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Whole Class Assembly/Presentation

Topic
Forces

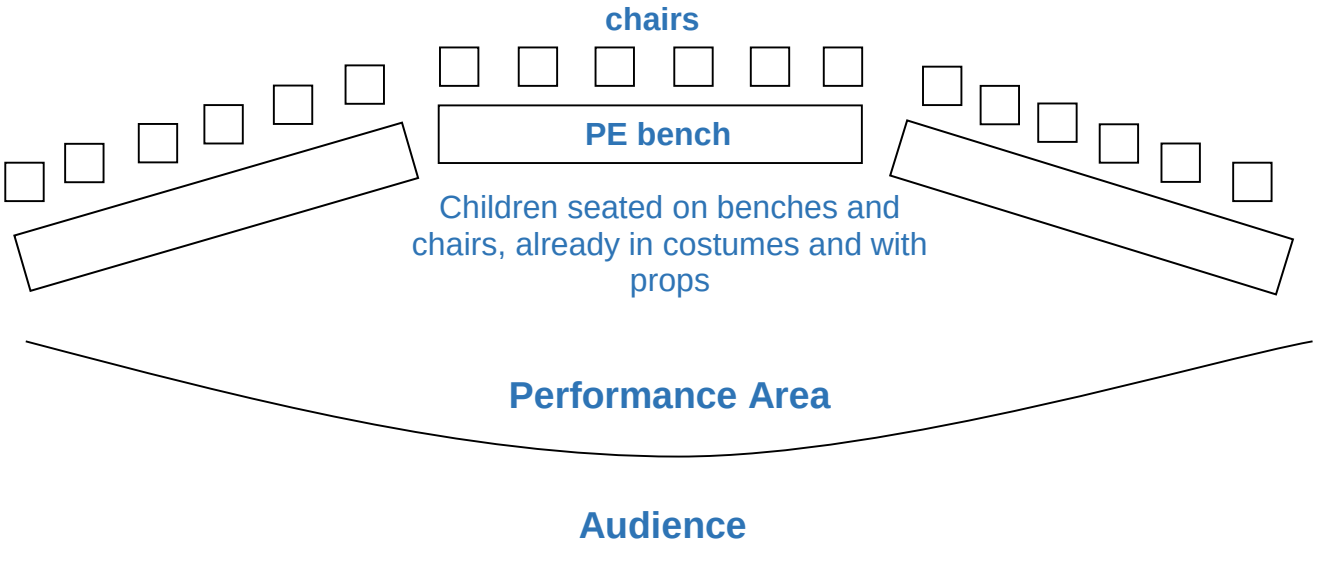
For class size
20 to 40. In smaller classes some children will need to take more than one of the speaking parts.

Summary
The assembly begins with a look at what the word ‘force’ means when applied to our daily lives. We then consider what scientific forces are, ie. pushes or pulls. There follows practical demonstrations and explanations of gravity, up-thrust, friction, and air resistance. The class then perform a short drama/comedy which shows the devastating effect forces can have, in an adaptation of the ancient legend of Icarus. An optional prayer and then a song, ‘Push & Pull’ close the assembly.

Duration
20 – 25 minutes

Props/costumes to make or collect
A toy Star Wars light sabre, a microphone, an army/RAF/navy hat and a school prospectus are needed for the opening.
For the second section you will need a PE kit, some chewing gum, a dog lead, three large cut-out arrows, a rope, a force meter and a tennis ball, a chair, a cardboard box, a pair of plimsolls, a sheet of paper, and pictures/paintings of; a bird flapping its wings, a helicopter, a person floating in water, a parachutist and a rocket.
The ancient legend characters could wear bed sheet togas, or white t-shirts (belted at the waist) and shorts. Two sets of card wings are needed for Icarus and Daedalus, a crown for the king and two spears for his guards.

Seating



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(7 children stand in a line at the front of the performance area, facing the audience.)

Child 1 Good morning everyone, and welcome to our class assembly. To start with I'd like you to listen to these sentences and think about what they all have in common.

Child 2 *(brandishing light sabre)* May the force be with you!

Child 3 My mum is a force to be reckoned with!

Child 4 *(holding the microphone)* We've had force 10 gales battering the west coast of Scotland!

Child 5 *(Wearing military hat)* Our armed forces will be mobilised within 24 hours!

Child 6 *(reading school prospectus)* A new school rule about uniform will come into force next term!

Child 7 *(looking sheepish)* It wasn't my idea to let down the headteacher's tyres. My so-called friend forced me to do it!

Child 1 That's right. They all contain the word 'force'. As you can tell by the way the word was used, 'force' has a lot to do with power and strength, and in the scientific world this is also the case.

Child 2 But what do we mean *exactly* when we talk about forces in science. Well, a force is either a push or a pull.

(Child 2 shoves and pulls child 3)

Child 3 Oi! Get off! These pushes and pulls are done to an object, any object. In this case it was me! The object then changes in a particular way. The change in me is that I'm angry with him/her!

Child 4 But seriously, a push or pull can speed up a slower moving object, like this.

(A staggering, panting child in PE kit is pushed to the front by a PE instructor.)

Instructor MOVE YOURSELF YOU LAZY TOERAG. WHAT IS THE MATTER WITH YOU? I SAID GET A MOVE ON!

(They exit)

Child 5 Or a pull can slow an object down, like this.

(A girl struggles on with a boy desperately pulling at her ankle.)

Boy OH PLEASE DON'T GO! DON'T LEAVE ME! I PROMISE I'LL CHANGE!

(She slowly exits, still dragging him.)

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Child 6 *(taking chewing gum from mouth)* Pulling and pushing an object can change its shape.

(He/she stretches the gum in different ways, rolls it up and puts it back in mouth)

All Eurgh!

Child 7 A push or pull can change the direction in which something is moving.

(A child acting as a dog, wearing a lead, drags on another child - the handler - moving in different directions.)

Handler SPOT! SPOT! WILL YOU MAKE YOU MIND UP WHERE YOU'RE GOING!

(They exit.)

Child 1 So there you have it. Forces are…..

All …pushes or pulls…..

Child 1 …to an object that can…..

All …speed it up, slow it down, change its direction or change its shape.

(The largest and the smallest child in the class pick up either end of a skipping rope and pull against each other. A large cut-out arrow is held over the large child's head to show the direction of his/her pull, while a smaller arrow is held over the small child's head to show the direction of his/her pull.)

Child 2 If two forces push or pull against each other, like these two having a tug-o'-war, and one force is larger, then the object, in this case the rope, will move in the direction of the largest force.

(The smaller child is pulled over and the larger child celebrates. A second large child sitting at the back addresses the first.)

2nd large child Oi! Pick on someone your own size.

(The two large children then pull on either end of the rope. Neither moves the other. Again a large cut-out arrow is held over the first large child's head to show the direction of his/her pull, while an equally large arrow is held over the second large child's head to show the direction of his/her pull. They strain but neither budges.)

Child 2 If, however, two equal forces pull or push against each other, like these two pulling the rope, they are said to be balanced forces, and the object won't move.

Child 3 *(holding up the force meter)* Scientists measure these pushes and pulls using one of these – a forcemeter or Newton meter. This is just a spring which resists a force, and this resistance is measured in newtons, which are read from a scale on the side. The more newtons it reads the

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greater the force. And yes, newtons take their name from the man who first studied the force of gravity after an apple fell on his head – Sir Isaac Newton.

(The 7 children sit down and are 5 more take their places.)

Child 8 So forces are pushes or pulls, but each different push and pull has its own specific name. Let's look at these different forces that we feel the effects of in our daily lives.

Child 9 *(throwing up and catching a tennis ball)* What goes up must come down. Why? Because of the pulling force called gravity. The centre of our earth pulls everything towards it, whether those things are on the ground, in the air or in water.

Child 10 It's impossible to beat gravity in the air, unless you are a bird or in a machine that can create a stronger opposite force. *(holding up picture of a bird)* Birds flap their wings against the air to produce an upward force, while planes and helicopters *(holding up picture of a helicopter)* use powerful engines to do the same thing and beat gravity.

Child 11 *(holding up picture of a floating person)* It is easy to beat gravity in water, because water provides an opposite force called 'up-thrust'. If we lie in a certain position in the water the up-thrust matches the gravity and we float.

Child 12 *(standing on a chair, with a cardboard box on the floor)* Solid surfaces also give us up-thrust which works against gravity. The solid ground prevents us from being pulled to the centre of the earth. This chair is sturdy enough to provide and up-thrust that stops me being pulled to the floor. The cardboard box, however, isn't. *(S/he jumps down onto the box which will crumple and collapse!)* Gravity – it's a bit of a downer but at least it keeps your feet on the ground!

(These 5 children sit down and 4 more take their places.)

Child 13 *(wearing no shoes, just socks)* Moving on, have you noticed how certain children will conveniently forget to put on their indoor shoes. This is because they can do this…. *(s/he runs and skids across the floor!)*....when they come into the hall! And who can blame them? Skidding is great fun.

Child 14 *(holding a pair of plimsolls)* However, the party-poopers in charge, out of concern for our health and safety, insist that we wear shoes like this, with rubber soles. Why? Because they make use of another pulling force – friction. Friction occurs when two surfaces rub together. Let's watch this in a slow motion demonstration.

(Child 14 slowly pulls a crouching child 13 in a prolonged, steady skid along the floor, as child 15 speaks.)

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Child 15 The two surfaces rubbing together are (child 13's name)'s socks and the shiny floor. Shiny surfaces and soft materials do not provide a lot of grip. (Child 14's name)'s pull is a strong force which means (child 13's name) slides along the floor. However the force of friction is acting in the opposite direction to this pull and will eventually bring the skid to an end.

Child 16 However, when s/he puts her/his indoor shoes on, as s/he should whenever s/he comes inside school, it's a different story. The rubber soles provide a strong force of friction when in contact with the floor. *(Child 13 puts on the plimsolls and attempts a skid)* There is now a lot of grip and a skid is impossible.

(These 4 children sit down and 5 more take their places.)

.....end of script sample……