



HANGLOOSE **BLUEWATER** ADVENTURE

SCHOOLS

KS3



BLUEWATER HISTORY!

Bluewater Shopping Centre is one of the largest shopping centres in Europe today, but it was not always a place for shops and restaurants.

A long time ago, the area was a huge chalk quarry, where stone was dug out of the ground. When the quarry closed in the late 1900s, it left large holes that filled with water and became lakes surrounded by chalk cliffs.

In the 1990s, the land was redeveloped into a modern shopping and leisure centre. The designers kept the lakes and natural landscape as a feature of the site.

Bluewater opened in 1999. It includes shops, restaurants, entertainment, and green spaces, making it more than just a shopping centre.

Today, it is a popular destination for shopping, food, and days out with family and friends.

When visiting Hangloose Bluewater you will learn through adventure!

FORCES AND MOTION

ENERGY

WORKING SCIENTIFICALLY

PROBLEM SOLVING

FORCES AND MOTION

Forces are all around us. We can't see them, but we can see their effects on movement and objects.

In our activities, you'll explore the main forces you experience, including:



Can you think of any activities you do that might use these forces?



An object's weight is caused by gravity acting on its mass. The stronger the gravitational field, the greater the weight.

All objects are pulled towards the centre of the Earth, which is why things fall "downwards" no matter where you are.

Gravity is a force that pulls objects with mass towards each other. On Earth, it pulls everything towards the ground.

Gravity is always acting on objects, even when they are not moving or are floating (like astronauts in orbit).

Jumping is a fight against gravity—it pulls you back down every time.

WHICH OF THESE IS AN EXAMPLE OF GRAVITY?

A – A person slowing down as they land on a zipline

B – A bike stopping because the brakes are applied

C – A boat moving forward through water

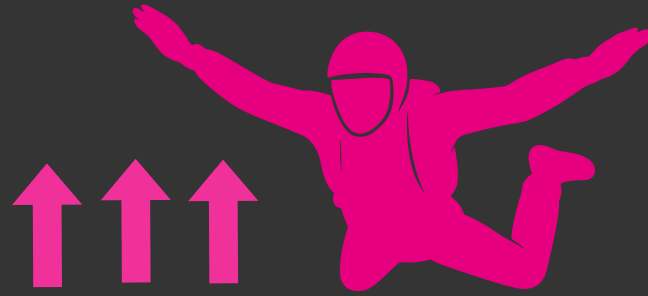


A PERSON SLOWING DOWN AS THEY LAND ON A ZIPLINE

WHY?

Gravity is the force that pulls objects towards the Earth and gives them weight.

When someone rides a zipline at Hangloose Adventure and reaches the landing point, gravity pulls them back down to the ground and helps bring them to a stop.



AIR RESISTANCE

As speed increases, more air particles hit the object, increasing the force of air resistance.

WHICH OF THESE IS AN EXAMPLE OF AIR RESISTANCE?

A – A person being pulled towards the ground when standing still

B – A skydiving machine slowing a person's fall as they descend

C – A ball speeding up as it rolls down a hill

Air resistance (also called drag) acts in the opposite direction to an object moving through air.

Objects with a larger surface area or less streamlined shape experience more air resistance (e.g. a parachute slows a fall)

Air resistance is a form of frictional force that occurs when air particles collide with a moving object.

**B!**

A SKYDIVING MACHINE SLOWING A PERSON'S FALL AS THEY DESCEND

WHY?

Air resistance is the force that acts against movement through air. In the skydiving machine at Hangloose Adventure, the air pushes against the person as they fall, slowing their descent and reducing their speed. This makes it an example of air resistance because the force of the air is directly opposing their motion downwards.



FRICTION

Rough surfaces produce more friction, while smoother surfaces produce less.

When surfaces rub together, energy is transferred and heat is often produced.

Friction acts between two surfaces in contact and works against the direction of movement.

Even smooth surfaces have friction because microscopic bumps and irregularities interact.

It reduces speed and can eventually bring moving objects to a stop.

WHICH OF THESE IS AN EXAMPLE OF FRICTION?

A – A sled slowing down as it moves across snow

B – A person being pulled towards the ground when they jump

C – A kite staying in the air because of wind

A large green square containing the white text 'A!' in a bold, sans-serif font. The square is positioned on the left side of the slide.

A SLED SLOWING DOWN AS IT MOVES ACROSS SNOW

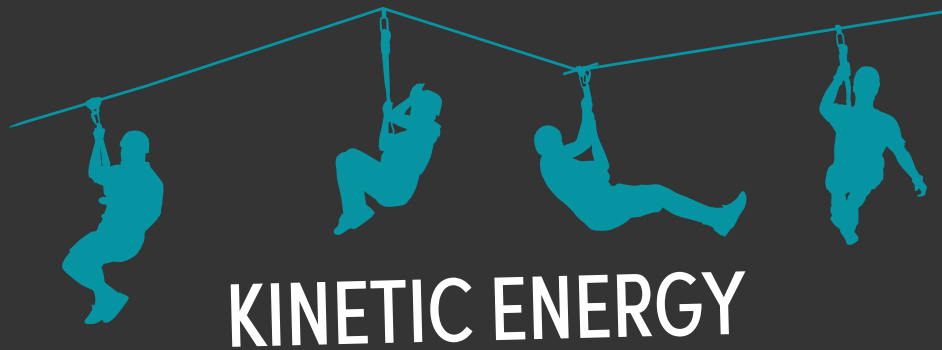
WHY?

Friction is a force that acts between two surfaces in contact and opposes motion. In this example, the sled slows down as it moves across the snow because friction is acting between the sled and the snow. This force resists the movement, gradually reducing the sled's speed until it stops.

ENERGY!

Energy allows us to move, climb, swing, and fall during activities.

We can observe different types of energy being transferred and used in action during Hangloose Adventure activities.



KINETIC ENERGY

POTENTIAL
ENERGY



ENERGY
TRANSFERS





KINETIC ENERGY

= MOVEMENT!



WHAT IS IT?



Kinetic energy is the energy an object has because it is moving. Any moving object has kinetic energy, whether it is a person running, a ball rolling, or a zipline rider moving through the air.



HOW IT WORKS

When an object starts moving, it gains kinetic energy. When it slows down or stops, its kinetic energy decreases and is transferred into other forms of energy, such as heat or sound.

WHAT AFFECTS KINETIC ENERGY?

Speed: The faster an object moves, the more kinetic energy it has.

Mass: Objects with greater mass have more kinetic energy when moving at the same speed.

EVERYDAY EXAMPLES!

- A moving car
- A rolling football
- A falling raindrop
- A running child

POTENTIAL ENERGY

= STORED ENERGY



WHAT IS IT?

Potential energy is stored energy.

It is the energy an object has because of its position or shape, for example when it is raised above the ground.

This energy can be transferred into other forms, such as kinetic energy, when the object starts to move.



HOW IT WORKS

When an object is released, its potential energy is transferred into other forms of energy, usually kinetic energy.

For example, a ball at the top of a hill has stored potential energy. As it rolls down, this energy is transferred into kinetic energy as it speeds up.

WHAT AFFECTS KINETIC ENERGY?

Height: The higher an object is above the ground, the more gravitational potential energy it has.

Stretching or compression: The more an object is stretched or compressed, the more elastic potential energy it stores.

Mass: Objects with greater mass store more gravitational potential energy when raised to the same height.



EVERYDAY EXAMPLES!

A book on a high shelf

A stretched rubber band

A drawn-back bow

A child at the top of a
slide

ENERGY TRANSFERS



= ENERGY CHANGING FROM ONE
FORM TO ANOTHER



WHAT IS IT?

Energy transfers happen when energy moves from one place to another.

Energy can also change form during a transfer



HOW ENERGY CHANGES

Energy is never lost, it just changes form.
Some energy is often transferred as heat or sound.



EVERYDAY EXAMPLES!

A lamp transfers electrical energy into light and heat.

A toaster transfers electrical energy into heat.

A moving car transfers chemical energy (fuel) into kinetic energy.

A falling object transfers potential energy into kinetic energy.

KINETIC OR POTENTIAL?

Ziplining across a
course

Ready to jump on
a high platform

Stretched safety
rope before
movement starts

Freefalling on the
big swing

Standing on the
edge of a zipline
platform

WHAT ENERGY TRANSFERS COULD HAPPEN ON:

GIANT SWING

ZIPLINE

CLIMBING WALL

KINETIC OR POTENTIAL?

Kinetic: Ziplining
across a course

Potential: Ready
to jump on a high
platform

Potential:
Stretched safety
rope before
movement starts

Kinetic:
Freefalling on the
big swing

Potential:
Standing on the
edge of a zipline
platform

WHAT ENERGY TRANSFERS COULD HAPPEN ON:

Big swing: chemical energy (body) → potential → kinetic

Zipline: potential energy at height → kinetic energy as you travel

Climbing wall: chemical energy → movement + heat (muscles working)

WORKING SCIENTIFICALLY

Working scientifically is how scientists ask questions, test ideas, and use evidence

It is used in all areas of science. It helps us understand real-life situations and design safe activities at places like Hangloose Adventure



Why do scientists use evidence instead of guessing?

The example we will focus on is England's longest zipline, exploring how factors such as rider weight and wind conditions can affect the speed of the ride.



WORKING SCIENTIFICALLY

STEP BY STEP!

Start by making a prediction about what you think will happen. *What is your hypothesis?*

Scientists then identify the variables in the investigation:

- *What is the independent variable (what is changed)?*
- *What is the dependent variable (what is measured)?*
- *What are the control variables (what is kept the same)?*

Test the idea by collecting data and repeating the investigation to improve reliability. *What type of graph would be best to present your results?*

Analyse the results to look for patterns. *What trends would you expect to see based on your hypothesis?*

Evaluate the data. *What went well? Could the method be improved? Are the results accurate and reliable?*

(Refer to Worksheet)



PROBLEM SOLVING

At Hangloose Adventure, problem solving is used in real time to make sure activities are safe, controlled, and enjoyable.

EXAMPLE: AQUA PARK

Using what you have learnt, what are some solutions to the below problems that may occur on the Aqua Park?

Participant might be slipping too much on the surface?

Participant struggling to stay afloat?

PROBLEM SOLVING

Participant might be slipping too much on the surface?



If surfaces are too wet or slippery, the problem is that there is not enough friction between the person and the surface, which increases the risk of slipping. To solve this, grip socks are used to increase friction, helping improve safety and stability while moving around the Aqua Park.

Participant struggling to stay afloat?



If someone is struggling to stay afloat, the problem is that they are not getting enough upthrust to support their weight. To solve this, they wear a buoyancy aid, which increases upthrust and helps them float more easily against the force of gravity. All participants must wear a buoyancy aid and be able to swim to keep the activity safe.