Angela Clayton

Angela Clayton was an internationally renowned physicist

who specialised in the field of preventing accidents in nuclear reactors, known as 'nuclear criticality safety'.

As part of this, she had an active interest in health physics – the science of how to protect people from the effects of radiation. Some of her accomplishments in the field of nuclear criticality include being Head of Criticality Safety at the Atomic Weapons Establishment, and chair of the UK Working Party on Criticality. In other words, she was in charge of a lot of projects that made sure nuclear materials were handled very, very safely!

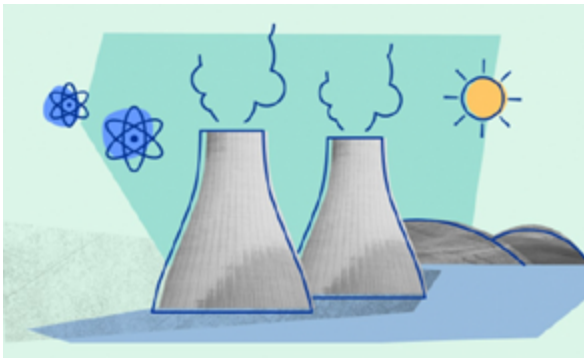

Image Credit: International Atomic Energy Agency

She also pursued many additional interests such as astronomy, and, notably, law, gaining a Law degree from the Open University at the age of 50. Not only did she graduate with first class honours, but she also achieved this before she had retired – meaning she was completing a Law degree while working in the field of nuclear physics at the same time!

In addition to her incredible academic achievements, Angela was also a very influential figure in furthering the rights of transgender people. Some examples include:

- She worked as an activist with Press for Change, a group which led the campaign for full legal recognition for trans people living in Britain.
- She was the first ever "trans observer" for the UK Trades Union Congress, a group representing trade unions, meaning she stood for the rights of trans people in the workplace. (Unions are groups of people who work to ensure employees are respected and treated well in their jobs.)
- She helped to develop and implement the Gender Recognition Act 2004, an Act of Parliament that allows people to change their gender legally by obtaining a Gender Recognition Certificate.

In 2005, Angela was awarded an MBE for services to gender issues.

She sadly passed away in 2014, but as you can see she was a very important figure in both nuclear physics and human rights!

The Fission Game

Inspired by Angela's work in nuclear safety, we have put together an activity all about nuclear fission. This is the process that takes place in nuclear reactors to create energy.

The Science

Nuclear energy is the energy stored inside an atom. Atoms are the tiny building blocks that make up everything in our universe. When you split an atom into two or more smaller atoms, you can release a huge amount of energy. In nuclear reactors, atoms are split in a controlled way, so that the energy can be used to generate electricity. If this process is not controlled properly, lots of atoms can be split very quickly in a chain reaction. This can be very dangerous and create nuclear explosions! That is why it is important that scientists like Angela Clayton work hard to ensure processes are safe and people are protected.

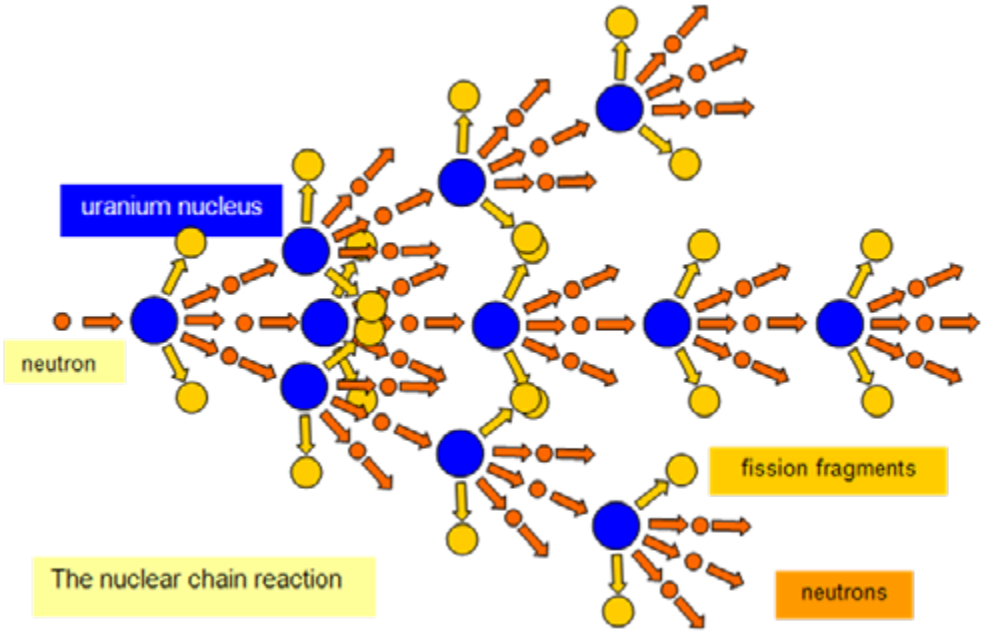

Image Credit: schoolphysics.co.uk

The Game

You can play this game with a large group of people – the bigger the group, the better it works. All you need is a selection of balloons – twice as many balloons as the number of people in your group.

Round 1

1. One person is a free neutron. This is part of an atom that is unstable and has broken away from an atom. They get one balloon.
2. Every other person in the group are uranium atoms. They get two balloons: two balloons make one atom. Everyone stands close together in a closely-packed group.
3. The free neutron throws their balloon into the group. When someone is hit by this balloon, they release their energy by throwing their two balloons into the air!
   This is because the uranium atom has `split' – their balloons are now more free neutrons.
4. There are now three balloons – or neutrons – in the air. When you get hit by a balloon, then you "split" and throw your balloons into the air, and so on until everyone has split!

Round 2

Repeat the game except this time add someone who is a control rod who will try and catch the balloons. Control rods are devices that absorb neutrons, meaning chain reactions are slowed down or stopped completely. See how many balloons the control rod can catch!

Round 3

Add more free neutrons or control rods and see if you can speed up or slow down the chain reactions. Can you stop the reaction completely?

You can see a similar demonstration of a chain reaction, using ping pong balls and mousetraps instead of balloons, by the Dalton Nuclear Institute at the University of Manchester here.