

Introduction

This small device demonstrates movement in a low friction environment, allowing greater intuitive understanding of Newton's laws.

Running the activity

Make the speeder devices as a class activity, using spare CD ROMs brought into school by pupils. There are often spare ones given away for publicity, which are now surplus to requirements, or badly damaged CDs that no longer play.

Safety

Not applicable.

More ideas

Pupils enjoy decorating their personal speeder. Brainstorm possible investigations which pupils could use the speeders for, as a prediction and planning activity.

Learning outcomes

Factors affecting friction, balanced forces and air resistance.

Where the activity fits in

Speed, friction and balanced forces
QCA Unit 9K

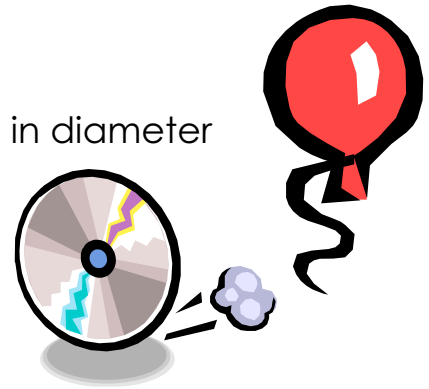
Skills

Vocabulary, numeracy.

Luke Skywalker's Space Speeder

What you need

- An old or damaged CD
- A cork with one hole in the middle about 15mm in diameter
- A normal balloon
- Glue



To make your speeder

- Glue the cork onto the CD. The hole in the cork should be over the hole on the CD.
- Let the glue dry.
- Blow up the balloon and hold the neck tightly. Put the blown up balloon over the cork, without letting the air out.
- Put the CD face down on a smooth surface, like a tabletop.
- Let the your speeder go.

Some questions to think about

1. Explain how the speeder works.
2. Why is this an example of low friction movement?
3. What happens if you push your speeder gently?
4. What happens if you stop pushing your speeder?
5. One example of high friction movement is pushing a toy car on a carpet. How is the movement of your speeder different?

Introduction

A selection of very poor science based jokes.

Running the activity

It would be an idea to print out individual jokes and challenge pupils to give the right answer and to explain why the joke is funny, or not.

Safety

Not applicable.

More ideas

Get your own pupils to generate their own jokes.

Use the jokes as a tutor time activities across the school as a Science Year Joke Day.

Where the activity fits in

As an introduction to many topics.

Acknowledgements

Many thanks to those who have sent in jokes. More can be found on the Science Year website

www.scienceyear.com

Please send your jokes to

nigel.heslop@scienceyear.com for

inclusion on future CD ROMs.

Jokes

Efficiency

Save energy in the supermarket. Stand in one place and take what you need from other trolleys as they go past.

Save energy in the home. Have only one light bulb and take it with you as you move from room to room

Save money by running to and from school. If you run behind a taxi you'll save even more money than if you run behind a bus.

Literacy and numeracy ..?

Q. What does the word "benign" mean?

A. Benign is what you will be after you be eight.

More real life exam question answers

Q. What is the correct use of a semi-colon?

A. Only to be used as a last resort, a semi-colon is a partial removal of the intestines.

Q. Name the four seasons.

A. Salt, pepper, mustard and vinegar.

Q. Name a greenhouse gas. What could be done to decrease global warming?

A. Cows make large amounts of methane when they fart. This could be reduced by fitting them with cattle converters.

Q. Explain one of the processes by which water can be made safe to drink.

A. Filtration makes water safe to drink because it removes large pollutants like grit, sand, dead sheep and canoeists.

Q. How is dew formed?

A. The Sun shines down on the leaves and makes them perspire.

Q. What is a planet?

A. A body of earth surrounded by sky.

Q. What causes the tides in the oceans?

A. The tides are a fight between the Earth and the Moon. All water tends to flow towards the Moon, because there is no water on the Moon, and nature abhors a vacuum. I forget where the Sun joins in.

Q. What is a fossil?

A. A fossil is an extinct animal. The older it is, the more extinct it is.

Q. What is the fibula?

A. A small lie.

Q. What are steroids?

A. Things for keeping carpets still on the stairs.

Q. What is a common treatment for a bad nosebleed?

A. Put the nose much lower than the body until the heart stops.

Q. How should you remove dust from the eye?

A. Pull the eye down over the nose.

Q. Describe a super-saturated solution.

A. A super-saturated solution is one that holds more than it can hold.

Q. What is momentum?

A. What you give someone when they are going away.

Q. What is a vacuum?

A. A large empty space where the pope lives.

Almost medical...

A man was walking home alone late one night when he hears a BUMP, BUMP, BUMP behind him.

Walking faster he looks back, and vaguely makes out the image of an upright coffin banging its way down the middle of the street behind him - BUMP, BUMP, BUMP.

Terrified the man begins to run towards his home, the coffin bouncing quickly behind him.

Faster. Faster. Faster. BUMP, BUMP, BUMP.

He runs up to his door, fumbles with his keys, opens the door, rushes in, and locks the door behind him.

However, the coffin crashes through the door with the lid of the coffin clapping..... Clappity- BUMP... Clappity- BUMP... Clappity- BUMP on the heels of the now very terrified man.

Rushing upstairs to the bathroom the man locks himself in. His heart is pounding, his head is reeling, and his breath is coming in sobbing gasps..

With a loud CRASH the coffin breaks down the door, bumping and clapping towards him.

The man screams and reaches for something..... anything..... but all he can find is a bottle of cough medicine.

Desperate, he throws the bottle at the coffin, and the coffin stops.

Introduction

This is similar to a well-known TV game for pupils. Questions in this version are mainly physical science.

Running the activity

Print the playing grids onto OHT sheets. There are twenty spaces on the grids. Players must answer a series of questions to win a line that starts in one coloured zone and reaches to the other zone of the same colour. Team 1 plays top to bottom, Team 2 plays left to right. A session consists of the best of three games using different grids.

The quizmaster chooses the first letter. The first team to put up a hand may answer. An incorrect answer gives a chance for the opposing side to respond. Shouting out automatically forfeits the chance to answer. A successful answer gives the right to choose the next letter. If no successful answer then the quizmaster selects the next letter.

The teacher keeps track of questions answered correctly by marking the hexagon with a shaped counter, round for Team 1, triangular for Team 2. Teachers will need to make about a dozen of each shape of these counters.

Select two teams. In the TV version one person plays against two others so the teams should not be of equal strength or size as Team 1 has only to answer four questions to win a game where as Team 2 has to answer five.

Safety

Not applicable.

More ideas

Pupils write their own questions at the end of a topic.

Learning outcomes

- Recall testing and vocabulary

Where the activity fits in

Review of physics KS3 topics.

Skills

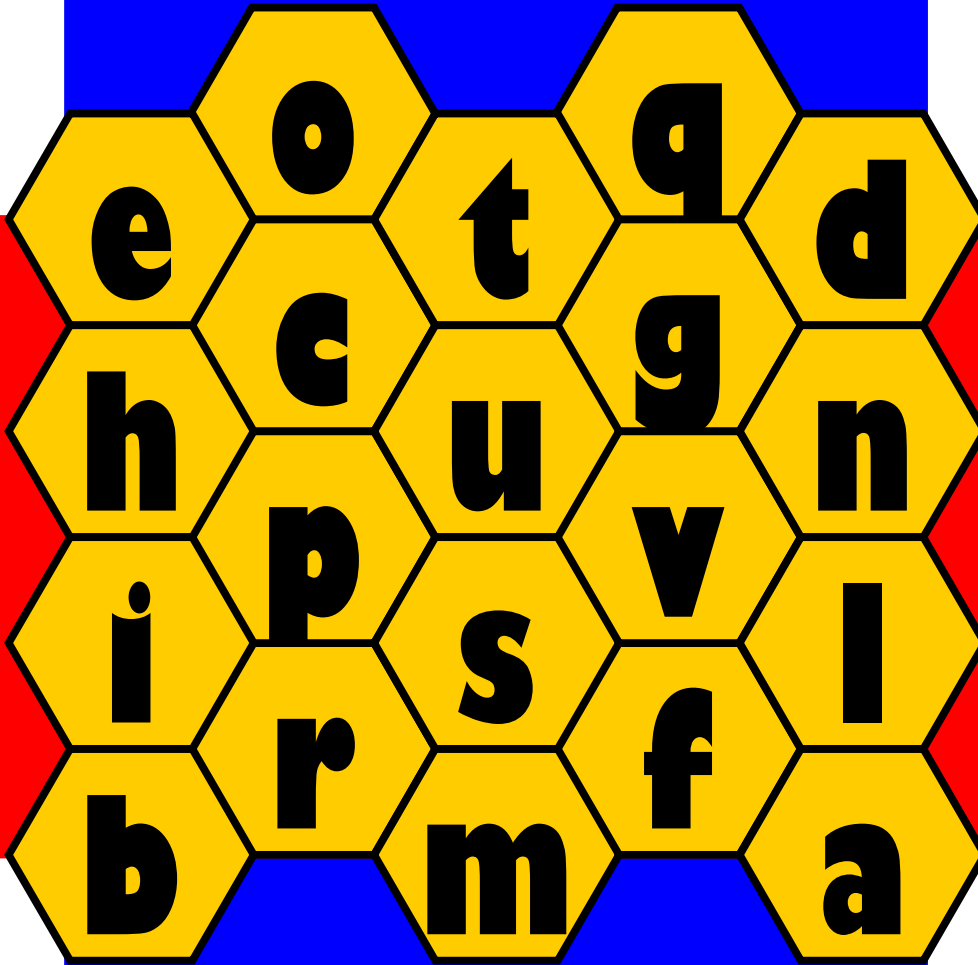
Team-work, vocabulary.

Acknowledgements

Thank you to the producers of similar games who suggested this activity.

Please send your fun size games to nigel.heslop@scienceyear.com for inclusion on future CD ROMs.

TEAM 1

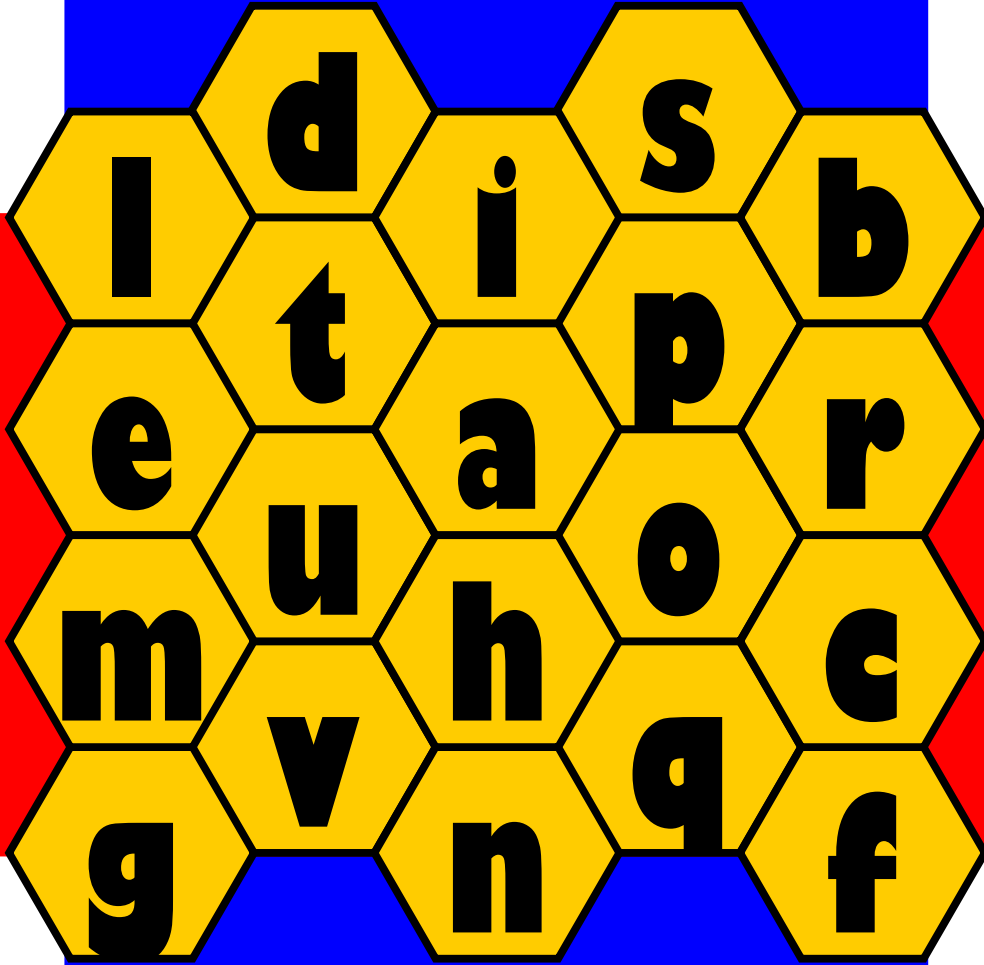


TEAM 2

TEAM 2

TEAM 1

TEAM 1

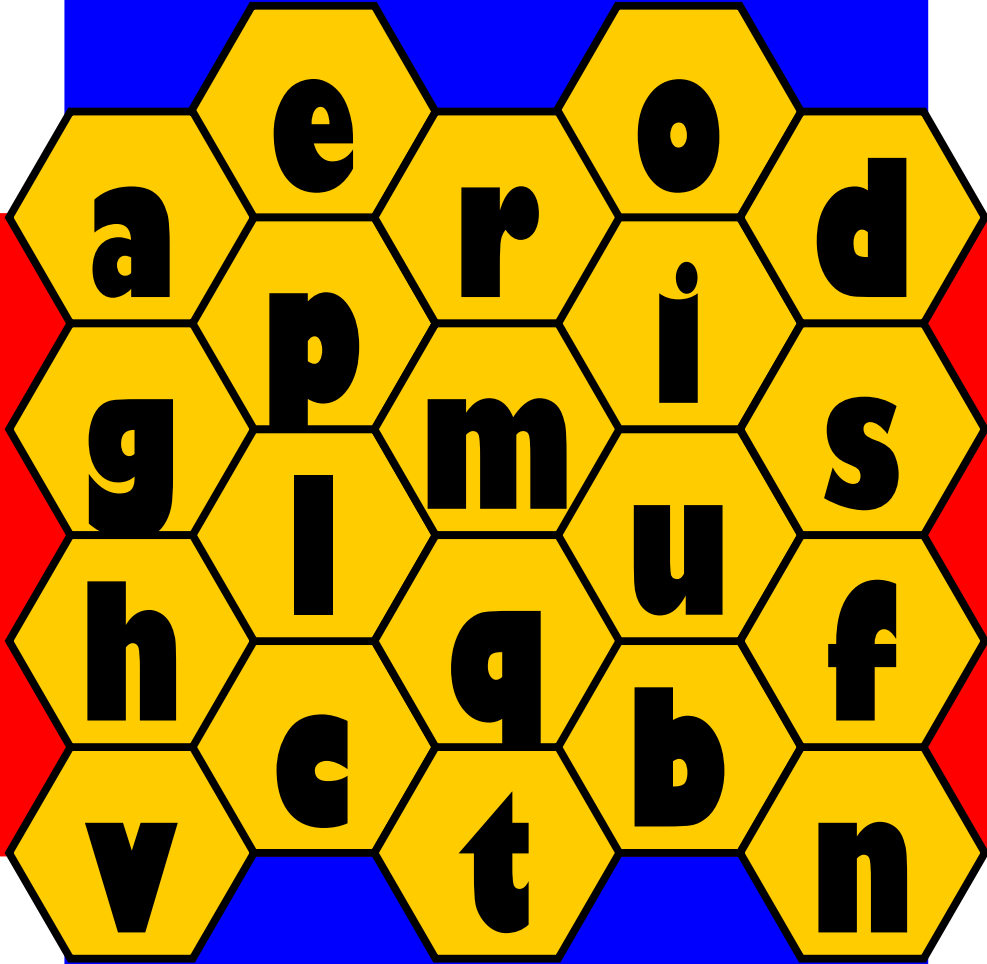


TEAM 2

TEAM 2

TEAM 1

TEAM 1



TEAM 2

TEAM 2

TEAM 1

Spacebreakers Questions

Contestant(s) choose a letter from the chart.
The teacher selects a suitable question for the team and marks it off.
Questions should be asked in the form 'This (A) means ...'

acceleration	getting faster
accurate	very precise
alloy	mixture of metals
alpha	type of radioactive particle
aluminium	metal for kitchen foil
ammeter	measures current
ammonia	smelly gas – contains nitrogen
amplitude	the height of a wave
atmosphere	all round the Earth
atom	the smallest particle of an element
audible	you can hear it
barometer	measures air pressure
base	like an alkali
battery	lots of cells
beta	electrons as particles
biosphere	where we live
Brownian motion	random movements
camera	like the eye in structure
carbon dioxide	gas we breathe out
catalyst	makes a reaction faster
cell	one source of electricity in a battery
Celsius	temperature
charge	positive or negative
compound	pure chemical, not an element
concave	lens thin in the middle
conclusion	drawn from data
condensation	water on the windows
conduction	energy transfer through solids
contracts	colder and smaller
convection	hot air current
convex	lens in the eye
current	flow of electricity

decrease	get smaller
density	mass divided by volume
diffraction	waves spreading through a gap
diffusion	random mixing
dilute	few particles per litre
diode	conducts in one direction only
dissolve	sugar vanishes in tea
distillation	makes pure water
echo	sound comes back
effervescence	fizz
efficiency	energy out vs. energy in
electromagnet	magnet that can be turned on or off
electrons	outer particles of an atom
element	lots of the same atom
energy	makes things happen
equilibrium	reactions in balance
erosion	soil gets washed away
evaporation	water into vapour
expansion	getting bigger
field	can be magnetic or gravitational
filter	separates solid and liquid
fission	atom nucleus gets broken and releases energy
flammable	can burn easily
formula	symbols and numbers
fossil	once living, but the shape has been preserved
frequency	waves per second
friction	rubbing force that releases heat
fuel	energy store
fuse	weak link in electric circuit
galaxy	The Milky Way is ours
gamma ray	more penetrating than an X-ray
gas	no fixed shape, no fixed volume
generator	makes electricity
glucose	blood sugar
gravity	holds us down
half-life	time for radioactivity to fall by 50%
halogen	Group 7
hydrocarbons	methane and petrol are examples of these
hydrogen	acid plus metal makes this gas

igneous	rock from magma
increase	get bigger
indicator	shows pH
induction	makes electricity flow
inertia	helps you stay moving or stay still
infra-red	hot rays
insulation	keeps you warm
ion	charged particle
ionosphere	reflects radio waves
isotopes	two atoms of the same element with different masses
lava	comes out of volcanoes
liquid	no fixed shape, fixed volume
longitudinal	wave motion, along the direction of movement
loudness	sometimes called volume on the TV
luminous	describes any object that gives out light
magma	molten rock
magnesium	burns with white light
magnet	has a north and south
mass	stays the same in space
metal	a material that bends and conducts
metamorphic	rock changed by pressure
meter	for measuring
microwave	waves or satellites
mineral	single substance in a rock sample
molecule	small group of atoms
moment	turning effect of a force
motor	turns electricity into movement
negative	other end to plus
neutral	pH 7
neutron	mass but no charge
newton	unit of force
nitrogen	makes up most of the air
observation	what you see
ohm	unit of resistance
ore	rock for metal extraction
oxidation	adding oxygen
oxide	oxygen compound
oxygen	photosynthesis by product
ozone	poisonous oxygen

parallel	house lights circuit
pitch	how high the frequency is
planet	goes round the Sun
pollution	waste in the wrong place
polymer	any plastic chemical
positive	other end to minus
potential	gravitational energy
precipitates	solids from solutions
predict	say what will happen
pressure	force divided by area
prism	splits white light
proton	positive particles in the nucleus
radiation	energy from the Sun
radioactive	atom nucleus falls apart naturally
reaction	chemical change
reactivity	if it's high, then this element will displace another
reflection	bouncing back
refraction	bending light rays
renewable	constantly being replaced
repulsion	pushing away force
resistance	measured in ohms
resistor	hold up the flow
salt	acid plus alkali (minus the water)
satellite	goes round in free fall
sedimentary	rocks from weathering
series	Christmas tree lights circuit
Solar System	from the Sun to Pluto
solenoid	coil for magnetism
solid	fixed shape, fixed volume
soluble	can dissolve
solute	solid in solution
solution	a mixture and an answer
solvent	the liquid used to make solutions
spectrum	rainbow colours
sublimation	from solid to gas in one go
tectonic plate	a section of crust
temperature	measure of heat energy
terminal	battery end
thermometer	alcohol replaced mercury in these for safety
transformer	changes the voltage
transverse	wave motion, across the direction of movement

ultrasound	beyond hearing
ultraviolet	tans the skin, but beware
unsaturated	healthy food fat
Uranus	blue planet, orbits on its side
vacuum	nothing at all
valency	combining power
vapour	a name for gas, often water
velocity	speed in one direction
vibration	how sound goes through materials
water	the most common compound
watt	power of light bulbs
waves	these carry energy, made by winds
wavelength	distance between waves
weathering	breaking up rocks naturally
weight	mass and gravity together
welding	thermit is used for this on railways
wire	a thin piece of metal
wolfram	the old name for tungsten
work	energy can be used to do this, measured in joules
white light	a mixture of all the colours of light

Introduction

Excerpt from the Science, Technology and Reading (STAR*) publication from ASE, which uses creative writing to stimulate debate.

Running the activity

Teacher notes from Star* are included in the pdf files

Safety

Not applicable.

More ideas

See STAR* notes.

Learning outcomes

See STAR* notes.

Where the activity fits in

Friction, forces and lubrication topics.

Skills

The STAR* notes refer to relevant science, literacy and numeracy skill development.

Acknowledgements

STAR* published by ASE.

Sponsored by ESSO, Royal Society for Chemistry, Institute of Physics and the Design Council.

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Granma's Hands

My Granma's 72
She says she's getting old.
My Granma's 72
She says her hands are cold.

My Granma stands at the bus-stop
in all kinds of weather
My Granma stands at the bus-stop
rubbing her hands together.

'I always rub me hands,' she says
'when I'm running from pillar to post
'I always rub me hands,' she says
'ohh, they're warm as toast.'

Related poems:

Engine Oil
Lubricate the Joints

Granma's Hands

My Granma's 72

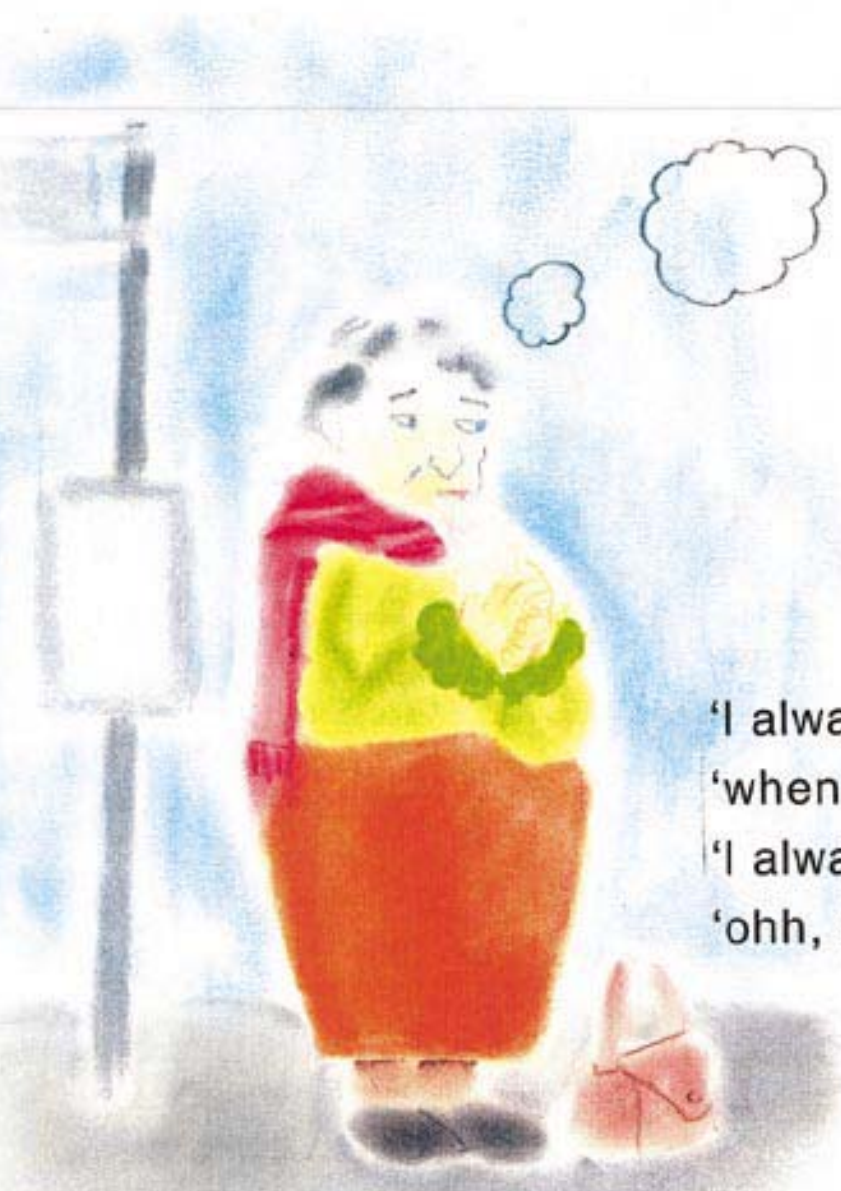
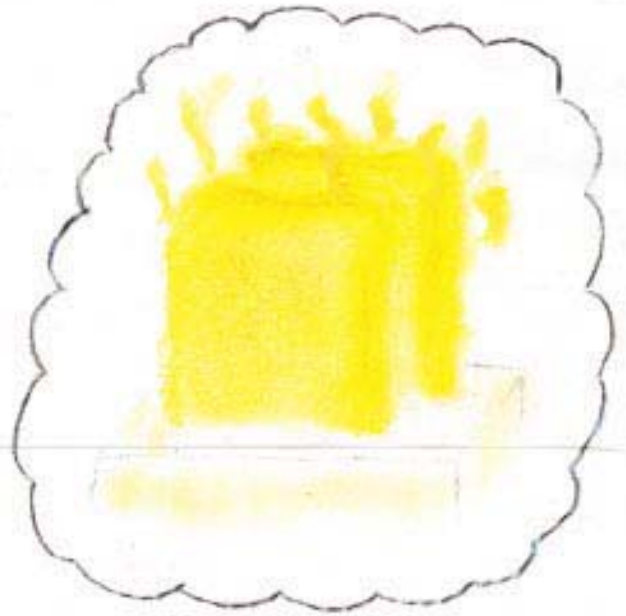
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'I always rub me hands,' she says
'when I'm running from pillar to post,
'I always rub me hands,' she says
'ohh, they're warm as toast.'

“Granma’s Hands”

Discussion

Points

- ◆ How many of you have waited at bus stops in the cold?
- ◆ What kind of things do you do to keep warm?
- ◆ What does grandma do to keep warm?
- ◆ First, rub your hands together slowly, then rub them together quickly.
- ◆ What happens? What can you feel? What can you see?
- ◆ What do you think makes your hands feel hot?
- ◆ What can you do to make them even warmer?
- ◆ Can you think of any other examples where two surfaces rubbing together creates heat, such as car tyres at the end of a journey?
- ◆ What different ways do people use to keep warm in winter?

Science

Background

- ◆ Friction is the force created by two surfaces moving against each other.
- ◆ When two objects are rubbed against each other, heat is produced as a by-product. This is because energy is being used to overcome the friction and some of this energy is released as heat.
- ◆ Friction is a force that opposes movement but can either ease or hamper the movement of objects and materials.
- ◆ Without friction everyday movements become impossible, for example: friction occurs when writing with a pen or pencil on a piece of paper; a rolling ball slows down or stops because of friction.
- ◆ The surface does not have to be a solid. Friction also occurs through movement in both liquids and gases.
- ◆ All solids have tiny irregularities that catch and hinder movement. If the surface is lubricated these irregularities are easier to resist and friction is reduced.

Key

Ideas

- ◆ There is a force between two moving surfaces in contact called friction. The force may or may not be useful.
- ◆ Different surfaces cause different amounts of friction to a moving object.
- ◆ Lubricants reduce the effects of friction and allow surfaces to move more freely.

Science

Skills

Children should be able to :

- ◆ turn suggestions into ideas;
- ◆ understand the use of control experiments;
- ◆ investigate, predict and conduct a fair test;
- ◆ choose and use apparatus and equipment accurately;
- ◆ draw conclusions;
- ◆ work with others.

Key Activities

Observe the effects of friction on balls, bean bags, or quoits by watching their movement across different surfaces. Can children identify the different speeds the objects travel? Do they roll or skid? Brainstorm examples from everyday experience. Perhaps focus on a fairground or playground where friction is either helpful or can cause problems.

Conduct a rubbing test. Rub a block of wood covered with material against different surfaces to test which surfaces create holes in a given material. This is a simple measure of the friction created by the two surfaces. Alternatively, rub a variety of materials on the same surface to investigate which is the safest material to wear in a playground to protect against friction burns.

Using a slope, slide, marble run, or guttering, explore how the speed of an object can be changed as it travels down a helter skelter by changing the helter skelter's surface. The surface can be made: wet, dry, oily, sandy, smooth or rough. The children should be encouraged to keep the object and the slope the same.

Using different lubricants, for example: vaseline, washing-up liquid, polish, baby oil, vegetable oil, or water (plastic gloves should be used when applying lubricants) – use a Newton-meter or stretch an elastic band to measure the force needed to move an object across a given surface. To obtain different readings make sure the surface is not too smooth. Compare the results against a non-lubricated surface as a control.

Explore other methods of reducing friction including rollers, marbles or wheels.

Safety : Be aware of the hazards when handling lubricants. Wear safety goggles. See ASE publication *Be Safe!* for information on all aspects of safety in school science.

Numeracy

Skills

Children should be able to :

- ◆ measure using a Newton-meter;
- ◆ use a stopwatch accurately;
- ◆ take repeated readings;
- ◆ calculate mean, mode and median
- ◆ record results on charts or tables.

Literacy

Skills

Children should be able to :

- ◆ understand how to use both rhyming and non-rhyming words;
- ◆ understand the use of direct and reported speech;
- ◆ write a verse in the style of the poem.

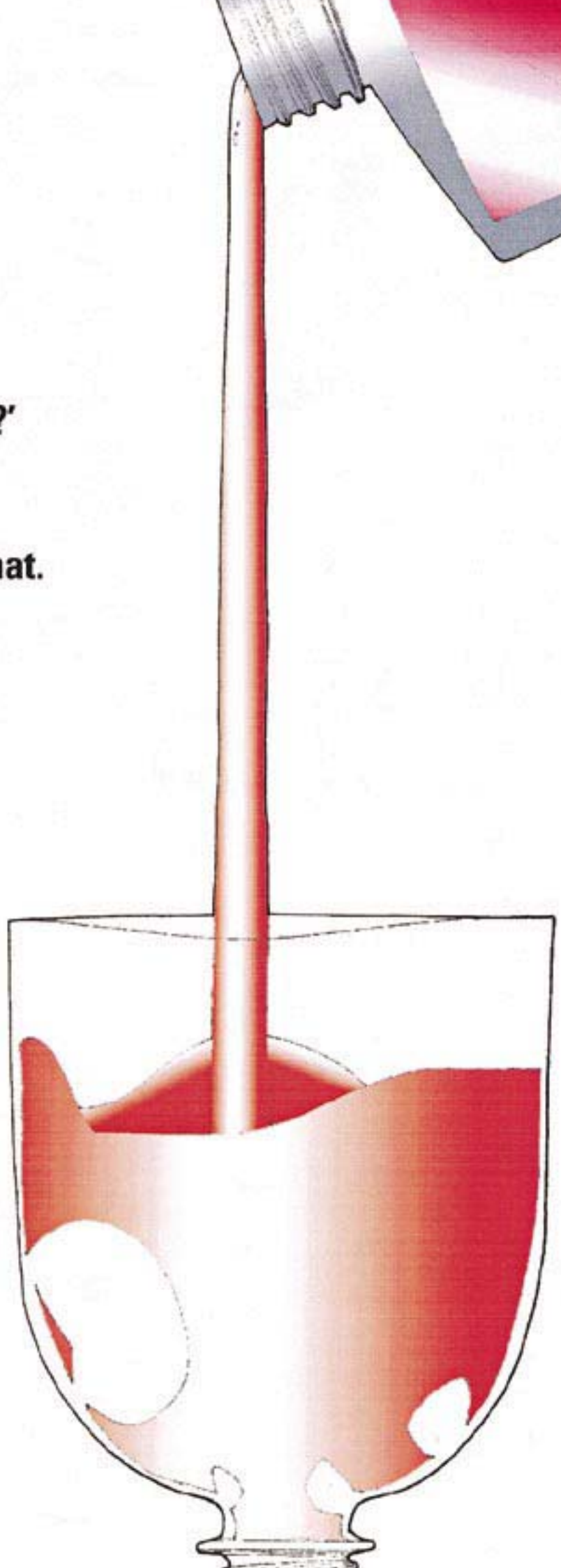
Engine Oil

**My dad said to his friend
'I can't find my funnel.
Can I borrow yours?'**
'Funnel?'
What d'you need a funnel for?'
**'For the oil.
To put the oil in the car.'**
**'You don't need a funnel for that.
I'll show you.'**

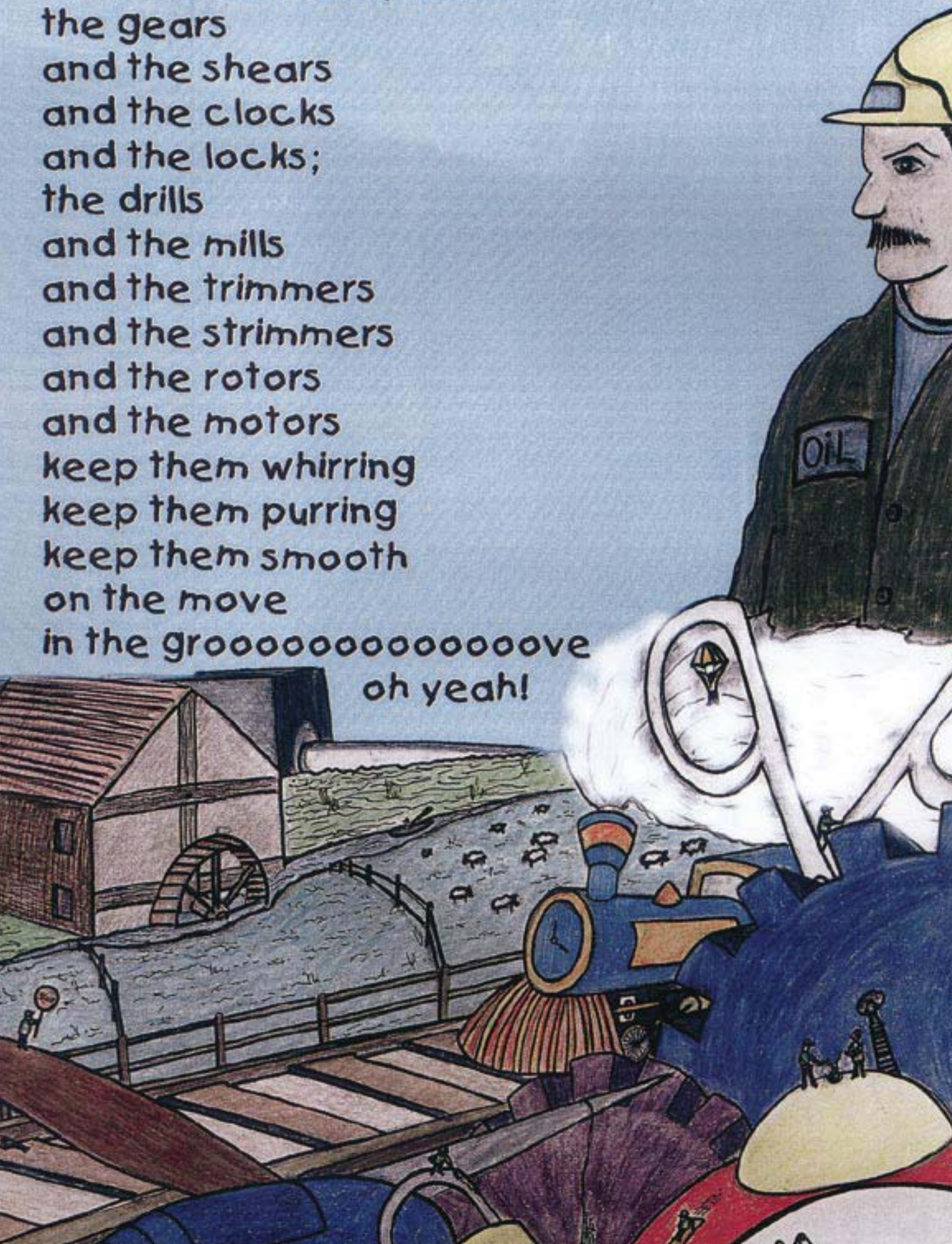
**He grabbed a plastic bottle
and cut the bottom off it.**

'There's your funnel.'

**My dad
put the open top of the bottle
down into the hole
for the oil
and the thick yellow syrup
globbed and glooped
through the bottle
into the engine
like it knew the way there
from long ago.**



Lubricate the joints
and the railtrack points
the gears
and the shears
and the clocks
and the locks;
the drills
and the mills
and the trimmers
and the strimmers
and the rotors
and the motors
keep them whirring
keep them purring
keep them smooth
on the move
in the groooooooooooooove
oh yeah!



Introduction

Exert from the ASE publication *Cool and Fun*, a collection of 100 Science poems by school pupils. A stimulus to creative and literacy work.

Running the activity

Read the poems as a class to stimulate individual or pair literacy work. The selected poems celebrate the awe and wonder of science.

Safety

Not applicable.

More ideas

Pupils could write their own poems in a cross-curricular activity with your English department.

Learning outcomes

- Engage pupil interest and enthusiasm.

Where the activity fits in

Year 7.

Skills

Literacy.

Acknowledgements

Cool and Fun published by ASE from entries from the ASE/Pfizer poetry competition for pupils.
ISBN 0 86357 322 3

An alien sends home a Letter

Dear Planet Mars,
I have arrived secure on Planet Earth,
Where Human beings are very peculiar,
I went to investigate this place called school,
Upon me came a 'lesson' named Science!

Diminutive humans set conflagration to liquids and solids,
They exercise their minds with words and pictures,
The leader gives out commands,
Others observe and obey him or her!

Now assembled is an experiment,
Where specific protection is worn,
Hazardous liquids and substances are given out,
Along with plants and granites!

I can see minor explosions,
Dotted around the room,
After the information wrote down,
Things are packed up and disentangled!

Familiar humans leaving,
Unfamiliar humans arriving,
Leader still at the front,
I abandon this mirthful environment!

Humans are very bizarre and do extraordinary things,
I must confess that I take pleasure from that 'lesson' named Science!

Your Peace
Captain Martian



It's Amazing

It's amazing how science surrounds us,
The beauty of the animal kingdom,
The vastness of space,
The endless discoveries and inventions,
It's amazing how much we have found out about the world around us, yet we will
never stop finding out more.

It's amazing how just one person can find out something new, and add another
chapter to a science textbook.

It's amazing how much we have evolved,
From simple one-celled animals,
To beings with thoughts, feelings and emotions.

It's amazing how a person from this planet,
Can travel at incredible speed through space,
And walk on the moon,
Leaving footprints that will last

It's amazing how some materials can change from liquids into solids,
And back again,
In the blink of an eye (well, almost).

It's amazing how a force pushes us to the ground every day,
Something we can't see makes things fall.

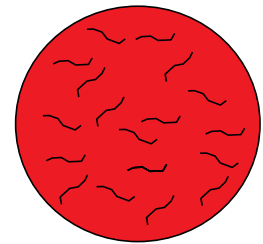
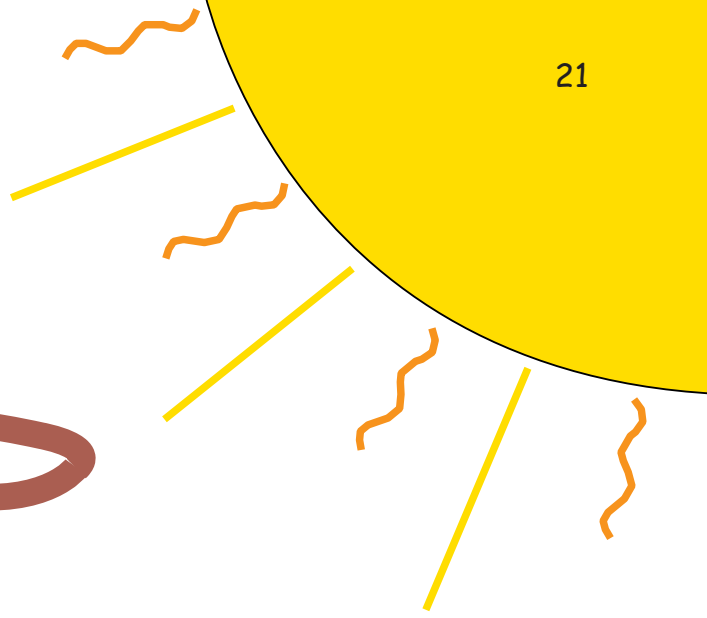
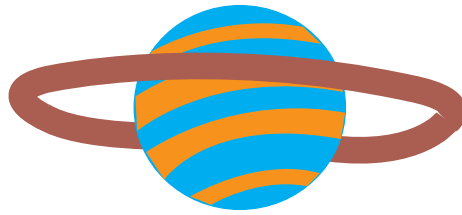
It's amazing.

Just amazing.



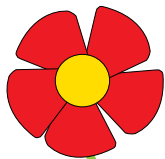
Claudia Saviotti, age 12, Lady Margaret School, Parson's Green, London

Science



The planets all orbit the Sun,
Swirling and sparkling one by one,
Skies filled with enchanted stars,
Twisting and taunting 'round Saturn and Mars.

Down below on the damp, soft soil,
Plants and bees slave and toil,
Scattering pollen and clustering petals,
Flaunting their leaves, seedlings and sepals.



Messages to and from the brain,
Shoot round the body again and again,
Labouring muscles stretch and groan,
Skin and flesh surrounds crumbling bone.

Frequencies waver, ripple and rise,
Light reflects and shoots into our eyes,
Sound waves hum with pitch and vibration,
Our eyes seek to find, with keen exploration.

Science is everywhere, in space and on Earth,
Bodies strain for all they are worth.
Scientist explore microscopic places,
Skins and cells and people's faces.