Year Group: 11 Term: 4 (electromagnetic spectrum and using waves)

We are learning:

1. **Magnetic Fields – Created by magnets and electric currents; field lines show the direction and strength of the field.**
2. **Permanent and Induced Magnets – Permanent magnets always produce a magnetic field; induced magnets become magnetic when near a magnet.**
3. **Electromagnets and Solenoids – Electromagnets are made by passing current through a wire; solenoids (coiled wires) produce strong, uniform magnetic fields.**
4. **The Motor Effect – A wire carrying current in a magnetic field experiences a force; this principle is used in electric motors.**
5. **Fleming's Left-Hand Rule – A method to predict the direction of force in motors based on the direction of current and magnetic field.**
   Separate science only
6. **The Generator Effect – Moving a wire through a magnetic field induces a voltage; this is how electricity is generated in power stations.**
7. **Transformers – Devices that use electromagnetism to change the voltage of alternating current; essential for efficient electricity transmission in the National Grid.**

How can you support your child:

- Encourage them to make revision posters on each of the sub-topics within the topic.
- Encourage them to make cue cards with questions and answers on all the sub-topics.
- Encourage them to use the notes, videos, and quizzes, on BBC Bitesize.
- Encourage them to use Seneca Learning to supplement and secure their knowledge on the topic.

Try asking them:

1. **"What is a magnetic field?"**
   Answer: A region around a magnet where magnetic forces can be felt. Field lines show the direction and strength of the field.
2. **"What's the difference between a permanent magnet and an induced magnet?"**
   Answer: A permanent magnet always produces a magnetic field. An induced magnet becomes magnetic only when near a magnet.
3. **"Which materials can be magnetised?"**
   Answer: Iron, steel, nickel, and cobalt — these are magnetic materials.
4. **"How do we make an electromagnet?"**
   Answer: By passing an electric current through a wire, especially when it's coiled into a solenoid.
5. **"How can we make an electromagnet stronger?"**
   Answer: Increase the current, add more coils, or use an iron core inside the coil.
6. **"What is the motor effect?"**
   Answer: When a wire carrying current is placed in a magnetic field, it experiences a force — this is used in electric motors.
7. **"How does Fleming's Left-Hand Rule help us?"**
   Answer: It shows the direction of the force on a wire in a magnetic field, based on the current and field direction.
8. **"What is the generator effect?"**
   Answer: When a wire moves through a magnetic field, a voltage is induced — this is how electricity is generated.
9. **"What do we use the generator effect for?"**
   Answer: To generate electricity in power stations using turbines and magnets.
10. **"What is a transformer?"**
    Answer: A device that changes the voltage of alternating current using electromagnetic induction.
11. **"Why are transformers important in the National Grid?"**
    Answer: They increase voltage to reduce energy loss during transmission, and then decrease it for safe use in homes.
12. **"What's the difference between the primary and secondary coils in a transformer?"**
    Answer: The primary coil receives the input voltage; the secondary coil gives the output voltage. The number of coils affects whether voltage goes up or down.

Useful Links:

Senecal Learning = https://senecalearning.com/en-GB/

BBC Bitesize = GCSE Physics (Single Science) - AQA - BBC Bitesize

Kerboodle = www.kerboodle.com