

Play at Powerhouse make & do activity kit

Science with Zoe & Cogs - Experiment 12

Balloon Universe

Our universe is expanding all the time!
What does that look like?



What to do:

1 Before you blow it up, draw Earth and our other planets and moons all over your balloon with different coloured felt tip pens. Around the planets, draw some larger stars and galaxies. Keep them very small.

2 Blow up your balloon with one deep breath if you can. What happens to the planets? Now blow the balloon up fully. What do you notice?



Things you need:

Balloon
Coloured felt tip pens

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What's going on?

Astronomers say that the universe is expanding. Not only is it expanding, but this expansion is accelerating. It's as if the galaxies (groups of stars) in space were racing cars that were getting further and further apart in all directions, going faster and faster all the time.

One way to picture this is to imagine that you are the dot on the balloon. You have entered a two-dimensional universe (you are now completely flat and not lumpy) and live entirely within the balloon skin.

As you blow up the balloon, everything in space – the planets, stars and galaxies, is moving away from you (the dot).

As you continue to blow up the balloon, the stars and galaxies move away from you more as the balloon's rubbery skin stretches. The planets close by the dot move away from the dot more slowly than the more distant stars and galaxies.

The universe's expansion works like the balloon's expansion, but in three dimensions. It's harder to imagine, but astronomers can describe it using mathematical equations.

What else do you see?

Use this space to write about, and draw anything else you noticed while doing this experiment.

Dark forces

Edwin Hubble first discovered the universe was expanding in the 1920s by looking at the way light from distant stars stretched and changed their apparent colour. If you traced the path of expansion of all of the stars and galaxies back in time you would end up at the beginning of the universe, the Big Bang.

Astronomers first found that the universe's expansion was accelerating in 1998, and it came as a bit of a shock. Many now believe that a mysterious substance called dark energy is responsible. But no-one knows exactly what dark energy is.