

Did you know?

Power stations do not store electricity, so it is constantly being made.

The high voltage electricity is distributed over long distances by pylons and high voltage overhead cables.

The pylons and high voltage lines carry the electricity to a substation.

A substation has transformers that "step down" the high-voltage electricity into medium voltage electricity.

From the substation, distribution lines carry the medium voltage electricity to other transformers on utility poles or on the ground that reduce the electricity to low voltage so it can be used in homes, offices, stores and factories.

The amount of electricity in the lines must be kept at a constant electrical pressure to provide enough power for the appliances and equipment that will use it.

From the meter box, wires run through the walls in the house to outlets and lights. The electricity is always waiting in the wires to be used.

A cable then carries the electricity from the distribution wires to the house through a meter box. The meter measures how much electricity the people in the house use.

New Build | Nuclear Services | Decommissioning

cavendishnuclear.com



cavendish
nuclear

My Life as a Fuel Element



CHAPTER 1

I am an element

Hi Guys, my name is Rodney the fuel rod and for the last 50 years I have been asleep, lazy or what!

Even though I have been a sleep I have effected your lives in many ways.

For now I am living like a mermaid underwater with all my fuel friends! However, this is the end of my journey so let's start at the beginning.

Let's talk about how I am made: inside me is a very special element called Uranium. This makes the inside of me orange.

I would be poorly if Uranium was put straight inside me.



MINED (mining)

This is a process which involves digging up (extracting) materials or minerals of importance to create lots of things.

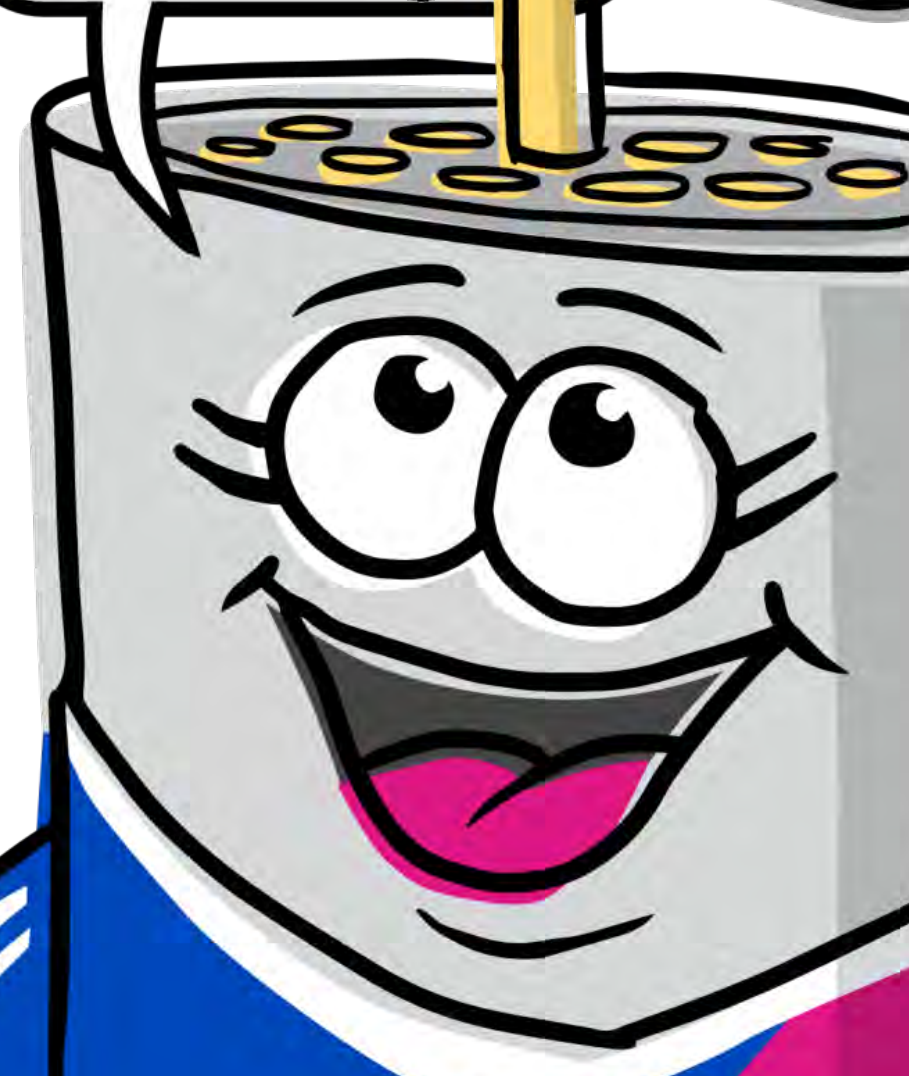
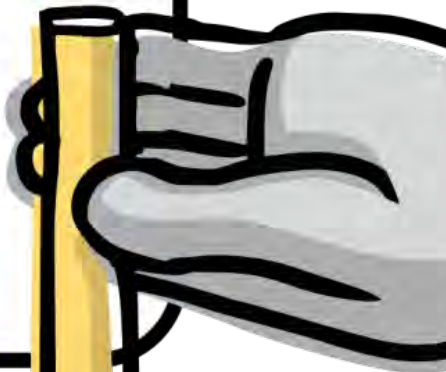
PERIODIC TABLE

This is the table of elements, it contains chemical elements arranged in order of their atomic number.



CHAPTER 2

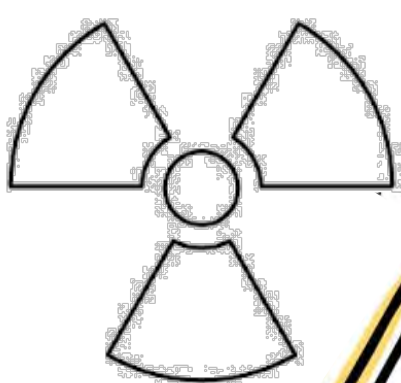
How I am made



CHAPTER 3

What's inside me?

Now I can be made, I have to eat a special powder called yellow cake, yummy! Inside me there is 36 fuel pins and many 235 pellets, WOW I am very full.



CERAMIC FUEL PELLETS

235

These are the pellets which go in the fuel pins and contain the uranium 235.

FUEL PINS

These contain the fuel pellets which are used to provide the fuel to the nuclear reactor.

R1

IDENTITY NUMBER

This is like their name, this is what they are known by.



CHAPTER 4

Our journey to a power station

Wahoo, now that I am alive, I and my team mates can start our mission!

Our adventure starts with a trip to our new home at the power station, there are many places at the power station but my home is the reactor building.



TURBINE HALL

REACTOR



CHAPTER 5

Going inside the reactor

Being at my new home means that we need to make sure that none of us get hurt on the journey, this is because we are reactive.

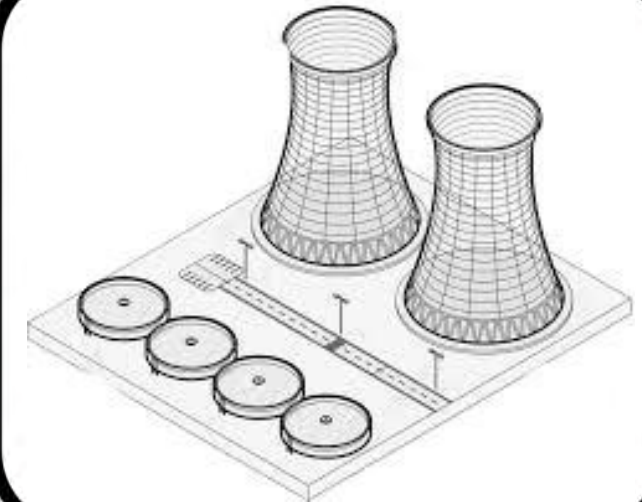
Of course we are all okay!

Now I am joined by the rest of my fuel friends, we are now a team again.

It is time to start our mission but some of my fuel friends are scared ... We know that because we are all together we will be okay!

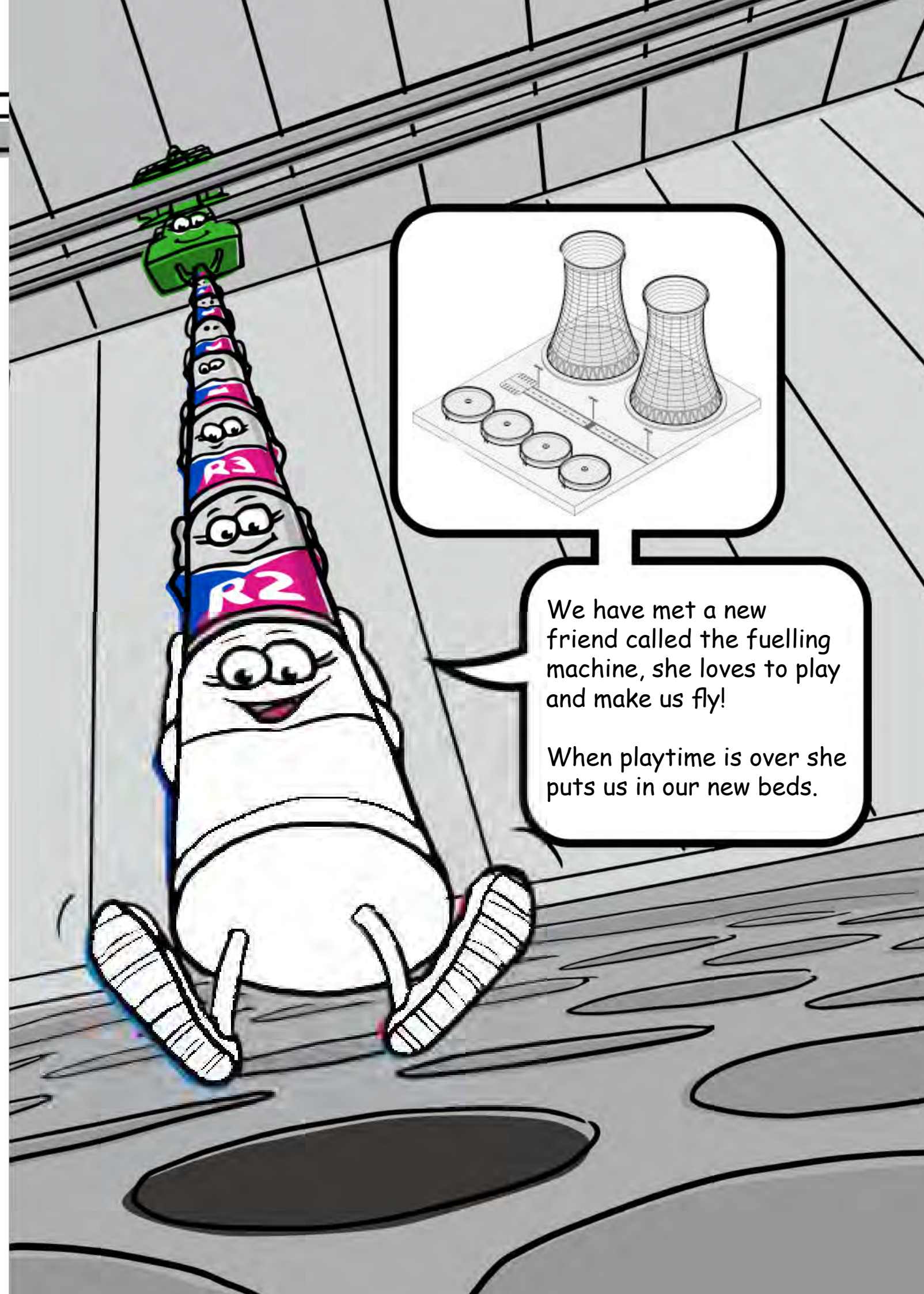
FUELLING MACHINE

this is an overhead machine which is used to take out the fuel elements and replace them.



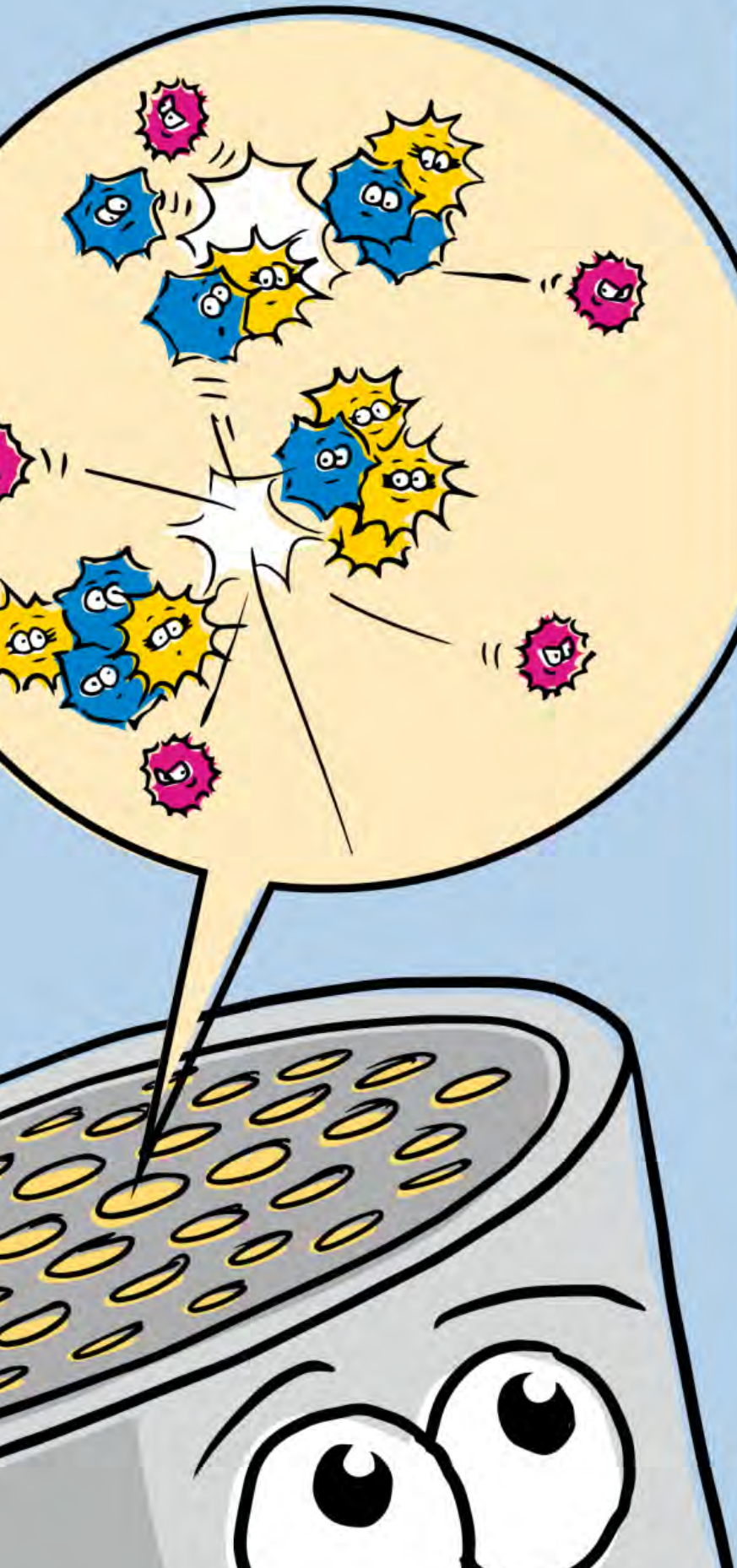
We have met a new friend called the fuelling machine, she loves to play and make us fly!

When playtime is over she puts us in our new beds.



CHAPTER 6

Making energy



Now that our new friend has dropped us off in our new beds, half of our mission is complete.

The special element inside of me, 235 uranium is made up of three things, these work together to create energy.

- Nippy Neutron
- Peggy Proton
- Eddie Electron



REACTION

A reaction in science is when particles collide and break apart, this causes chemical changes.

DEGREES

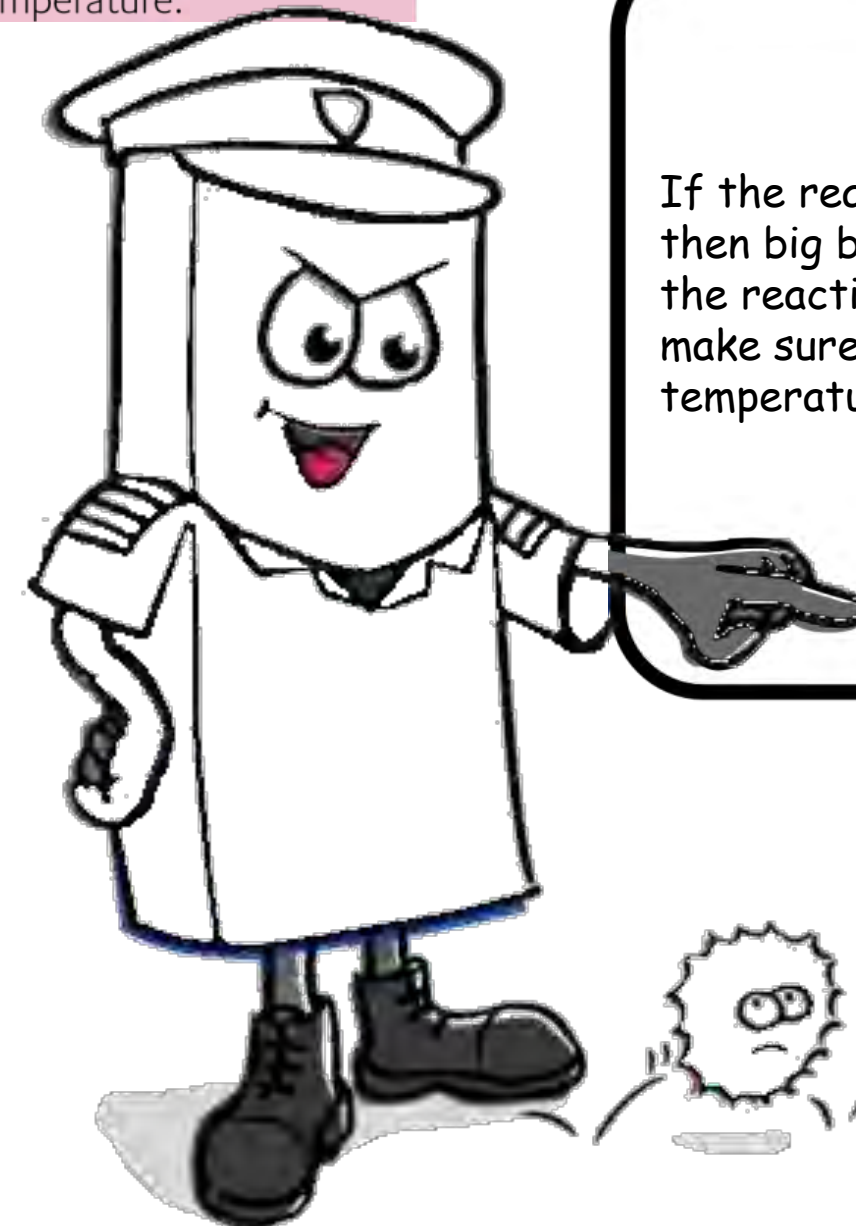
this is a form of measurement, like on a ruler there is centimetres well degrees are the measurement for temperature.



Now that Nippy Neutron has got a sugar rush, it gets very hot, it feels like I am on holiday getting a tan!

A new friend called graphite inside of me helps the reaction, this slows down Nippy Neutron and helps him to collide with nucleus to become stronger.

The reaction can get as hot as 650 degrees.

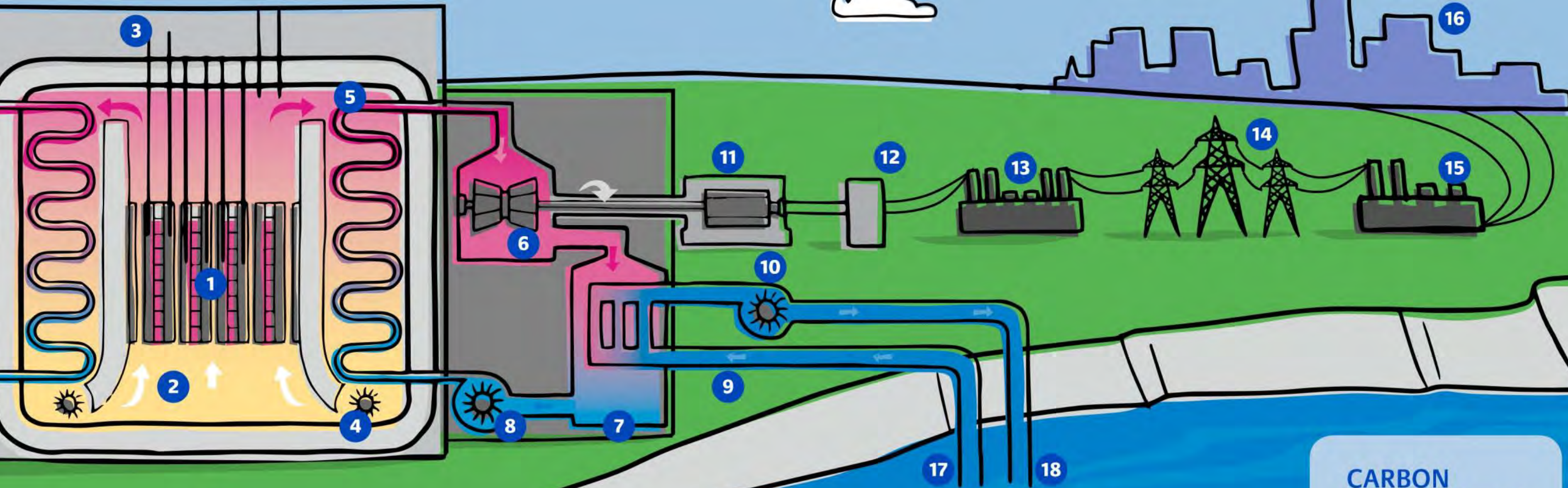


If the reaction gets too hot then big bad Boron will lower the reaction temperature to make sure it is at the right temperature for us.



CHAPTER 7

Electricity for your home



This is a diagram of how I start my life to how it ends up powering your home.

Did you know I help to power your XBoxes and TVs?

I even help to cook your tea!

- | | |
|---|--|
| 1 Reactor (graphite core) | 9 Secondary seawater cooling system |
| 2 Fuel assemblies (approx 300 per reactor) | 10 Seawater pump |
| 3 Control rods (approx 300 per reactor) | 11 Electricity generator |
| 4 Gas circulators (CO ₂ - 4 per reactor) | 12 Transformer (output 600MW) |
| 5 Heat exchangers (boilers - 8 per reactor) | 13 Switchyard (electrical distribution to National Grid) |
| 6 Steam turbine | 14 Electricity pylon |
| 7 Condensor (returns steam back to water) | 15 Electrical substation |
| 8 Primary water system pump | 16 City |
| | 17 Inlet |
| | 18 Sea outlet |

CARBON DIOXIDE (CO₂)

This is a gas which is in the periodic table. When we breathe in we are breathing in oxygen which is sent around our body to feed our muscles, when we have finished with the oxygen we breathe out again and the stuff that we breathe out is called carbon dioxide, so there is a lot of it around us but not as much as in a reactor.

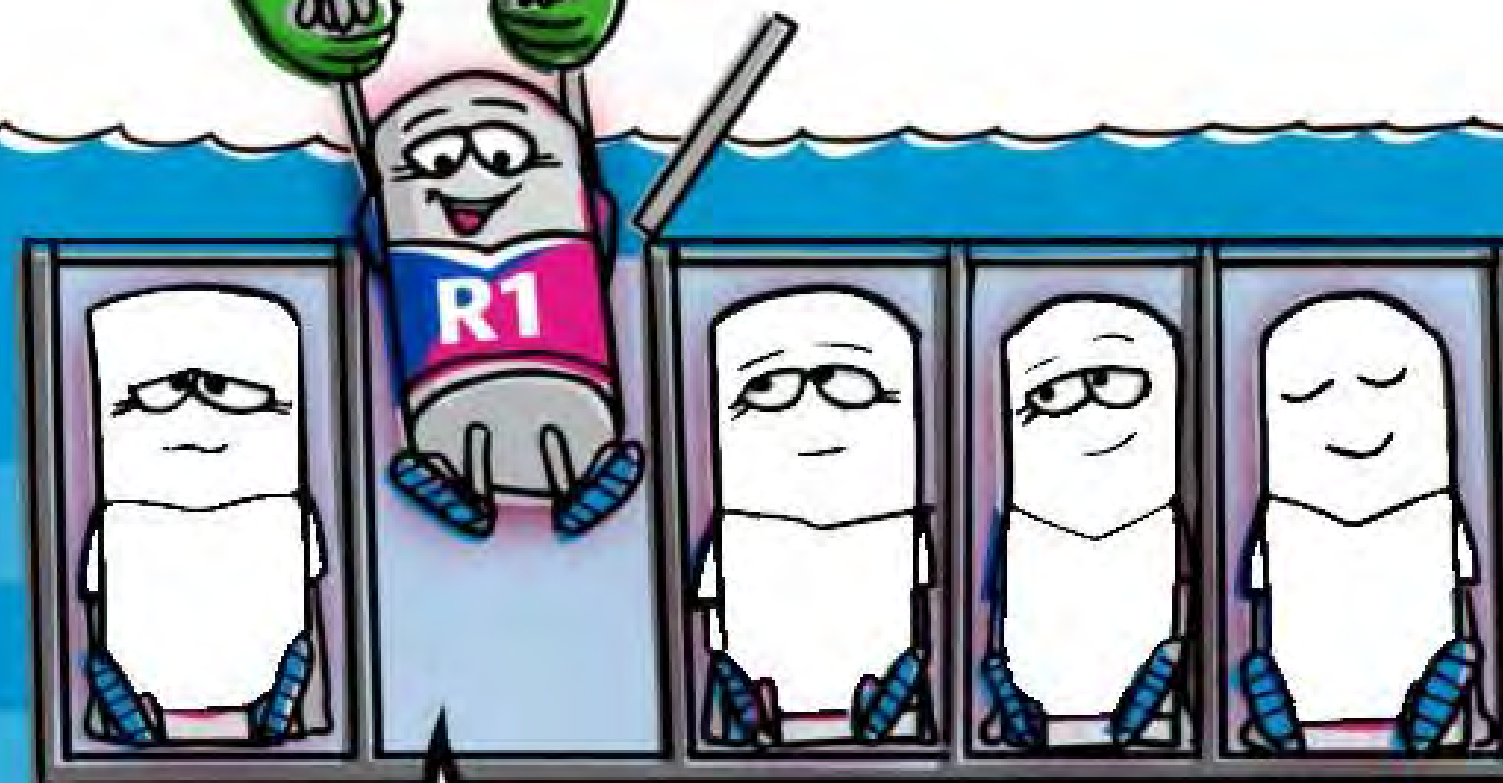
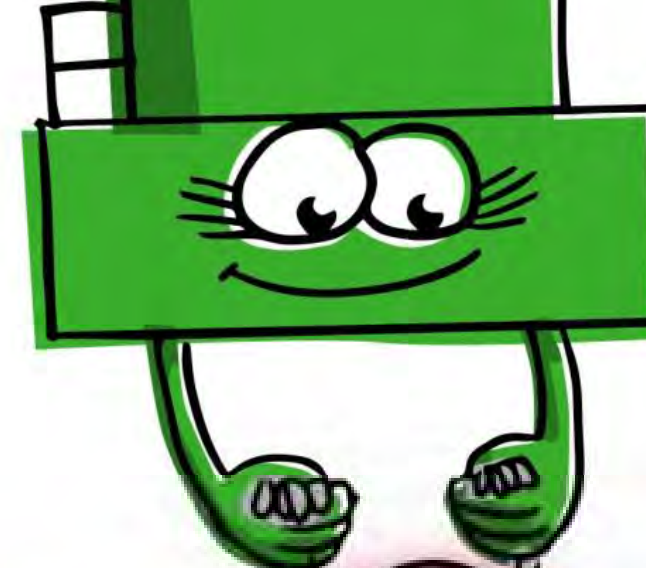
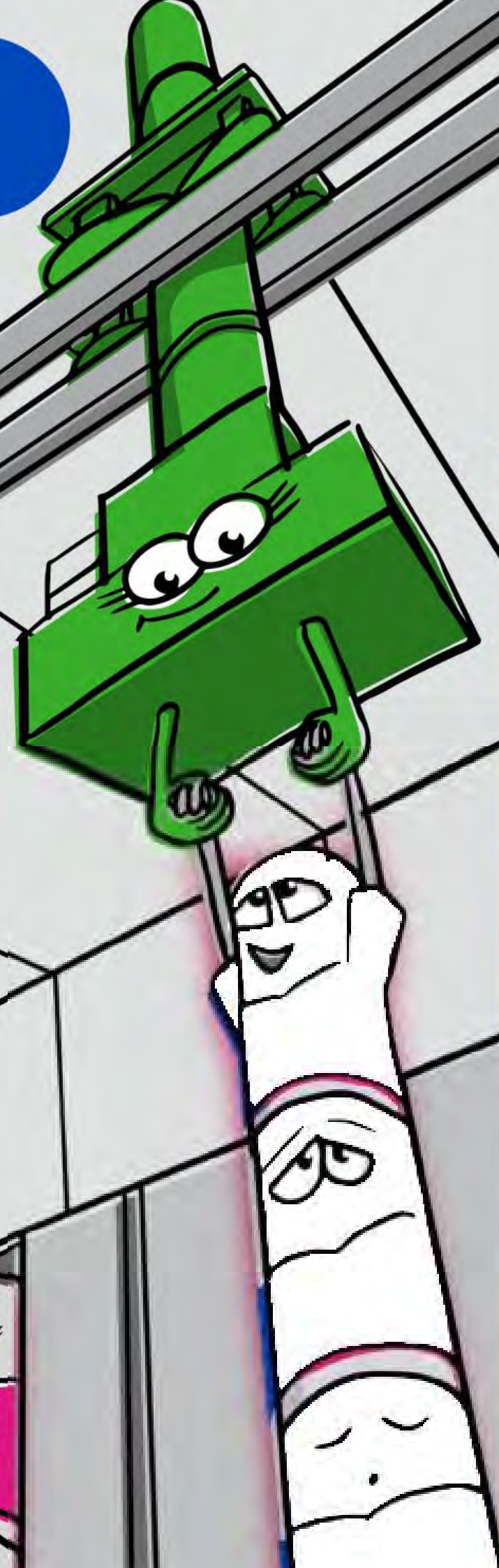
CHAPTER 8

Leaving the reactor

One of the best parts of being a fuel rod is that I can help produce heat and electricity for 8 years.

This tires me out and eventually me and my fuel friends need to go and rest.

Its been a long time since we have seen our friend the fuelling machine but she has come to play again and make us fly before we go and rest for 50 years.



Because our mission was very dangerous and we are now radioactive, we cannot come into contact with people.

The fuelling machine takes us to a large pond where we are safe and people are safe with us being in there!

Me and my fuel friends have been in here for 50 years but it may be another 50 years until it is safe for us to come out.

CHAPTER 9

Starting all over again?

During my time in the reactor we have provided enough heat to supply electricity to over 500 homes for 8 years!

I am so happy my mission was a success.

Now that our mission is over, my friends and I sleep alot to pass the time.

Once we are fully rested we will have the chance to be reprocessed and start our journey all over again!

