


Secondary

A central green circle with a white border contains the text '50+ STEM activities for any secondary classroom'. This circle is surrounded by a variety of colorful icons representing different STEM fields: a rocket, a potted plant, a lightbulb, a pencil holder with pens, a calculator, a smartphone, a ruler, a pencil, a DNA double helix, a television with gears on the screen, gears, a triangle, and a rocket with a flame. A dotted line connects some of the icons on the left side.

50+ STEM
activities for
any secondary
classroom

This collection is for teachers, technicians, STEM Club leaders and families. It consists of easy to run, short and practical STEM activities which are ideal for any setting; classroom, outside and home.

Activities can be adapted to suit the setting or time available and require few resources and materials. Each has a suggested list of substitute materials, making them easy to clean up. With minor adjustments they will meet school health and safety requirements.

Activities do not require extensive STEM subject knowledge, enabling anyone to use them irrespective of experience level.

Choose age range:

9-14

View 17
activities

11-14

View 43
activities

11-16

View 5
activities

14-16

View 2
activities

STEM activities for ages 9-14

17 Activities



Published by
Resource Booklet

European Space Agency (ESA)
ESERO-UK Resources

ESA spacecraft - cut out and make models

Templates for cut-out and stick paper models of various ESA spacecraft.

Suggested Materials

Paper, sticky tape; scissors; glue; pre-printed templates.

www.stem.org.uk/rxetru

Published by

Design Club

Design club: design a helpful mobile app

Run a Design Club project, using worksheets, delivery guide and three themed project handouts. At the end of the project, pupils will have designed and prototyped a helpful mobile app aimed at solving one of three environmental problems.

Suggested Materials

Paper; pens; post it notes; rulers; internet/laptop/tablet as required.

www.stem.org.uk/rxgh72

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



50+ STEM activities for any secondary classroom

STEM activities for ages 9-14

17 Activities



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Resource Booklet Applying Mathematical Processes - Practical Explorations

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Resource Booklet Applying Mathematical Processes - Practical Explorations

Money bags

Design a wallet, purse, or credit card holder for a target consumer, and explain the rationale underlying their design.

Suggested Materials

Paper; pens; ruler; card; scissors; sticky tape and glue; dimensions of bank cards/paper money etc.

www.stem.org.uk/rxuhp

Reaction times

Design an experiment to measure reaction times and use it to test people's reaction times.

Suggested Materials

Paper; pens; post it notes; rulers; timing devices.

www.stem.org.uk/rxuho

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



50+ STEM activities for any secondary classroom

STEM activities for ages 9-14

17 Activities



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Resource Booklet Applying Mathematical Processes - Practical Explorations

School holidays

Consider what factors might affect the choice of dates for school holidays and use these to determine the holiday dates for an alternative school year.

Suggested Materials

Paper; pens; post it notes; rulers; calendar; list of term dates; internet access.

www.stem.org.uk/rxu43

Fashion entrepreneur

Using a fashion workshop as the business idea, plan a schedule for six employees time, to complete all of the daily tasks. Consider whether the schedule is a viable solution to producing the garments on time.

Suggested Materials

Paper; pens; post it notes.

www.stem.org.uk/rxu3z

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



50+ STEM activities for any secondary classroom

STEM activities for ages 9-14

17 Activities



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Resource Booklet Applying Mathematical Processes - Practical Explorations

Design a table

Design a table for a group of 5 people for daily use. The table must be extendable to accommodate 8 to 10 people for some occasions.

Suggested Materials

Paper; pens; post it notes; rulers; card; internet access.

www.stem.org.uk/rxu3x

Beach guesthouse

This practical exploration is a simulation of a booking system for a small guesthouse. Manage the bookings and, as far as possible, arrange to give people the accommodation they request.

Suggested Materials

Paper; pens; post it notes.

www.stem.org.uk/rxu3v

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



50+ STEM activities for any secondary classroom

STEM activities for ages 9-14

17 Activities



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Applying Mathematical Processes - Practical Explorations

Three dice

This investigation starts with a game. In order to maximize the chance of winning, decide which numbers are most likely to occur when three dice are thrown and the scores are added together.

Suggested Materials

Paper; pens; post it notes; card; dice.

www.stem.org.uk/rxu3u

Symmetry

In this investigation make different symmetrical shapes, using one or more of three given shapes.

Suggested Materials

Squared paper; Templates of the shapes; Mirror; Tracing paper; Scissors; glue; Computer software.

www.stem.org.uk/rxu3t

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



50+ STEM activities for any secondary classroom

STEM activities for ages 9-14

17 Activities



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Resource Booklet Applying Mathematical Processes - Practical Explorations

Sending texts

Determine the number of text messages sent if four people send texts to each other, and then extending this for different numbers of people.

Suggested Materials

Paper; pens; post it notes; rulers; calculators.

www.stem.org.uk/rxu3r

Paper sizes

Study paper sizes in the A and B international series, exploring relationships within each series and between the series.

Suggested Materials

Paper in various A and B sizes; pens; post it notes; rulers; scissors, sticky tape.

www.stem.org.uk/rxu3q

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



50+ STEM activities for any secondary classroom

STEM activities for ages 9-14

17 Activities



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Hide the spies

Determine where spies should sit in a park that has a square grid of benches, interspersed by bushes, so that they cannot see each other, and investigate how many different arrangements are possible.

Suggested Materials

Paper; pens; post it notes; rulers; counters/cubes etc.

www.stem.org.uk/rxu3p

Golden mazes

In this investigation pupils explore the effect of the route, through a series of rectangular mazes, on the number of gold coins that can be collected.

Suggested Materials

Paper; pens; post it notes; rulers; counters/cubes; calculator.

www.stem.org.uk/rxu3o

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



50+ STEM activities for any secondary classroom

STEM activities for ages 9-14

17 Activities



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Resource Booklet Applying Mathematical Processes - Practical Explorations

Fire hydrants

In this investigation pupils experiment with the placing and number of fire hydrants required in a city with square blocks that form a rectangular grid.

Suggested Materials

Paper; pens; post it notes; rulers; counters/cubes; straws.

www.stem.org.uk/rxu3n

Corner to corner

In this investigation pupils investigate how different numbers of squares can be joined corner to corner, and the effect their arrangement has on the area of the rectangle that encloses the squares.

Suggested Materials

Squared paper; Mirror; Tracing paper; Scissors; or interactive drawing software.

www.stem.org.uk/rxu3m

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



50+ STEM activities for any secondary classroom

STEM activities for ages 9-14

17 Activities



Published by

Royal Academy of Engineering

In control

Set small groups of students the challenge of working together to design a gadget that can be attached to and powered by a bicycle.

Suggested Materials

Paper; pens; post it notes; rulers; internet/laptop/tablet as required.

www.stem.org.uk/rxesc9

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



50+ STEM activities for any secondary classroom

STEM activities for ages 11-14

43 Activities



Published by
Resource Booklet

Royal Academy of Engineering
Mission to Mars

Published by
Resource Booklet

Sheffield Hallam University & cre8ate maths
Olympic & Paralympic Games Mathematical Investigations

Launch crew

Calculate the areas of the floor space for each space modules to estimate the maximum number of seats you can fit in the following space craft: Apollo, CST-100 and Soyuz.

Students can draw a scale plan of the spacecraft and either draw the seats in or create, to scale, seat templates. The latter will allow students to try different layouts.

Suggested Materials

Paper; pencils; compass; scissors.

www.stem.org.uk/rxessv

Classroom olympics

Based on Olympic sports, this collection of activities uses a full range of mathematical problem solving skills. Cotton wool shot put and triple jump from a standing start are the focus of the activities together with measuring foot length and student height. Further investigations include: Can girls shot putt further than boys? Do boys triple jump further than girls?

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxsst

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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STEM activities for ages 11-14

43 Activities



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Sheffield Hallam University & cre8ate maths
Olympic & Paralympic Games Mathematical Investigations

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Sheffield Hallam University & cre8ate maths
Olympic & Paralympic Games Mathematical Investigations

Running tracks

Students explore the mathematics of an athletics running track. Investigations include how the track is marked out and distances measured accurately for runners in each of the lanes. Further experiments include: Where could a track be placed in the school grounds? * What is the smallest area required? How can the track lanes be marked accurately? etc.

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxssd

World records

Working with elite athletes means understanding how prowess in sport changes over time. The world record time provides a vital benchmark of performance against which all athletes may aspire. Using women's marathon as the basis, students will construct a statistical chart and use ratio and percentage in these logical thinking activities.

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxsse

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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STEM activities for ages 11-14

43 Activities



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Working with Chemicals

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Food and Drink

Hair and beauty

Hair and beauty professionals use a wide range of chemicals in their treatments. Minerals, bleaches and dyes are used to change hair colour. Soaps, oils and emulsifiers are used to cleanse the skin. Chlorine and bromine keeps the water clean in spas and hot tubs. These activities use mathematics, discussion and surveys to develop understanding of the data handling cycle.

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxssv

What's in your bowl?

The "What is in your bowl?" activities investigate serving amounts and what is eaten for breakfast. Students explore estimation and measurement and topics such as: Do boys eat more cereal than girls? What is a typical serving amount? Does bowl diameter affect serving amount? What do pupils eat for breakfast? How healthy are breakfast cereals?

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxsss

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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43 Activities



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Working with Others

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Working with Others

Vedic maths 1

Working in the community sector involves knowing and understanding a variety of cultures. This activity explores the ancient laws of Vedic mathematics which feature in Hindu and Islamic contemporary cultures. Students will use multiplication tables to calculate digital roots and observe and interpret patterns.

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxssp

Vedic maths 2

This activity follows on from Vedic Maths 1 and explores the ancient laws of Vedic mathematics. Students will investigate number patterns and deepen their arithmetic understanding.

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxssq

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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STEM activities for ages 11-14

43 Activities



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Working with Others

Running a club

Using the basis of running a STEM Club or Youth Group, this activity draws on context to work on chance and the mathematics of combinatorial thinking.

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxsso

Islamic design

This maths activity focuses on reflection and thinking about translation or rotation. It also uses co-ordinates to develop a non-standard transformation. The activity provides rich opportunities for cross curricular work and can also provide the focus for off-site activities.

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxssn

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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STEM activities for ages 11-14

43 Activities



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Getting There

Is it fair?

Use mathematics and discussion to explore electoral systems, their complexity and their fairness.

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxssk

Working for efficiency

The topic for this activity set is to look at simplified versions of three different network problems: paper rounds, cable connections and deliveries. Students will look at the problems encountered in practical logistical planning. The activity lends itself to current school based logistics, such as school lunch schedules.

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxssj

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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Getting There

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Getting There

The greenest route

Explore the external costs of transport which affect society but which are not paid for by the transport users. Students will look at measuring freight, external costs and plan which route is best.

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxssh

Ordering

These three mathematical based problems look at problem solving, working systematically and creating, describing and experimenting with systematic strategies. The activities explore the quickest way to make tea, the fastest way to build a warehouse and how to plan ahead and think through a problem.

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxssg

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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43 Activities



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Getting There

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STEM Learning
STEM Clubs: Can you survive an asteroid impact?

More miles for your money

High fuel costs, fuel efficiency and environmental responsibility theme this activity that investigate the cost benefits of improving lorry cab aerodynamics.

Suggested Materials

Paper; pens; post it notes; rulers; calculator; internet/laptop/tablet as required.

www.stem.org.uk/rxssf

Your own telescope

Become an amateur astronomer by designing and creating a small telescope.

Suggested Materials

2 sheets corrugated paper; 2 magnifying glasses; pva glue; scissors; pencil; ruler; duct tape.

www.stem.org.uk/rxfn3k

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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43 Activities



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An apocalyptic meal

Students create their own menu based on foods that are easier to grow and farm with decreased sunlight after a meteorite impact.

Suggested Materials

A3 paper (various colours); A4 paper (various colours); coloured pens/pencils; laminating film.

www.stem.org.uk/rxfn3k

Published by | STEM Learning
Resource Booklet | STEM Clubs: Can you survive a zombie apocalypse?

Spread the word

Students use phone apps to code and decode simple messages in Morse code.

Suggested Materials

Own mobile phones with suitable Morse code apps.

www.stem.org.uk/rxfmzo

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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43 Activities



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STEM Clubs: Can you survive a zombie apocalypse?

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STEM Learning
STEM Clubs: Can you survive a zombie apocalypse?

Silent steps

Students design shoe covers that allow them to move silently over a variety of surfaces and avoid zombie detection, testing their ideas with a decibel meter, sound pressure meter or appropriate app.

Suggested Materials

Selection of materials and soft padding to wrap around shoes; string/sticky tape/stapler etc.; scissors; ruler; scrunched up newspaper to walk on / or do experiment in suitable outdoor setting; decibel/sound pressure meter / or phone app.

www.stem.org.uk/rxfmzo

Food for thought

Students consider the characteristics of ingredients and foods, and the properties of packaging materials and preservation methods, to identify the best foods to grab while on a raid during the zombie apocalypse.

Suggested Materials

Paper; pens; examples of food packaging.

www.stem.org.uk/rxfmzo

Ages 9-14

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43 Activities



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STEM Clubs: Can you survive a zombie apocalypse?

Nature's real zombies

Students use the internet to research some parasites that take over their hosts to create some of nature's real zombies. They then present what they discover and choose the creepiest example.

Suggested Materials

Laptop/tablet/internet; data projector to showcase the image/video clip.

www.stem.org.uk/rxfmzo

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Resource Booklet

STEM Learning
STEM Clubs: Could you survive on a desert island?

Need a rope

Students use the only resource they can find on the island – a plastic bag – to make strong rope. Students explore how they can twining strips of plastic can join them together to form a strong rope and test to see whose rope is strongest!

Suggested Materials

Plastic carrier bags; bin liners; scissors; weights; optional: a newton meter.

www.stem.org.uk/rxfmzm

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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43 Activities



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STEM Clubs: Could you survive on a desert island?

Sundial

Students design their own sundial. Students will select the best materials for their sundial, considering their properties. Their design should be based on their properties of the materials available to them, and how they can use changing shadows formed from the rotation of the Earth to tell the time.

Suggested Materials

Rocks; pebbles, bamboo; sticks; shells; carrier bags; plastic bottles; a watch.

www.stem.org.uk/rxfmzm

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Resource Booklet

STEM Learning
STEM Clubs: How can we enhance sporting performance?

Lie back and float

Students explore the buoyancy of different fruits. Students will learn that increasing mass sometimes results in enabling an object to float rather than causing it to sink.

Suggested Materials

Large beaker / bowl of water; variety of citrus fruits: orange, lemon, lime, banana; digital scales; Optional wetsuit material.

www.stem.org.uk/rxg7no

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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STEM activities for ages 11-14

43 Activities



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STEM Clubs: How can we live smarter?

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STEM Learning
STEM Clubs: How can we live smarter?

Micro flats

Students discuss and sketch/mock up a micro flat – a small, flexible living space where objects can be converted from one purpose to another.

Suggested Materials

Squared paper; pencils; pens; cardboard/construction paper; laptop/tablet.

www.stem.org.uk/rxg7nn

There's an app for that

Students learn about the effects of waste on the environment. They will design an app that incentivises recycling by allowing households to log how much they are recycling each week.

Suggested Materials

Pencils/pens; rulers; paper; design worksheets; Optional tablet/laptop.

www.stem.org.uk/rxg7nn

Ages 9-14

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STEM Clubs: How can we live smarter?

Smarten up your life

Students discuss how advances in the kitchen might affect the future and design their own product that has all the smart features they can think of. They will then try to sell their product to the CEO of an important 'smart' company using a PowerPoint presentation.

Suggested Materials

A3 paper; plain paper; pencils/pens; Optional laptop/tablet.

www.stem.org.uk/rxg7nn

Smart showers

Students will do calculations where they can figure out how many litres of water they use per minute and create a scoreboard to gamify the way they look at water usage at home.

Suggested Materials

A3 paper (coloured); cardboard; coloured markers; extension laptop/tablet.

www.stem.org.uk/rxg7nn

Ages 9-14

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Fighting hunger

Students learn about the fight against world hunger and make their own nutrition bar (using Plumpy'Nut as a case study). They can experiment with the ratios to make a nutritious and energy-rich recipe which can be tested using calorimetry.

Note: use photos of suitable ingredients and list their benefits, protein / fats / carbohydrates and calories - students calculate what their nutrition bar would contain rather than making one.

Suggested Materials

Range of photos of nutrient rich foods e.g. nuts, cooked brown rice, honey, dried fruit, chia seeds etc.; paper, pens, rulers.

www.stem.org.uk/rxg7nn

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STEM Learning
STEM Clubs: How could we augment ourselves?

Gripping stuff

Students make a simple 'bionic' hand out of cardboard to mimic the role of tendons and muscles in controlling finger movement.

Suggested Materials

Corrugated card; pens; straws; tape; string; scissors; rubber bands; stapler.

www.stem.org.uk/rxg7nk

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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STEM Clubs: How could we augment ourselves?

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STEM Clubs: How could we augment ourselves?

Clear heads

Students explore whether a simple 10-minute guided meditation / relaxation session can affect their pulse, blood pressure and subjective feelings. Use this to consider how we might monitor our stress levels and suggest helpful actions to improve wellbeing and focus.

Suggested Materials

Listen to 10 min meditation video; stopwatches; optional blood pressure monitor.

www.stem.org.uk/rxg7nk

Brain boosters

Students explore how nutrition can help to increase brain function. After validating evidence on the topic, the students will then create a brain-boosting diet for a day of the week. The session will end with the opportunity for students to share their feedback on their peers' diets.

Suggested Materials

Photos or images of sample foods; paper and pens; internet access for research.

www.stem.org.uk/rxg7nk

Ages 9-14

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Should we 'go super'?

Students generate and share ideas about how STEM could give them superpowers or animal-like abilities, such as super strength (robotic/prosthetic limbs), super healing abilities (nanomedicine), super linguistic abilities (instant translators) or flight (Richard Browning's jet suit). Then, they should discuss whether it would be right or wrong to use science and technology in this way.

Suggested Materials

Access to a screen/tv/etc. to display the question or show suggested video clips or photos.

www.stem.org.uk/rxg7nk

Green humans

Students use simplified information to estimate how much energy an adult could create if he/she could photosynthesise, and whether this would be enough to fulfil their daily energy needs.

Suggested Materials

Calculators; measuring tapes; A4 paper; pens/pencils.

www.stem.org.uk/rxg7nk

Ages 9-14

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STEM Clubs: How could we augment ourselves?

How could we fly?

Students research bird anatomy and follow a template to design a wing for a human, thinking about the bones and muscles they would need to create for it.

Suggested Materials

Option 1: Lolly sticks long and short; marker pens; brass paper fasteners; tape; craft knives/scissors; paper; rubber bands of various lengths.

Option 2: A4 tick card - students cut card into strips instead of using lolly sticks.

www.stem.org.uk/rxg7nk

Heads-up displays

Students generate ideas for a wearable heads-up display and present their design sketches.

Suggested Materials

Corrugated and thin card; pipe cleaners; thin clear plastic sheet; scissors, sticky tape; glue; paper; pens.

www.stem.org.uk/rxg7nk

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STEM Learning
STEM Clubs: How do they make movies?

Green screens

Students use a simple green screen app to explore Chroma key compositing and create their own green screen video clips.

Suggested Materials

Own phone or tablet; green screen App; green backdrop or use own photos.

www.stem.org.uk/rxeypj

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Resource Booklet

STEM Learning
STEM Clubs: How do they make movies?

Scale sets

Students think like set designers and builders to create scale models for a movie in which students have changed size due to a mysterious accident in the science department.

Suggested Materials

Corrugated thin card; rulers/measuring tape; pencil; paper; calculator/app on phone; Alternatively use 3D design software to create the designs.

www.stem.org.uk/rxeypj

Ages 9-14

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STEM Clubs: How do they make movies?

Foley fun

Students use a range of everyday objects and some simple sound processing to discover the range of Foley sound effects they can create.

Suggested Materials

Audio software; microphone/tablet/phone; items to make noise with: rice, straws, water, cornflakes etc.

www.stem.org.uk/rxeypj

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Resource Booklet

STEM Learning
STEM Clubs: Witchcraft and wizardry

Apparition

Students build a device that will reflect an image in multiple directions, creating a hologram.

Suggested Materials

Scissors; graph paper; pencil; ruler; clear acrylic; tape; own smart phone.

www.stem.org.uk/rxeyjq

Ages 9-14

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50+ STEM activities for any secondary classroom

STEM activities for ages 11-14

43 Activities



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Resource Booklet

STEM Learning
STEM Clubs: Movie music

Emotional reactions

Students will listen to movie music, and observe and measure their different emotional responses. They will discover the real power of movie music.

Suggested Materials

Laptop/tablet; 4 or more short movie music clips chosen for the range of emotions e.g. suspense, sad, action, peaceful etc.; stopwatch; pens, paper; Optional: pulse monitor etc.



www.stem.org.uk/rxeymv

'How to' activity videos: www.stem.org.uk/rxfpxm

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Resource Booklet

STEM Learning
STEM Clubs: Movie music

Music tricking our eyes

Students investigate if listening to certain types of music affects how people interpret different facial expressions from photos.

Suggested Materials

Laptop/tablet with sound functionality; music clips: happy, sad, angry etc.; selection of photos of people with a range of emotions.; printed student guidance sheet; pens/pencils.



www.stem.org.uk/rxeymv

'How to' activity videos: www.stem.org.uk/rxfpxm

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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STEM Learning
STEM Clubs: Movie music

Micro:bit beat box

Students can follow a tutorial to create a simple beatbox that makes a rhythm when tapped.

Suggested Materials

Laptop/tablet with internet access.

> www.stem.org.uk/rxeymv

'How to' activity videos: www.stem.org.uk/rxfpxm

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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5 Activities



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Resource Booklet

Nuffield Foundation
Applying Mathematical Processes - Practical Explorations

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Resource Booklet

Nuffield Foundation
Applying Mathematical Processes - Practical Explorations

Stacks

In this investigation students explore, analyse and describe the patterns generated by moving counters between two stacks according to a fixed rule, always doubling the size of the smaller stack.

Suggested Materials

Counters or multilink cubes; Interactive software; Spreadsheet; Pens/pencils; paper; card; rulers.

www.stem.org.uk/rxu3s

Average limits

This investigation allows students to explore limiting values of an iterative process, using arithmetic, algebra or spreadsheets. Students can move from identifying patterns to forming, verifying and proving conjectures.

Suggested Materials

Calculator or computer Spreadsheet for introduction and/or to work through examples as required.

www.stem.org.uk/rxu3k

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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Resource Booklet

Nuffield Foundation
Applying Mathematical Processes - Practical Explorations

Co-primes

Starting with a definition of what it means for integers to be co-prime, students to work out how many positive integers are less than and co-prime to any given positive integer.

Suggested Materials

Calculator; pen; paper; laptop/tablet with spreadsheet.

www.stem.org.uk/rxu3j

Published by
Resource Booklet

Royal Institution
L'Oreal Young Scientist Centre Activity Pack

How to make and use a pinhole camera

Make a pinhole camera and use it to take a photograph which is developed using 'kitchen' chemicals to make a developing solution. Make the camera in the club, take and make the photo at home.

Suggested Materials

Black card; camera template; black tape; photographic paper; clean aluminium can; sandpaper; scissors; cutting board; craft knife.

www.stem.org.uk/rxettf

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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5 Activities



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Resource Booklet

STEM Learning
STEM Clubs: A future STEM

Complete collection

Discover STEM heroes who have made a difference in our lives, think critically about how STEM careers are portrayed in films and TV and explore different ways to get into a STEM career. This collection of activities focuses on careers and PSHE related activities that are easy to adapt to suit any age.

Suggested Materials

Paper; pens; post it notes; tablet/laptop/ internet access.

www.stem.org.uk/rxg7nh

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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STEM activities for ages 14-16

2 Activities



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Royal Society of Chemistry

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STEM Learning

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STEM Clubs: Save the World with STEM

Smartphone spectrometer

Students construct a spectroscope using card, DVD and a smartphone camera. Club leaders can prepare the dvd in advance and cut and clean etc. to reduce risk to students.

Suggested Materials

Blank dvdr; template printed on black card; cutting board; craft knife; black electrical tape; scissors; sticky tape/glue; phone or tablet; clean soft cloth; ethanol/methylated spirits; cotton wool.

www.stem.org.uk/rxettz

Can we rid the world of disease?

Students investigate disease control through a vaccination simulation. By analysing their data they will attempt to conclude what percentage of a population must be vaccinated in order to protect the majority of a community.

Suggested Materials

Laptop/tablet with internet access; Large sheets of paper; pens/pencils.

www.stem.org.uk/rxfmzn

Ages 9-14

Ages 11-14

Ages 11-16

Ages 14-16



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www.stem.org.uk