

**Unit Aims** - In this unit, learners will develop their understanding of computer systems and how information is transferred between systems and devices. Learners will consider small scale systems as well as large scale systems, explaining the 'input - process - output' aspects of a variety of different real world systems.

**Progression of Learning (Prior Learning)** - Learners applied their knowledge of networks to appreciate the internet as a 'network of networks'. Children have also explored the World Wide Web for themselves and learnt about who owns content.

**Progression of Learning (Future Learning)** - In Year 6, the children will learn about the World Wide Web as a communication tool, comparing different search engines and internet based communications.

Core Computing Knowledge/Skills	Lesson Sequence [Curriculum Time - Minimum 6 hours]
<p><b>What is a computer system?</b></p> <ul style="list-style-type: none"> <li>- To know that computers can be connected together to form systems.</li> <li>- To know and explain that systems are built using a number of parts.</li> <li>- To know that a computer system features inputs, processes and outputs.</li> <li>- To know that computer systems communicate with other devices.</li> </ul>	<p><b>What is a computer system?</b></p> <p><b>Vital Vocabulary</b> (system, connection, digital, input, process, output).</p> <p><b>Part 1: Explanation</b> → <i>Exploring</i> (Pose the question, 'What is a system?') Explore the children's prior learning from Year 3 and 4).</p> <p><b>Part 2: Structured Discussion</b> → <i>Problem solving and collaborating</i> (Apply their knowledge of systems to the context of a bike, describing the different systems on it, such as the steering system. Further examples can be found on the pre-made PowerPoint slides. Expand on this understanding to a digital system, exploring the concept of an 'input, process and output'. Discuss the Talking Teddy on slide 8, to describe the 'input, process and output' model).</p> <p><b>Part 3: Journaling</b> → <i>Creating and applying</i> (Go to slide 9 and show learners an example of a smart locker. Ask learners to think about the processes and steps involved, right from ordering up to the collection point. Complete activity 3 to record ideas). <b>[Evidence in 'Pupil Files' on Pupil Share]</b>.</p> <p><b>Part 4: Reflection Time</b> → <i>Sharing and debugging</i> (Can the children summarise what a system is?)</p>
<p><b>How do we use computer systems?</b></p> <ul style="list-style-type: none"> <li>- To know and recognise the role of computer systems in our lives.</li> <li>- To know tasks that are managed by computer systems.</li> <li>- To know that there are human elements of a computer system.</li> <li>- To know and explain the benefits of a given computer system.</li> </ul>	<p><b>How do we use computer systems? [Unplugged Lesson]</b></p> <p><b>Vital Vocabulary</b> (system, connection, digital).</p> <p><b>Part 1: Explanation</b> → <i>Exploring</i> (Once again, revisit the word 'system' in talk partners and ask the children to consider what computer systems they can think of that are used around them in their everyday lives. Show learners slide 4 and ask them to tell a partner how to cross the road safely, using the crossing).</p> <p><b>Part 2: Structured Discussion</b> → <i>Problem solving and collaborating</i> (Use slide 5 and pose the pre-made questions. Children to complete the activity 1 handout with a partner to compare timed vs sensor crossing).</p> <p><b>Part 3: Journaling</b> → <i>Creating and applying</i> (Show slides 9 and 10, with the children working in groups of 3. Provide the children with activity sheet 2 and ask them to cut the statements up and group under the correct heading. Once sorted, show the children slide 11 and ask them to identify which tasks are done by people and which are done by computers. <b>Challenge</b> → Use slide 12 as a next step opportunity). <b>[Evidence in 'Pupil Computing Journal' on Seesaw]</b></p> <p><b>Part 4: Reflection Time</b> → <i>Sharing and debugging</i> (Reflect on how a system has helped both the customers and employees).</p>
<p><b>How is information transferred over the internet?</b></p> <ul style="list-style-type: none"> <li>- To know that data is transferred using agreed methods over the internet.</li> <li>- To know that network digital devices have unique addresses.</li> <li>- To know and explain that data is transferred over networks in packets.</li> </ul>	<p><b>How is information transferred over the internet?</b></p> <p><b>Vital Vocabulary</b> (protocol, address, packet).</p> <p><b>Part 1: Explanation</b> → <i>Exploring</i> (Explain to the children that in computer system the different parts of the system are sometimes not near each other and sometimes not even in the same country! Show learners slide 4 and ask them to consider how they communicate with each other. Ask them what they need to do to hear each other, but not speak all the time (link to listening ladder). Introduce the word 'protocol').</p> <p><b>Part 2: Structured Discussion</b> → <i>Problem solving and collaborating</i> (Show children slide 7 and explore which of the six addresses will reach the correct destination. Ask them to reason why and why not. Show children the IP address on slide 9 and explain that this is the address, however it is an address for a computer. Play the video link on slide 11: <a href="http://www.bbc.co.uk/bitesize/topics/z7wth9q/articles/z3thgk7">www.bbc.co.uk/bitesize/topics/z7wth9q/articles/z3thgk7</a>).</p> <p><b>Part 3: Journaling</b> → <i>Creating and applying</i> (Show slide 12 and explain to learners that they will be sending messages as packets of information. Discuss and model how a simplified example of a packet works and where the information goes in the boxes. Using activity 3, provide each learner with three packet strips to complete with a question. <b>Note, at this stage, learners do not complete the address section (to and from).</b> Show slide 14 and select 10 learners. Send 5 learners to each side of the room in a space. Give each of these 10 learners a number from 1-10, this will act as their address. Tell them to add this to the packets as the 'from address'. Ask the rest of the class to spread across the room, to ensure that no packets get stuck. When a message has been received, the recipient can reply and send a message back in another packet. The class should demonstrate the model practically - refer to slide 14). <b>[Evidence in 'Pupil Computing Journal' on Seesaw]</b></p> <p><b>Part 4: Reflection Time</b> → <i>Sharing and debugging</i> (Ask learners to work in pairs and consider the questions on slide 15).</p>
<p><b>How does sharing information help us to work together?</b></p> <ul style="list-style-type: none"> <li>- To know that sharing information online lets people in different places work together.</li> <li>- To know that I can send information over the internet in different ways, allowing different media to be shared.</li> <li>- To know that digital devices can allow us to access shared files that have been stored online.</li> </ul>	<p><b>How does sharing information help us to work together? [Part A].</b></p> <p><b>Vital Vocabulary</b> (chat, explore, slide deck).</p> <p><b>Part 1: Explanation</b> → <i>Exploring</i> (Complete retrieval questions on slide 3. Introduce slide 4 and explain that people who are not in the same location may need to work together. Ask the children how this might be done practically e.g. phone calls, travel meetings etc).</p> <p><b>Part 2: Structured Discussion</b> → <i>Problem solving and collaborating</i> (Learners to consider the pro's and con's of the different options on slide 5. Apply this knowledge to the project below).</p> <p><b>Part 3: Journaling</b> → <i>Creating and applying</i> (Explain to learners that they will be producing an information pack about an animal in a zoo, but will remain in their seats and can only communicate using the chat function. Children to use Office 365 online, to access the activity 2 template, saved in Pupil Files. <b>Note, the teacher should create 10 group documents in advance, that the children can then collaboratively work on.</b> Model how to use Office 365 online, including the chat function. <b>Note, this is the start of the project and should not be fully finished in this lesson.</b>) <b>[Evidence in Pupil Files on Pupil Share]</b></p> <p><b>Part 4: Reflection Time</b> → <i>Sharing and debugging</i> (Use slide 10 to ask learners to reflect on their shared working so far).</p>
<p><b>How does sharing information help us to work together? [2]</b></p> <ul style="list-style-type: none"> <li>- To know and apply strategies to ensure successful group work.</li> <li>- To be able to compare working online with working offline.</li> </ul>	<p><b>How does sharing information help us to work together? [Part B].</b></p> <p><b>Vital Vocabulary</b> (chat, explore).</p> <p><b>Part 1: Explanation</b> → <i>Exploring</i> (Complete the working together speaking and listening task on slide 4, reflect on What Went Well (WWW) and Even Better If (EBI)).</p> <p><b>Part 2: Structured Discussion</b> → <i>Problem solving and collaborating</i> (How could the children use this unplugged activity to continue with their project?)</p> <p><b>Part 3: Journaling</b> → <i>Creating and applying</i> (Children to continue with their projects in groups). <b>[Evidence in Pupil Files on Pupil Share]</b></p> <p><b>Part 4: Reflection Time</b> → <i>Sharing and debugging</i> (Children to complete the shared drawing task on the pre-made PowerPoint. Teacher to model how this could be applied to Scratch, using the example on the slide).</p>
<p><b>Exit Task and Snapshot Completion</b></p>	<p>At the end of the unit, complete the pre-made multiple choice questions, assessing knowledge from across the unit. These should be completed on a computer (each child to save individually) and peer-assessed, prior to teacher judgements being made. <b>[Evidence in 'Pupil Files' on Pupil Share]</b>.</p>

Our Rainbow Promises:

- Encourage **R**esilience and perseverance
- Develop **A**rticulate learners
- I**nfluence aspirations
- N**urture curiosity
- Instil **B**ritish and Christian Values
- Provide **O**pportunities to build upon knowledge and skills
- Promote **W**ellbeing and Health

Cross-Curricular Links:

Wider Reading Opportunities:



Unit Specific National Curriculum Coverage:

- Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.
- Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.
- Understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration.
- Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.
- Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Education for a Connected World Links (Online Safety):

- I can assess and justify when it is acceptable to use the work of others.
- I can give examples of content that is permitted to be reused.

Lesson Part:	Transferable Concept(s):
1. Exploration 	→ Exploring
2. Structured Discussion 	→ Problem solving and collaborating
3. Journaling 	→ Creating and applying
4. Reflection Time (Computational Thinking) 	→ Sharing and debugging

Across the academic year, these transferable concepts are **revisited** within the context of a 'spiral curriculum' to develop **computational thinking and creativity**.

Teaching Resources:  
Outline of lesson resources from 'Teach Computing Curriculum' [T.C.C] (provided by the National Centre for Computing Education).  
Office 365 Online.

<b>R</b>	Our bespoke approach to teaching and learning uses open-ended tasks, aimed to encourage resilience, perseverance and computational thinking.
<b>A</b>	Opportunities to use and apply carefully selected vital vocabulary within structured discussions (part 2 of the lesson sequence). Oracy Link [Speak It] - 'Talk It' through structured discussion activities.
<b>I</b>	The opportunity to become a Digital Leader and explicit links to Computing-based careers, to encourage active participants in a digital world.
<b>N</b>	Using a range of information technology, to encourage real-world computational thinking and creativity.
<b>B</b>	Christian Values: Friendship, respect, creativity, perseverance. British Values: Mutual respect, Rule of Law, Individual Liberty. SMSC embedded throughout.
<b>O</b>	Knowledge and skills are progressively sequenced; refer to unit planning overleaf and wider progression document(s).
<b>W</b>	National Online Safety units are taught each half-term through our Parish Spirit Curriculum. This is supported by regular retrieval and reinforcement within our Computing Curriculum offer, linked to the Education for a Connected World Framework (see above).

Vital Vocabulary:  
system  
connection  
digital  
input  
process  
output  
system  
connection  
digital  
protocol  
address  
packet  
chat  
explore  
slide deck  
chat  
explore

