Elm, Maple, Walnut
Inventions That Changed the World

Lesson	IPC Learning Goal	NC Coverage	Activities	Resources / Vocabulary / Personal Goals
Entry Point		Introduce the topic and ask the children 'What is an invention?' Discuss Find out what they come up with about inventions as they may take things for granted and not realise that life was very different without some inventions. Refer to the Easter home learning and models/posters made. **Activity 1** On large sheets of paper in their groups, write or draw the inventions they know that have changed the world we live in. **Activity 2** Share the home learning and models made. Encourage the children to talk about their invention. Take photos for the display. **Mini Plenaries** Encourage the children to ask each other questions.	
Knowledge Harvest		After the inventions exhibition, explain to the children that together you are going to find out everything they know about inventions and machines. Remind the children of the entry point activity. Make a mind map, or a timeline, listing all the inventions from the exhibition and any other suggestions offered by the children. You could use a mind-mapping tool such as Inspiration 9: inspiration.com/global Include a photograph or drawing of each one and key words outlining what the children know about the invention. You could organise the children's ideas into different time periods (e.g. 1st century BCE, 1st century CE, 2nd century CE, up to the 21st century) or by category (e.g. inventions in transport, building, engineering, medicine, homes). At this point, the information on the mind map will be incomplete because it is the intention that the children will add to it as they progress through the unit. Display the mind map or timeline prominently in the classroom where the children can easily access it. You might decide to update your mind map once a week, adding new knowledge and information as the children learn more about inventions and machines.	
Big Picture		Inventions have transformed the way that we live our daily lives – from the simple paperclip to the latest mobile device. By learning about the important inventions that have changed our world, we can discover how we could become great inventors too!		
History 1	2.04 Be able to give some reasons for particular events and changes 2.05 Be able to gather information	a significant turning point in British history, for example, the first railways or the Battle of Britain	Have a selection of everyday objects, ie, scissors, playdoh, plastic cup, pencil, pen, glue, paper clip etc. (P21/22) displayed. Ask the children why they think they are there. What do the children know about them? When do they think they were invented? The children will choose an object to find out about the invention of it using the internet.	scissors, playdoh, plastic cup, pencil, pen, glue, paper clip Ipads

	from simple sources		Give the children the following questions to search. They can use them as sub headings and write information about their object. • Who was the inventor? • When it was invented? • Why it was invented? • How it was made? **my.christchurchcitylibraries.com/inventions** – Christchurch City Libraries website has lists of inventions and their inventors. **enchantedlearning.com/inventors** – Enchanted Learning features an informative A to Z listing of inventions and inventors. **factmonster.com/ipka/A0908738.html** –Face Monster features a guide to inventions as well as a useful timeline of everyday inventions. (**Note**: this site does feature advertising.) **explainthatstuff.com/timeline.html** – Explain That Stuff has a timeline of inventions with hyperlinks to articles that provide more information about each invention. Share the research about the different objects. Did anyone find anything fascinating? Has anyone been surprised by what they found out?	
Art 1	2.03 Be able to use art as a means of self expression 2.04 Be able to choose materials and techniques which are appropriate for their task 2.05 Be able to explain their own work in terms of what they have done and why 2.06 Be able to talk about works of art, giving reasons for their opinions	to create sketch books to record their observations and use them to review and revisit ideas to improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials [for example, pencil,	Watch a Wallace and Gromit short film – The Wrong Trousers, A Close Shave, A Grand Day out. Discuss how he makes crazy inventions to do things. TTYP – What would you invent a machine to do? **Activity 1** With a partner decide on an invention. What would it do? How? Etc. The children will sketch and plan their invention. They need to decide on the materials they will need to use. **Activity 2** The children will use their plan to make their invention. Ask the children to think of equally crazy names to describe them. Can the children guess the purpose of each other's wacky machines.	sketeching pencils

		charcoal, paint, clay]		
Science 1	2.01a Be able to carry out simple investigations 2.01b Be able to prepare a simple investigation which is fair, with one changing factor 2.01c Be able to predict the outcome of investigations 2.01d Be able to use simple scientificequipment 2.01e Be able to test ideas using evidence from observation and measurement 2.01f Be able to link evidence to broader scientific knowledge and understanding 2.01g Be able to use evidence to draw conclusions	asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests using straightforward scientific evidence to answer questions or to support their findings	Pose the question – **What is air?** TTYP and discuss. Share ideas and write them up on a large sheet. How can we investigate air? How do we know air is around us? The children will work in mixed ability groups to investigate air. **Air is real** Fold a plastic bag to one quarter of its size. Then fold it again. What do you notice? Scrunch a piece of A4 paper. Place the paper at the bottom of an empty beaker. Turn the beaker upside down in a bowl of water. Why does the paper stay dry? **Air moves** Blow over the top of a thin strip of paper. Why does the paper lift? Put two thick books on a table with a space between them. Place a sheet of paper across the top of the books. Blow under the paper. Why does the paper sink in the middle? **Air pushes** Run with a big piece of cardboard in front of your chest. What does it feel like? **Falling through the air** Drop objects of different weights and sizes. Which fall quickly? Which slowly? Why? Drop two pieces of A4 paper – screw one up and leave the other at. Which falls faster and why? **The children will write up about their investigations.** **HA and MA to use sub headings** • What were you investigating? • How did you carry out your test? • Was your test fair? • What did you predict would happen? • What was the result? • What did you learn from the investigation? **LA** To choose one of the investigations and complete a table with the headings. **The children will conclude that …** • Air is all around us • Air presses against things • Air that moves quickly exerts less pressure	plastic bag beaker paper card

Art 2	2.03 Be able to use art as a means of self expression 2.04 Be able to choose materials and techniques which are appropriate for their task 2.05 Be able to explain their own work in terms of what they have done and why 2.06 Be able to talk about works of art, giving reasons for their opinions	to create sketch books to record their observations and use them to review and revisit ideas to improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials [for example, pencil, charcoal, paint, clay]	Watch a Wallace and Gromit short film – The Wrong Trousers, A Close Shave, A Grand Day out. Discuss how he makes crazy inventions to do things. TTYP – What would you invent a machine to do? **Activity 1** With a partner decide on an invention. What would it do? How? Etc. The children will sketch and plan their invention. They need to decide on the materials they will need to use. **Activity 2** The children will use their plan to make their invention. Ask the children to think of equally crazy names to describe them. Can the children guess the purpose of each other's wacky machines.	**Junk modelling materials**
History 2	2.04 Be able to give some reasons for particular events and changes 2.05 Be able to gather information from simple sources	a significant turning point in British history, for example, the first railways or the Battle of Britain the achievements of the earliest civilizations – an overview of where and when the first civilizations appeared and a depth study of	Ask the children what they think people used before pens, pencils, etc were invented. Link to Ancient Egypt. Discuss **Activity 1 OUTSIDE** Give the children a collection of early writing tools, for example, stones, sticks, pieces of chalk and charcoal (early humans would have used burnt twigs), brushes made from twigs. Provide flat stones, trays of sand and tablets of clay for writing on. Ask the children to write messages to each other using these basic implements. **Activity 2 iPads** Give each group one of the following to research about. • Early cave paintings, stone carvings and Egyptian hieroglyphics • Paper made from papyrus, parchment and pulp • The invention of Indian ink and the first pens • Earliest printed books and printing presses, e.g. the Gutenberg Press	**iPads**

		one of the following: Ancient Sumer; The Indus Valley; Ancient Egypt; The Shang Dynasty of Ancient China	Discuss what the children find out. Can the children organise their different reports into a correct chronological order or timeline? For example, which came first – papyrus or cave paintings? Can we start a time line?	
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			Provide them with a variety of materials, such as paper of different weights and sizes (glossy and matt), transparent paper, tissue paper, straws, sticky tack, rulers/tape measure, scissors and paper glue. Have a glider competition to find out: Which glider goes furthest? Which stays in the air longest? Which does the best aerobatics?	
Art 3	2.03 Be able to use art as a means of self expression 2.04 Be able to choose materials and techniques which are appropriate for their task 2.05 Be able to explain their own work in terms of what they have done and why 2.06 Be able to talk about works of art, giving reasons for their opinions	to create sketch books to record their observations and use them to review and revisit ideas to improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials [for example, pencil, charcoal, paint, clay]	Compare the different methods and techniques employed by traditional artists such as Hans Holbein and Jan Vermeer and modern artists such as Damien Hirst, David Hockney • Use of colour, form, texture and patterns • Materials and processes • Purpose or role of the artist (2 Lessons?) Ask the children to sketch and plan an artwork that explores the world of machines and inventions, using either traditional tools or digital tools. Discuss possible ideas: • An invention from the past • An invention from the future • Machines at work • Machines in the home • A scientific or medical invention • A time travel machine The children are to complete their pieces of traditional or digital artwork, referring back to their initial sketches and reviewing their original ideas. They should use their chosen media to express their interests and ideas about machines and inventions – do they need to adapt or change any of their original ideas because of the media they have chosen to represent the final piece with? Encourage the children to draw comparisons between the different methods and techniques they have used. They should compare their own and other's artwork and express what they feel about it.	
History 4	2.04 Be able to give some reasons for particular events and changes	a significant turning point in British history, for example, the first	Recap on the home learning. What did the children find out about the Golden Age of Inventions? Ask the children to choose an invention from The Golden Age to research. • Elephant clock • Astrolabes	**iPads**

	2.05 Be able to gather information from simple sources	railways or the Battle of Britain	• Concept of zero • Arabic numerals • Automata • Camera obscura • Perfumes • Spectacles • Cat-gut • First hospitals • First libraries • First university Ask the children to find out why these inventions were important in world history, and how they connect with our modern world. The children should decide what or who they think the most important invention or inventor of the Islamic Golden Age was and why.	
Science 3	2.01a Be able to carry out simple investigations 2.01b Be able to prepare a simple investigation which is fair, with one changing factor 2.01c Be able to predict the outcome of investigations 2.01d Be able to use simple scientificequipment 2.01e Be able to test ideas using evidence from observation and measurement 2.01f Be able to link evidence to broader scientific knowledge and	identifying differences, similarities or changes related to simple scientific ideas and processes asking relevant questions and using different types of scientific enquiries to answer them	Look at a collection of materials, wood, wool, silk, cotton, leather, faux fur, plastic (hard and soft), bubblewrap, sticky tack (e.g. Blu Tack), tissue, Velcro, Sellotape, and so on. Help the children to sort the materials into two groups: natural and man-made. Explain that the human-made materials are inventions – that is why we sometimes refer to them by their brand names. Can the children think of any examples? Compare the different materials according to their properties, for example: • Strength • Flexibility • Hardness • Waterproof • Magnetic • Man-made The children should be able to relate these properties to the intended uses of the materials. Encourage the children to devise simple means of testing the materials for the different properties. The children should understand and ensure that the tests they carry out on the materials are scientific and fair tests. The children will represent their testing in a table see p.58 in the IPC. As a class, discuss the everyday usefulness of the materials from their research. Then ask the children to vote on the material they think is the most useful in modern-day society. Ask them to justify their choice of material.	wood, wool, silk, cotton, leather, faux fur, plastic (hard and soft), bubblewrap, sticky tack (e.g. Blu Tack), tissue, Velcro, Sellotape

	understanding 2.01g Be able to use evidence to draw conclusions			
History 5	2.04 Be able to give some reasons for particular events and changes 2.05 Be able to gather information from simple sources	a significant turning point in British history, for example, the first railways or the Battle of Britain	Ask the children intuitive questions, for example, what do you think motivated the early pioneers of aviation? Why did they want to fly? What were the risks and difficulties they faced? How did they overcome these? What sort of person takes risks? Ask the children to research the history of flight. Give each group a time period or pioneer of flight. (See p.33). The children can decide how they want to record it. Information text Poster Refer back to the introduction and compare their thoughts before and after the lesson.	**iPads**
Art 4	2.03 Be able to use art as a means of self expression 2.04 Be able to choose materials and techniques which are appropriate for their task 2.05 Be able to explain their own work in terms of what they have done and why 2.06 Be able to talk about works of art, giving reasons for their opinions	to create sketch books to record their observations and use them to review and revisit ideas to improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials [for example, pencil, charcoal, paint, clay]	Show the children photographs of early wooden carved printing blocks from China. You will find examples in reference books and on the internet. Study photographs of the printing presses that came much later, for example, the Gutenberg Press in the 1440s and the introduction of 'movable type'. **en.wikipedia.org/wiki/History_of_printing** – Wikipedia has a complete and detailed history of printing starting from Mesopotamia in 3000 BC. **en.wikipedia.org/wiki/Woodblock_printing** – Wikipedia includes a history of woodblock printing from the earliest surviving examples, including images of the first printed book, the Diamond Sutra from China. **absolutechinatours.com/china-travel/Printing-China-Ancient-Inventions.html** – China Absolute Tours is a travel website, that also features sections on Chinese history and culture. This page contains information and images related to Bi Sheng and block printing. **hrc.utexas.edu/exhibitions/permanent/gutenbergbible/process/#top** – the Harry Ransom Center website features a brief but informative overview of Gutenberg and his invention. The site also features a video showing the press in action. The children will explore different ways to print and create their own print.	

			Potato printing – challenge the children to cut out the letters in their name from half potatoes (or other hard vegetables) so that they are the right way round when printed **Inkjet or laser printers** – print the same image in colour, greyscale and black and white, and observe the different results **Junk printing** – experiment with different effects and textures using a variety of junk materials, for example, fabric, corrugated card, leaves, sponges, sticks, etc. This could be a pattern, an image or some text. Discuss with the children their choice of different printing methods. Can they choose the most appropriate method to suit the purpose? When the children have completed their printed artwork, discuss the different effects that have been achieved through the various printing methods. Encourage the children to compare their results with those of others in the class. Can they develop their work further? Collect together the prints from everyone in the class and put them together to make one huge patchwork of the children's artwork and display this in the classroom.	
Technology 1	2.02 Be able to design and make products to meet specific needs 2.03 Be able to make usable plans 2.04 Be able to make and use labelled sketches as designs 2.05 Be able to use simple tools and equipment with some accuracy 2.06 Be able to identify and implement improvements to their designs and products	select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately investigate and analyse a range of existing products understand how key events and individuals in design and	Look at how cameras have changed over the years. Look at how a pinhole camera works. **staffordshire.gov.uk/Resources/Documents/p/pinholecameraworksheet.pdf** – the Staffordshire.gov website has a guide suitable for children, explaining how to make a simple pinhole camera. **exploratorium.edu/science_explorer/pringles_pinhole.html** – the Science Explorer website explains how you can make a pinhole camera from an empty Pringles can. **youtube.com/watch?v=ax-1dNyceo4** – YouTube has this video presented by children on the study of light and its uses, and how a pinhole camera works. **brainpop.com/technology/scienceandindustry/cameras** – BrainPOP has this video that shows how cameras work. Divide the children into groups and ask them to make a simple pinhole camera. They should look at the research and decide how best to do this. Ask the children to write a series of step-by-step instructions, explaining how to make a pinhole camera. They should include annotated drawings or photographs to accompany the text. Some children could draw a diagram to explain why the reflected image from the pinhole camera appears upside down.	card

		technology have helped shape the world	How has the camera changed over time?	
Society 1	2.03 Know that people within groups have different outlooks, characteristics and purposes 2.05 Know that people in different countries have different traditions, celebrations and ways of living 2.06 Know about ways of keeping healthy and safe through diet, clothing, exercise, hygiene and the observance of reasonable rules 2.08 Understand that people's health and safety can be affected by a variety of factors including food, climate, rules, and the availability of resources		Ask the children to think of two or three inventions. What are the advantages of these inventions? Now ask them to think about the downsides of each of these things, for example, cars pollute the atmosphere. Ask the children to work in small groups to think of ways to improve the downsides of each invention without destroying the advantages of it. Encourage the children to present their arguments logically. Show them how they can do this by sorting their ideas into three columns, using these headings: • Advantages • Disadvantages • Solutions The children will present their ideas to the class.	
Technology 2	2.02 Be able to design and make products to meet specific needs 2.03 Be able to make usable plans 2.04 Be able to make and use labelled sketches as	select from and use a wider range of materials and components, including construction materials, textiles and	**1001inventions.com/media/video/engineering** Look at how cogs and wheels work and discuss. What might use cogs, gears and wheels? Bikes, watches, clocks etc. **robives.com/mechs** – the Robives website has animated illustrations of gears, cams, cranks, levers and many other mechanisms. **youtube.com/watch?v=6ZWz6457asM&feature=related** – YouTube has this wooden rolling ball clock that uses gears.	mechanical toys mechano

	designs 2.05 Be able to use simple tools and equipment with some accuracy 2.06 Be able to identify and implement improvements to their designs and products	ingredients, according to their functional properties and aesthetic qualities understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] 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	**youtube.com/watch?v=odpsm3ybPsA&feature=fvw** – YouTube features this Hila Science video, a basic introduction to gears, rates of rotation and examples of gears in use. **youtube.com/watch?v=M8ZEJTNW3OM&feature=channel** – YouTube features this Hila Science video explaining the role that gears play in mechanical clocks. **Activity 1** Share the toys bought in and explore how they move. • Up and down – vertical movement • Side to side – horizontal movement • Round and round – rotational movement How is the moving part engineered? • Levers and pivots • Wheels and axles • Cogs and gears • Cranks and camshafts **Activity 2 (Might go over 2 sessions)** Ask the children, in pairs, to design a simple moving toy that uses one or more of the following mechanisms: a lever, wheel, gear or simple cam. They should sketch out their designs on paper, clearly labelling the moving parts and using arrows to show the direction of movement. Ask the children to share their ideas with another group or pair of children. Encourage peer and self-evaluation. They should ask themselves, will this design work? Once they are satisfied with their designs, the children can go on to make a prototype of their moving toy.	
Society 2	2.03 Know that people within groups have different outlooks, characteristics and purposes 2.05 Know that people in different countries have different traditions, celebrations and		Explain to the children that they are going to design and conduct a questionnaire to find out how people live differently because of inventions and technological advances. They will use the same questionnaire for two different people – the first person will be close to their own age (perhaps another child from the school) and the second will be somebody much older (perhaps a parent or a grandparent). First of all, work as a class to think about all the things you want to find out. Some useful categories include: **Food** – how you cook it (recipes, equipment), where you buy it, eating out, fast food	

	ways of living 2.06 Know about ways of keeping healthy and safe through diet, clothing, exercise, hygiene and the observance of reasonable rules 2.08 Understand that people's health and safety can be affected by a variety of factors including food, climate, rules, and the availability of resources		**Health and fitness** – how you keep fit (gym, sport), how you keep healthy (diet, vaccinations, x-rays, scans, dental check-ups) **Leisure** – television, games, books, music, dance, cinema, holidays **Communication** – internet, telephone, mobile phone, letters **Travel** – aeroplanes, boats, cars, bicycles, buses, trains You should work together as a class to design the questionnaire. You need enough questions to build up a picture of how people live now and how people lived in the past. Make sure the children know the difference between 'open' and 'closed' questions. Use 'open' questions in the questionnaire to elicit as much information as possible. Once the questions are agreed on and completed, the children can conduct their questionnaires. Collate the information from all the questionnaires as a class. How has life changed because of new inventions and technology?	
International 1	2.01 Know about some of the similarities and differences between the different home countries and between them and the host country 2.02 Know about ways in which these similarities and differences affect the lives of people 2.03 Be able to identify activities and cultures which are different from but equal to their own		Discuss how the invention of the internet has changed the way we communicate with each other. Focus on email, VOiP (Voice Over internet Protocol) such as Skype, video conferencing, information sites such as Google, shopping sites such as Ebay and Amazon, online games, and so on. Ask the children to think about how they use the internet at school. Does their family use the internet at home? If so, how much time does their family spend on it each day? Try to establish a picture of how, when and why your class uses the internet. Do the children think their use of the internet is typical of all children? What about children in other parts of the world? Do they use the internet in the same way? Invite the children to find out.	