

MODULE: *Matter 1*

Activity Sheet 1.6: Rules for making an atom

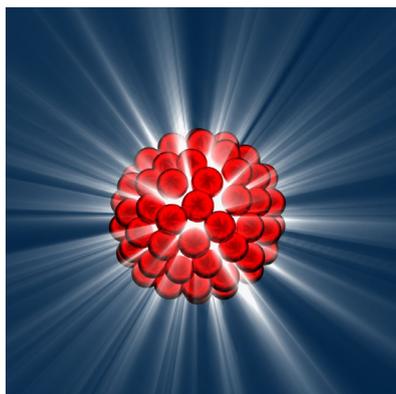
Nucleus

Atoms pack nearly all their mass into the nucleus. This is where all the protons and neutrons are located.

Even though the nucleus is comparatively heavy, it takes up only a tiny amount of space in the atom – if the atom was the size of a football stadium, its nucleus would be a pea in the middle of it.

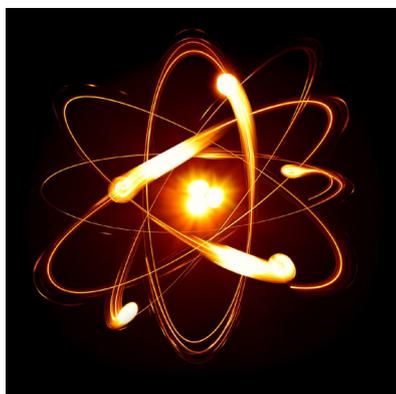
Each proton has one positive charge, and so the protons repel each other. Neutrons, which have no charge, are needed to stop the protons flying apart.

At least as many neutrons as protons are needed in the nucleus to hold it together. Protons and neutrons stick together in a lump, like a raspberry.



The energy holding the nucleus together is called Nuclear Energy.

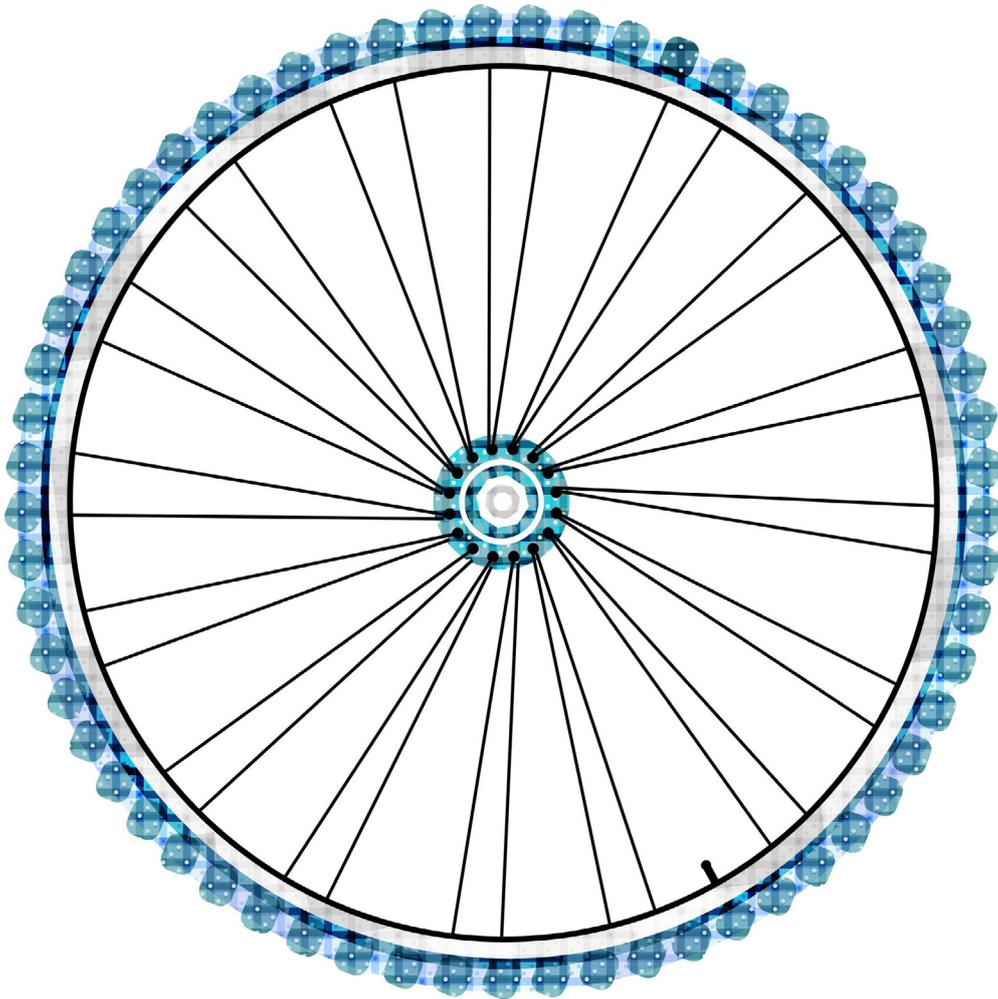
Orbiting electrons



Atoms also have electrons surrounding the nucleus in orbit, each one with a negative charge, balancing every proton with its positive charge, so the atom has no charge overall.

The number of protons = the number of electrons. The electrons are bits of matter with a very small mass, but they move around very fast and with a lot of energy.

The electrons move so fast that they act like a shell right round the atom (see box: bicycle wheels).



Bicycle wheels

A bicycle wheel disc (hub/ spokes/ rim) is mainly space. But when the wheel is spinning quickly, a stone kicked up from the road will bounce back from it. The spokes are moving so fast that it seems like they have made a solid disc. If something is moving at a slower speed than the spokes, it cannot pass through the wheel.

The electrons round an atom do the same thing as the spokes; they move so fast that they make a complete shell around the atom.

When atoms come into contact with each other, it is only the outer electrons that touch.

Task

Draw a diagram of what you think an atom would look like if it wasn't too small to see.

Then annotate the diagram with labels showing its different parts.