

5th July

**If God be for us,
who can be against us?**

He that spared not his own Son,
but delivered him up for us all,
how shall he not with him
also freely give us all things?
Romans 8:31b-32

If... the word that begins this week's memory verse is very small. The Apostle Paul wrote these words to Christian's in Rome. When he writes "us all" he means those Roman Christians long ago, himself, and all Christians down the ages. **If** we are trusting the Lord Jesus and have asked Him to forgive us for our sins this verse belongs to us as well. Younger children can learn the words in bold. They work very well if said in two halves by two children.

On 5th July 1687 one of the most important books ever written about science was published: *Philosophiae Naturalis Principia Mathematica* (mathematical principles of natural philosophy) by Isaac Newton (1643–1727).

In this book Newton described the three laws which are still called by his name: Newton's Laws of Motion.



1. Newton's First Law:

An object that is sitting at rest will stay at rest, and an object that is in motion will stay in motion until a force acts upon it.

2. Newton's Second Law:

The greater the force the greater the acceleration.
The greater the mass, the greater the force needed to move the object.

3. Newton's Third Law:

For every action there is an equal and opposite reaction.

Here are some experiments you can do to demonstrate the three laws:

1.

you need:

a small plastic cup,

a playing card

a coin.

Method:

Put the playing card on top of the plastic cup

Put the coin on top of the card

With a sharp flick, hit the card out from under the coin or pull it very quickly toward you.

The coin will drop into the cup.

The coin has **inertia**, meaning it really "wants" to stay in one place. If you move the card slowly, it isn't fast enough to overcome that force. If you flick it quickly, the coin stays in one place and then drops into the cup.

2.

You need:
a football.

Method:

Do this outdoors preferably in the park.

Kick the ball gently and mark how far it goes.

Now kick it hard and mark how far it goes again.

The harder you kick a ball the farther it will go.

You could also try a heavier ball and a lighter ball. You will need more force to move a heavier ball than a lighter one.

3.

You can demonstrate the third law using marbles. What happens when you roll a marble so that it hits a stationary marble?

You might think that the things you have just shown seem very obvious. But the laws that you have demonstrated are the foundation of classical mechanics which is one of the main branches of physics! Of course people knew before Newton that they had to kick a ball harder to make it go further. Newton's genius was to collect this “obvious” information and write down the principles – *Principia* – behind it.

Like many of the great scientists who established the principles of science, Newton believed that the Bible was God's Word. He believed in Christ as his Saviour. He investigated the world around him because he knew that doing so would lead to a greater knowledge of the Creator of the world. Newton was not untouched by worldly thinking around him. Nor was he free of the Arianism¹ so prevalent in his day. But he wrote “I have a fundamental belief in the Bible as the Word of God, written by men who were inspired. I study the Bible daily.” This is a good practice which we should all follow!

¹ Arius taught that Jesus Christ was not divine. He did not believe in the Trinity. See the lesson on Constantine for 25th July for more information.