

Combine imagination and engineering and exciting things start to happen! This lesson not only develops pupils' creative problem-solving skills, but also provides the perfect preparation for entering the Young Imagineers Competition. Pupils will be taken on a thrilling voyage of discovery into the past, present and future of ideas and inventions, before generating their own imaginative ideas to improve the world.



Suggested timing:

60-120 minutes, plus time to work on Young Imagineers entries at home. The activities have been designed to allow flexibility; you could choose to carry them out in one session or allow more time for in-depth exploration, splitting activities across two or three lessons.



Preparation and resources:

- Young Imagineers Presentation
- Activity Sheet 1: Solving a problem
- Activity Sheet 2: Coming up with ideas
- Competition Leaflet

Learning questions (objectives):

- What have I found out about inventors and inventions that have changed the world?
- What creative techniques have I explored that help me express ideas to solve real-world problems?

Starter (5-10 mins):

As a quick warm-up to get pupils thinking creatively, hold up a simple object, such as pool noodle. Ask pupils to see the object beyond what it really is; they should use their imagination, discussing with a partner what it could become. Invite some pupils to come to the front and mime using it in different ways (e.g. it could be a lifebelt, a bull's horns, a swing, a halo, a snake, a hobby horse).

In their pairs, challenge pupils to write down as many 'inventions' as they can in 30 seconds, then share some of their ideas. They're likely to list mechanical or electric items. Ask whether everything they can see around them is an invention, from carpets to shoes to pencils to computers to buildings to the internet. At some point, someone has come up with an idea, researched it, developed it, tested it and brought it to life. The best ideas and inventions sometimes become part of our everyday life. You could prompt a pupil to describe some of the inventions he or she used as you prepared for school today, e.g. toothbrush/paste, clothes, TV, bowl, glass, breakfast cereal, kettle, toaster, bag, car. Point out that all of these started with a simple idea – someone using their imagination and wondering: "Wouldn't life be better if...".

Optionally, you could run the 30-second challenge again, but provide 'categories', e.g. 'Inventions in the classroom/your bedroom' or 'Inventions beginning with s'.

Optionally, share the inspirational quotes about inventions on the Presentation (**slides 2 and 3**). Ask pupils what they think the quotes mean, and to justify their reasoning.

Share the learning questions (**slide 4**).

Main activities (45-90 mins):

PAST: History of great ideas (10-15 mins):

Organise pupils into groups of three or four. Give them two minutes to decide what they think are the top three inventions and why. Explain that the world is filled with the most amazing feats of 'Imagineering' (combining science with creativity). You're now going to travel back in time to discover some of the greatest inventions and inventors throughout history. Use the Presentation (**slides 5-11**) to reveal the stories behind some world-shaping ideas and inventions: wheels and axles, paper, telephone, electric light, aeroplane, and the internet. Optionally, allocate each group one of the inventions from the slides (or an invention suggested by the pupils earlier). Task them with giving a 30-second presentation on why their invention made the world a better place.

PRESENT: Today's life-improving inventions (5-10 mins):

Explain that some ideas and inventions can make a big difference to the lives of specific groups of people. Use the Presentation (**slides 12-17**) to show pupils: the Kenguru electric car (for wheelchair users), the Braille smartphone, Roomba robot vacuum cleaners and the Firefly Upsee (designed to help young children with cerebral palsy to walk with their parents). Before revealing what each invention is, ask pupils to look at the pictures and share what they think it is, who it might be for and how it might be used. Ask if pupils can think of any other examples they'd like to share.

FUTURE...is up to your imagination! (30-45 mins):

Use the Presentation (**slides 18-21**) to introduce the Young Imagineers Competition. Ask pupils how they (or how inventors might) come up with creative ideas? What inspires them? Do they have any methods they use or do ideas sometimes just pop into their heads? What problems might someone come up against when searching for a solution? What makes an invention successful?

Creative technique: 'Join it' – Optionally, explain that one of the ways people come up with new ideas and inventions is by taking two existing things and combining them together to create something new or better. Give each pupil group an object to consider, e.g. toaster, watch, coat hanger, phone, pencil case, umbrella. Task groups with thinking about how their object could combine with another object and explaining the benefits. Share ideas as a class.

Creative technique: 'What if...'- Optionally, explain that another creative technique for generating ideas is to ask the question 'What if...'. Ask the groups to come up with suggestions, however ridiculous, to: 'What if the world had no colour?'; 'What if everyone had the same name?'; 'What if there was no more plastic?'; or ask pupils to come up with their own 'What if...' questions.

Group competition practice: Give groups five minutes to brainstorm and write down a list of problems they might like to solve for the competition. These could be everyday irritants (e.g. losing possessions; being late; forgetting something), or important issues that affect lots of people (e.g. water pollution; poverty) or a specific group (e.g. mobility in the elderly, hearing loss). Prompt them by saying that many inventions come about due to the inventor's personal connection with the problem (e.g. the desire to help a family member with a disability). For the purpose of this activity, you may choose to give them a focus, e.g. 'invent something that would make your life at school/home easier'.

Give each pupil group copies of Activity Sheets 1 and 2, which contain a plan to help them focus on a specific problem to solve, and tips for generating ideas. Remind them that we're talking about the future, so they can be as creative as they want to be - the sky is the limit! This task will ultimately help them with competition entries.

Give groups a ten-minute challenge to select one problem and come up with a creative idea to help solve it.

Plenary (10-20 mins):

Ask pupil groups to share the ideas and inventions they have come up with, explaining one of the ways they will help to improve lives for people. If possible, allow time for peer evaluation. The class could agree success criteria to check against or use the criteria from the competition.

Optionally, show the example of last year's winner (**on the Presentation, slide 22**), who created an idea for an invention to get wheelchair users get up and down stairs.

Give pupils the Competition Leaflet and a personal copy of Activity Sheets 1 and 2 to take home. Encourage them to create an entry for the competition. It can be submitted by a parent/carer or you could ask that it be returned to you in time for online submission at www.youngimagineers.equinor.com by **21st October 2018**.

Support:

Differentiation will be by process and outcome. Pupils could be given images representing world problems and challenges, to stimulate ideas and discussion.

Extension:

Pupils could choose a favourite invention and research its inventor and how it was developed, or even create a scaled timeline of favourite inventions.

Groups could spend additional time researching the challenge they wish to solve, or even interview their 'target audience' to establish their needs and wants.

You could also spend additional time trying out other techniques to stimulate creativity and idea generation.

England:

Design & Technology Design/Evaluate:

- Understand how key events and individuals in design and technology have helped shape the world
- Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
- Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

There is also potential relevance to PSHE, Science and Maths, depending on what pupils decide to invent.

Wales:

Design & Technology - Designing:

- Use a range of information sources to generate ideas for products
- Investigate how existing products look and function as a source of ideas for their own products
- Demonstrate their creative thinking when considering and recording solutions to problems that arise during their designing and making
- Evaluate their design ideas as they develop, considering the needs of the user

There is also potential relevance to PSHE, Science and Maths, depending on what pupils decide to invent.

Scotland:

Science – Topical Science:

- Through research and discussion I have an appreciation of the contribution that individuals are making to scientific discovery and invention and the impact this has made on society. SCN 2-20a

Technologies – Craft, Design, Engineering and Graphics:

- I can extend and enhance my design skills to solve problems and can construct models. TCH 2-09a
- I can use a range of graphic techniques, manually and digitally, to communicate ideas, concepts or products, experimenting with the use of shape, colour and texture to enhance my work. TCH 2-11a
- I can extend my knowledge and understanding of engineering disciplines to create solution. TCH 2-12a

Republic of Ireland:

Science – Designing and Making:

- Identify a need for new or revised designs; imagine and suggest a possible object to be made
- Discuss, using appropriate vocabulary, what he/she would like to design or make
- Clarify and communicate through pictures or simple modelling the materials and structures required to build the object
- Recognise a need to adapt or change an object or surroundings
- Become aware that new designs may create an interest and perceived need among others
- Work collaboratively to create a design proposal
- Communicate and evaluate the design plan using sketches, models and information and communication technologies

There is also potential relevance to SPHE and Maths, depending on what pupils decide to invent.

Northern Ireland:

Art & Design:

- Use a range of media, materials, tools and processes such as: drawing, painting, printmaking, malleable materials, textiles and three-dimensional construction, selecting which is appropriate in order to realise personal ideas and intentions

Thinking Skills and Personal Capabilities:

- Being creative
- Thinking, Problem-Solving and Decision-Making

There is also potential relevance to PDMU, Science and Maths, depending on what pupils decide to invent.