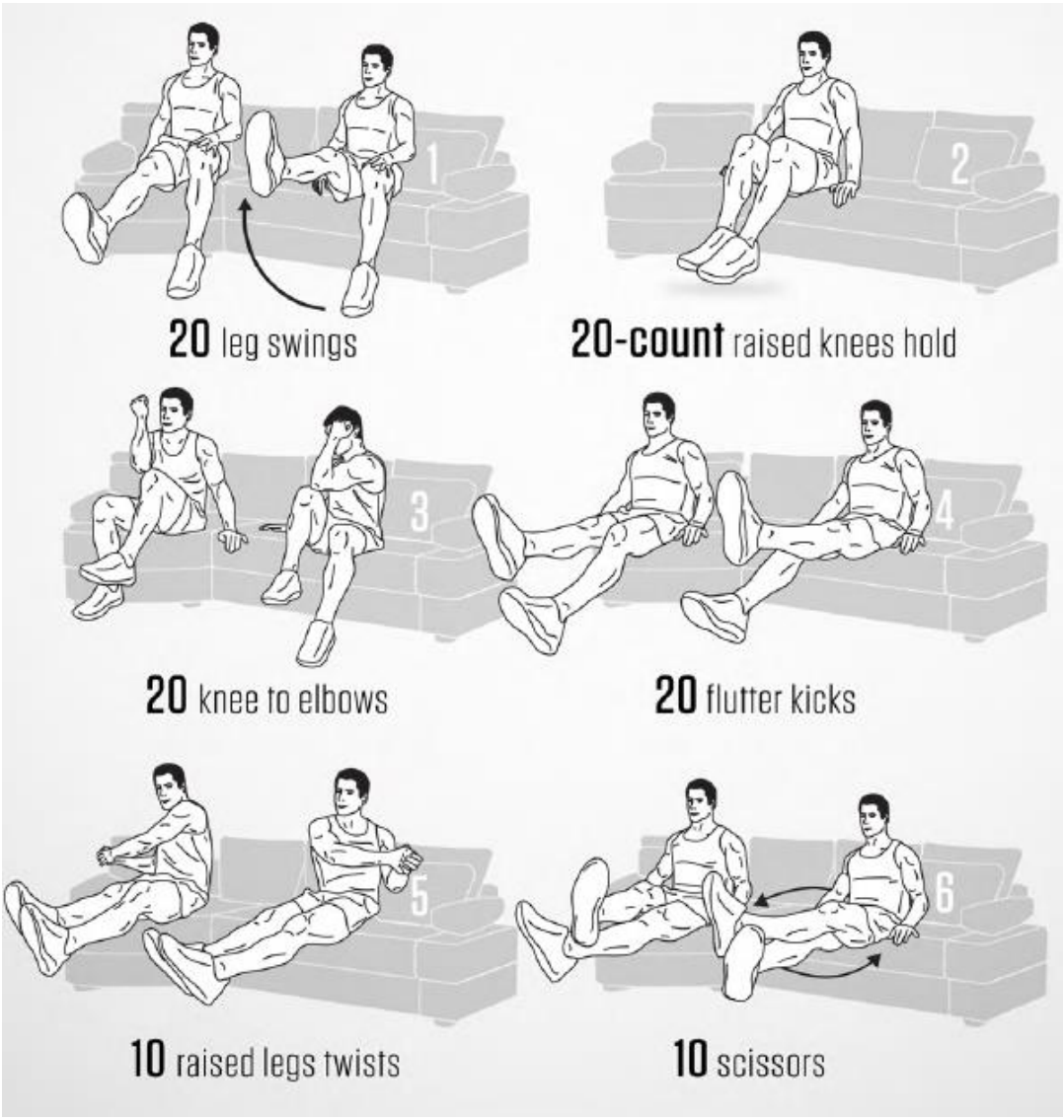
7. Where would you find Faraday's grave?

Extra questions, from the second video clip:

8. What is a Faraday Cage used for?

9. Where do you find Faraday Cages?

10. Draw a simple pencil portrait of Michael Faraday



These are quite difficult if your sofa is really, really soft.

Other chairs will do!

These are well worth learning and remembering for whenever you have been sitting still for a long time.

Do each set twice!