FOR GRADE
7

COMPUTER WHIZ

TEACHING GUIDE

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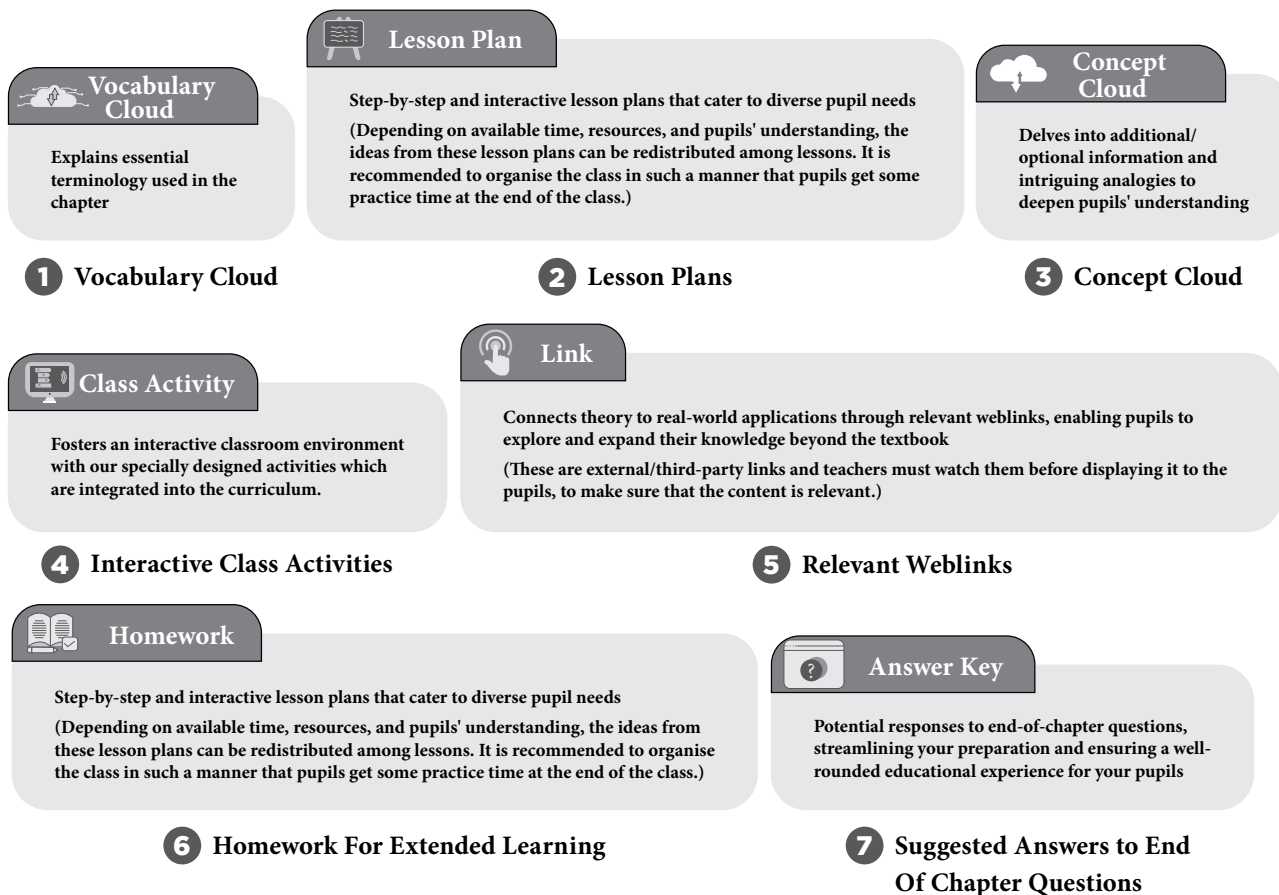available from such sites or resources

Introduction

Computer Whiz books 6-8 extend the comprehensive *Computer Whiz* series to lower secondary grades. Aligned with the National Curriculum of Pakistan 2022, *Computer Whiz 6-8* is a diligent attempt to provide necessary knowle.g. skills, and attitudes compatible with modern developments in computers and technology.

Pupils of today need to learn how technology can be used to tackle with various socio-economic challenges, e.g. global warming, climate change, sustainable development, food shortage, etc. It is imperative for pupils to study computer science because it fosters creativity, critical thinking, and problem-solving skills that will nurture their digital entrepreneurial skills and prepare them for the future job market. This series will enable them to master essential digital skills (word processing, presentation, spreadsheets, photo editing, etc.), the fundamentals of coding and programming, and understand the ethical norms, behaviours, and practices in the digital world.

KEY FEATURES

Each book in this series comprises of six domains.

1. ICT FUNDAMENTALS
2. DIGITAL SKILLS
3. ALGORITHMIC THINKING AND PROBLEM SOLVING
4. PROGRAMMING
5. DIGITAL CITIZENSHIP
6. ENTREPRENEURSHIP IN DIGITAL AGE

The content in each chapter is supported by

Vocabulary Cloud

Explains essential terminology used in the chapter

Lesson Plan

Step-by-step and interactive lesson plans that cater to diverse pupil needs

(Depending on available time, resources, and pupils' understanding, the ideas from these lesson plans can be redistributed among lessons. It is recommended to organise the class in such a manner that pupils get some practice time at the end of the class.)

Concept Cloud

Delves into additional/ optional information and intriguing analogies to deepen pupils' understanding

1. **Vocabulary Cloud**
2. **Lesson Plans**
3. **Concept Cloud**

Class Activity

Fosters an interactive classroom environment with our specially designed activities which are integrated into the curriculum.

Link

Connects theory to real-world applications through relevant weblinks, enabling pupils to explore and expand their knowledge beyond the textbook

(These are external/third-party links and teachers must watch them before displaying it to the pupils, to make sure that the content is relevant.)

4. **Interactive Class Activities**
5. **Relevant Weblinks**

Homework

Step-by-step and interactive lesson plans that cater to diverse pupil needs

(Depending on available time, resources, and pupils' understanding, the ideas from these lesson plans can be redistributed among lessons. It is recommended to organise the class in such a manner that pupils get some practice time at the end of the class.)

Answer Key

Potential responses to end-of-chapter questions, streamlining your preparation and ensuring a well-rounded educational experience for your pupils

6. **Homework For Extended Learning**
7. **Suggested Answers to End Of Chapter Questions**

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01. EMERGING TECHNOLOGIES

After completing this chapter, pupils should be able to:

- describe the progression of technology in the five generations of computers,
- describe the following emerging technologies and their applications:
  - o Robotics
  - o Artificial Intelligence (AI)
  - o Self-Driving cars
  - o 3D printing
  - o Virtual Reality (VR)
  - o Augmented Reality
  - o 3D Hologram

Introduction for the teacher

Pupils must understand the five generations of computers and emerging technologies as it provides them with a historical perspective on the evolution of computing. Each generation represents a significant advancement, from vacuum tubes to artificial intelligence. This knowledge aids in appreciating the rapid progress in computing power and capabilities.

Moreover, familiarity with emerging technologies like AI, quantum computing, and biotechnology equips pupils to navigate a tech-driven world, fostering critical thinking and innovation. It empowers them to make informed decisions about their career paths and contributions to society, enabling them to harness technology effectively for solving complex problems. This awareness enhances digital literacy and prepares pupils to adapt to future technological shifts, ensuring they remain competitive and active participants in the digital age.

Vocabulary Cloud	
VR	Virtual Reality
AR	Augmented Reality
AI	Artificial Intelligence
Cloud Computing	Delivery of computing services, including storage, processing power, and software, over the Internet (the cloud) to provide on-demand access to resources and services.

Lesson plan 1

Resources
✓ Textbook pages 1-3

✓ Index cards and sticky notes

✓ Soft board or white/black board to put index cards or sticky notes in a linear order.

Starter activity (5 min)

Here are some introductory questions to teach pupils about the five generations of computers and the progression of technologies: (It is expected that pupils will have prior knowledge about the generations of computer as it has been covered earlier in Computer Whiz 6)

- What is a computer, and how do you think it has evolved over the years?

- Can you name some common electronic devices that use computer technology today?

- Have you ever heard of the first generation of computers? What do you think they were like compared to today's computers?

- Have you ever seen a computer that took up an entire room? How do you think it compares to our home or school computers?

- What are some ways computers have impacted our daily lives and industries throughout history?

Reading and explanation (30 min)

Pupils have already identified the five generations of computers and their timelines in Computer Whiz 6. Here the focus will be on the evolution of technology linked to the generation-to-generation progression of computers. Activate their prior knowle.g. build on the concept of computer generations, and explain that technology used in computers has evolved significantly over time. Read pages 1-3. Provide a brief overview of the five generations of computers, highlighting the key advancements and changes in technology that occurred in each generation.

Emphasise the exponential growth in processing power, storage capacity, miniaturization, and accessibility. Describe the advancements and characteristics of each generation.

Class activity: Divide pupils into small groups and provide each group with a set of index cards or sticky notes. Assign each group a specific generation of computers (e.g. first generation, second generation, etc.). Instruct pupils to research and create a timeline of significant events, inventions, and advancements that took place during their assigned generation. They should write each event on a separate index card or sticky note and arrange them in chronological order on a wall or whiteboard.

Conclusion (5 min)

- How has the evolution of computers impacted society, businesses, and individuals?

- In your opinion, what do you think could be the potential future advancements in computer technology beyond the fifth generation?

Classwork (2 min)
✓ Do part B from the workstation.

Homework assignment
✓ Do question 2 from part D

Pre-reading: Textbook pages 4-8

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Lesson plan 2

Resources

✓ Textbook pages 4-8

Starter activity (5 min)

To engage pupils in learning about emerging technologies and their applications, start with these introductory questions:

- What do you know about robotics, and can you think of some examples where robots are used in our daily lives?

- Have you ever heard of Artificial Intelligence (AI)? How do you think AI is different from human intelligence, and where can we find AI in our surroundings?

- Have you ever heard of a self-driving car? How do you think they work, and what are the advantages of having self-driving cars on the roads?

- Have you ever seen or used a 3D printer? What do you think are some practical uses of 3D printing technology?

- Have you experienced Virtual Reality (VR) or Augmented Reality (AR) before? What are the differences between VR and AR, and how can they be applied in entertainment, education, or other areas?

Reading and explanation (20 min)

Describe each emerging technology followed by a brainstorming question. Some interesting facts about each technology are also listed to gauge pupils' interest.

1. Robotics:

✓ Define robotics and its applications in manufacturing, healthcare, and exploration.

✓ Discuss examples like industrial robots and robotic surgeries.

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- ✓ Did you know that the word 'robot' was first introduced in a 1920 play called 'R.U.R.' by Karel Čapek? It comes from the Czech word 'robota,' which means forced labor.

- ✓ Robots can be inspired by animals. For example, the cheetah robot mimics the speed and agility of a cheetah to run quickly.

- ✓ Some robots can even learn from their mistakes. They use a process called machine learning to improve their performance over time.

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2. Artificial intelligence (AI):

✓ Define AI and its ability to mimic human intelligence.

✓ Explain AI's use in virtual assistants and recommendation systems.

Concept Cloud

✓ AI can be found in everyday things like voice assistants (e.g. Siri, Alexa) and recommendation systems (e.g. Netflix suggesting movies).

✓ AI can play chess and even beat human champions. IBM's Deep Blue defeated chess grandmaster Garry Kasparov in 1997.

✓ AI helps diagnose diseases faster and more accurately by analysing medical images, such as X-rays and MRIs.

3. Self-driving cars:

✓ Introduce autonomous vehicles and their potential benefits.

✓ Discuss challenges and safety concerns.

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✓ Self-driving cars use sensors and cameras to navigate and make decisions on the road.

✓ Google's self-driving car project, now called Waymo, began in 2009 and has driven millions of miles autonomously.

✓ Self-driving cars can reduce traffic accidents because they don't get tired or distracted like human drivers.

4. 3D printing:

✓ Define 3D printing and its applications in prototyping and manufacturing.

✓ Mention medical applications like prosthetics.

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✓ With 3D printing, you can create physical objects layer by layer from a digital model.

✓ NASA uses 3D printing to make spare parts for the International Space Station.

✓ Some people have even 3D-printed houses and prosthetic limbs.

5. Virtual reality (vr) and augmented reality (ar):

✓ Explain VR's immersive experience and AR's overlay of digital information.

✓ Discuss gaming, training, and educational uses.

Concept Cloud

✓ VR can transport you to different worlds, like exploring the bottom of the ocean or travelling to outer space.

✓ AR overlays digital information onto the real world, like Pokémon GO, where you catch virtual creatures in your neighborhood.

✓ VR and AR are used in education to make learning more interactive and engaging.

6. 3D holograms:

✓ Define holograms and their use in entertainment and visualization.

✓ Mention advancements like holographic displays.

☁ **Concept Cloud** ✕

✓ Holograms create 3D images that appear to float in the air without the need for special glasses.

✓ A famous singer's hologram performed at the Coachella music festival in 2012, stunning the audience.

✓ Holographic displays are being developed for use in medical imaging and design.

Teaching these topics with these fun facts can capture the imagination of pupils and make learning about emerging technologies exciting and engaging. Consider using online videos to help pupils visualize and understand these concepts better. You may use the following online links which are grade appropriate:

👆 **Links**

✓ https://www.youtube.com/watch?v=kQPC4_DsJ8I

✓ https://www.youtube.com/watch?v=id86HeV-Vb8

Conclusion (5 min)

• Discuss with the pupils how technology has evolved over the years.

Classwork (10 min)

✓ Do Part A and C from the workstation.

✓ Do Questions 1, 3 and 4 from part D.

Homework assignment

✓ Do part E from the workstation.

✓ Ask pupils to write a short paragraph or make a presentation on the emerging technology they find most fascinating and why. Encourage them to explore technologies that aren't listed in the textbook.

Suggested answers to end-of-chapter questions on pages 8 to 9

A. Fill in the missing blanks

1. Transistors

2. Tele-operated robots

3. Augmented reality

4. Objects

5. Photographic projection

B. True/false statements

1. True

2. True

3. True

4. False. It is a simulated 3-dimensional environment that allows users to explore and interact with a virtual world.

5. True

C. Choose the correct option

1. b

2. a

3. b

4. d

5. a

D. Short-Answer Questions

1. It refers to the continuing development of an existing technology. In a world driven by digital solutions, new technologies continue to influence the way we live, work, and interact.

2. A transistor is a semiconductor-based device that amplifies, controls and generates electrical signals. Transistors replaced the large vacuum tubes, in second-generation computers.

3. Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions.

4. Pupils can answer this question by reviewing these two topics on pages 7 and 8 of the chapter.

5. A vehicle that can sense its surroundings and function without human intervention is an autonomous vehicle or a self-driving car. These cars have artificial intelligence-based systems that use past data to learn and then perform the same task without human interaction.

E. Long-Answer Questions

1. Pupils will answer this question through their overall understanding of the chapter. They can refer to emerging technologies such as Virtual Reality, robotics, 3D printing, etc. to build their response.

2. Robotics is a merger of engineering and computer science. It involves the design, construction, operation, and use of robots. The types of robots include pre-programmed, humanoid, teleoperated, augmenting, and autonomous. Pupils can build on these points to demonstrate their understanding.

3. For this answer, pupils can consult online sources. A basic answer is as follows:

A 3D hologram displays a 3D image by using lasers to create a special pattern on a surface. When light shines on this pattern, it makes the 3D image appear in space, like magic.

4. Pupils will answer this question through their overall understanding of the chapter. They can refer to emerging technologies such as Virtual Reality, Augmented Reality, 3D printing, etc. to build their response. They can also consult online sources to elaborate on how these latest technologies impact human lives.

02 HARDWARE COMPONENTS

Introduction for the teacher

In today's digital age, computers are omnipresent, and understanding their fundamental workings is a crucial life skill. Familiarising pupils with computer hardware instills digital literacy. It empowers them to use computers confidently for various tasks, from school assignments to future careers. Moreover, it promotes problem-solving skills. Pupils can troubleshoot basic issues and make informed decisions when upgrading or repairing computers.

It aligns with STEM (Science, Technology, Engineering, and Mathematics) education, which is increasingly important in the job market. A solid foundation in computer hardware can open doors to exciting STEM fields. As technology evolves rapidly, understanding hardware is a stepping stone to comprehending advanced concepts like artificial intelligence, data science, and programming.

Incorporating engaging instructional materials can further enhance the learning experience, making it less monotonous and more captivating for pupils.

Vocabulary Cloud	
NIC	Network Interface Card
Heat sink	Hardware used to maintain optimal temperature in a computer system
RAM	Random Access Memory
ROM	Read Only Memory
CPU	Central Processing Unit
HDD	Hard Disk Drive
SSD	Solid-State Drive
HDMI	High Definition Media Interface

Lesson plan 1

Resources

✓ Textbook pages 11-13

✓ Computer or laptop for demonstration

✓ Diagrams or visual aids of computer's internal and external hardware components

✓ Various computer peripherals (mouse, keyboard, microphone, camera, USB flash drive, scanner, printer, etc.)

Starter activity (5 min)

Begin with a short discussion on what pupils already know about computers. Ask questions like,

- What makes a computer work?

- Can you name any parts of a computer?

Reading and explanation (20 min)

Define computer hardware as the physical components of a computer that you can touch and see. Use an analogy to introduce the concept of computer hardware. For example, compare a computer to a human body, with the hardware being the bones and organs that enable it to function. Use real-life examples like the screen, keyboard, and mouse. Explain its types; internal hardware (built-in) and external hardware (attached). Provide examples of each, such as RAM (internal) and a USB drive (external).

Explain that internal hardware components are the parts inside the computer that enable it to function. Introduce the main internal and external components. Break down each component, explaining its importance in everyday technology. Use interactive diagrams to explain their roles. Discuss the functions of each of these components in detail. Relate each component to real-life examples. For instance, compare RAM to a workspace on a desk where you temporarily place things you're currently working on.

Make a chart of short referrable analogies such as:

Internal hardware components:

✓ **Motherboard:** The motherboard is like the central nervous system, connecting all the parts.

✓ **CPU:** The CPU is the brain, doing all the thinking and processing tasks.

✓ **RAM:** RAM is like short-term memory, storing information while the computer is on.

✓ **ROM:** Similar to long-term memory, ROM stores essential instructions for the computer.

✓ **HDD/SSD:** Hard Drives and Solid State Drives are like the computer's storage room, holding all your data.

✓ **Optical drive:** Think of it as the computer's library, reading and writing data from CDs or DVDs.

✓ **Heat sink:** A heat sink is like a cooling system, preventing the CPU from getting too hot.

✓ **GPU:** The Graphics Processing Unit is responsible for creating images and videos on your screen.

✓ **NIC:** The Network Interface Card connects your computer to a network, like a bridge to the Internet.

External Hardware Components:

✓ **Introduce and discuss various input and output devices with analogies:**

✓ **Input devices:** 'These are like the tools you use to interact with the computer—similar to pencils and notepads for writing.'

✓ **Output devices:** 'These devices show you the results of your work, like a TV displaying a show.'

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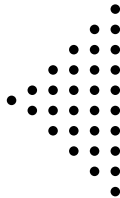
- ✓ **CPU:** The brain of the computer, responsible for processing instructions.
- ✓ **RAM:** Temporary memory for active tasks; faster access than storage.
- ✓ **Storage:** Holds data permanently; Hard Drive for larger storage, SSD for faster access.
- ✓ **Motherboard:** Connects all components and allows communication between them.
- ✓ **PSU:** Supplies power to the computer.

If possible, encourage pupils to do hands-on exploration in the lab. Set up different computer peripherals (mouse, keyboard, microphone, etc.) for pupils to explore. Discuss the purpose of each device and how it contributes to the overall computer experience. Ask questions about any components they find confusing or would like to know more about.

Refer to page 12. Show images of HDD, SSD, Optical Drive, and GPU. Then have the pupils identify these in a CPU if possible. Discuss the NIC (Network Interface Card) and its importance in Internet connectivity. Explain how NIC connects computers to networks. Show them a diagram of basic network diagram.

Conclusion (5 min)

Show images or diagrams of computer components. Ask pupils to identify whether they are internal or external hardware. Conclude the lesson by asking the following questions:

- Why is RAM called 'volatile' memory, and what are the implications of this for computer operation?
- What are the main differences between an HDD and an SSD in terms of speed, durability, and data storage?

Classwork (10min)

- ✓ Do part C from the workstation.
- ✓ Do questions 1 and 2 from part D.

Pre-reading: Textbook pages 15-19

Homework assignment

- ✓ Do questions 1 and 2 from part E.
- ✓ Provide a list of computer hardware components and have pupils match them with their corresponding pictures and functions.

Lesson plan 2

Resources

- ✓ Textbook pages 15-19
- ✓ Computers or laptops with various I/O ports
- ✓ Visual aids or diagrams of different I/O ports (Can be used from the books as well)
- ✓ Chart paper and markers
- ✓ Sample cables and connectors (optional, for demonstration purposes)
- ✓ A variety of devices with different ports (optional, for demonstration purposes)

Starter activity (5 min)

Begin with a discussion about the importance of I/O ports in a computer system. Ask questions like,

- Why do we need different types of ports?

- Can you name any ports you have seen on computers or other devices?

Reading and explanation (20 min)

✓ Refer to page 15. Introduce the concept of I/O ports using an analogy. Compare the ports to different types of doors or gates on a house, each serving a specific purpose. For example, a front door for people (USB), a garage door for large items (eSATA), and a mail slot for communication (Ethernet port). Refer to the collective chart of all the ports discussed in the chapter on page 15. Ask Pupils to identify and mark the ports they already know about. Present an overview of common I/O ports, briefly explaining each one. Highlight their purpose and the types of devices that connect to them.

Where possible, use analogies to relate each I/O port to real-world scenarios such as:

✓ **PS/2 port:** Like the keys on a piano, PS/2 ports connect to devices that help the computer 'play' various functions.

✓ **USB port:** Similar to a power strip, USB ports allow you to plug in multiple devices at once, expanding your computer's capabilities.

✓ **HDMI port:** Think of HDMI as a high-definition bridge, connecting your computer to a TV or monitor for clear visuals and sound.

Allow pupils to explore different types of cables and connectors. Demonstrate how each cable connects to specific ports and discuss the importance of matching the right cable to the right port, in the lab. If possible, Have pupils go around the lab to find devices or computers that have these ports. They should match each port with its corresponding device.

Conclusion (5 min)

- Summarise the key points discussed during the lesson, emphasizing the diversity and importance of I/O ports in computer systems.

Classwork (10 min)

✓ Do part A and B from the workstation.

✓ Do questions 3,4, and 5 from part D.

Homework assignment

✓ Do questions 3,4, and 5 from part E.

✓ Assign a project where pupils research and create a poster illustrating the different i/o ports and their applications.Suggested answers to end-of-chapter questions on pages 19 to 20

A. Fill in the missing blanks

1. Motherboard	**2.** Network Interface Card (NIC)	**3.** Heat sink
4. Apple	**5.** Input devices	

B. True/false statements

1. True	**2.** True.

3. False. The Port Type C typically consists of 24 pins, not 30.

4. True

C. Choose the correct option

1. a	**2.** d	**3.** b
4. b	**5.** a	

D. Short-Answer Questions

1. Pupils can name some of the following:

   Mouse, keyboard, microphone, camera, touchpad, USB flash drive, scanner, memory card.

2. Pupils can name some of the following:

   Display screen, printer, speaker, headphones, earphones and earbuds

3. Pupils can list some of the following differences:

Serial port:

   Data is transmitted one bit at a time.

   Uses a single cable.

   Suitable for longer distances.

   Used for devices like modems.

   Simpler and slower.

Parallel port:

   Data is transmitted in parallel.

   Uses multiple wires.

   Suitable for shorter distances.

   Used for devices like printers.

   Faster but more complex.

4. Pupils can list some of the following differences:

   HDMI (High-Definition Multimedia Interface):

   Standard-sized connector.

   Used in TVs, gaming consoles, etc.

   Supports 4K and 8K.

   Common in various devices.

   Mini HDMI (Mini High-Definition Multimedia Interface):

   Smaller, compact connector.

   Used in smaller devices like cameras.

   Supports high resolutions but is less common for 8K.

   Found in portable electronics.

5. Gigabit Ethernet is the newest form of Ethernet technology which can carry data at a rate of more than 10 Gigabits per second

E. Long-Answer Questions

1. PCIe lanes consist of two pairs of copper wires, typically known as traces, that run through the motherboard, connecting the PCIe-enabled device to either the processor or motherboard chipset. Pupils can build on this response to demonstrate their understanding.

2. Pupils will answer this question through their understanding and reference to pages 12 and 13 of the chapter.

3. Pupils will answer this question through their understanding and reference of pages 14 to 16 of the chapter.

4. Pupils can answer this question through their understanding of the topic I/O ports and the help of online sources. Examples include USB, HDMI, etc.

5. Pupils can answer this question by consulting online sources.

03 WORD PROCESSING AND PRESENTATION

After completing this chapter, pupils should be able to:

* define Word processors,
* create and edit a document using MS word,
* define Multimedia Presentations,
* create and edit a multimedia presentation using MS PowerPoint.

Introduction for the teacher

Proficiency in word processing using tools like MS Word is essential these days. It enables pupils to communicate effectively through typed documents, emails, and more. Teaching them how to create and edit documents fosters organisation, creativity, and the ability to present ideas coherently. This skill is invaluable for academic assignments and later in their careers.

Multimedia presentations are ubiquitous, from educational videos to business pitches. Defining multimedia presentations helps pupils grasp the concept of combining various media elements for effective communication.

Learning to create and edit multimedia presentations using tools like MS PowerPoint enhances their presentation skills. These skills are vital for sharing ideas persuasively in classrooms and beyond.

Lesson plan 1

Resources

✓ textbook pages 21- 34

✓ Microsoft Word installed on the computers in the lab

✓ Sample text document saved on the computer for pupils to edit.

Starter activity (5 min)

Here are some introductory questions to gauge pupils' interest:

* Have you ever created a document on a computer? What was it for, and what challenges did you face?

* How do you think technology has changed the way people write and share documents compared to the past?

* What do you think word processing means, and how do you imagine it can be useful in your life?

* Have you ever seen or used Microsoft Word? If so, what features do you already know about it?

Reading and explanation (30 min)

This unit must be taught in the lab. It is essential for pupils to have hands-on experience in exploring the various features of MS Word

Read page 21. Explain to the pupils that word processing is the creation, editing, and formatting of text documents using a computer. Discuss the advantages of using word processing software over traditional methods of writing.

Demonstrate how to open Microsoft Word and create a new document. Ask the pupils to familiarise themselves with the MS Word interface. Use the screenshots given on page 22 for reference. Using pages 25-35 as reference have pupils explore and practice the different features of MS Word. It does not have to be sequential. The aim is for pupils to become comfortable with using MS Word for day-to-day tasks. Other subject teachers can also be asked to assign homework to pupils such as writing essays in the form of Word documents. Introduce shortcuts such as saving a document is also possible by pressing 'Ctrl + s' on the keyboard

Divide the class into teams and ask them to explore as many features of MS Word as they can. A competitive/collaborative game will gauge your pupils towards creative and critical thought processes, and they will gain proficiency in MS Word along with it. You may use the following links for extended practice and hacks of MS Word.

⊕ Links

✓ https://www.investintech.com/resources/articles/beginnersmsoffice/

✓ https://edu.gcfglobal.org/en/word2016/#

Provide pupils with a sample text document. Instruct them to edit and format the document according to specific guidelines. Circulate the classroom to provide assistance and feedback as needed.

☁ Concept Cloud ✕

Here are some interesting facts about Microsoft Word that pupils will find fascinating:

✓ **Age of MS Word:** Microsoft Word, often called Word, has been around for quite some time. It was launched in 1983, making it nearly 40 years old! Imagine how technology has evolved since then.

✓ **Purpose:** MS Word is a graphical word processing program created by Microsoft. Its main purpose is to allow users to type and save documents. It's not just about typing; it has various tools to make documents more appealing and functional.

✓ **Widespread Use:** Microsoft Word is widely used by people around the world, including pupils, teachers, professionals, and writers. Learning how to use Word can be a valuable skill for various tasks, from school assignments to creating professional documents.

✓ **Constant updates:** Microsoft regularly updates Word to add new features and improve existing ones. This means that as you grow and learn, you can keep discovering new things you can do with Word.

✓ **Integration:** MS Word is often part of the Microsoft Office suite, which includes other useful softwares like Excel and PowerPoint. Learning Word can be a stepping stone to mastering these other programs too.

Conclusion (5 min)

Ask:

- How has word processing made writing and editing documents easier?

- In what ways can word processing software be used in everyday life?

- What are some potential careers that require word-processing skills?

Homework assignment

✓ Do part C from the workstation

✓ Do questions 2-3 from part D and questions 1-2 from part E

✓ Assign pupils a writing task, such as writing a letter or creating a brochure. Instruct pupils to use Microsoft Word to complete the task, including formatting the text and adding relevant images.

✓ Give pupils a short practice assignment to insert an image, create a table, and add headers/ footers to a document.

✓ Initiate a class project where the whole class could design a newsletter for their respective class on MS Word.

Lesson plan 2

Resources

✓ Textbook pages 34-39

✓ Microsoft Word installed on the computers in the lab

✓ Sample multimedia presentation created with MS PowerPoint.

Starter activity (5 min)

Here are some introductory questions to gauge pupils' interest:

- What comes to mind when you hear the term 'multimedia presentation'? Can you think of examples?

- Have you ever created or seen a multimedia presentation? What elements were included in it?

- Why do you think multimedia presentations are used in various settings, such as school, business, and entertainment?

- What do you know about Microsoft PowerPoint? Have you used it before, and if so, for what purpose?

Reading and explanation (30 min)

Show pupils a sample multimedia presentation created with MS PowerPoint. Ask them to discuss what elements they notice in the presentation (text, images, transitions). Have them share any prior experiences with creating presentations using MS PowerPoint.

☁ **Concept Cloud**   ✕

Here are some interesting facts about MS PowerPoint that pupils will find fascinating:

✓ **Original name:** PowerPoint was originally released in 1987 under the name 'Presenter.' It wasn't initially known as PowerPoint, which is quite different from its current name.
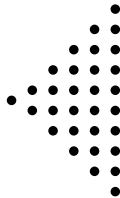
Here are some interesting facts about MS PowerPoint that pupils will find fascinating:

✓ **Original name:** PowerPoint was originally released in 1987 under the name 'Presenter.' It wasn't initially known as PowerPoint, which is quite different from its current name.

✓ **Not invented by microsoft:** Contrary to what you might think, Microsoft didn't invent PowerPoint. It was actually created by a company called Forethought Inc., and Microsoft later acquired it.

✓ **Versatile use:** PowerPoint is not just for business presentations. It has been used for various purposes, including creating art, playing karaoke, and more. It's a versatile tool beyond just slideshows.

✓ **Global impact:** PowerPoint is used worldwide and is the go-to software for creating presentations. Learning how to use PowerPoint effectively can be a valuable skill for school projects and future career opportunities.

✓ **Continuous evolution:** Over the years, PowerPoint has evolved with new features and improvements. It remains a popular and ever-changing tool for visual communication.

These facts show that PowerPoint has an interesting history and is a powerful tool with a wide range of applications. It's not just for school presentations; it has a rich background and can be used creatively in many ways. Read page 34. Explain the purpose of multimedia presentations and how they can enhance communication. Use the following points to explain the diverse impact of multimedia presentations.

☁ Concept Cloud ✕

A multimedia presentation is like a supercharged school project or report. It's a way to share information or ideas using not just words but also pictures, videos, sounds, and more. Here's why it's useful:

Engagement: Multimedia presentations are exciting because they capture your attention with visuals and sounds. It's like watching a cool movie about your topic.

Understanding: When you see pictures, diagrams, and videos, it helps you understand things better. It's like having a teacher explain with pictures.

Remembering: Multimedia presentations stick in your memory. Imagine learning through fun animations or interesting videos - you won't forget that!

Sharing: You can create your own multimedia presentations to share what you've learned. It's a fun way to teach others and show off your knowledge.

So, multimedia presentations are like using all your senses to learn and share information. They make learning more fun and effective, which is why we use them in school and beyond.

Ask pupils to refer to the screenshots on page 35 to familiarise themselves with the Interface of MS PowerPoint. Allow pupils to practice hands-on. Ask pupils to refer to page 36. Have them practice formatting text, resizing, and positioning images, and adding transitions between slides. Encourage pupils to experiment with different design elements and multimedia features. Ask pupils to refer to pages 37-38 and practice inserting new slides, deleting slides, and saving the presentation. Have them practice these tasks multiple times. Read page 39, and revise everything that has been covered in this chapter.

Refer to the query box on page 34 and encourage pupils to explore various other software applications that are used for multimedia presentation. Canva and Prezi complement PowerPoint presentations by offering distinct features for enhancing multimedia skills. Canva excels in graphic design and content adaptation, while Prezi stands out in dynamic and visually organised presentations. Utilizing both tools in education can provide a well-rounded multimedia learning experience, fostering creativity and effective communication.

☁ Concept Cloud ✖

Canva

- **Visual creativity:** Canva is renowned for its user-friendly interface, empowering users to create visually appealing graphics effortlessly.

- **Content adaptation:** It allows users to convert content into presentations seamlessly, making it suitable for multimedia projects.

- **Social media integration:** Canva offers easy integration with social media, simplifying the process of sharing multimedia creations.

- **Graphic design:** It fosters graphic design skills, enabling learners to create stunning visuals for various purposes.

Prezi

- **Dynamic Presentations:** Prezi specializes in dynamic, non-linear presentations, encouraging learners to think innovatively about how they present information.

- **Storytelling**: It promotes storytelling as an essential aspect of multimedia presentations, helping pupils engage their audience effectively.

- **Content Integration:** Prezi facilitates the integration of various media elements, enhancing multimedia skills.

- **Visual Organisation:** It encourages users to think visually about the organisation of content, improving their ability to structure multimedia presentations.

Conclusion (5 min)

Ask:

- How do you think multimedia presentations can enhance the communication of information compared to traditional text-based presentations?

- How does incorporating multimedia elements enhance the effectiveness of a presentation?

- What are some strategies for creating visually appealing and engaging slides?

- How can MS PowerPoint be used to effectively communicate information in a presentation?

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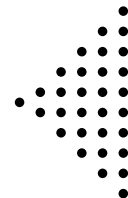
Homework assignment

✓ Do part A and B from the workstation.

✓ Do question 1 from part D and question 3 from part E.

✓ Assign pupils to create a simple presentation about a topic of their choice, using at least three slides, incorporating text and images.

Suggested answers to end-of-chapter questions on pages 39 to 40

A. Fill in the missing blanks

1. Quick Access Toolbar   **2.** Move   **3.** Left align

4. Indentation   **5.** Line Spacing

B. True/false statements

1. False. PowerPoint is primarily used for creating presentations, not table

2. True   **3.** True   **4.** True

5. False

C. Choose the correct option

1. d   **2.** a   **3.** a

4. a   **5.** d

D. Short-Answer Questions

1. The purpose of using the slide show in a PowerPoint presentation is to present your slides in a sequential and organised manner to an audience, making it easier to convey information, ideas, or messages effectively.

2. MS Word is used to make professional-quality documents, letters, reports, etc.

3. Pupils can list some of the following:

Cut | Copy | Paste | Format Painter | Font type | Font size | Bold | Italic | Underline | Strikethrough | Subscript | Superscript | Font color | Highlight color | Clear formatting | Alignment (Left, Center, Right, Justify) | Numbered list | Bulleted list | Decrease indent | Increase indent | Line spacing | Sorting options | Quick Styles | Change Styles | Create a Style | Find | Replace | Select | Select All | Print Layout | Full Screen Reading | Web Layout | Outline | Draft

E. Long-Answer Questions

1. Pupils will base their answers on their overall understanding of MS Word. Some examples include:

Borders, alignment, line and paragraph spacing, inserting images and tables, printing, etc.

2. Pupils will base their answers on their overall understanding of MS Word. Some examples include:

User-friendly, extensive formatting options, spelling and grammar check, printing, copy and paste, templates, integration of pictures, tables, etc.

3. Pupils can list and elaborate on the following features: Slides, templates, animations and transitions, texts and formatting, slideshow, multimedia, etc.

04 COMMUNICATION IN THE DIGITAL WORLD

Teaching Objectives

After completing this chapter, pupils should be able to:

- list the uses of the Internet,
- list the uses of electronic mail (e-mail),
- identify and explain the common platforms for electronic mail,
- create an e-mail address, and how to send electronic mail (tone, language, etc),
- explain the process of authentication. (Sign in to access the email etc),
- explain an appropriate use of email. (Signing out after usage etc),
- explain standard email protocols like SMTP and POP3 and implications for those who use them.

Introduction for the teacher

In an increasingly digitalized world, proficiency with communication tools is a fundamental aspect of digital literacy. Understanding how to use email effectively is a crucial skill for pupils' future academic and professional endeavors. Email is a tool for managing information. Pupils can learn how to organise emails, archive important messages, and use labels or folders for efficient information retrieval.

Email communication requires clear and effective written communication. Teaching pupils how to compose well-structured and polite emails helps them develop essential writing skills. Learning to use tools like Gmail introduces pupils to professional communication etiquette. This includes understanding formalities like greetings, subject lines, and signatures, which are essential for future job applications and workplace communication.

Teaching pupils about email also involves educating them about online safety, privacy, and responsible digital behaviour. They should understand how to identify phishing attempts and protect their personal information.

Proficiency in digital communication tools like Gmail is an asset in higher education and future careers. Many universities and businesses rely on email as a primary means of communication.

☁ Vocabulary Cloud	
POP	Post Office Protocol
IMAP	Internet Message Access Protocol
SMTP	Simple Mail Transfer Protocol

Lesson plan 1

Resources

✓ Textbook pages 41-47

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✓ Samples of different types of e-mails (e.g. personal, professional, newsletters, etc.); printed in hardcopy or displayed on a computer

Starter activity (5 min)

It's essential to start with introductory questions to gauge their prior knowledge and engage their curiosity. **Here are some questions to consider:**

• What is Email?

• Why Do People Use Email?

• What Are the Parts of an Email Address?

• What Are the Benefits of Using Email?

• What Is Gmail?

• Have You Ever Sent an Email Before?

Reading and explanation (20 min)

Begin by discussing the uses of the Internet given on page 41. Draw a web on the board and ask pupils to contribute additional uses of the Internet other than the ones given in the book.

Uses of Internet
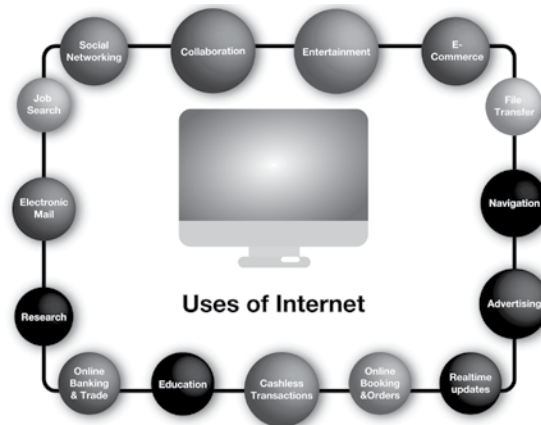
Continue the lesson by describing the importance of communication in today's digital age. Define what an e-mail is and how it differs from other forms of communication. Show examples of various types of e-mails (e.g. personal, professional, newsletters, etc.). Discuss the advantages and disadvantages of using e-mails. Engage pupils in a class discussion about their personal experiences with e-mails.

Introduce pupils to different e-mail service providers (e.g. Gmail, Outlook, Yahoo Mail). In the lab, refer to pages 42-43 and demonstrate how to create an e-mail account in Gmail. Now ask each pupil to create their own Gmail account.

Creating Gmail accounts for young school-age pupils requires careful guidance from teachers to ensure a safe and educational online experience.

Here's a guideline for teachers:

✓ **Educational purpose:** Emphasize that Gmail accounts are for educational purposes and should be used responsibly for school-related activities.

✓ **Parental consent:** Ensure that parents or guardians provide consent for creating Gmail accounts for their children.

✓ **Privacy education:** Educate pupils about the importance of privacy online. Teach them not to share personal information like addresses, phone numbers, or passwords.

- ✓ **Password security:** Instruct pupils to create strong passwords and explain the significance of password security.

- ✓ **Safe email contacts:** Encourage pupils to only communicate with known contacts, such as teachers and classmates, through their school Gmail accounts.

- ✓ **Cyberbullying awareness:** Discuss the concept of cyberbullying and make it clear that it's unacceptable. Encourage pupils to report any inappropriate behaviour.

- ✓ **Email etiquette:** Teach proper email etiquette, including how to address emails, write subject lines, and use a polite tone.

- ✓ **Safe attachments:** Advise pupils to be cautious when opening email attachments and not to open any from unknown sources.

- ✓ **Monitoring:** Explain that teachers or school administrators may monitor email accounts for safety and educational purposes.

- ✓ **Reporting issues:** Let pupils know how to report any issues or concerns related to their Gmail accounts to teachers or school staff.

- ✓ **Regular review:** Periodically review pupils' email activity to ensure it aligns with school guidelines.

- ✓ **Educational resources:** Share educational resources and tutorials on using Gmail effectively and safely.

- ✓ **Regular updates:** Keep pupils and parents informed about any updates or changes to email guidelines.

By following these guidelines, teachers can assist young pupils in creating Gmail accounts while fostering a safe and productive online environment for learning.

Ask pupils to identify various folders in the Gmail interface. Guide pupils through the process of composing an e-mail, including the subject, recipient, and message body. Refer to the instructions and screenshot on page 44. Teach pupils about the importance of proper e-mail etiquette, including using appropriate language, formatting, and attachments. Provide opportunities for them to practice creating and sending e-mails to each other individually or in pairs. Differentiate between the concept of replying to a mail and forwarding an email. Have pupils send mail to each other and practice both replying to and forwarding mails among fellows.
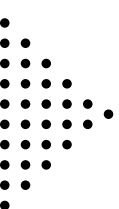
Read page 45-46. Explain the concept of an e-mail address and how it is used to send and receive messages.

Define what a password is and why it is important to have a strong password. Refer to page 46 and discuss with them the Two-step Verification process. Have them apply two-step verification on their Gmail accounts.

Discuss examples of how email can be used for means of authentication for another website.

Have pupils discuss and come up with strategies to create strong passwords for different online accounts. Have the groups share their strategies and discuss the importance of regularly updating passwords to ensure online security.

Read page 47. Introduce the concept of email protocols and explain that they are a set of rules or guidelines that govern the sending, receiving, and storage of emails. Explain the three main types of email protocols: POP, IMAP, and SMTP. Provide a brief description of each protocol and its functions. Show examples of how each protocol works using visual aids or diagrams online. Highlight the key differences between them.

IMAP

IMAP
Server

Client can
talk to
Multiple
servers

IMAP
Server

Multiple clients can talk
to the same account on
the same server - from
anywhere

Mail
Folders

Mail
Folders

IMAP Client

IMAP Client

Client decides
where to store
messages. Copy
them locally or
leave them on the
server

Client has full control over
their mail folders. Can
create, delete, purge or
move them around - even
between different accounts
on different servers

Mail
Folders

Mail
Folders

POP

POP
Server

Clients independently
download email.
Once downloaded it is
deleted from the server

POP Client

POP Client

Mail
Folders

Mail
Folders

SENDER — NETWORK — SMYP LINK — INCOMING & OUTGOING EMAIL — MAIL SERVER

RECEIVE — NETWORK — POP LINK — INCOMING & OUTGOING EMAIL — MAIL SERVER

Conclusion (5 min)

- Encourage pupils to engage in a class-wide discussion about the challenges and benefits of using e-mail as a form of communication.

Ask:

✓ Why is it important to have a strong password for your e-mail account?

✓ How can you ensure that your e-mail communication is clear and professional?

✓ What are some potential risks and challenges associated with using e-mail as a form of communication?

✓ Can you think of any real-life examples where understanding email protocols would be beneficial?

Classwork (10 min)

✓ Do part A, B, and C from the workstation

Pre-reading: textbook pages 50-53

Homework assignment

✓ Do part D and E from the workstation

✓ Ask pupils to research and find examples of different types of e-mails.

✓ Ask pupils to explore the interface of different e-mail service providers other than Gmail, such as Outlook and Yahoo Mail.

✓ Ask pupils to research and create a chart comparing the features and advantages of POP, IMAP, and SMTP protocols.

Suggested answers to end-of-chapter questions on pages 48 to 49

A. Fill in the missing blanks

1. Digital

2. Recovery email address

3. Two-factor authentication (2FA)

4. Internet Message Access Protocol

5. Email clients, email servers

B. True/false statements

1. False. You can insert multiple addresses in the To, Cc (Carbon Copy), and Bcc (Blind Carbon Copy) boxes of an email message.

2. False. It is possible to send emails to yourself.

3. True

4. True

5. False. Gmail is one of the most popular and widely used email platforms.

C. Choose the correct option

1. b

2. a

3. b

4. c

5. c

D. Short-Answer Questions

1. Emails are used to communicate and transfer various forms of data, e.g. documents, videos, photos, etc.

2. Refer to page 43 of the chapter.

3. To attach a file in an email:

   Open your email client or webmail.

   Compose a new email.

   Look for an attachment icon (usually a paperclip) in the email composition window.

   Click on the attachment icon.

   Select the file you want to attach from your computer or device.

   The file will be added to your email as an attachment.

4. The Cc (carbon copy) feature is for people who want to receive a copy of your email. The Bcc (blind carbon copy) feature is for hiding recipient's addresses and names from one another, for their privacy.

5. It adds an extra layer of security to your account in case your password is stolen.

E. Long-Answer Questions

1. Refer to pages 43 and 44 of the chapter.

2. Pupils can elaborate upon POP, SMTP, and IMAP protocols to demonstrate their understanding.

3. Refer to page 45 of the chapter.

4. Refer to page 46 of the chapter.

5. A strong password is important to protect your email account because it makes it significantly more difficult for unauthorized individuals to access your account. A strong password typically consists of a combination of upper and lower-case letters, numbers, and special characters. This complexity makes it harder for attackers to guess or crack your password, enhancing the security of your email account and the sensitive information it contains.

05 ALGORITHMIC THINKING AND PROBLEM SOLVING

After completing this chapter, pupils should be able to:

- explain the 4-step problem-solving process in computer science:
  - o Taking a look at the problem
  - o Creating an algorithm
  - o Coding
  - o Creating an algorithm
- describe computational thinking and its 4 steps:
  - o Decomposition
  - o Pattern recognition
  - o Abstraction
  - o Algorithm
- list applications and importance of algorithms,
- describe coding,
- define the stage of debugging and testing,
- describe Flowcharts and its symbols,
- describe facts, inputs, and outputs in an algorithm,
- describe control flow,
- describe and give examples of sequence, decision-making, and loop statements.

Introduction for the teacher

As technology continues to advance, computational thinking becomes a vital skill for the future workforce. It teaches pupils how to approach complex problems methodically, a skill that is applicable across various fields, not just computer science. It promotes critical thinking and analytical skills. Before developing solutions, pupils learn to break down problems into smaller, manageable parts (decomposition) and identify patterns (pattern recognition). This enhances their ability to think logically and solve real-world challenges.

Understanding algorithms helps pupils grasp the fundamental concepts behind computer programs and artificial intelligence. It demystifies the technology they interact with daily, making them more informed digital citizens.

Teaching problem-solving processes equips pupils with a structured approach to tackling issues. They learn to create step-by-step plans (algorithms) and iteratively refine solutions, fostering resilience and adaptability.

Computational thinking transcends traditional subject boundaries. It complements math, science, and even humanities subjects, making it a valuable addition to any curriculum.

These skills have practical applications beyond the classroom. Pupils can use computational thinking and algorithms to address personal challenges, such as time management or organising tasks efficiently. Moreover, in an increasingly competitive world, pupils who possess computational thinking skills will have a competitive edge. They can participate in emerging fields like data science, robotics, and artificial intelligence.

Lesson plan 1

Resources

✓ Textbook pages 50 - 52

Starter activity (5 min)

These introductory questions can spark pupils' interest and help them start thinking about the concepts of computational thinking, algorithms, and problem-solving in a relatable way. They provide a foundation for deeper exploration and learning in these areas.

- What do you think 'computational thinking' means, and how might it be useful in our everyday lives?

- Have you ever encountered a complex problem that felt overwhelming? How did you approach solving it?

- Can you think of examples where patterns play a role in our lives, such as in nature, mathematics, or even music?

- Have you ever solved a problem by coming up with a step-by-step plan? What was the problem, and how did your plan help?

Reading and explanation (20 min)

🖥 Class Activity

Display a problem-solving scenario on the board such as,

'You have completed your homework and put it in your folder, but when you arrive at school, you realise your folder is missing. Your homework is due today, and you need to find a solution before your first class.'

Ask pupils to identify the first step they would take in solving this problem. Here is an example of a possible response:

1. **Identify the problem:**

- Realise that the problem is your missing homework folder, and you need to come up with a solution quickly.

2. **Stay calm:**

- Take a deep breath and try not to panic. Stress can make problem-solving more difficult.

3. **Retrace your steps:**

- Think about where you last had your folder. Did you leave it at home, in a different bag, or in a classroom?

4. **Ask classmates:**

- Check with your classmates to see if they've seen your folder or if it got mixed up with their belongings.

5. **Check lost and found:**

- Visit the school's lost and found area to see if someone has found and turned in your folder.

6. **Contact teachers:**

- If you can't find your homework, contact your teachers and explain the situation. They may offer guidance on what to do next.

7. **Prepare a backup:**

- If you can't locate your original homework, be prepared to explain the situation to your teachers and offer to complete the assignment again if necessary.

Introduce the 4-step problem-solving process in coding.

a. **Taking a look at the problem:** - Explain the importance of understanding the problem before attempting to solve it.

b. **Creating an algorithm:** - Define what an algorithm is and its role in the problem-solving process.

c. **Coding:** - Discuss how coding is the process of translating the algorithm into a programming language.

d. **Testing and refining the algorithm:** - Emphasize the iterative nature of coding and the need to continuously improve the algorithm.

☁ Concept Cloud ✕

Here are the 4 steps made-easy:

Step 1 - Understand the Problem: Before diving into writing code, take the time to fully understand the problem. Read the problem statement carefully, clarify any ambiguities, and ensure you know what's expected.

Step 2 - Plan Your Solution: Once you grasp the problem's requirements, devise a plan for solving it. This might involve breaking the problem into smaller subproblems, designing an algorithm, or outlining the steps your code will take.

Step 3 - Implement Your Plan: Start writing your code based on the plan you've created. Follow best coding practices, use appropriate data structures and algorithms, and aim for clean and readable code.

Step 4 - Test Your Solution: Testing is a crucial step. Verify that your code works as expected by running test cases. Check for edge cases and handle potential errors. If your code doesn't produce the desired results, go back and debug it.

Demonstrate how to apply the process to a simple problem, involving the pupils in the discussion. The following link is useful to explore this topic more:

☝ Link

✓ https://www.freecodecamp.org/news/how-to-solve-coding-problems/

Show pupils a video clip of a complex problem-solving scenario (e.g. a Rubik's Cube being solved). Ask them to identify the different steps or processes that might be involved in solving the problem. Discuss as a class and make a list of the steps or processes identified by the pupils.

Read page 51. Introduce the concept of computational thinking and explain that it is a problem-solving method used by computer scientists and programmers. Explain the first step of computational thinking: decomposition. Define it as breaking down a complex problem into smaller, more manageable parts. After discussing the example of 'finding the best price for an airline ticket reservation online' given on page 51, provide more examples of decomposition in everyday situations (e.g. organising a messy room, or planning a party). Provide pupils with a worksheet or activity where they practice decomposing a problem such as planning a weekend trip into smaller tasks.

Present the second step of computational thinking: pattern recognition. Define it as identifying similarities or recurring elements in a problem. Show examples of patterns in different contexts (e.g. numbers, shapes, sequences). Engage pupils in a pattern recognition activity, such as completing number sequences or identifying geometric patterns.

Introduce the third step of computational thinking: abstraction. Explain that it involves focusing on essential details while ignoring irrelevant ones. Provide examples of abstraction in different scenarios (e.g. summarising a book, or creating a simplified map). Divide pupils into small groups and assign them a complex problem to solve. In their groups, have pupils practice abstraction by identifying the key elements and ignoring unnecessary details.

Define an algorithm as a step-by-step procedure for solving a problem. Emphasize that algorithms are used not only in computer programming but also in everyday life. Introduce the concept of computational thinking and explain how it involves breaking down complex problems into smaller, more manageable steps.

Refer to the following link to access additional teacher's resources on computational thinking. It is highly recommended that you use these resources to support pupils in-depth understanding and provide opportunities for hands-on activities.

🖱 Link

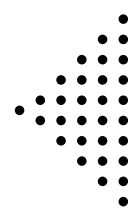✓ https://code.org/curriculum/course3/1/Teacher

Conclusion

Ask:

- How does understanding the problem help in finding a solution?

- Why is creating an algorithm an important step in coding?

- How does computational thinking apply to real-world scenarios beyond computer programming?

Classwork

✓ Do part A and B from the workstation using the textbook as reference.

Pre-reading: Textbook pages 52-53

Homework assignment

✓ Do part C from the workstation using the textbook as reference.

✓ Ask pupils to research online about Algorithms for the next class.

Lesson plan 2

Resources

✓ Textbook pages 52 - 56

Starter activity

These introductory questions can help set the stage for teaching Algorithms:

- Can you think of a sequence of steps you follow in your daily routine?

- Have you ever had to make a decision based on a situation? How did you decide?

- How might visual representations like flowcharts help us understand processes and algorithms?

- What comes to mind when you hear the word 'loop'? Can you think of examples where things repeat?

- Have you ever heard of coding or programming? What comes to mind when you think of it?

Reading and explanation (25 min)

Read page 52. Begin by defining what an algorithm is – a step-by-step set of instructions to solve a problem or complete a task. Ask pupils to name some popular websites or applications they use regularly. Prompt them to think about how these websites or applications provide personalized experiences based on their preferences and actions. Explain that algorithms play a crucial role in creating these personalized experiences. Just like the instructions that tell a chef how to cook a recipe or guide someone through assembling furniture, algorithms provide a set of precise steps to achieve a specific outcome.

Introduce other real-life examples of algorithms, such as Google's search algorithm, YouTube's recommendation algorithm, and online maps' route-finding algorithms. You may want to explain how these algorithms process vast amounts of data and provide personalized results based on user preferences and behaviours.

🖥️ Class Activity ✖

Divide pupils into small groups and assign each group a different real-life scenario where algorithms play a significant role, such as personalized advertisements, social media news feeds, or online shopping recommendations. Have each group discuss and analyse the impact of algorithms in their assigned scenario, considering both positive and negative aspects. Ask each group to present their findings and lead a class discussion on the importance and ethical considerations of algorithms in these scenarios.

Explain the concept of facts, inputs, and outputs in an algorithm, emphasizing their importance in problem-solving and decision-making processes. Provide pupils with several algorithm examples and guide them through the process of identifying and analysing the facts, inputs, and outputs in each one.

Read page 53 and describe a flowchart. Introduce the different symbols commonly used in flowcharts, such as start/end symbols, process symbols, decision symbols, and connector symbols. Explain the meaning and purpose of each symbol, using examples and visual aids/chart on page 54. Demonstrate how to create a flowchart step-by-step, using a simple algorithm or process. You may use the examples given on page 54. Model the process of translating an algorithm into a flowchart, emphasizing the accurate use of symbols.

Read pages 54-55. Discuss with pupils the role of coding in turning algorithms into executable instructions for computers. Introduce them to the concept of coding and its relationship to algorithms. Present examples of code snippets and explain how they relate to specific algorithms. Introduce the concept of debugging and explain its purpose in the software development process. Discuss the importance of debugging and testing code and why it is necessary for producing high-quality software. Present different debugging techniques and strategies, such as using print statements, using a debugger, and performing code inspections.

Provide a brief overview of control flow and its importance in programming. Explain the concept of sequence, emphasizing the step-by-step execution of instructions. Introduce decision-making statements/selection, such as if-else statements, and discuss their role in controlling the flow of a program. Discuss loop statements, including for loops and while loops, and demonstrate how they allow repeated execution of a block of code.

Conclusion

Ask:

- How do algorithms help us solve problems more efficiently?

- What are the key characteristics of a well-designed algorithm?

- How might algorithms evolve and shape our future experiences with technology?

- Why is it necessary to test and refine the algorithm in the problem-solving process?

- Why is it important to thoroughly test code before considering it complete?

Classwork (5 min)

✓ Do part D from the workstation.

Pre-reading: Textbook page 59

Homework assignment

✓ Do part E from the workstation.

✓ Have pupils create flowcharts to represent an algorithm for a simple task, such as making a sandwich or solving a simple Rubik's Cube.

✓ Assign pupils a task to research and present on a specific algorithm used in one of the mentioned applications (Google, YouTube, or online maps).

✓ Provide a few algorithmic problems to the pupils. Ask them to represent the solutions to these problems using flowcharts.

Suggested answers to end-of-chapter questions on pages 57 to 58

A. Fill in the missing blanks

1. Oval symbol
2. Diamond symbol
3. Graphical
4. Conditional
5. Start, end

B. True/false statements

1. True
2. True
3. True
4. True
5. True
6. True

C. Choose the correct option

1. a
2. d
3. a
4. d
5. a

D. Short-Answer Questions

1. An algorithm is a sequence of precisely described instructions for performing a task.

2. The decision-making statement is called an 'if statement'.

3. Characteristics of algorithms include precision, finiteness, facts, input, output, and effectiveness. Pupils can elaborate on these points through their overall understanding of the chapter.

4. Refer to page 55 of the chapter.

5. Some advantages of flowcharts include clarity, simplification, communication, and documentation. Pupils can further elaborate on these points through their understanding of the topic from the chapter.

E. Long-Answer Questions

1. Algorithmic problem solving is the process of finding a solution to a problem by defining a set of steps or instructions that, when executed in a specific order, lead to a desired outcome. It involves breaking down a complex problem into smaller, manageable parts and devising a systematic plan or algorithm to solve it. This approach ensures that problems can be tackled in an organised and logical manner, making it easier to reach a solution efficiently.

2. A flowchart is a diagram that describes the sequences of an algorithm in the correct order. Refer to page 55 of the textbook to further elaborate on this response.

3. Refer to pages 55-57 of the chapter.

4. Pupils will answer this question based on their overall understanding of the chapter.

5. Decomposition is crucial in problem-solving because it involves breaking down a complex problem into smaller, more manageable parts or sub-problems. Consequently, it simplifies complex problems, makes them easier to understand, and allows for efficient problem-solving. Pupils can further elaborate on this with examples to demonstrate their understanding.

06 THE NUMBER SYSTEM

After completing this chapter, pupils should be able to:

- describe that computers store information using binary codes,
- differentiate between binary and decimal number systems,
- explain that computer can only understand specific instructions. Text, image, and sound representation in computer,
- convert binary numbers into decimal numbers,
- convert decimal numbers into binary numbers,
- encode and decode text in binary using ASCII.

Teaching Objectives

Introduction for the teacher

Explaining that computers store information using binary codes helps pupils grasp the fundamental language of computers. This knowledge demystifies the inner workings of digital devices and empowers pupils to interact with technology more confidently. Moreover, differentiating between binary and decimal number systems is a fundamental mathematical concept. It not only enhances numerical literacy but also lays the groundwork for understanding more complex mathematical and computer science concepts in the future.

Teaching that computers can only understand specific instructions is vital for cultivating problem-solving skills. It introduces pupils to the logic-based nature of computing and encourages critical thinking. Also, understanding how computers represent text, images, and sound is crucial in a multimedia-driven world. It empowers pupils to be discerning consumers and creators of digital content.

Teaching conversion of binary numbers into decimals and vice versa is a practical skill with applications in computer programming and data analysis. It enhances their computational abilities and logical thinking. Moreover, introducing pupils to ASCII encoding and decoding connects computer science to language and communication. It demonstrates the intersection of technology and linguistics, fostering a holistic understanding of the digital world.

| ☁ **Vocabulary Cloud**	
EBCDIC	Extended Binary Coded Decimal Interchange Code
ASCII	American Standard Code for Information Interchange

Lesson plan 1

Resources

✓ Textbook pages 59- 65

Starter activity (5 min)

These introductory questions can help pupils connect with the topics and encourage them to think critically about how computers work and how numbers are integral in the digital space.
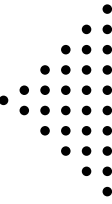
- Can you name some number systems that we use in everyday life?
- How do you think computers use numbers to process information? Is it similar to how we do it?
- Have you ever played a video game? How do you think a computer understands your commands when you play a game?
- What do you think happens when you save a file on a computer? How is this information stored?
- Have you heard of the term 'binary code' before? What do you think it might mean?

Reading and explanation (20 min)

Read page 59. Ask pupils to define the term 'data' and provide examples of data they encounter in their daily lives. Discuss the role of data in computer systems and how it is used to perform various tasks. Share a real-life scenario where a large amount of data needs to be processed quickly (e.g. online shopping, weather forecasting) and ask pupils to reflect on how computers handle such tasks. Introduce the concept of data representation and discuss different types of data formats (e.g. text, numbers, images, videos).

Explain the concept of binary code and how it represents data in computers. Discuss how computers use binary code to store and process information. Show a short video or interactive presentation that explains how computers understand data. Highlight key concepts such as bits, bytes, and data processing algorithms. Refer to the following link for additional content:

> 👆 **Link**
>
> ✓ https://homepage.cs.uri.edu/faculty/wolfe/book/Readings/Reading02.htm

You may use the following cafe analogy for pupils to grasp the idea that computers work with binary code, just as the cafe serves dishes based on binary recipes. It simplifies the concept and makes it more relatable.

> ☁ **Concept Cloud** ✕
>
> Imagine a computer as a cafe where the only language spoken is a secret code called 'Binary.' In this cafe:
>
> - **Explain that computers communicate using only two symbols:** 0 and 1, similar to a cafe menu with just two options, black coffee (0) and white coffee (1).
>
> - The processor (chef) in the cafe is responsible for preparing and serving dishes. Users place orders (instructions and data) in regular language (analog data), which the chef can't understand. To bridge this communication gap, a translator (menu translator) converts users' orders into binary recipes (0s and 1s), making them comprehensible to the chef.
>
> - Consider the recorded temperature of a city as an order. When this data is processed, it's like receiving an order for 'hot soup,' and the chef translates it into the binary recipe for 'hot soup.' The chef then serves the 'hot soup' (information) to the user after processing the binary recipe.
>
> - When you press a key on the keyboard, it's akin to sending a special binary signal to the chef, indicating what dish you desire. The chef interprets this binary signal and prepares the corresponding dish, effectively transforming data into information.

Read page 60. Introduce the concept of a number system and its purpose in representing numbers. Provide an overview of the four common types of number systems: decimal, binary, octal, and hexadecimal. Explain the base value and the number of allowed digits for each system. Refer to pages 62-63. Using examples and step-by-step explanations, demonstrate how to convert numbers between the different systems. Focus on decimal to binary and vice versa conversions.

Read pages 63-65. Introduce the concept of binary coding schemes and explain their purpose and importance in digital communication. Present EBCDIC, ASCII, and Unicode as three popular coding schemes used in computer systems. Discuss the characteristics and differences between EBCDIC, ASCII, and Unicode, focusing on their encoding methods and supported character sets.

Conclusion (5 min)

Ask:

- How does data differ from information? Give examples to support your answer.

- Why is binary commonly used in computer systems?

- How are decimal, binary, octal, and hexadecimal numbers used in real-world applications?

Classwork (10 min)

✓ Do part A and B from the workstation

✓ Do Questions 3-6 from part E

Pre-reading: Textbook page 68

Homework assignment

✓ Do part C and D from the workstation

✓ Do Questions 1 and 2 from part E

✓ Give each pupil a series of different binary numbers and ask them to convert it to Decimal numbers.

✓ Give a series of different decimal numbers to each pupil and ask them to convert it to binary numbers.

✓ Ask pupils to research and identify real-world examples where EBCDIC, ASCII, or Unicode encoding is used, and explain their findings.
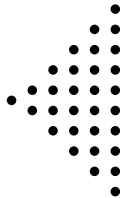
Suggested answers to end-of-chapter questions on pages 66 to 67

A. Fill in the missing blanks

1. 2	**2.** Decimal	**3.** O-7

4. American Standard Code for Information Interchange

5. Binary	**6.** Hexadecimal

B. True/false statements

1. True

2. False. Decimal to binary conversion typically involves repeated division-by-2, not division-by-10.

3. True

4. False. ASCII stands for 'American Standard Code for Information Interchange.'

5. True

C. Choose the correct option

1. b   **2.** c   **3.** d

4. b   **5.** a

D. Short-Answer Questions

1. The definitions are as follows:
   i. It is defined as a grouping of distinct facts or figures. Text, observations, figures, photos, numbers, graphs, or symbols are all examples of data.
   ii. Data that has been processed, organised, and structured is known as information.

2. In computers encoding and decoding are processes to transfer data from one format to another. Encoding is the process of petting a sequence into a specified format while decoding converts the encoded format back into the original sequence of characters.

3. A number system is a way to represent numbers. The four common types of number systems are the Decimal number system, the Binary number system, the Octal number system, and the Hexadecimal number system.

4. Text is typically converted to binary using the ASCII (American Standard Code for Information Interchange) coding system.

5. Computers are digital machines; thus they do not understand analog data. Instead, the computer saves data in digital or binary form because that is the language that the computer understands.

E. Long-Answer Questions

1. It's a process of converting a binary number (base 2) into its equivalent decimal number (base 10). Pupils can further elaborate on this based on their understanding of the topic.

2. ASCII (American Standard Code for Information Interchange): A widely used character encoding system that represents text characters as binary numbers.

EBCDIC (Extended Binary Coded Decimal Interchange Code): An older character encoding system used mainly on IBM mainframe computers.

Unicode: A modern character encoding system that includes a vast range of characters from different languages and symbols, providing a standardized way to represent text in various scripts.

Pupils can further elaborate on this to demonstrate their understanding.

3. $(1011011)_2$ in decimal is 91.

Pupils are required to show the steps.

4. $(1101011)_2$ in decimal is 107.

Pupils are required to show the steps.

5. $(11101110)_2$ in decimal is 238.

Pupils are required to show the steps.

6 **a.** 100 in binary is 1100100.
   b. 24 in binary is 11000.
   c. 39 in binary is 100111.
   d. 117 in binary is 1110101.

   Pupils are required to show the steps.

FUNDAMENTALS OF PROGRAMMING

After completing this chapter, pupils should be able to:

- define Programming language and visual programming tools,
- define the interface of Scratch programming IDE,
- create a multi-sprite – multi-script Scratch game.

Introduction for the teacher

Teaching programming concepts and Scratch game development to pupils not only introduces them to valuable technical skills but also nurtures problem-solving abilities, creativity, and a mindset for future learning and innovation. Understanding programming language introduces pupils to the foundational concepts of coding. It helps develop logical thinking and problem-solving skills, essential for various disciplines and future careers in technology. Programming also encourages computational thinking, which involves breaking down complex problems into smaller, manageable parts. This skill is valuable not only in computer science but also in various academic subjects and real-world scenarios.

Visual programming tools like Scratch provide a user-friendly environment for beginners. They allow pupils to grasp programming concepts without dealing with complex syntax. This lowers the entry barrier, making coding more accessible and enjoyable. Learning the interface of a programming environment like Scratch IDE (Integrated Development Environment) teaches pupils the basic layout and functionality of coding tools. This knowledge is transferable to other programming environments, fostering adaptability in the rapidly changing tech landscape.

Creating a multi-sprite, multi-script Scratch game is a hands-on, project-based learning experience. It engages pupils in a practical application of the programming concepts they've learned, promoting creativity, collaboration, and critical thinking.

Coding in Scratch can be difficult to teach as it is a relatively new language. However, it is imperative that you go into the classroom with confidence so that the pupils don't perceive coding as difficult. You can follow the following steps to self-learn Scratch from the official website:

Here's a step-by-step guide for teachers to use the Explore tab effectively:

Step 1: Access the explore tab

1. **Open scratch:** Log in to the Scratch website using your teacher account. (https://scratch.mit.edu/)

2. **Navigate to explore:** Once logged in, locate and click on the 'Explore' tab. This tab is typically found in the top menu bar of the Scratch website.

Step 2: Explore projects and studios

1. **Browse Projects:** Start by exploring various projects created by the Scratch community. Look for projects related to game development to gain insights and inspiration.
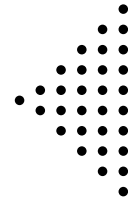
2. **Check studios:** Visit different studios that focus on game development. Studios are curated collections of projects centered around a specific theme or topic.

Step 3: Filter and search

1. **Use filters:** Utilize the search and filter options to narrow down projects based on difficulty level, coding concepts, or specific game types.

2. **Keyword search:** If you have a specific topic or game idea in mind, use the search bar with relevant keywords to find projects related to your interests.

Step 4: Analyse and learn

1. **Review project code:** Open projects that catch your attention and review the code. Take note of how different programming blocks are used to create various effects and functionalities.

2. **Examine comments:** Pay attention to any comments left by the project creators. Comments often provide insights into the coding choices and solutions.

Step 5: Experiment and remix

1. **Remix projects:** Feel free to remix existing projects. Remixing allows you to experiment with and modify the code, gaining hands-on experience with different coding techniques.

2. **Save remixes:** Save your remixes to your account. This creates a personal library of projects that you can refer back to later.

Step 6: Join scratch educator community

1. **Explore educator resources:** Visit the Scratch Educator Community within the Explore tab. Find resources, lesson plans, and support specifically designed for educators teaching Scratch.

2. **Connect with educators:** Engage with other educators in the community. Share your experiences, ask questions, and learn from the collective knowledge of the Scratch teaching community.

Step 7: plan for teaching

1. **Adapt projects:** Choose projects that align with your lesson objectives and the skill level of your pupils. Consider adapting projects to suit your specific teaching goals.

2. **Create studios:** Assemble studios with projects that form a coherent curriculum or learning path for your pupils.

☁ **Vocabulary Cloud**	
IDE	Integrated Development Environment
VPL	Visual Programming Language
Sprite	A sprite in Scratch is a character or object that can perform actions or have scripts attached to it. Sprites can be characters, animals, objects, or anything else you want to include in your project.
Script	A script in Scratch is a set of instructions or a sequence of code blocks that define the behaviour of a sprite.

Lesson plan 1

Resources

✓ Textbook pages 68-79

✓ Computer systems for pupils' use with Internet connectivity (This class needs to be conducted in the lab)

Note: Consider dedicating a separate session for after-class practice of scratch only.

Starter activity (5 min)

- Have you ever wondered how your favorite video games or animations are created?
- What if you could create your own interactive stories and games?
- What do you hope to achieve by the end of this Scratch adventure?

Reading and explanation (30 min)

Read page 88. A programming language is like a set of instructions that computers understand. It's how we communicate with computers to make them do specific tasks or solve problems. Ask pupils to think of it like giving directions to a friend. You use specific words and sentences to tell your friend what to do. Similarly, in a programming language, we use special words and symbols to tell the computer what steps to take.

Next, discuss visual programming language (VPL) as a type of programming language that uses visual elements like pictures, blocks, or icons instead of just text. It's designed to make it easier for people, especially beginners, to understand and create programs. Ask pupils to think of it like playing with building blocks. Each block represents a different action or command. Instead of typing, you connect these blocks to create a set of instructions for the computer. For example, in a VPL like Scratch, you might use colorful blocks to make a character move. There could be a block that says 'move forward,' another block that says 'turn right,' and so on. By connecting these blocks, you're creating a visual program for the computer to follow.

Have pupils explore the Scratch interface and identify all key features and blocks given on pages 69-70, one by one. A labelled diagram of 7 major components of the Scratch interface is given on page 69. Similarly, 9 different types of code blocks (colour-coded) are given on page 70. It would be better for pupils to familiarise themselves with these features before moving on to hands-on practice.

You may help them with the initial ones for example:

✓ Introduce the menu bar by discussing its purpose and the different options it provides.

✓ Demonstrate how to navigate the code tab and explain its function in organising and editing scripts.

✓ Guide pupils through an exploration of the script area, explaining how it is used to write code and create instructions for sprites.

Now ask pupils to go to the following link: *https://scratch.mit.edu/* and ask pupils to identify these components and code blocks on Scratch.

Now ask pupils to follow the instructions given on pages 73-79 step-by-step and develop a 'multi-script, multi-sprite, game'. Monitor them closely and provide assistance where required. They may develop a 'countdown timer' given on page 79 as class practice or homework.

Classwork (5 min)

✓ Do part A, B, and C from the workstation

Homework assignment

✓ Do part D and E from the workstation.

✓ Practice at home

- Follow the instructions given on page 79 and develop a countdown timer on Scratch.

- Re-create the falling objects game as practice at home.

Suggested answers to end-of-chapter questions on pages 80 to 81

A. Fill in the missing blanks

1. Visual
2. Choose a Sprite
3. White
4. Repeat
5. Turn
6. Touching
7. Play Sound

B. True/false statements

1. False
2. True
3. False. The area where the sprite moves is called the 'stage,' not the script area.
4. False. Instructions in Scratch are executed sequentially, not altogether.
5. True
6. True

C. Choose the correct option

1. c
2. b
3. d
4. c
5. a

D. Short-Answer Questions

1. Scratch is used for creating interactive stories, games, and animations.
2. The role of a sprite in Scratch is to represent characters, objects, or figures that can move and interact within a Scratch project.
3. Blocks in Scratch are used to give instructions to sprites. They control the actions and behaviours of sprites, allowing them to move, respond to events, and perform various tasks within a Scratch project.
4. Some of the main components of Scratch are the stage, sprites, block palette, script area, costumes, and sound libraries.
5. Program controls in Scratch are blocks that help you manage the flow and order of instructions in your program. They include blocks like 'if,' 'repeat,' and 'forever' that control when and how certain actions occur within your project.

E. Long-Answer Questions

1. A programming language is similar to a set of instructions that the computer follows to perform a task. All computer programs and software are created using programming languages.

   A visual programming language (VPL) is a programming language that allows you to create programs using graphical elements and figures. An executable graphics language is another name for a visual programming language. Scratch, M-block, and Microsoft Visual Studio are the most popular VPLs.

   Pupils can further elaborate on this to demonstrate their understanding.

2. Pupils will answer this question based on their overall understanding of the chapter. A good answer should include sound reasoning and examples.
3. Refer to page 74 of the chapter.
4. Refer to the table on page 77 of the chapter.
5. To add multiple sprites in a game in Scratch, you can click the 'Choose a Sprite from Library' button in the sprite palette to select and add additional sprites from the Scratch library. You can also create custom sprites by drawing or importing images. Pupils can further elaborate on this using their understanding of the topic.

DIGITAL CITIZENSHIP

After completing this chapter, pupils should be able to:

- explain ethics and what constitutes an ethical issue in digital environments,
- explain key concepts of copyright, plagiarism, and piracy,
- outline the importance of being safe, responsible, and respectful online,
- evaluate digital media bias and messaging,
- improper use of computer resources,
- steps to secure information privacy and confidentiality,
- possible dangers of the Internet and related security measures to counter them.

Teaching Objectives

Introduction for the teacher

It is crucial to introduce pupils to the concept of digital ethics, explaining what constitutes ethical behaviour in online environments. We must teach them the importance of honesty, empathy, and respect for others' privacy and opinions while navigating the digital world. It's imperative to outline the significance of being safe, responsible, and respectful online emphasising the potential consequences of cyberbullying, sharing personal information, and engaging in harmful online behaviours.

Pupils must understand the importance of respecting intellectual property rights, citing sources properly, and not using or sharing copyrighted materials without permission, Also the potential consequences of copyright infringement. This lesson not only promotes good online citizenship but also prepares them for a future where digital literacy and ethical behaviour are paramount.

☁ Vocabulary Cloud	
BOTNET	A network of compromised computers or devices that are controlled by a single entity, known as a 'bot herder' or 'botmaster.'
SPYWARE	Malicious software designed to secretly monitor and gather information from a computer or device without the knowledge or consent of the user.
ADWARE	Advertising-supported software

Lesson plan 1

Resources

✓ Textbook pages 82- 84

Starter activity (5 min)

Ask:

- What does the term 'digital ethics' mean to you, and why is it important in today's world?

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- Can you share an example of a situation in which someone might face an ethical dilemma while using the Internet or social media?

- Why is it crucial to be safe, responsible, and respectful when interacting with others online?

- Have you ever come across the terms 'copyright' and 'plagiarism'? What does it mean?

- Do you know what online piracy is? How do you think it affects creators and the online community as a whole?

Reading and explanation (25 min)

Read page 82. Begin by explaining the fundamental concepts of digital citizenship, including online etiquette, privacy, security, and responsible Internet use. Use relatable examples to engage pupils. Foster open discussions about online experiences and challenges. Create a safe space for pupils to share their concerns or questions.

☁ Concept Cloud ✕

By drawing parallels between traditional citizenship and digital citizenship, pupils can better understand the importance of responsible and ethical behaviour in the online world.

Analogy: Digital citizenship is like being a good citizen in your community

- **Rights and responsibilities**: Just like citizens in your community have rights and responsibilities, being a digital citizen means you have rights (like freedom of speech and privacy) and responsibilities (like being respectful and following rules) when you're online.

- **Respect for others:** Just as you wouldn't shout in a library or litter in your neighbourhood, in the digital world, you should be respectful by using polite language and not engaging in cyberbullying.

- **Following laws and rules:** Just as your community has laws and rules to maintain order, the digital world has guidelines and rules (terms of service) on platforms. You should follow them to stay safe and respectful.

- **Protecting personal information:** Like you wouldn't share your home address with strangers, in the digital world, you should protect your personal information and be cautious about who you share it with.

- **Online reputation:** Similar to how your actions in your community affect your reputation, your online behaviour can impact your digital reputation, which can affect future opportunities.

- **Helping others:** Just as being a good citizen means helping others in your community, being a digital citizen involves supporting and assisting others online, especially if they're facing problems.

Divide pupils into small groups and have them brainstorm examples of positive and negative digital behaviour.

Read page 83. Start discussing the elements of digital citizenship one by one. Facilitate a class discussion on each topic, highlighting key points and addressing pupils' questions. Provide examples and case studies to illustrate the concepts and their real-world applications.

✓ Engage pupils in a role-play activity where they demonstrate proper and improper online behaviour. Reinforce the importance of respectful online behaviour.

✓ Introduce different forms of online communication (email, social media, etc.) and their impact on interpersonal relationships. Provide scenarios where pupils analyse and discuss appropriate ways to communicate in various online situations. Assign groups to create a digital communication guide that includes tips for effective online communication.

✓ Ask pupils to share their experiences with online shopping and any concerns they may have related to cyber security. Discuss recent news articles related to cyber security breaches in e-commerce platforms. Discuss the following benefits and risks of online shopping. Ask the pupils to brainstorm and add more to the list.

☁ Concept Cloud ✖

Benefits

- **Convenience:** Online shopping allows 7th graders to shop from the comfort of their homes or schools, saving time and effort.

- **Variety:** E-commerce platforms offer a wide range of products, enabling 7th graders to explore diverse options.

- **Price Comparisons:** Websites often provide price comparisons, helping pupils find the best deals.

- **Educational tools:** E-shopping can teach financial responsibility, budgeting, and decision-making.

- **Access to information:** Online reviews and product descriptions aid in informed decision-making.

Risks

- **Cybersecurity:** There is a risk of fraud, credit card scams, and identity theft when sharing personal information online.

- **Counterfeit products:** Some websites sell counterfeit or substandard goods, leading to dissatisfaction and potential safety hazards.

- **Overindulgence:** Easy access to shopping can lead to overspending and financial mismanagement.

- **Privacy concerns:** Personal information may be used for targeted advertising without consent.

- **Lack of physical activity:** Over-reliance on e-shopping may reduce physical activity and outdoor experiences.

✓ Discuss the importance of cybersecurity in e-commerce and present strategies to protect personal information online. Engage pupils in a class discussion about the rights and responsibilities of both consumers and businesses in online transactions. Moreover, discuss the rights and responsibilities of of digital users. Some are given below for reference:

☁ **Concept Cloud** ✕

Some Important Rights and Responsibilities of Digital Citizens

Rights

Privacy: Digital citizens have the right to protect their personal information and online privacy. They should be aware of data protection and privacy settings on various online platforms.

Security: Users have the right to a secure online experience. This includes protection against cyber threats, viruses, and online harassment.

Access and inclusion: Everyone should have equal access to digital resources and information. Discrimination or exclusion online should not be tolerated.

Freedom of expression: Digital users have the right to express their opinions and ideas within the bounds of responsible and respectful communication.

Responsibilities

Respect: Users should respect the rights and privacy of others. This includes following digital etiquette, adhering to online laws and regulations, and being considerate of others.

Education: Digital literacy is crucial. Users should educate themselves about online threats, scams, and how to navigate the digital world safely.

Ethics: It's important to maintain ethical behaviour online. This includes not engaging in cyberbullying, harassment, or spreading false information.

Empathy: Practicing empathy and understanding the impact of one's actions online is a key responsibility. Avoid harming or causing distress to others.

Refer to page 84 and break down the concepts of copyright, plagiarism, and piracy in a way that's easy to understand for 7th graders. You may use the following examples:

1. **Copyright**
✓ **Definition:** Copyright is like a special protection for things that people create, like books, music, art, and movies. It gives the person who made something the right to say how it can be used and who can use it.
✓ **Example:** Imagine you make a painting. Copyright means that only you can decide if others can use it, and if they can, you might say they have to ask you first or give you credit.

2. **Plagiarism**
✓ **Definition:** Plagiarism is when someone takes something that someone else made (like a story, drawing, or idea) and pretends it is their own without giving the original creator credit.
✓ **Example:** Let's say your friend wrote a fantastic story, and you copy it word for word and submit it as your own homework. That's plagiarism because you didn't give credit to your friend.

3. **Piracy**

✓ **Definition:** Piracy is like stealing or copying something that someone else made without their permission, especially when it comes to digital things like music, movies, or software.

✓ **Example:** If you download a movie from the Internet without paying for it or getting permission, that's piracy. It's like going into a store and taking something without paying for it.

Explain to the pupils that it is important to respect other people's work and creativity, and understanding these concepts will help them do that. If they are not sure if they can use something, it is always a good idea to ask for permission or give credit to the original creator.

Class activity (this activity requires a separate 40-min session)

Before starting this activity make sure that pupils understand the meaning of the key terms, i.e. copyright, plagiarism, and piracy. You may want to write small definitions on the board for pupils to refer to, such as:

✓ Copyright is about protecting the rights of creators.

✓ Plagiarism is taking someone else's work and pretending it's yours without giving credit.

✓ Piracy is like stealing or copying other's work or digital things without permission.

Divide the pupils into groups of four and give each group a paper with a scenario related to copyright, plagiarism, or piracy. For example, one scenario could be: 'You are writing a report on the history of Pakistan and you find a website that has all the information you need. You decide to copy and paste the text from the website into your report without citing the source.'

The groups will have to discuss the scenario and identify the problem, the possible consequences, and the solution. Monitor the groups and provide feedback.

The following is a very informative online teaching guide to help aid teachers in understanding and delivering the concepts of digital citizenship to pupils:

Links

✓ https://www.youtube.com/watch?v=BHy4SqmxgsM

Conclusion (5 min)

Ask:

• Can you name three examples of respectful behaviour in online communication?

• How can individuals contribute to preventing digital piracy?

• How do digital etiquette, copyright, plagiarism, and piracy relate to being responsible and respectful digital citizens?

Classwork (5 min)

✓ Do Part A from the workstation.

Pre-reading: Textbook pages 84-86

Homework assignment

✓ Do Questions 3 and 4 from part D.

✓ Do Question 3 from part E.

✓ Have pupils create a digital presentation showcasing effective communication strategies for different online platforms.

✓ Ask pupils to analyse and evaluate the privacy policies of popular e-commerce websites, identifying areas of concern and suggesting improvements.

Lesson plan 2

Resources

✓ Textbook pages 84- 88

✓ Computer system, laptop, or tablet with Internet connectivity to display videos. If Internet connectivity is not possible then download the desired videos beforehand.

Starter activity (5 min)

• Have you ever encountered information online that seemed biased or one-sided?

• How did you identify it, and why is it important to be aware of bias in digital media?

• Can you think of situations where using computer resources improperly might cause problems or harm to individuals or organisations?

• Do you know about any potential dangers or risks associated with the Internet?

Reading and explanation (20 min)

Introduce the concept of media bias as the tendency of some media outlets or journalists to present a particular perspective or opinion on an issue, rather than providing balanced and objective information. Explain that media bias can affect how people perceive and understand the world, and why it is important to be aware of it and seek multiple sources of information. You may want to gauge pupils' attention by discussing various forms of media bias, such as:

☁ Concept Cloud ✕

• **Framing:** The way a story is presented or emphasised, such as using certain words, images, or headlines. For example, the headline 'ABC team claims to have created the first room-temperature, ambient-pressure superconductor' frames the story as a claim, rather than a fact, and implies doubt or skepticism

• **Omission:** The exclusion of relevant or important information, facts, or perspectives from a story. For example, not sharing any details about the methods, materials, or results of the experiment, or any peer review or verification process.

• **Selection:** The choice of what stories to cover or ignore, and how much attention to give them.

• **Spin:** The use of subjective or emotional language, tone, or interpretation to influence the audience's attitude or opinion. For example, using words like 'elusive', 'holy grail', and 'breakthrough' creates a sense of excitement and hype about the experiment.

Refer to page 85 and introduce the concept of digital citizenship as the norms and expectations of appropriate and responsible behaviour online. Explain that being a good digital citizen means being safe, respectful, and responsible when using the Internet and digital devices.

Discuss some examples of good and bad digital citizenship, in more detail, given in the list on page 85; such as creating strong passwords, avoiding cyberbullying, respecting intellectual property, etc. Ask pupils to identify the benefits and risks of each example, and discuss how they can improve their own digital citizenship skills. Examples can be found in the following video:

Links

✓ https://www.youtube.com/watch?v=QpNeavL0Dfw

✓ https://www.youtube.com/watch?v=gjHtgioa-1E

Class Activity

This activity will require a separate session

Divide the pupils into groups and assign each group a scenario or a case study related to digital citizenship, such as sharing personal information online, posting inappropriate or hurtful comments, downloading or copying content without permission, etc.
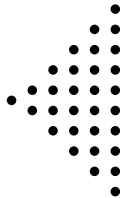
Ask each group to analyse the scenario or case study and suggest what the best course of action would be for the people involved. Have each group present their analysis and suggestions to the class, and discuss how they can apply the principles of digital citizenship in similar situations.

Refer to page 86 and introduce the concept of data protection and privacy as the right and responsibility of individuals to control how their personal data is collected, used, stored, and shared online. Explain that personal data is any information that can identify or relate to a person, such as name, address, phone number, email, photos, etc. Explain that data protection and privacy are important for safeguarding one's identity, reputation, and security online.

You may use the following explanations to break down the 6 tips for protecting against data security threats given on pages 86-87:

Concept Cloud

1. **Passwords:** A password is like a secret code that helps protect your online accounts. It's essential to create strong passwords that are hard for others to guess. Avoid using easily guessable information like your name or birthdate. A good password combines letters, numbers, and symbols.

2. **App privacy settings:** Many apps have privacy settings that let you control who can see your information. Always check and adjust these settings to ensure you're comfortable with what the app is sharing. Be cautious about sharing personal details online, and think about who should have access to your information.

3. **Firewalls and antivirus:** Think of a firewall and antivirus like protective shields that protect your computer from bad things on the Internet. A firewall is like a barrier that blocks unwanted visitors, and antivirus is like a guard that fights against harmful programs. Make sure to have both to keep your computer safe.

4. **Backup data**: Imagine your school project or favourite pictures are on your computer, and something happens to it. Creating a backup is like making a copy of those important things so that even if something goes wrong, you still have them. You can use an external hard drive or cloud services to back up your data.

5. **OS updates:** Your computer or device has an operating system (OS), like Windows, macOS, or iOS. Just like apps get updates, the OS gets updates too. These updates often include important security improvements. Always make sure to install these updates to keep your device safe from the latest threats.

6. **Public Wi-Fi**: It is like a free Internet connection at places like cafes or libraries. However, it's not always secure. Be cautious about what you do on public Wi-Fi, like avoiding logging into important accounts or making online purchases. If needed, consider using a virtual private network (VPN) for added security.

Discuss the various web security threats given on page 87-88. Use the following online sources to explain these further:

🖑 Links

✓ https://www.youtube.com/watch?v=n8mbzU0X2nQ
✓ https://www.youtube.com/watch?v=c6OUn9_YIKI

Conclusion (5 min)

Ask:

- What steps can you take to be a critical consumer of news and information?

- Why is it important to be cautious when clicking on links or downloading files from the Internet?

- How can you protect your computer from malware, and what steps would you take if you suspect your device has malware?

- How can you educate others, like your friends and family, about media literacy and online safety?

Classwork (10 min)

✓ Do part B and C from the workstation.

✓ Do questions 1 and 2 from part D.

Pre-reading: Textbook pages 91-92

Homework assignment

✓ Do Questions 1 and 2 from part E.

✓ Have pupils create a personal digital citizenship pledge where they commit to being responsible online citizens.

✓ Ask pupils to research and find examples of successful e-commerce businesses and identify the security measures they have in place.

✓ Provide a scenario where pupils have to create a secure password for an online shopping account and explain the reasons behind their choices.

Suggested answers to end-of-chapter questions on pages 89 to 90

A. Fill in the missing blanks

1. Netiquette
2. Plagiarism
3. Copyright
4. Digital Piracy
5. Privacy (double-check)

B. True/false statements

1. False. Bullying, harassment, trolling, and stalking online are not normal and acceptable behaviour.
2. True
3. True
4. False. It is not easy to guess strong passwords.
5. True

C. Choose the correct option

1. a
2. c
3. a
4. b
5. c

D. Short-Answer Questions

1. Web threats can be identified through antivirus software, firewalls, app privacy settings, backup data, and by being cautious of suspicious websites and emails.

2. Ethical ways for online research include citing sources, respecting copyright laws, and obtaining proper permissions for using others' work.

3. Common ethical issues while surfing online include cyberbullying, plagiarism, invasion of privacy, and spreading false information.

4. Consequences of piracy can include legal penalties, loss of revenue for creators, and security risks from downloading unauthorized software or files.

E. Long-Answer Questions

1. Media bias refers to the bias or perceived bias of journalists and news producers within the mainstream media in the selection of numerous events and stories that are reported and how they are covered. Pupils can further elaborate on this to demonstrate their understanding.

2. Refer to pages 88 and 89 of the chapter.

3. Digital Citizenship is important because it teaches people how to use technology and the Internet responsibly and respectfully. It helps individuals understand the potential risks and benefits of the digital world, promoting safe and ethical online behaviour. Being a good digital citizen means protecting your privacy, respecting others, and using technology for positive purposes, ultimately contributing to a safer and more inclusive online environment. Pupils can further elaborate on this with examples to demonstrate their understanding.

ENTREPRENEURIAL DESIGN THINKING

After completing this chapter, pupils should be able to:

- define entrepreneurship and design thinking,
- explain the stages of the design thinking process,
- apply the design thinking process to a real-world problem,
- identify the benefits and challenges of design thinking for entrepreneurs.

Introduction for the teacher

Entrepreneurial design thinking is a problem-solving approach that combines creativity, critical thinking, and practical application. The aim of introducing this concept is to instil in the pupils a mindset that fosters innovation, resilience, and adaptability.

Entrepreneurial design thinking encourages pupils to analyse problems from various angles, think critically, and develop innovative solutions. These skills are invaluable not only in entrepreneurship but also in everyday life and future careers. Design thinking often involves collaborative projects. Teaching this approach promotes teamwork and effective communication skills that are crucial in the professional world.

In an interconnected world, pupils need to understand global challenges and be equipped to contribute positively. Entrepreneurial design thinking fosters a global perspective by encouraging pupils to consider diverse viewpoints and address issues with a broader impact.

Lesson plan 1

Resources

- ✓ textbook pages 17- 21
- ✓ Computer
- ✓ Projector
- ✓ Internet access
- ✓ paper
- ✓ pencils
- ✓ sticky notes
- ✓ scissors
- ✓ glue
- ✓ markers

Starter activity (5min)

Ask pupils to brainstorm and respond to the following questions:

- What do they think entrepreneurship is?
- What is design thinking and how is it related to entrepreneurship?

Write their responses on the board.

Reading and explanation (20 min)

Read page 91. Explain that entrepreneurship is the process of creating, launching, and running a new business that offers a product or service that solves a problem or meets a need. Give some examples of famous entrepreneurs and their businesses, such as Mark Zuckerberg and Facebook, etc.

Explain that design thinking is a creative and human-centered approach to problem-solving that involves understanding the needs and perspectives of the users, generating and testing ideas, and implementing solutions. Give some examples of how design thinking has been used to create innovative products or services, such as Airbnb, Uber, etc.

Tell pupils that in this lesson, they will learn more about the design thinking process and how it can help entrepreneurs create value for their customers and society. Ask pupils to refer to the pages 95-97 of the textbook. Read the text aloud and explain the main points using simple language and examples. Highlight the five stages of the design thinking process: empathise, define, ideate, prototype, and test. Explain what each stage involves and why it is important.

Use the example of the comfortable chair given in the book to illustrate how the design thinking process works. Explain how the problem was identified, how the user needs and preferences were understood, how different ideas were generated and evaluated, how a prototype was built and improved, and how the solution was tested and refined.

Ask pupils to think of some questions or comments they have about the design thinking process or the example. Invite them to share their thoughts with the class and clarify any doubts or misconceptions they may have.

🖥 Class Activity

Divide pupils into small groups of 3-4. Assign each group a real-world problem that they can relate to and that can be solved using design thinking. Some examples are: how to reduce food waste at school, how to encourage more physical activity among children, how to make learning more fun and engaging, etc.

Give each group some paper, pencils, sticky notes, scissors, glue, markers, and other materials they may need to complete the design thinking process. Instruct them to follow the five stages of the design thinking process and document their work using the paper and sticky notes. Remind them to focus on the user needs and perspectives, to be creative and open-minded, and to test and improve their ideas.

Monitor the groups as they work and provide guidance and feedback as needed. Encourage them to ask questions, share opinions, and collaborate with each other.

Ask each group to present their problem and solution to the class using their paper and sticky notes. Invite the class to give constructive feedback and suggestions to each group.

Conclusion (5 min)

- Summarise the main points of the lesson and review the learning objectives. Ask pupils to reflect on what they learned and how they can apply design thinking to their own lives and future projects.
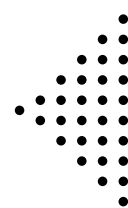
Classwork (10 min)

✓ Do part B from the workstation.

✓ Do question 1 from part D.

Homework assignment

✓ Do question 1 from part E.

Lesson plan 2

Resources

✓ Textbook pages 93-97

✓ Computer systems with Internet connectivity to use Instagram online

Starter activity (5min)

Ask:

- Imagine you're starting your own business. What information do you think you'd need to organise and plan for its success?

- Why do you think it's important for businesses to show up at the top of search results?

- Who here uses Instagram? What do you like about it?

- Have you ever seen a post or an ad on Instagram that made you interested in a product or service? What was it about that post that caught your attention?

Reading and explanation (20 min)

Explain the purpose and objectives of the lesson, which aim to teach about the concept of a business plan, its components, and the use of SEO and Instagram for promotional marketing. Activate prior knowledge by asking pupils what they know about these topics and why they are important for entrepreneurs.

Ask pupils to read page 93 of the textbook, which overviews a business plan and its benefits. Then, divide the pupils into groups and ask them to brainstorm and write down the main components of a business plan, using the headings on page 93-94 as a guide. Have each group share their answers with the class and discuss any similarities or differences.

Ask pupils to read pages 94 of the textbook, which explains the concept of SEO (Search Engine Optimization) and how it can help increase the visibility and ranking of a website. Then, ask the pupils to work individually or in pairs and use a search engine to find examples of websites that use SEO techniques, such as keywords, meta tags, links, etc. Have the pupils share their findings with the class and explain how they identified the SEO elements.

Read page 95-96, which describes how to use Instagram as a marketing tool for a business.

> 🖥️ **Class Activity** ✕
>
> Ask the pupils to create an Instagram account for a hypothetical business of their choice, using the tips and suggestions on the page. Have the pupils post at least one photo or video related to their business, along with a caption, hashtags, and a call to action. Have the pupils follow each other's accounts and comment on their posts.

Conclusion (5 min)

- Review the main points of the lesson and ask the pupils to reflect on what they learned and how they can apply it to their own entrepreneurial projects. Ask the pupils to complete a

self-assessment or a quiz to check their understanding of the concepts. Provide feedback and additional resources for further learning.

Classwork (10 min)

✓ Do part A and C from the workstation.

✓ Do questions 2-5 from part D.

Homework assignment

✓ Do questions 2-4 from part E.

Suggested answers to end-of-chapter questions on pages 98 to 99

A. **Fill in the missing blanks**

1. Design thinking framework	**2.** Define	**3.** Business idea
4. Competitors	**5.** SEO	**6.** Encrypted

B. **True/false statements**

1. True   **2.** True

3. False. Even established businesses may need to update their business plans to adapt to changing market conditions, technologies, or customer preferences.

4. True   **5.** True

C. **Choose the correct option**

1. a   **2.** c   **3.** a

4. c

D. **Short-Answer Questions**

1. Pupils will elaborate on the following steps: Empathise, Define, Ideate, Prototype, Test

2. A business plan is a written document that outlines the goals of the business and a roadmap of how to achieve them.

3. Promotional marketing is a set of activities to share knowledge about a particular brand, product, or service with as many people as possible with the aim of increasing brand awareness and sales.

4. SEO refers to the process of improving your website so that it appears more prominently when people search for products or services related to your company on Google, Bing, and other search engines.

5. Payment is the agreed transfer of money, from one person to another in exchange for goods or services while transaction is the finalised agreement between a seller and a buyer for transferring goods, services, or financial assets in exchange for money.

E. **Long-Answer Questions**

1. Pupil will elaborate on the five steps listed in answer 1 of the previous section.

2. Refer to pages 93 and 94 of the chapter.

3. Refer to pages 95 and 96 of the chapter.

4. A value proposition is a company's plan that describes how the benefit of its product or service will be provided to its customers. Pupils will further elaborate on this from their understanding of the topic from the textbook.