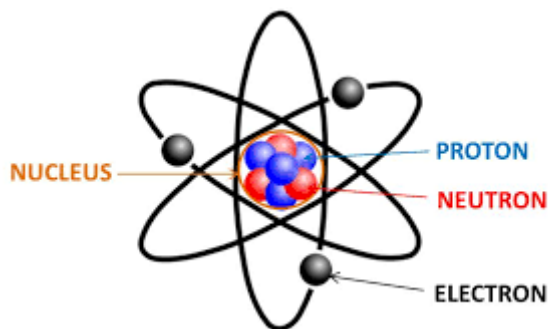


## Pisa

We have said that if you take some gold and keep cutting it in half, you would get little bits which are all the same [call them atoms]. So, gold is an ‘element’ and all its atoms are exactly the same. We know carbon, oxygen and hydrogen are elements, and are all made up of slightly different atoms. Although the atoms of different elements are different – they all have similar features.

We said that every atom has stuff in the middle, and some little bits [electrons] whizzing around the outside.

**Well, it is a bit more complicated than that**



The bit in the middle is called the ‘nucleus’. And the nucleus has two different sorts of specks in it – some are called ‘**neutrons**’ and the others are called ‘**protons**’.

Two last things, 1) there is the same number of electrons buzzing around as there are protons in the nucleus, and 2) the mass of the atom is the number of neutrons added to the number of protons. OK, that’s enough.

If flies are called flies because they ‘fly’...

Adults should be called ‘walks’.

And kids should be called an ‘annoyances’.

## Life cycle of the fly

We know that some insects have a 'life cycle' – such as beautiful butterflies coming from caterpillars which hang in bags called cocoons.



But what about the boring old house fly? Yes, they have a life cycle.

Flies lay eggs, a bit like birds... they lay eggs, but let's not get off the track.

When the eggs open out comes 'larvae'.

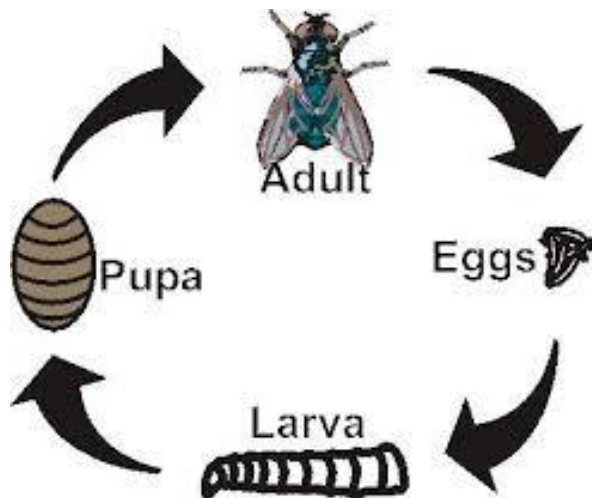
Now, in the butterfly life cycle, the 'larva' is the caterpillar, which is quite cute.

In the life cycle of the house fly, the 'larva' is thought to be pretty horrible. They don't have pretty colours like most caterpillars – instead they are creamy-white. They are called maggots. They eat rotting meat. If you see a dead animal on the road and turn it over, you will see maggots eating the dead meat. People don't like maggots – but they are good – they clean up the world.

The next stage is the pupa stage. With butterflies this is the cocoon hanging somewhere. With the house fly, the pupa stage is like a tiny

Show your parents  
Chapter 33.

acorn, with bands around it – usually in a pretty smelly place like the remains of a dead animal or other rubbish.



[Wikimedia Commons, the free media repository. Many thanks  
[https://commons.wikimedia.org/wiki/File:Musca\\_domestica\\_-\\_life\\_cycle.png](https://commons.wikimedia.org/wiki/File:Musca_domestica_-_life_cycle.png)]

Anyway, when the pupa stage is over, out comes the fly – ready to play a part in cleaning up roadkill and other bodies.

But, we mustn't praise house flies too much. While they clean up some messes, they do carry germs, and we must keep them well away from people, especially when we need to avoid infection with germs.

## The most important experiment

Aristotle (384-322 BC) lived in Greece, and was a fabulously clever person – he knew about physics, zoology, philosophy... he knew everything that was known in his time.

He said, “Good habits formed during youth make all the difference”.

But, he made one mistake. He thought that heavy things fall faster than light things.

Galileo (1564-1642) lived in Italy, and was also fabulously clever and knew about physics and astronomy.

Show your parents  
Chapter 33.

Before Galileo, everyone believed the Earth was the centre of the universe and the Sun revolved around the Earth.

Galileo is perhaps most famous for teaching that the Sun is the centre of the system in which we live, and the Earth and other planets circulate around it.

However, we want to talk about something else. Galileo also said that Aristotle was wrong, and that all things [heavy and light] fall at the same speed.

Galileo was the first person to say experiments were the way to prove things.

It is said that Galileo took two weights, one heavy and one light, up to the top of the Tower of Pisa [Italy] and dropped them at the same time. It is said these two objects landed at the same time, proving he was right.

This is one of the most important findings ever made.

[The Tower of Pisa leans because the earth under one side sank down – somebody didn't do an experiment.]



Show your parents  
Chapter 33.

[Interestingly, Galileo might not have actually done this experiment – perhaps he might have just talked about doing it.]

**Q: What do you call a train carrying bubble gum?**

**A: A chew-chew train.**

**Knock, knock.**

**Who's there?**

**Butter.**

**Butter who?**

**Butter be quick, I have to go to the bathroom!**

**Q: Why was 6 afraid of 7?**

**A: Because 7, 8, 9.**

This is a real animal which lives in deserts in Australia – it is called the thorny devil. They have similar ones in USA.



[<https://www.genesispark.com/exhibits/reptiles/lizards/horned/>].

Show your parents  
Chapter 33.

**Knock, knock.**

**Who's there?**

**Cargo.**

**Cargo who?**

**No, car go "beep beep"!**

**Knock, knock.**

**Who's there?**

**Police.**

**Police who?**

**Police stop telling these awful knock-knock jokes!**

