



Year 2	Topic Title: E-Safety	Key Vocabulary
<p>National Curriculum Objectives: Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.</p>	<ul style="list-style-type: none"> • Understand the importance of being safe, responsible and respectful online. <ul style="list-style-type: none"> ▪ Ask the children ‘Do you ever go on the internet? What kind of things do you do? Or could you do? Answers will vary but emphasise that there are many different things we can do online, including learning new information, playing games, communicating with friends and family, and looking and pictures and videos. ▪ Tell the children that when they are online, it is important to follow certain rules to make sure that we have a good time. • Learn the “Pause & Think Online” song to remember basic digital citizenship concepts. <ul style="list-style-type: none"> ▪ Ask the children which character do they relate to the most when they are online? ▪ Use the following key questions in a discussion: <i>Do you believe everything you see on the internet? Why should we take a break from technology sometimes? Why shouldn't you open a message from someone you don't know? Why is it important to be kind online? Why shouldn't you share your username and password with other people? How do you communicate with friends and family online?</i> • Recognise the different kinds of feelings they can have when using technology. <ul style="list-style-type: none"> ▪ Use plenty of discussion with this outcome. Explore the concept of ‘how do you feel?’ Ask ‘How do you feel inside on a rainy day?’ reinforce the ideas of bored, tired, cooped up, miss friends etc. Link this with feelings they might have when using technology. Can they be good and bad feelings? Offer scenarios in which they may feel good and then ones that make them feel worried/bad etc. Define the word uncomfortable. Use ideas to create a word web or a mind map. • Know what to do when they don't have a good feeling when using technology. <ul style="list-style-type: none"> ▪ When children feel like they have had too much time on a device, they should follow the three step routine: PAUSE, THINK, ASK. ▪ Pause – When you start to get a feeling, pause and take a moment to notice it. ▪ Think- Notice your feelings and think about what to do next. ▪ Ask- Listen to all your feelings and if you're feeling uncomfortable or frustrated, ask for help from a grown-up. • Understand that being safe online is similar to staying safe in real life. <ul style="list-style-type: none"> ▪ Reinforce the concept of not talking to strangers, following the rules and knowing when to get help. ▪ Explain the phrase ‘Trust your gut’ This is an expression that means they should trust their feelings about whether something is right or wrong. ▪ Look at internet traffic light system (green websites are suitable, yellow websites are ones you are unsure about and red websites are not suitable for a number of reasons) • Learn to identify websites and apps that are “just right” and “not right” for them. <ul style="list-style-type: none"> ▪ If children have not come across a ‘red’ website before then they may not participate fully with this section. Explain that it is perfectly normal to have not come across a ‘red’ website/app and that it is important they will know what they are and what to do if they encounter one. • Know how to get help from an adult if they are unsure about a website. 	<p>Caution Appropriate Pause Online Website App Uncomfortable</p>



	Previous Learning Experiences:	
	Year 1: E-Safety lessons (Media Balance is important, Pause for people, Safety in my online neighbourhood)	
Possible Community Links/trips	Future Learning Experiences:	
	Future E-Safety lessons throughout the school from Years 3-6	



Year 2	Topic Title: Word Processing	Key Vocabulary
<p>National Curriculum Objectives:</p> <p>Use technology purposefully to create, organise, store, manipulate and retrieve digital content.</p> <p>Recognise common uses of information technology beyond school.</p> <p>Use technology safely and respectfully, keeping personal information private.</p>	<ul style="list-style-type: none"> ● <u>To begin to learn to touch type.</u> <ul style="list-style-type: none"> ▪ Begin by giving the children the opportunity to explore the computer keyboard and familiarise themselves with the layout of the keys. Before you start, ask the children to explain how you would communicate with that computer. They might talk about using a mouse or a keyboard or be familiar with artificial intelligence devices such as an Alexa or Siri. ▪ Draw attention to the keyboard being the most useful form of input to a computer as it allows us to type a large number of characters of the computer knows how to interpret. In fact, coders type words and numbers on the keyboard and the computer is able to translate them into its own language to turn them into cool things such as websites or computer games! ▪ Use programmes such as notes on Microsoft word to allow children to experiment with the keys on the keyboard. As you are going along you may wish to ask the children quiz questions such as which key on the keyboard is called the space bar and what does it do? ▪ Some key questions that you may wish to ask at the end of the session in order to cheque for pupils understanding would be how do you communicate with the computer? What do you think the word input means? And which key on the keyboard is called the space bar and what does it do? ▪ Ask the children to open up Microsoft Word and type the following sentence: the quick Brown Fox jumps over the lazy dog. Once the children have type this, ask them if they've noticed anything special about the sentence. This sentence has every letter in the English alphabet in the words, therefore the children will have had to touch every single letter key on the keyboard. Were the children able to find them all? Did they struggle to find any of the letters? Did anyone figure out how to delete a letter they had typed by mistake? Show the children the backspace key which will remove one letter at a time. ● <u>To understand how to use a word processor.</u> <ul style="list-style-type: none"> ▪ Recap the work on identifying the keyboard layout from the previous session. Ask the children key questions such as: what do you remember from the previous lesson? What was so special about the quick Brown Fox jumps over the lazy dog? What are the home keys? These are the keys that have little bumps on them so the F&J on a keyboard. ▪ Come together to discuss what the children have discovered and the buttons they've explored. Explained that there's a keyboard shortcut for lots of the functions that they have tried out. We can use: Ctrl + B, Ctrl + I, Ctrl + U to use bold, italics or underline. Ask the children to re type the sentence: the quick Brown Fox jumps over the lazy dog and use some of the keyboard shortcuts to either put some of the words in bold italics or underline them. ● <u>To understand how to add images to a text document.</u> <ul style="list-style-type: none"> ▪ Start with a quick recap of typing on a keyboard. You may wish to ask questions such as can you type your name? How do you type a capital letter without using capital locks? And what does the character above the number 7 mean? ▪ Read the gingerbread man or another well known tale to the class, the children's goal is to create a newspaper page based around a well-known story. The key skills we are focusing on are image imports and building keyboard shortcuts. On a document on your Interactive Whiteboard, type a title for your newspaper and make a few changes like altering the size of the colour of the font. Ask the children if they can remember any of the keyboard shortcuts. ▪ Model typing a sentence about the Storey they looked at earlier on in the session , encourage the children to consider: what happened? Who was involved? Where did it happen? When did it happen? Why did it happen? What caused it? Let people know that you not expected pages of text and that they should focus on experimenting with images layout and text effects. An important part of their work will be importing a relevant image into the document. Demonstrate how to do this by going on to Google image search, look for gingerbread man or something relevant to the book that you have chosen to read. ▪ For ease, demonstrate choosing the image you want and dragging it to your desktop so that you can drive then drag the picture into your document. Show children that they can alter the positioning of a picture by choosing whether to make it in line, wrap text or break text. You 	<p>Keyboard, keyboard character, space bar, word processing software, touch typing, delete, backspace, highlight, undo, redo, bold, italics, underline</p>



will need to click on the image to alter this. In Word, the menu will open when you right click the image so that you can then look for wrap text and drop down will appear to select the text wrapping that you want.

- Ask the children to use images and text editing to create a newspaper article about the gingerbread man or a story that you have chosen. Remind them that they should show off all the skills learned in the topic so far rather than spending too much time finding an image or typing the story.
- **To create a poetry book using sources from the internet.**
 - Start the session by allowing the children to continue to practise their typing skills by using the typing club link and games online.
 - review the shortcuts you've looked at so far, explain that the children are now going to learn one of the most useful keyboard shortcuts: copy and paste.
 - Explain that sometimes we find information on the Internet or in another document that we want to copy. We can do this by highlighting the text we want and then typing ctrl + c to copy, and ctrl + V to paste the text into a new document.
 - It is important that children understand that the citing of sources when you copy something from the Internet explained that when someone put something online, it still belongs to them. We can often use their text or images, but we must say where we got the image from.
 - Explain to children that they are going to use copy and paste to create a poetry book using poems from the Internet. Ask the children to choose some of their favourite poems. They will then need to copy and paste the poem they like, add a relevant picture and alter the formatting, text and layout to make it look more attractive. They can then repeat this process for a second and third poem, but they should only copy one poem per page. Remind children that they must include the name of the person who wrote the poem and which website they copied it from.
 - Using the poems that the children have chosen and edited, you can create a class poetry book. As a class get the children to direct you to create a front cover for the poetry book they have made. How will they change the size, colour and font of their title page? This book can then be stored in a book corner or displayed elsewhere in the classroom to be used when pupils need inspiration for vocabulary or poetry of their own.
- **To understand how to stay safe when talking to people online.**
 - In this session, we are going to be looking at online safety video about Lee and Kim, created by the thinkuknow, which is the education programme of the children exploitation and Online Protection command. As we have been working on familiarising children with typing, it is important that we take a look at online chat and how dangerous this can be.
 - Ask the children to discuss whether they use the Internet at home and establish what they might use it for?
 - After watching the video of Lee and Kim, ask children what they noticed about the children that Lee and Kim met online. Try to steer them away from talking about the man who wanted to give the children treasure for now. We will talk about him later. The children may have observed that some of the children were kind and helpful, but that one child was not very nice at all. Start by focusing on the child who was rude. Do children think he would have said those things in real life? Discuss why it is important to be kind and polite online, just as it is in the real world. It can be hurtful when people say unkind things and we must not think that just because someone can't see us, it doesn't matter what we say.
 - Talk about the last person that Lee and Kim meet. Was he honest about who he was? People online don't always tell the truth and can sometimes lie about who they are. It's important when we don't give out too much personal information to strangers and we don't want them to know where we live or who we are. Finally, ask the children to tell you what they think they should do if someone makes them feel uncomfortable online. Who might they talk to?
 - The children will make an online safety poster based on the Storey they have watched remind the children about the work we've done in the flash for lessons using word processing software and choosing images from the Internet and not forgetting to credit images. You may wish to display your posters in the class or send them home.



	Previous Learning Experiences:
	EYFS and Year 1 Units around using a computer.
Possible Community Links/trips	Future Learning Experiences:
	Future computing experiences and lessons throughout the school from Years 3-6.



Year 2	Topic Title: Programming - ScratchJr	Key Vocabulary
<p>National Curriculum Objectives:</p> <p>Use logical reasoning to predict the behaviour of simple programs.</p> <p>Create and debug simple programs.</p> <p>Use technology purposefully to create, organise, store, manipulate and retrieve digital content.</p> <p>Understand what algorithms are; how they are implemented as programs on digital</p>	<ul style="list-style-type: none"> ● Using ScratchJr - To explore a new application <ul style="list-style-type: none"> ▪ Show children the Scratch Jr app and how to start a new project. Before they start ‘tinkering’, the children need to know that they: need a character to control; must give that character instructions to make them do things. ▪ When you open a new project on ScratchJr, you are always presented with a white background and a Cat character. To delete the Cat, you will need to hold your finger on the cat icon to the left of the project, this will bring up a red ‘x’ which you can use to delete it. Model to children how to add a background and a new character. ▪ Once you have got a character in place, introduce the ‘green flag’ block as the start of their program. Demonstrate that dragging blocks onto the green flag block builds the program. Each block is another instruction – they clip together like a jigsaw. When you run the code, the children will see whatever blocks have been selected in action. This could be movement, growing in size, disappearing and reappearing – it depends on what blocks have been chosen. ▪ Give the children the iPads they will be using, and time to explore the different blocks. They should be left to ‘tinker’ independently. ▪ Ask the children the key questions. <ul style="list-style-type: none"> ● Key questions ▪ Why are some of the blocks different colours? (Because they’re grouped by similar attributes.) ▪ Can you give a definition here of the colour blocks you used and what they do? ▪ How could you get rid of unwanted blocks? (Drag them back to the code bench.) ▪ How did the ‘x’ block you use affect the character? ▪ Did anyone’s character do something unexpected? ▪ How did you make ‘y’ happen? ▪ Did anyone lose their character entirely? (This is important as there’s a ‘hide’ block that can cause the children to worry their character is gone forever.) ▪ Give each child a score sheet from the activity ‘Tinkering score sheet’ every time the children use one of the blocks in their program, they can circle it on their printout. To get the points, however, the children need to be able to explain both what the block did and how it worked. ▪ Give the children the main bulk of this time to explore, tinker and challenge themselves to use blocks and work out what they do using the predict > test > review cycle. <ul style="list-style-type: none"> ● Key questions ▪ What blocks did you use? ▪ What did they do? ▪ Did the blocks do as you predicted? ● Creating an animation - To create an animation <ul style="list-style-type: none"> ▪ Ask children who can do a good impression. Hopefully, some children will start ‘bobbing’ in the air, changing directions regularly, darting aimlessly in one direction after another and then suddenly zooming with purpose. Show the children a simple ScratchJR program with a fly. You will need to select the fly from the character menu by tapping the blue ‘add’ button below the character and adding the code. You want to show a fly flying across the screen in a straight line using a green flag and five forward motion blocks. ▪ Ask the children if they can identify what’s wrong with the fly you have programmed? It is not moving like a fly because it’s moving too straight. After their tinkering with blocks in Lesson 1, Using ScratchJr, the children may be able to suggest how to add in different movement blocks. Ask the children to suggest blocks to use – implementing and testing their suggestions. Keep adjusting the blocks until the children are 	<p>Algorithm</p> <p>Animation</p> <p>Bug</p> <p>Code</p> <p>(computer)</p> <p>Code (verb)</p> <p>Debug</p> <p>Icon</p> <p>Imitate</p> <p>Instructions</p> <p>Loop</p> <p>Repeat</p> <p>Scratch Jr</p> <p>Sequence</p>



devices; and that programs execute by following precise and unambiguous instructions

satisfied that the fly is moving as a 'real' fly would. As they make suggestions, keep adding the blocks onto the existing program so that all of it is connected to a single green flag.

Key questions

- Is the fly moving like a fly?
- How can we make the fly move more realistically?
- Show the children that you get a more fluid movement when you give the computer two or more instructions to do at the same time. To illustrate this, start a new ScratchJr project, adding in the fly character once more. This time, use two green flag blocks to tell the computer that the actions are carried out at the same time. The code will look something like this; run the program and compare this with the program the children devised for the first fly project. The first project will appear more disjointed as each block runs one after the other. Which do they think looks better? Why?
- Look at the code for the second fly. Is there anything we could do to make this even better? Guide children to the idea that they do not need to use lots of straight arrows when they could change the number on the first one to four instead of one. Look at the second row of code, can they spot a pattern? Change the numbers to three – does it work? No, because then it tips forward three times and then backward three times instead of rotating forwards, backwards and then forwards again, etc.
- Two other blocks you might want to demonstrate to the pupils are the:
- Orange loop block – Loops are used in all programming languages and allow programmers to tell the computer to repeat an instruction more than once. This block is currently telling it to repeat four times.
- Red repeat 'forever' block – This makes the code continue/repeat forever. The children will need to use these.
- Explain that when animators make films with CGI animals, they spend a lot of time watching real life animals to make sure the CGI animals move in a realistic way. Children will use the pre-drawn characters in ScratchJR and aim to make them move in a realistic way.
- Recap how some animals move: snakes slither; birds swoop; butterflies flutter, etc. This will influence the children's understanding of how to create movement in ScratchJR as well as the process of predict > test > review.
- The children can choose their own animals, but the following are the easiest:

Field scene:

- Fly.
- Butterfly.
- Bird (swooping – wings won't flap).
- Snake.
- Rabbit.

Underwater scene (slightly harder as children are less likely to know how these creatures move):

- Fish (there are two types of fish).
- Crab.
- Seahorse.
- Starfish.
- Whale.
- Children add one animal at a time to their scene trying to get the movement as realistic as possible. They should be using forever loops in their code so that the movement will never end.

Key questions

- Which fly project looks better and why?



- How do animals, birds, fish and other creatures move?
- **Making a musical instrument - To use character as buttons**
 - Ask children to become a musical instrument – what sounds can they make?
 - Ask children to demonstrate how to make a sound repeatedly (for example, boom, boom, boom and another zip, zip, zip). Ask the children to hold out their hands, and when you tap them or point to them, they make that sound. Now ‘play’ the children.
 - Encourage the children to think about how you are controlling the ‘human instruments’ – just like we control the characters on ScratchJr. Ask the children if they think we could make something similar in ScratchJr? How would it work? What blocks would we need? Ask them to try and explain what would/could happen?
 - Key questions**
 - What sounds can you make?
 - Can you make a sound repeatedly?
 - Could we make something similar in ScratchJr?
 - How would it work?
 - What blocks would we need?
 - Can you try to explain what would/could happen?
 - Show the children an example musical instrument you have made in ScratchJR by pre-recording your own sound using the dotted microphone icon. This can be a simple shape background with some different coloured button characters on top (it won’t look like a guitar, but a musical instrument is anything that you can use to make music.)
 - Ask the children to predict what they think will happen when you tap a button. Then show them. Each of the buttons is a ‘character’ in the ScratchJr sense. If the code is correct, when the button is pressed, it will play a recorded sound so that you can play your creation like a musical instrument.
 - Draw the children’s attention to the green sound blocks. Explain that the children can record their own sounds using the dotted microphone icon (this will open the blue recording option – press ‘red’ to record). Each sound recorded will be numbered and stored within the sound icons. Children will be recording the sound of their own voice, which they explored at the beginning of the lesson. The children could make the sounds of familiar instruments using their voice, the strum of a guitar, the toot of a trumpet, or they could tap on different surfaces or use pencils on pots, etc.
 - Demonstrate to the children the new block ‘START ON TAP’ which means our program does not wait for the green flag anymore. Instead, each of the sounds you have created and attached to any single character, will play when you press the character to which you have attached the sound code.
 - Children design their instrument outline for their background, using the background editing tool. The button they have created (which is a character) then goes on top.
 - To draw a background, the children select the background tool from the top middle of the project, select a blank background, then tap the paintbrush in the top right to enter the editing tools.
 - Next, they will need to decide how many buttons (‘characters’) they want and create them by using the ‘draw new character’ tool and designing some simple shapes, before choosing and recording a sound for each of them. When they are finished, the children should have their own musical instrument.
 - Key questions**
 - Why would we use the characters as buttons?
 - What would we want to happen when we pressed our ‘button’?



- What could our button look like?
- What do you predict will happen when a button is tapped?
- How are we controlling our program? (By tapping the characters.)
- Which blocks are we going to need to.....?
- How will the computer know which sound to play? (It plays the one you've picked – each new recording has a number on the microphone block.)
- Do we need 'x' block?

Programming a joke - To follow an algorithm

- Show the children a program you have created in ScratchJR that tells a joke. For example: Question: Why has a giraffe got a long neck?
Answer: Because his feet stink.
- Explain to the children that they will be creating their own joke, but they need to think about how you made this one to help them. Remind the children that when you start a project there is a white background with the cat character. Ask what they think you did to get to this project? Children need to draw on their experience from the previous three lessons.
- Give the children five minutes to discuss with a partner how the project was made before getting them to make suggestions as to the steps that you must have gone through to create it.
- Write down what they think you would need to do to make the joke.
- Key questions
- How did I make this happen?
- What do you think I did next?
- What blocks can we use to make 'x' happen?
- Which colour blocks let us do 'y'?
- Explain that an 'algorithm' is a set of instructions that allow you to make a computer do something. Tell the children that in this lesson they need to take these instructions and turn them into 'code' so that the computer can understand them.
- The children could create their own joke if they have ideas, or use one of your examples if they're not sure.
- As it is the first time that the children have worked from an algorithm, you might want them to have the ipads in front of them and take the class through the steps as they carry out the action:
- Show the children how to delete the cat. Then, add one or two new characters that are relevant to the joke that the children have chosen. Now, begin coding – remind the children that to give instructions to their character, they need to drag the blocks down into the coding area.
- After adding the green flag, the children are going to record their voices speaking the first part of the joke. Try and get the children to suggest where they might find these blocks? Ask them to think back to last lesson. Model recording the sound, using the record button as you did last lesson.
- Once you have shown the children how to record the question, they should be able to record the answer as well. If you have any children that cannot record their voice for any reason, they could use the 'say' block, which shows writing on the screen in a speech bubble. However, it does mean children have to type the joke out.
- To finish the program, the children can add some movement appropriate to their characters, for example, a fish bobbing in the water or the giraffe walking across the screen.

Key question

- Where might we find the blocks to record voices?
- **'The Three Little Pigs' algorithms - To plan and use code to create an algorithm.**





Possible Community Links/trips	Future Learning Experiences:
	Future computing experiences and lessons throughout the school from Years 3-6.



Year 2	Topic Title: What is a computer?	Key Vocabulary
<p>National Curriculum Objectives:</p> <p>Recognise common uses of information technology beyond school.</p> <p>Use technology purposefully to create, organise, store, manipulate and retrieve digital content.</p> <p>Use logical reasoning to predict the behaviour of simple programs.</p> <p>Recognise common uses of information technology beyond school</p>	<ul style="list-style-type: none"> • Computer parts - To recognise the parts of a computer <ul style="list-style-type: none"> ▪ Write the peripherals on post-its to hand out to each table. Ask for a volunteer from each table and explain to them that they are going to be the person from their group who will get up and place the post-it notes in the correct places. But before they move, they will discuss, as a table, in secret, where they think these items are. ▪ Explain to the class that any words written on the post-it notes can be found somewhere in the classroom, and their challenge is to find them and label them with the appropriate post-it note. The whole table must decide before a volunteer, who the table pick, label them. ▪ Once each group has placed all their labels, ask groups to explain where they placed their post-its. Why did they put them there? What does the technology they labelled do? <p>Key questions</p> <ul style="list-style-type: none"> ▪ What does the word peripheral mean? ▪ Why are there so many? ▪ What do the buttons without letters on do? (Spacebar, Backspace, Caps Lock, etc.) ▪ What's the purpose of a screen? ▪ Does a computer work without a screen? ▪ Why do I have an interactive whiteboard (IWB) and a screen on my laptop? ▪ Why does a mouse have two buttons? How do you move it around? ▪ Model how to draw a computer using a program such as Microsoft Paint or 'Sketchpad'. Remind the children how to change colours, paint and rub out and, depending on their previous experience, you may also want to show them the brush size tool. ▪ Towards the end of the lesson, get the children sharing their drawing with their partner and pointing out where they drew the mouse, keyboard and screen. • Inputs - To recognise how technology is controlled. <ul style="list-style-type: none"> ▪ Show one of the items or photos to the class and ask them what they think would happen when you press a button. Repeat this a few times with the different objects. ▪ In pairs or small groups, the children then discuss what they think will happen when the buttons are pressed on these items. There may be some they have not used, e.g. washing machine, so discuss the objects as a class to ensure everyone knows what each of them do. ▪ Then, explain that they have a computer inside them. That is how they know what to do when someone presses the button. The computer says "When someone presses the button, do this..." and then it happens. <p>Key questions</p> <ul style="list-style-type: none"> ▪ What does the word technology mean? ▪ What do you think will happen when the button is pressed? ▪ Can the children start to independently predict what they think different technology does and consider how it's controlled. Explain that learning about how technology works allows us to make our own inventions that do what we want them to. ▪ Show children activity: 'Robot sheet' and point out the remote control. Explain that this remote control can program children. When you press the red button, it makes the children wave their arms in the air; when you press the green button, they tap their knees; when you press the blue button, they fall asleep. Play with the control for a few minutes. You could get children to suggest what different buttons could do. 	<p>Battery Buttons Computer Desktop Device Electricity Input Invention Keyboard Laptop Monitor Mouse Output Technology Wire</p>



- Show and hand out the activity: 'Robot sheets', ask children to label the robot and explain how it works. Their robot can do anything they want. The activity is for children to recognise that it will need buttons to control it (inputs), and perhaps even lights/sounds (outputs) to see what it's doing.
- Give them some time to share their ideas with a partner before sharing some as a whole class. Model labelling the robot, pointing to which parts would be buttons or lights, etc. Whilst the children are labelling, get them to articulate what they're doing and how their robot works.

Key questions

- What is an input?
- Can you give an example from your robot activity of an input?
- What is an output?
- Can you give an example from your robot activity of an output?

Technology safari - To recognise technology

- Remind the children what they've learned about computers so far. They all have: wires or batteries, buttons, a screen.
- Show children the toys and, using the list you've just come up with, decide which of these objects they think might have a computer inside them. You will probably decide that all of them could have a computer and battery pack inside them. Discuss these points together, encouraging children to justify their opinions.

Key questions

- What have we learned about so far?
- What do all computers have?
- Which of these toys have a computer inside them?
- Explain to the children that they are going to go on a 'Technology Safari' around school and they'll need to keep their eyes peeled for technology that they see.
- Organise the children into pairs and then group two pairs together. One pair in the group of four will have the clipboard with the activity, 'Safari sheet', the other pair will have the digital camera/iPad.

Key questions

- What can we see if there are computers inside technology?
- Can you see any technology here?
- What do you think it does?
- Watch carefully, can you see what it's doing?
- How do we take a good photo?

Invention - To create a design for an invention

- Show children the Rocket-powered chair image. Then, ask them what an invention is. After this, give them time to formulate questions about the invention they are being shown and to discuss them on their tables.
- They might come up with questions like: How does it work?, Is it safe?, How do you control it?, Can it only go up?, Do you need a special suit to use it?, Can you go to space with it?
- These sorts of questions show that the children are beginning to think about how the invention works, and this is recognising that technology (including inventions, computers) is designed by humans and follow instructions.
- After the children have suggested some of their questions, choose two or three to put to the rest of the class and ask them for their answers.

Key questions



- What do you see?
 - What is an invention?
 - What types of questions can you come with for this invention?
 - Explain to pupils that they're going to be inventors and create their own invention, using all the knowledge they've learned about computers all around us. Their invention will have some kind of computer inside of it, but what it does is entirely up to them.
 - Remind children of their 'technology safari' last lesson and ask them: What did you find? How did you know it was technology? How did it work?
 - As a class, create an example invention together. Ask pupils for ideas first – what could they design? For example, a cupcake machine – press a button on your desk and a cake appears.
 - Get the children to consider the inputs and outputs of the invention and what they think they'll need. List these alongside the image.
 - Ask:
 - Will I have buttons to start it? Or a microphone?
 - Should I have a touchscreen to choose what colour glitter to fall?
 - Will I use a lever/joystick to move where the glitter will fall from the ceiling?
 - How do we know it's happening? Are there lights that flash?
 - Is there a screen that counts down?
 - When you decide on what you want to include, use annotations to label it with all of this information. Ask pupils why annotating is so important.
 - Set the children to work planning their inventions. As they're doing this, question them about their inputs and outputs to ensure they're considering them – this is showing their recognition of everyday technology features.
 - Model how to write an explanation of their invention. Then, give the children time to create their own.
- Key questions**
- What can you remember from last lesson?
 - What did you find?
 - How did you know it was technology?
 - How did it work?
 - What could we design?
 - What is input and output?
 - Can you give an example of each for the invention?
 - What will we need?
 - Why do you think annotations are important?
- Real world roleplay - To understand the role of computers**
- Explain that we are going to be learning what computers do.
 - Model using the shop with some children:
 - Get children to take the scanner photos and pick products from the shelf. When they scan it, they write what they scanned on the mini whiteboard the picture is attached to.
 - Those children go to the tills (where there are more children), hand over their scanner and whiteboard, and pay.



	<ul style="list-style-type: none"> ▪ When the till people use the scanner, children at the database computer remove a picture of it from the interactive board. When the list of pictures on the board gets too low, they should phone the warehouse and ask for a new delivery (return everything to the 'shop floor' and add stock back into the database). ▪ Split the class into approximately three groups: ▪ Shop Roleplayers – those who are using the 'shop'. ▪ Digital Recorders – using tablets/cameras they film each part of the roleplay. ▪ Paper Recorders – they explain what happens in each part of the supermarket and what the computers there do. 	
	<p>Previous Learning Experiences:</p> <p>EYFS – Using a computer Y1 – Getting started</p>	
<p>Possible Community Links/trips</p>	<p>Future Learning Experiences:</p>	
	<p>Future computing experiences and lessons throughout the school from Years 3-6.</p>	



Year 2	Topic Title: Stop Motion	Key Vocabulary
<p>National Curriculum Objectives:</p> <p>Use technology purposefully to create, organise, store, manipulate and retrieve digital content</p> <p>Recognise common uses of information technology beyond school</p> <p>Use technology safely and respectfully, keeping personal information private</p>	<ul style="list-style-type: none"> • <u>To understand what animation is.</u> <ul style="list-style-type: none"> ▪ Introduce animation to the children and discuss the key vocabulary still images and animation. Watch the video paper cut out stop motion animation and discuss with the children how they think the animation was made. explain that the objects appear to move because they are carefully adjusted between photographs. Introduced the children to the term flipbooks, discuss with the children at the first flip book appeared in 1868 when it was patented by John Barnes Linnett under the name kineograph. ▪ Watch the video pencil flip book consolation prize on video link to show how one works. Discuss how flip book is made up of a sequence of still images with slight movement between each page this is also known as a frame in animation. Which gives the illusion of a moving image just like the previous animation they watched. ▪ Show the children a series of still images of a bowl. Posed the question: what do you think happened to the ball in this flip book? Allow the children time to predict. Play the videos and discuss how the ball appears to be moving across the page emphasised the importance of the ball being the same size. ▪ Introduce the activity and tell the children that they will be creating their own flip book animation and to number each page. Discuss potential animations the children could create. ▪ Using the activity flip book template, demonstrate an animation drawing by pressing on lightly with your pencil and amending a drawing to ensure that fluid movement between images. Emphasised using small movements across each of the frames. Once created, show the children how to assemble the flip book. Allow children time to create and assemble their flip books. Tentatively, a set of post it notes stuck together will also work as a flip book. ▪ Ask children to swap their flipbooks with another child and consider the following questions: with the movements small? Did the ball look like it was moving? Did the animations seem smooth? Finally, ask the children to discuss their experience of creating a flip book: was it easy to make the movement small? How did you ensure the ball was in the correct position each time? What other problems did you encounter? • <u>To understand what stop motion animation is.</u> <ul style="list-style-type: none"> ▪ Recap what the children already know about animation with the flip book. A stop motion animation is made in the same way, but instead of a paper based version it is made using a camera; 8 digital device. Ask the children if they can think of any other digital devices that can be used to take a photo. Answers include digital cameras, mobile phones, tablets and webcams. Explain how each shot of an animation film is made by taking a photo of an object, making a tiny adjustment to that object and then taking another photo. Introduce the vocabulary frame to the children. Explain each picture taken is called A-frame similar to each page of the flip book they created last week. State their animators can take hundreds of photos for just three seconds of film. ▪ Discuss issues some children may have encountered in the previous lesson- ensuring their ball was in the correct place on each page of the flip book. Introduced the term onion skinning to the children. Explain how the onion skinning feature in stop motion software allows the last frame to be seen when creating the next frame. This way, the animators can see how far they need to move or position the object from the last frame. Using the pupil video onion skinning, use this video to show the children how the onion skinning feature works in the J2E animation software. Please make sure the video quality found in the settings is placed at 1080P. ▪ Introduce the task to the children. Explain that they will be creating a space scene with an astronaut in, but they can choose which astronaut character they would like to animate. Using the website link to J2E animation do a live demonstration to guide the children through how to choose their space background and astronaut. ▪ Show children The video on how to create a basic animation. This example only uses 8 frames, but you need to see at least 10 frames to get a lengthy animation. Give the children at least 15 minutes to create their animation. If needed, demonstrate on the board how to delete or add frames in to ensure a smooth animation is created. 	<p>stop motion, animation, digital device, frame, onion skinning, animator, flip book, still images, moving images, drawing, background, object, plan.</p>



- once the animations have been created, get the children to swap their devices or seats. Use the question prompts to discuss the animation: were the movements small? Was the animation fluid ? Were the frames clear? Finally, ask the children to discuss their experience of using the software . Use the following questions as a prompt for discussion: was it easy to make the movement small? Did you like the onion skinning feature? What problems did you encounter? Which method did you prefer for creating an animation?
- End by posing the question: is using a digital device an easier way to create an animation? Give the children time to discuss with their partner before sharing with the class.
- **To create a atop motion animation.**
 - Recap what you've done in the previous session with children and introduced today's lesson. The children will be creating another space themed animation, this time using the software application stop motion studio. This lesson will work better if the children can be together in pairs. Show the activity: space backgrounds to the children and let them choose which background they would like. You could print these out onto A3 paper to showcase to the class. Show the three different space crafts on the activity sheet. Let the children choose the spacecraft they wish to animate. These space crafts could be cut out for those children who need extra support. Give the children time to prepare their working space for the activity.
 - Show the children how to navigate the stop motion studio app on the iPads. Demonstrate or use the video in the presentation to show the children how to create a stop motion animation. If you are demonstrating, emphasised the importance of keeping the tablet steady, having all the background in the shot and making sure no hands are in the shot to.
 - Introduce the challenge to the children and discuss the tips on how to create a successful stop motion animation. Once the children have created their animations, get them to swap their device with another pair. Use the questions as a prompt for discussion: were the movements tomorrow? Was the animation fluid? With the frames clear?
 - At the end of the session use the questions on the slide to discuss how the children found using the app: was it easy to keep the camera still? Was it easy to make the movement small? Was it easy to use the onion skinning feature? What problems did you encounter? Ask children to compare stop motion studio and J2E animates software which do they prefer and why?
- **To plan my stop motion animation.**
 - Recap the previous lesson with children introduced today's lesson. In pairs, the children will plan their own space themed animation, using a range of backgrounds and objects.
 - Show the children the objects they can choose from via the activity object colour version resource. You can choose to stick to one object to animate or extend children by having two available. You also have the option of having these in black and white in the resource bank, so the children can decorate them.
 - Show the children the activity spaced backgrounds; they can choose to use one any of these for their animation. Put the children in pairs and ask them to discuss what their animation might be, for example, seeing one could have a shooting star flying past. At this point, ask pairs to discuss the object or objects they will be animating. Share their ideas with the class.
 - Handout differentiated planning sheets to the children, depending on how many objects you want the players to focus on. Demonstrate how to complete the activity using one of the ideas the pairs have come up with.
 - Give the children enough time to share their ideas and complete planning their stop motion animation.
- **To create my stop motion animation.**
 - Ask children to get into the same pairs from the previous lesson. Handout their planning sheets from the previous lesson and their chosen background an object or objects. Give the children time to look through their planning and remind themselves of their animation.
 - Ask the pass to label themselves partner A and partner be. Use these ideas to discuss how the pairs can work effectively together to produce their animation. Partner A- you must ensure: the tablet is still when taking a photo. All the background is in the photo. There



	<p>are no hands or other objects present. The shots are in focus. Partner B- you must ensure: you use only small movements between each frame. Use onion skinning to make sure the object is in the correct place. Refer to your plan to ensure you have the correct movement. If children are working in groups more than pairs split these tasks even further.</p> <ul style="list-style-type: none"> ▪ Discuss the tips for creating a successful animation. If you wish, refer back to the previous session on the planning sheet you created as a class and demonstrate creating a successful animation using the tips discussed. Handout the criteria grid to each pair and encourage children to use this while creating their animation. ▪ Give children time to create their stop motion animation. Pause at regular intervals to ensure children are affirming to their plans. Highlight good examples of teamwork. Once the children have finished their animation, give them time to think critically about their animation and to look back at the criteria grid. This way they can check that they have completed everything. ▪ Let the children share their animations with the rest of the class. If you want to, you can share these on the school website with the wider community. 	
	<p>Previous Learning Experiences:</p>	
	<p>Year 1- Children have worked with images on an iPad and have taken photographs.</p>	
<p>Possible Community Links/trips</p>	<p>Future Learning Experiences:</p>	
	<p>Future computing experiences and lessons throughout the school from Years 3-6.</p>	



Year 2	Topic Title: International Space Station	Key Vocabulary
<p>National Curriculum Objectives:</p> <p>Use technology purposefully to create, organise, store, manipulate and retrieve digital content.</p>	<ul style="list-style-type: none"> • <u>Homes in space - To understand how computers can help humans survive in space.</u> <ul style="list-style-type: none"> ▪ What types of homes can you think of? Watch this video about the 'Houses through the centuries' , pausing when the children have questions. Ask the key questions. <u>Key questions</u> ▪ What is essential for a home? ▪ What makes it difficult for humans to survive in space? ▪ Explain that in this topic we will be looking at how the International Space Station is designed to be a home in space. Life in space is quite different to life here on Earth. Watch the 'Space vs. Earth' video to illustrate this. We will also be looking at how computers can be used to collect data to help people to survive in space. ▪ Homes in space and show the children the 'ESA's image of the International Space Station', which is a huge satellite that people can live on, built as a research lab to observe what happens in space. ▪ Ask the children: What might people need aboard a space station to enable them to survive? ▪ Open the 'ESA's Virtual Tour' interactive map of the International Space Station (ISS) on the board and use the map in the top right corner to find your location (look at the red circle). Then, either click on the map or use the navigation arrows to take you around the space station. Take the viewer to the Destiny Module (just above the centre of the spaceship) and find the water dispenser – if you click on the 'Play' button (the one on the 'roof') you can watch a short video about how it works. ▪ Ask: Why do you think the water does not spurt out? (To avoid the water floating off and getting into the instruments.) ▪ Give children time to explore the interactive map of the ISS using the arrows and the map in the top right, and then ask them to complete the following activity, draw or write about the interesting things that they discovered about the ISS, noting down where they found the things. ▪ Ask all children to look out for things on the ISS that make life possible in space, based on the discussion from the start of lesson. <u>Key questions</u> ▪ What might people need aboard a space station to enable them to survive? ▪ Why do you think the water does not spurt out. <ul style="list-style-type: none"> • <u>Space bag - To create a digital drawing of essential items for life in space</u> <ul style="list-style-type: none"> ▪ Remind the children that in the previous lesson we learnt how technology helps to keep the astronauts alive and well aboard the ISS. ▪ Ask pupils to consider what people on the ISS might need and discuss: ▪ What type of food might they need? (Healthy, balanced diet), what exercise could they do and why is this important?, how will they stay clean (body, teeth, clothes)? Why is this important? ▪ Explain that to carry out everyday activities on the ISS, astronauts take lots of things with them. Ask the children to predict what these things might be. ▪ Ask the children what they would take with them, getting them to consider what they take on holiday (toys, games, football, books, etc), and what they like to do at home. Ask whether these things are necessary for survival. ▪ As a class, read the information on the website Link: 'Wonderopolis' What Would You Pack For a Trip To Outer Space', look at the images and watch the short video and discuss what astronauts need to take with them to the ISS. <u>Key questions</u> ▪ What type of food might they need? 	<p>Approximate Astronaut Data Digital content Experiment Interactive map International Space Station (ISS) Interpret Laboratory Monitor (verb) Satellite Sensor Space Survival Thermometer</p>



- What exercise could they do and why is this important?
- How will they stay clean (body, teeth, clothes)? Why is this important?
- What activities do you commonly like to do at home?
- Model on 'Sketchpad' how to draw a large bag or suitcase shape that fills the page. Ask the children what the most important things are to take with them in to space. Draw (and label) the items they suggest inside the bag.
- Encourage the children to think about everything you discussed at the start of the lesson (items for survival, recreation and exercise).
- Space bag: Pupils then create their own space bag on 'Sketchpad'. The children must write the quantity next to each item as the sensor and computer need to know this.
- Once the children have completed their space bag, discuss as a class what were the most useful or creative ideas. Encourage pupils to think about whether these items would get used up (for example, food), or whether the items would last (for example, cards). You could also ask the children to consider how computers might monitor things like food and water levels to make sure that the astronauts have enough.
- Key questions
- What would you need to take with you if you were going to survive in space?
- Which activities are essential for your survival, and which are leisure activities?

- Warmer, colder - To understand the role of sensors on the ISS
 - Play the video on the Link: 'Bill Nye's Temperatures in space', which explains how space stations use insulation to keep the temperature comfortable.
 - Ask the key questions and discuss the children's responses.
 - Key questions
 - What would happen if the space station did not have 'multi-layer insulation' (MLI)?
 - Do you think there are giant thermometers hanging up in the ISS?
 - Why do the astronauts need computers to check the temperature?

 - Reiterate the fact that there are sensors on the ISS that measure the temperature every second, as well as lots of other things, to make sure that nothing runs out and the crew is safe.
 - Presentation: Warmer, cooler and explain to pupils that they are going to pretend to be computer sensors and measure the temperature around the school.
 - Recap how to read a thermometer before walking around the school to take the temperature in the five locations you placed the thermometers in. Get at least two pupils to take the readings.
 - Having collected the data, the pupils return to the classroom and record the temperatures in a spreadsheet. Ask the children what they notice. Point out that there is not a huge variation between the temperatures. Ask them which of these spaces they think is the most comfortable temperature.
 - Ask the children to predict what the temperature might be aboard the ISS right now. Show them live data from the ISS via the 'Ethos Life Support System Display' website and challenge them to find the temperature of the Destiny Lab. Ask whether the ISS is warmer or cooler than the temperatures they recorded around school.
 - Look at 'Ethos Regenerative Life Support Display', which shows data from the ISS, including how full the 'clean water tank' is at this precise moment. Explain that the information is 'live'. Ask them to check how full the 'urine tank' is and tell them that we'll look again later and see if any of the astronauts have visited the toilet!



- Explain that the computer aboard the ISS does most of the monitoring, taking data from the sensors and using this to make decisions. For example, if the clean water tank were running low, the computer would recycle some of the wastewater.
- Recap what the astronauts need to survive and be comfortable on the ISS, including cleanliness and exercise. Then ask the children how certain things could be monitored by the computers on the ISS. Discuss their ideas, then get them to design a display that will show everything they need to monitor, for example, water supply, food supply, temperature, pressure, amount of sleep they get, the amount of exercise they get, the amount of power needed for light, heat, etc.
- Key questions
- What do you notice?
- Which of these spaces do you think is the most comfortable temperature?
- Can you predict what the temperature might be aboard the ISS right now?
- Can you find the temperature of the Destiny Lab?
- How full is the 'urine tank'?
- How could certain things be monitored by the computers on the ISS?
- Experiments in space - To create an algorithm for growing a plant in space
 - Presentation: Experiments in space. Ask key questions.
 - Key questions
 - Why do astronauts go to the ISS? (To carry out experiments that will benefit us back on Earth and to explore the farther reaches of the galaxy and to carry out research about how the human body will react on longer space missions.)
 - What experiment would you do if you could visit the ISS?
 - Watch the video on Link: 'Canadian Space Agency's Why do we conduct science experiments in space?' about why experiments are done aboard the ISS.
 - Explain to the children that in this lesson, having seen how important it is to carry out experiments and how the ISS is the most unique science laboratory in the galaxy, the children will be designing a computer program for conducting an experiment in space.
 - Start by asking the children what plants need to grow. If you need to teach/recap this with your class, watch and discuss the video on Link: The needs of a plant'.
 - Explain that the children's mission is to program a computer to grow a plant in space. Ask the children to work in pairs to consider what the plant needs and what devices would need to be incorporated to provide this, for example a water reservoir that releases a certain amount of water that could be programmed to be done daily.
 - Ask the children to write or draw their algorithms on paper or by using the Activity: If... then... template as a scaffold.
 - Encourage pupils to act out the different parts of their algorithms to make sure that they are clear and easy to follow.
 - Get the children to share these ideas as a class and allow time for children to adapt or add further detail to their algorithms based on what they've heard. You should also ask them what they might learn from trying to grow a plant in space?
 - Key questions
 - What do plants need to grow?
 - What would this look like for others we need to monitor to make sure our plant is healthy?
- Goldilocks planets - To interpret data
 - Start by watching the Link: 'NASA's International Space Station Live Stream' , which is from cameras aboard the International Space Station (ISS), looking down on planet Earth. While children watch the video, ask the key questions.
 - Key questions



	<ul style="list-style-type: none"> ▪ What makes Earth a good place for life? ▪ What would another planet need if it were to support life? ▪ Do you think that there is other life in the universe? ▪ Why do you think water is important to life on Earth? ▪ Explain that it is possible that there are other homes in space, but at the moment Earth and the ISS are the only ones we know about. Scientists are engaged in trying to find others and to do this, they need to consider all the factors that are necessary for life to exist. Explain that water is a very important part of life on Earth. Encourage the children to think about why. Animals, including humans need to drink water to survive. Plants also need water. All forms of life need at least some water. ▪ Show children the video on Link: 'How to find a living planet' , which explains what makes a Goldilocks planet. ▪ Explain that our planet is able to support life as it has just the right temperature. Earth is in what is known as the 'Goldilocks Zone' (it is neither too hot nor not too cold). Ask children why temperature is so important for life and why temperature would affect liquid water. (If it's too hot, the water would evaporate, but if too cold the water would freeze.) ▪ Hand out to the children the cards from the activity: Unknown planets top trump cards or the activity: Unknown planets spreadsheet). Explain that the cards include information about real planets and made up planets. ▪ The information includes: The name, The average temperature, The size, The colour, The number of moons they have, The name of the planet's star ▪ Ask pupils to decide whether any of these planets might have life on them, encouraging them to say why. Remind the children to check the freezing and boiling temperatures for water to make sure their planet could have water, i.e. between 0°C–100°C. ▪ Once the children have gone through all of the planets, get them to discuss which ones they think humans could live on and why. You could also ask them which one they would like to see and why. ▪ Pupils create a fact file for one of the planets, which should include a picture of what the planet might look like based on what they know about it. <p><u>Key questions</u></p> <ul style="list-style-type: none"> ▪ Why is temperature so important for life? ▪ Why would temperature affect liquid water? ▪ Decide whether any of these planets might have life on them? And why? ▪ Which planets do you think humans can live on and why? 	
	<p>Previous Learning Experiences:</p> <p>– Rocket to the moon</p>	
<p>Possible Community Links/trips</p>	<p>Future Learning Experiences:</p>	
	<p>Future computing experiences and lessons throughout the school from Years 3-6.</p>	