**How a nuclear reactor works**

Why am I doing this?

* to describe and explain the process of nuclear ***chain reaction***;
* to describe the basic construction of a fission reactor and explain the role of the ***fuel rods***, ***control rods*** and the ***moderator***;
* to describe the use of nuclear fission as an energy source;
* to describe the peaceful uses of nuclear fission.

To do

Using the information you have been given and other sources,

* provide a large and carefully labelled diagram showing a nuclear reactor. Label the **fuel rods, control rods** and **coolant**.

Questions

* **Nuclear fuel**

1. What types of nuclear fuel are commonly used in nuclear reactors?
2. What fissionable isotopes are used in nuclear reactors?
3. What is a ‘fuel rod’?

* **Moderator**

1. What does a **moderator** do in a nuclear reactor, and why is moderation necessary?
2. What substances are commonly used as moderators? What do they have in common?
3. Explain what is meant by a ‘thermal’ neutron.

* **Control rods**

1. What is the purpose of **control rods** in a nuclear reactor?
2. What substances are used in control rods? What do they have in common?
3. What is a ‘scram’?
4. Explain the meaning of ‘neutron poison’. Why do neutron poisons accumulate during the operation of a reactor, and how do they affect the operation of the reactor?

* **Coolant**

1. What is the purpose of a **coolant** in a nuclear reactor?
2. What substances are used as coolants in BWR, AGR and PWR power stations? Are there any other types of coolant available?
3. Why are the primary and secondary cooling loops kept separate?