Gravity is one of the most important forces in the universe. It causes planets and stars to form. It keeps everything, including us, on our planet. It traps the air in our atmosphere and causes the tides.

The Mini Page talked with an expert from the National Science Foundation to learn more about this important force.

**Forces of nature**

Gravity is one of the four forces that affect the universe. Gravity is a force that causes every object to attract every other object. The three other forces are strong, weak, and electromagnetism.

A force is something that pushes or pulls something. It can make an object move in a certain direction, or it can make an object stop moving.

A force is like an imaginary elastic band attached to an object. The force pulls the object just as an elastic band pulls an object.

Gravity is the weakest force. We know little about it since it is so mysterious.

According to NASA, some scientists think gravity is made up of particles called gravitons, which travel at the speed of light.

**Newton changes everything**

Sir Isaac Newton was a scientist born in England who lived from Jan. 4, 1643, until March 31, 1727. He was the first person to explain gravity.

The story goes that Newton was sitting under a tree when an apple fell and bonked him on the head. He wondered what had made the apple fall down. Why hadn’t it flown to the side? Why hadn’t it gone up? Why hadn’t it flown to the side? When Newton was still in his 20s, he figured out that the same force that had made the apple fall also made the moon orbit the Earth and the planets orbit the sun. He was the first person to make this connection.

**Everything changes again**

In the early 1900s, another young genius, Albert Einstein, realized that Newton’s idea of gravity doesn’t work for huge distances. It doesn’t work near massive objects such as black holes.

Einstein, who was born in Germany, figured out that time had to be part of the picture. Time and space are linked together. To understand gravity, we need four dimensions — length, width, height, and time.

If you’ve watched sci-fi shows or movies or read sci-fi books or graphic novels, you may have heard about the space-time continuum (the-TIN-aulum). This is what they’re talking about.

**Try ’n’ Find**

Words that remind us of gravity are hidden in this puzzle. Some words are hidden backward or diagonally, and some letters are used twice. See if you can find it:

APPLE, BLACK HOLES, CONTINUUM, EARTH, ELECTRON, FORCE, GRAVITY, HEIGHT, LENGTH, MASS, MYSTERY, NASA, NEWTON, PLANETS, SPACE, SPEED, TIME, WAVES, WIDTH.

**Mini Facts**

Gravity keeps the moon revolving around the Earth and the other planets orbiting the sun.

**The facts of gravity**

Gravity is a mysterious force. Here are some facts about gravity:

- Bigger objects have stronger gravity than smaller objects.
- Stronger objects have a stronger gravitational pull than distant objects.
- Weight is tied to gravity. The more gravity there is, the more something weighs. For example, the moon has only about one-sixth the gravity of Earth. You would weigh about one-sixth as much on the moon as on Earth.
- On Earth, you would weigh about 84 pounds. If you weigh 84 pounds on Earth, you would weigh about 14 pounds on the moon.
- Space shuttle astronauts experienced about 3 G’s. One G is the effect of gravity on the Earth’s surface. It is what we feel all the time without even realizing it. Space shuttle astronauts experienced about 3 G’s at lift-off. This means they felt about three times heavier. Roller-coaster riders can briefly experience about 5 G’s.
- Gravitational waves can change the shape of matter. On Earth, we’re hit by gravity waves all the time. They stretch or squash our bodies, but they are so weak that we don’t even notice them.

**Eco Note**

The deep ocean currents that carry vital heat, oxygen, and nutrients around the world are slowing down around Antarctica in a trend scientists warn could have a massive effect on climate. Australian scientists say the trend is caused by rapidly melting Antarctic ice, which is flooding the surrounding ocean with less-salty and warmer water, reducing the typical downward movements of the currents around the icy continent. Those currents are only part of a vast system of important currents around the world that affect temperatures and precipitation.

**For later:**

Look in the newspaper for articles about space.

**Teachers:** Follow and interact with The Mini Page on Facebook!

**Mini Jokes**

Gill: Did you read the book about gravity?
Gino: I didn’t put it down!