

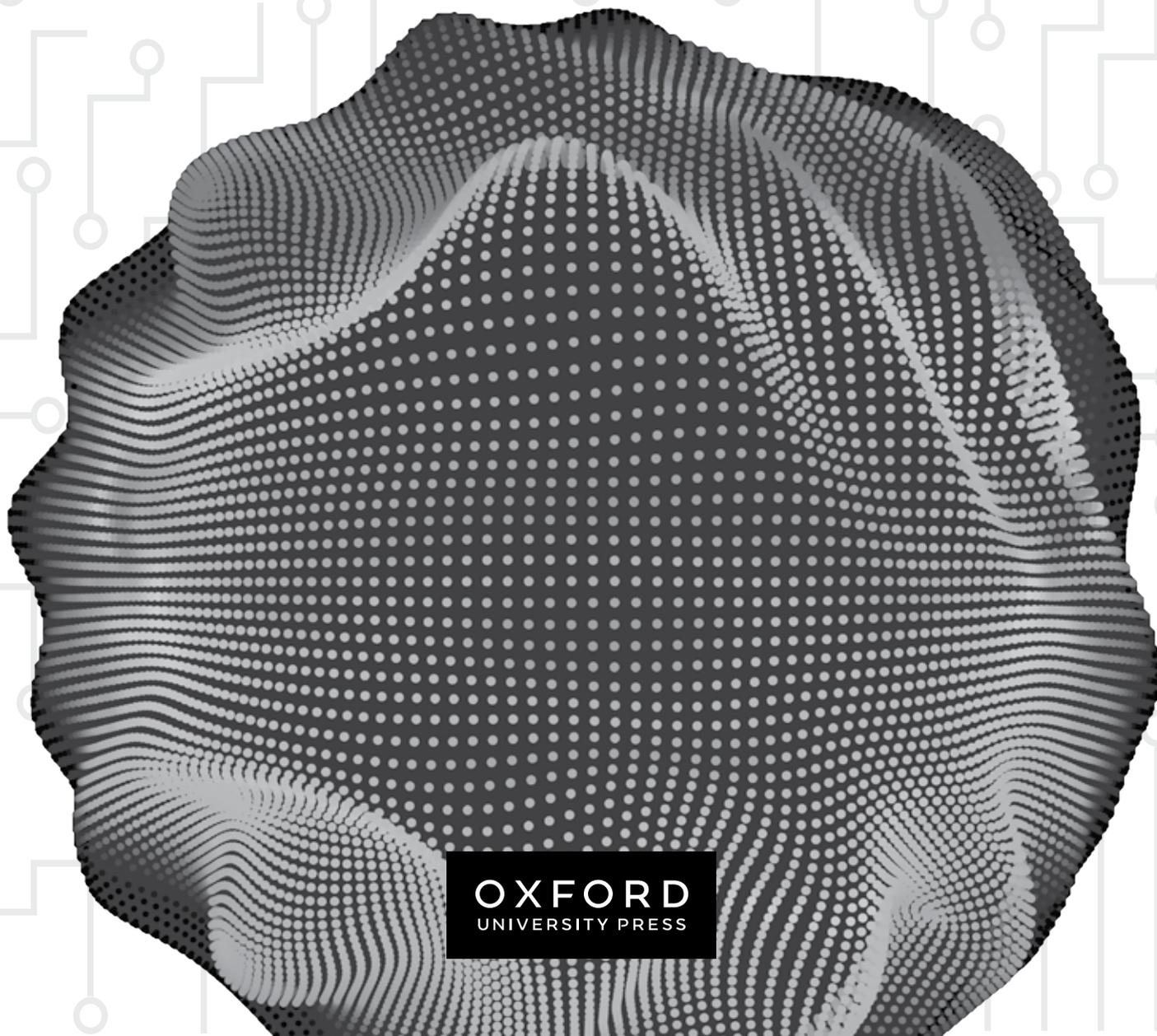
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COMPUTER WHIZ

FOR GRADE

8

TEACHING GUIDE



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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 knowledge, 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.



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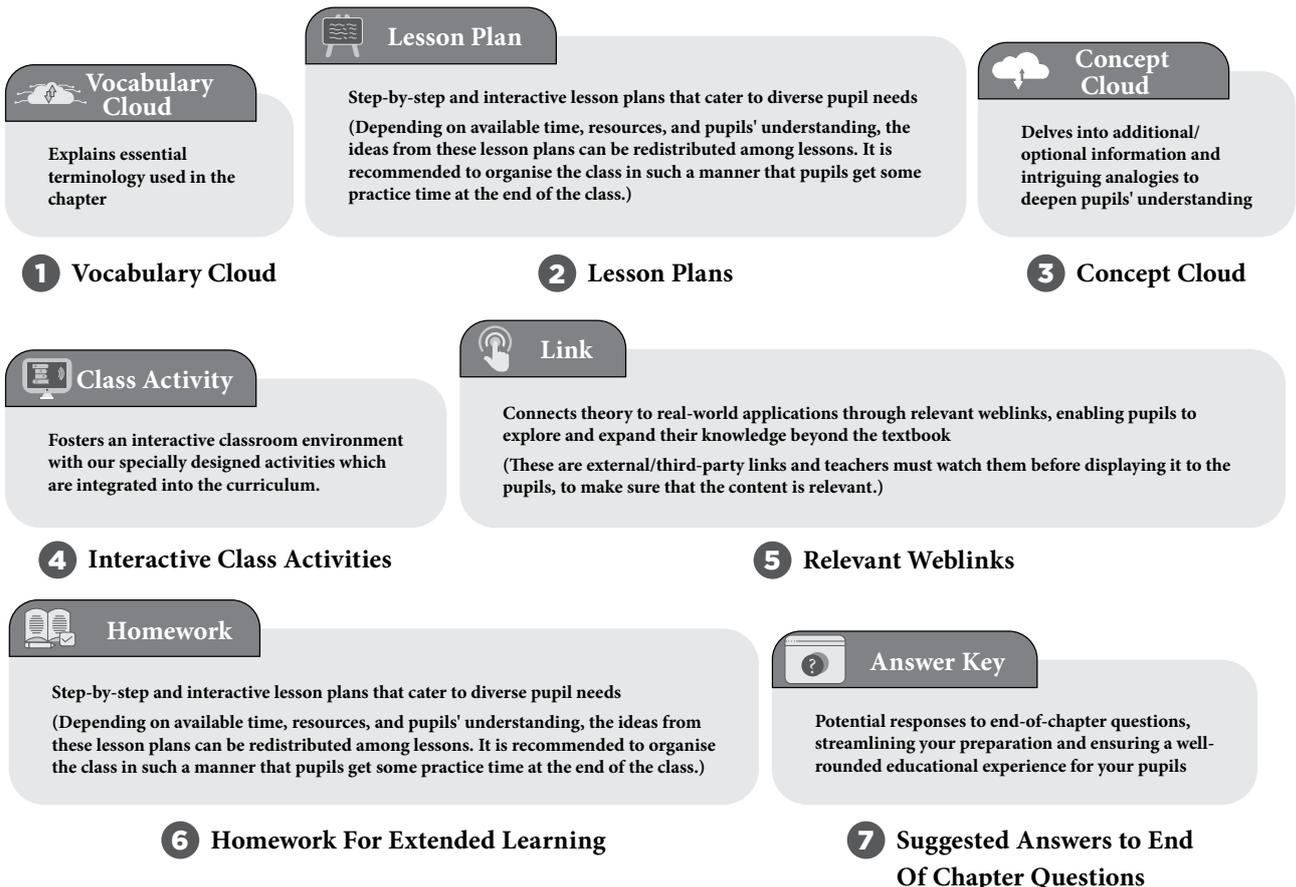


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01

EMERGING TECHNOLOGIES

After completing this chapter, pupils should be able to:

- name and explain the applications of the following emerging technologies in various walks of life:
 - Artificial intelligence (AI)
 - 5G communication
 - Robotics
 - Computer-Aided Translation (CAT)
 - Distributed Applications
 - Blockchain
 - 3D holographic imaging
 - Virtual reality (VR)

Teaching Objectives

Introduction for the teacher

Teaching emerging technologies to 8th graders is crucial because these technologies are rapidly becoming integral to various industries, and preparing pupils early equips them with skills needed for future careers. Learning about these technologies encourages critical thinking and problem-solving, as pupils explore their work and potential applications. They often intersect with various subjects like science, mathematics, and engineering, promoting interdisciplinary learning. Understanding emerging technologies inspires creativity and innovation, fostering an entrepreneurial mindset among pupils. Familiarity with these technologies can give pupils a head start when pursuing higher education in related fields.

Proficiency in these technologies can enhance a nation's global competitiveness by producing a technologically advanced and skilled workforce. These technologies can also be used to address global challenges, such as climate change or healthcare, making pupils part of the solution.

Vocabulary Cloud	
AI	Artificial Intelligence
VR	Virtual Reality
AR	Augmented Reality
CAT	Computer-Aided Translation

Lesson Plan 1

Resources

- ✓ Textbook pages 1-3

Starter activity (5 min)

These introductory questions can pique pupils' interest and encourage them to think about the real-world applications and implications of these emerging technologies.

1. Artificial intelligence (AI)

- ✓ What comes to your mind when you hear 'Artificial Intelligence'?
- ✓ How do you think AI is already used in our daily lives without us realising it?
- ✓ Can you imagine some ways AI can make our lives easier or more interesting?

2. 5G communication:

- ✓ Do you know what 5G means in the context of mobile networks?
- ✓ How might faster and more reliable Internet (5G) impact the way we communicate and use technology?
- ✓ What do you think 5G could enable that wasn't possible with previous generations of mobile networks?

3. Robotics:

- ✓ What are some examples of robots you've seen or heard about in the real world or in movies?
- ✓ How can robots be used to help people or improve processes?
- ✓ Can you think of tasks you'd like a robot to do for you?

Reading and explanation (20 min)

Read pages 1 and 2. Begin by explaining that AI refers to the ability of a computer or machine to exhibit intelligent behaviour, such as the ability to learn, solve problems, and make decisions. Provide examples of AI, such as Google's search engine, which is able to suggest search terms and autocomplete words based on previous searches, or self-driving cars, which use sophisticated sensors and algorithms to navigate the road.

Explain that machine learning is a subset of AI that refers to the ability of a computer to learn from data and improve its performance. Provide examples of machine learning, such as Netflix's recommendation engine, which uses data on what users have watched to make recommendations on what to watch next, or AI-powered robots, which learn through trial and error and are able to perform tasks with increasing accuracy.

Provide a brief overview of the historical development of communication technology, starting with 1G and progressing to 5G. Highlight key advancements and their impact on society. Use the chart given on page 2 to illustrate the progression from 1G to 5G. Include examples of how each generation of technology improved upon the previous one.

Discuss the role of robotics in manufacturing, healthcare, and exploration, highlighting specific examples of robots being utilised in these areas.

1. Group activity: (optional)

- ✓ Divide pupils into small groups and provide each group with a set of news articles about AI or machine learning.
- ✓ Ask each group to identify and discuss examples of AI or machine learning in the articles.

- ✓ Have each group present their findings to the class and facilitate a class discussion on the pros and cons of AI and machine learning.

Conclusion (5 min)

Review the key concepts and applications of each of the three emerging technologies. Ask pupils to reflect on what they learned and how they think these technologies will affect the world in the future.

Ask:

- How might artificial intelligence impact the job market in the future?
- What are some potential benefits and challenges of implementing 5G technology on a global scale?
- In what ways has the advancement of communication technology influenced other industries, such as healthcare, transportation, or entertainment?

Classwork (10 min)

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

Pre-reading: textbook pages 4-6

Homework assignment

- ✓ Do part Question 1 from part E
- ✓ Ask pupils to choose one of the three technologies (AI, machine learning, or 5G) and conduct research on its history, current applications, and potential future applications.
- ✓ Have pupils create a presentation or report on their research findings.

Lesson Plan 2

Resources:

- ✓ Textbook pages 4-6

Starter activity (5 min)

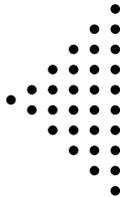
Ask the pupils the following questions, before starting to teach each technology, to gauge their interest:

1. Computer-aided translation (CAT)

- ✓ Have you ever used online translation tools or apps? How did they work?
- ✓ How can technology help bridge language barriers in our increasingly connected world?
- ✓ What do you think are the benefits and limitations of using CAT tools?

2. Blockchain

- ✓ Have you heard of cryptocurrencies like Bitcoin? Do you know how they work?
- ✓ How might blockchain technology make online transactions more secure and transparent?
- ✓ Can you think of other areas where blockchain could be applied besides finance?



3. 3D holographic imaging

- ✓ Have you seen movies or shows with holograms? What do you know about them?
- ✓ How do you think 3D holographic imaging can be used for educational or entertainment purposes?
- ✓ What other applications can you imagine for this technology?

4. Virtual reality (VR)

- ✓ Have you ever tried virtual reality, like VR gaming or VR headsets?
- ✓ What are some potential uses of VR outside of gaming, such as in education or healthcare?
- ✓ How might VR change the way we experience things like travel or museum visits?

Reading and explanation (20 min)

Read page 4. Provide a brief overview of Computer-Aided Translation (CAT) and its significance in bridging language barriers in various fields such as business, healthcare, and diplomacy. Demonstrate how Computer-Aided Translation (CAT) tools are used to assist human translators in accurately and efficiently translating text in different languages.

Explain the concept of blockchain technology, emphasising its decentralised nature and applications in secure transactions and digital contracts. Explain the concept of blockchain and its applications beyond cryptocurrency, such as in supply chain management and secure data storage. Refer to the diagram given on page 4 and explain it to the pupils.

Read page 5. Introduce the concept of 3D holographic imaging, highlighting its potential in fields like entertainment, education, medical imaging, imaging in entertainment and product visualisation.

Introduce virtual reality (VR) technology and explore its applications in fields like architecture, training simulations, and mental health therapy.

Cite the following applications of emerging technologies being used to showcase how these technologies impact our daily lives, from making our devices smarter to revolutionising industries and offering immersive experiences.



Concept Cloud

Here are cool and relatable examples of how these emerging technologies are applied in everyday life:

Artificial Intelligence (AI):

AI chatbots like Siri and Alexa can answer questions, set reminders, and play music, making our devices smarter and more interactive.

AI helps recommend movies, songs, and products based on our preferences, making our online experiences personalised.

5G Communication:

With 5G, downloading movies takes seconds instead of minutes, making streaming and gaming smoother and faster.

Smart cities use 5G for real-time traffic monitoring, reducing congestion and making commuting more efficient.

Robotics:

Robotic vacuum cleaners like Roomba can clean your house autonomously.

Drones are used for aerial photography and delivering packages.

Computer-Aided Translation (CAT):

Apps like Google Translate can instantly translate text from one language to another, aiding communication in a globalised world.

CAT tools are used in international business to translate documents and emails, facilitating trade and collaboration.

Conclusion (5 min)**Ask:**

- What ethical considerations should be taken into account when implementing emerging technologies like 3D holographic imaging or virtual reality?
- How might blockchain technology revolutionise industries beyond finance and cryptocurrency?

Classwork (10 min)

- ✓ Do part A and B from the workstation
- ✓ Do questions 3 and 4 from part D

Pre-reading: textbook pages 8-11**Homework assignment**

- ✓ Do Questions 2-4 from part E
- ✓ Provide a case study for pupils to analyse, where they must identify the emerging technology being utilised and discuss its impact on the given industry.

Suggested answers to end-of-chapter questions on pages 6 to 7**A. Fill in the missing blanks**

1. Algorithmic thinking
2. AI
3. 5G
4. Control system, Sensors, Actuators, Power Supply, End Effectors
5. Distributed ledger

B. True/false statements

1. False. (AI) is used in various applications beyond robots, including virtual assistants, recommendation systems, autonomous vehicles, etc.
2. True
3. False. 5G is a specific generation of wireless communication technology.
4. False. CAT typically stands for Computer-Aided Translation.
5. True

C. Choose the correct option

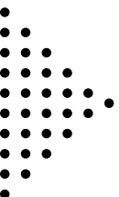
1. b 2. b 3. c 4. d 5. b

D. Short-answer questions

1. Emerging technology is a term that refers to the ongoing development of an existing technology.
2. AI stands for Artificial Intelligence. It is used for image and speech recognition, navigation apps, smartphone personal assistants, ride-sharing apps, etc.
3. Computer-Assisted Translation (CAT) tools are software applications that assist in translating content from one language to another.
4. Pupils can list three of the following:
Telephone networks and cellular networks
Computer networks such as the Internet
Wireless sensor networks
World Wide Web and peer-to-peer networks
Aircraft control systems
Industrial control systems

E. Long-answer questions

1. 5G communication is faster than previous generations due to higher frequencies, increased bandwidth, and improved network architecture. It uses millimetre waves, which have more available bandwidth for data transmission, and employs advanced antenna technology for efficient signal propagation.
2. Blockchain is a technique for storing data that makes it difficult or impossible for the system to be altered, hacked, or otherwise manipulated. It is a type of distributed ledger that distributes and copies transactions among the network of computers involved. Pupils can consult online sources to cite an example of blockchain technology.
3. Virtual reality (VR) finds applications in gaming, education, training (e.g. flight simulations), healthcare (e.g. medical training), and architecture (virtual walkthroughs). It can also be used for virtual tourism, therapy, and entertainment.
4. 3D imaging adds depth to images. It's used in medical imaging (e.g. MRI), movies, and video games for realistic effects. Holographic imaging goes a step further, creating 3D projections of objects. It's used in security (e.g. holographic IDs), art, and even entertainment (holographic concerts).



02

COMPUTER NETWORK

Teaching Objectives

After completing this chapter, pupils should be able to:

- describe and differentiate between the types of computer networks: PAN, LAN, MAN, WAN, VPN,
- explain the types of physical transmission media, and their uses,
- explain the uses of different types of transmission media Cellular Communication,
- explain the concept of IoT (Internet of Things), Embedded systems, Edge Computing, and Data Analytics Communication.

Introduction for the teacher

Teaching these topics to 8th graders will inculcate a broader awareness of the role technology plays in our lives and society. Understanding different types of computer networks is crucial as they are the backbone of communication in today's interconnected world. From personal devices (PAN) to the Internet (WAN), pupils will grasp the diverse scales and purposes of networks. Introducing VPNs helps pupils understand the importance of securing communication over public networks, promoting awareness about online privacy and security.

Explaining types of physical transmission media (like copper wires, fiber optics, etc.) provides pupils with a tangible understanding of how data is transmitted. This knowledge is foundational for understanding network infrastructure. Understanding the uses of different transmission media helps pupils appreciate the role of infrastructure in communication and connectivity.

With the prevalence of smartphones and mobile devices, explaining cellular communication is highly relevant. Pupils will gain insights into how voice and data are transmitted wirelessly, connecting this knowledge to their everyday experiences. Learning about cellular communication also introduces pupils to the evolution of technology, from 1G to 5G, fostering an understanding of technological progress.

Understanding IoT, embedded systems, edge computing, and data analytics provides a glimpse into the world of smart devices, automation, and data-driven decision-making. Familiarity with these concepts prepares pupils for potential careers in technology and engineering, fostering an interest in fields that are increasingly in demand.

 Vocabulary Cloud	
NIC	Network Interface Card
PAN	Personal Area Network
LAN	Local Area Network
WLAN	Wireless Local Area Network

MAN	Metropolitan Area Network
VAN	Wide Area Network
VPN	Virtual Private Network
IoT	Internet of Things
Edge Computing	Edge computing is a distributed computing paradigm that brings computation and data storage closer to the location where it is needed, rather than relying solely on a centralised data processing warehouse or cloud.

Lesson Plan 1

Resources

- ✓ Textbook pages 8- 14

Starter activity (5 min)

Ask the pupils the following questions:

- Name some devices that are used to communicate with others. (Such as mobile phones, laptops, tablets, etc.)
- How are these devices connected to each other and to the Internet?

Reading and explanation (20 min)

Ask pupils to Imagine a Computer Network Like a Digital Neighbourhood. A computer network is like a big digital neighbourhood where computers can talk to each other. Instead of houses and streets, we have devices like computers, phones, and tablets, and they use special paths called 'connections' to talk and share things. Explain that communicating devices such as mobile phones, laptops, tablets, etc. are part of a computer network, which is a system of interconnected devices that can exchange data and information.

Read page 8 and explain the definition and components of a computer network. Use the diagram on page 9 to illustrate the terms host, client, server, and peer. Give examples of different types of computer networks, such as LAN, WAN, VPN, etc. Ask the pupils to identify the type of network they use at home, school, or work.

Refer to page 9 of the document and explain the types of transmission media, which are the channels that carry data and information from one device to another. Use the images on the page to show the difference between guided and unguided media. Give examples of different types of guided media, such as twisted pair, coaxial, and fiber optic cables. Give examples of different types of unguided media, such as radio waves, microwaves, and infrared waves. Ask the pupils to name some devices that use these types of transmission media, such as TV, radio, remote control, etc.

Refer to page 10 and explain the types of wireless communication, which are the methods of transmitting data and information without using wires or cables. Use the images on the page to show the examples of wireless communication technologies, such as Wi-Fi, Bluetooth, GPS, and satellite communication. Explain the advantages and disadvantages of wireless communication, such as mobility, flexibility, cost, speed, security, etc. Ask the pupils to name some applications of wireless communication in their daily lives, such as mobile phones, laptops, smart devices, etc.

Explain the different types of computer networks using the following analogies:



Concept Cloud

1. Pan (personal area network):

Analogy: Think of a PAN like an all purpose utility belt. Your belt has all the gadgets you need, and it's just for you. Similarly, a PAN connects devices like your phone, tablet, and smartwatch together for your personal use.

2. Lan (local area network):

Analogy: Imagine your LAN as your own clubhouse where you and your friends hang out. Inside the clubhouse, you share toys, play games, and chat with each other. A LAN is like a network for a small group of devices in a limited area, like your home or school.

3. Wlan (wireless local area network):

Analogy: Picture an invisible rope connecting all the devices in your clubhouse. With WLAN, the rope is like an invisible connection that lets your devices talk to each other without any physical wires. It's like having a secret language only your devices can understand.

4. Man (metropolitan area network):

Analogy: Now, imagine your city as a big playground. A MAN is like a network that covers a whole city. It helps different places in the city, like schools, offices, and libraries, connect and share information, just like how different parts of a playground can share toys and games.

5. Wan (wide area network):

Analogy: Expanding our playground analogy, a WAN is like connecting playgrounds in different cities. It's like a giant web that links cities together, allowing people from one city to play and share things with people from another city. It covers a wide area, just like WAN.

6. Vpn (virtual private network):

Analogy: Imagine you have a special tunnel that connects your clubhouse to a friend's clubhouse. Inside this tunnel, you can pass secret notes and share your toys without anyone else seeing. A VPN is like a secure tunnel on the Internet, making sure your information travels safely from one place to another, like a secret passage for your digital stuff.

Conclusion (5 min)

Ask:

- Can you think of a real-life example where different types of networks might be used?
- Can you name a situation where a PAN (Personal Area Network) might be more useful than a WAN (Wide Area Network)?
- Do you think computer networks will become more or less important in the future? Why?
- If you could invent a new type of network, what would it be for, and how would it work?

Classwork (10 min)

- ✓ Do part A from the workstation
- ✓ Do Questions 1 and 2 from part D

Homework assignment

- ✓ Do Questions 1 and 2 from part E

Lesson Plan 2

- ✓ Resources: textbook pages 17- 21

Starter activity (5 min)

- What do you think 'data analytics' means?
- What comes to mind when you hear the term 'Edge Computing'?
- How do you think Edge Computing is different from Cloud Computing?
- Have you heard of the Internet of Things before? What do you think it means?
- How do you think embedded systems are different from regular computers?

Reading and explanation (20 min)

Refer to pages 14-17. Break down the types of transmission media to make it relatable for the pupils. Each type of transmission media is like a special way for devices to talk to each other such as through invisible waves, bouncing off satellites. Understanding these helps us see how our devices communicate and stay connected in the digital world. The following analogies can be used:

**Concept Cloud****1. Wireless communication:**

Wireless communication is like talking to your friend without a physical connection, just like how you can talk to someone across the room without any wires. It's like there's a giant invisible spiderweb carrying your words and messages.

2. Satellite communication:

Picture this - your message goes up to space, bounces off a satellite (like a super-fast mirror), and then comes back down to its destination. It's like sending a message on a space adventure!

3. Infrared communication:

Think of infrared communication like sending secret messages with invisible light beams. It's a bit like a special flashlight that only those people with whom you want to communicate it to can see.

4. Microwave communication:

Microwaves are like tiny waves that can carry information. Imagine your message is like popping popcorn, and these microwave waves carry the popcorn (information) from one place to another.

5. Mobile communication system:

Mobile communication is what happens when your phone talks to other phones without any wires. It's like having a magical pocket talker that lets you chat with your friends, no matter where they are.



6. Bluetooth technology:

Bluetooth is like a digital version of connecting the dots. It lets your devices talk to each other without needing any plugs or cables. It's amazing when your phone connects to your headphones without any wires!

7. Global positioning system (gps):

GPS is like having a map on your phone that tells you exactly where you are and helps you find your way. It's like having a treasure map that guides you to your destination using satellites in the sky.

Refer to page 18 and explain the concept of IoT, which is a network of smart devices that can communicate with each other and the Internet. Use the image on the page to show an example of an IoT device, such as an environment data monitoring system. Explain the benefits and challenges of IoT, such as convenience, efficiency, innovation, privacy, security, etc. Ask the pupils to name some examples of IoT devices that they use or have seen, such as smart homes, smart watches, smart cars, etc.

Refer to page 19 and explain the terms embedded systems, edge computing, and data analytics. Use the images on the page to show some examples of these concepts, such as smart homes, autonomous vehicles, and data science. Explain the importance and applications of these concepts in various fields and industries, such as engineering, healthcare, business, etc.

Conclusion (5 min)

Ask:

- What are some everyday examples of IoT devices, and how do they make our lives more connected and convenient?
- How might the security and privacy considerations change when dealing with a network of interconnected IoT devices?
- How do edge computing and IoT work together to create smarter and more efficient systems?
- In what ways do different types of transmission media play a role in supporting the communication needs of IoT devices and edge computing?

Classwork (10 min)

- ✓ Do part B and C from the workstation
- ✓ Do Question 3 and 4 from part D

Homework assignment

- ✓ Do Question 3 from part E

Suggested answers to end-of-chapter questions on pages 20 to 21

A. Fill in the missing blanks

- | | | |
|---------------------|----------------|------------------|
| 1. Computer Network | 2. Underground | 3. Guided medium |
| 4. electromagnetic | 5. radio | 6. microwaves |

B. True/false statements

1. False. It provides a connection between a computer's motherboard and its display devices, such as monitors.
2. True
3. False. Unguided media, such as wireless communication, do not use cables for signal transmission.
4. True
5. False. It allows for two-way communication, meaning that data can be transmitted and received simultaneously.

C. Choose the correct option

- | | | |
|------|------|------|
| 1. c | 2. c | 3. b |
| 4. d | 5. c | |

D. Short-answer questions

1. Refer to the table on page 12 of the chapter.
2. Guided media uses physical cables, while unguided media relies on the air or space. Guided media directs signals within cables, less interference, longer distances. Unguided media sends signals through the air, more interference, shorter distances.
3. Pupils can conduct online research to answer this question. Some examples include:
 - Decision Making:** Helps in informed decision-making based on data insights.
 - Customer Understanding:** Understands customer behaviour and preferences.
 - Product Improvement:** Enhances products and services.
 - Cost Reduction:** Reduces operational costs.
 - Forecasting:** Predicts future trends and outcomes.
 - Healthcare:** Enhances healthcare outcomes and patient care.
 - Scientific Research:** Advances scientific discoveries.
 - Marketing:** Improves marketing strategies and campaigns.
4. Industrial machines, consumer electronics, agricultural and processing industry devices, automobiles, medical equipment, cameras, digital watches, household appliances, airplanes, vending machines and toys, as well as mobile devices, are possible locations for an embedded system.

E. Long-answer questions

1. Computer network refers to the interconnection of computing equipment that may exchange data and share resources. Its components include hosts, Network Interface Card (NIC) and nodes. Pupils can further elaborate on this based on their understanding of the topic.
2. Refer to page 16-18 of the chapter.
3. Refer to page 19 of the chapter.

3A

DATA HANDLING USING SPREADSHEET

After completing this chapter, pupils should be able to:

- describe the purpose and uses of spreadsheet software,
- list different spreadsheet software, e.g. Excel, Google Sheets, OpenOffice,
- recognise and infer spreadsheet interface to create a result card, home budget, etc,
- create a spreadsheet.

Teaching Objectives

Introduction for the teacher

Spreadsheets provide a practical way to apply mathematical concepts such as formulas, functions, and data analysis. Pupils can learn how to use spreadsheets to solve complex mathematical problems, perform statistical analysis, and visualise data.

Working with spreadsheets requires pupils to think critically and solve problems. They need to understand the problem, identify the relevant data, and apply the appropriate formulas or functions to find the solution. This process helps develop analytical and problem-solving skills.

Spreadsheets help pupils learn how to organise and manage data effectively. They can create tables, sort and filter data, and create charts and graphs to visualise information. These skills are valuable in many fields, including business, research, and academia.

Spreadsheets are widely used in various industries and professions, including finance, accounting, marketing, and engineering. Teaching pupils how to use spreadsheets prepares them for future careers and provides practical skills that they can use in their daily lives.

Vocabulary Cloud	
Spreadsheet	Software used to store, organise, and analyse data.

Lesson Plan 1

Resources:

- ✓ Textbook pages 22-25
- ✓ Lab access and computers for hands-on practice
- ✓ Apache OpenOffice Software installed on lab computers
- ✓ Internet access for hands-on practice of Google Sheets

Starter activity (5 min)

Ask:

- Have you ever used a spreadsheet before?
- What have you used it for?

- Where do you think spreadsheets may be used?

Reading and explanation (30 min)

Explain that spreadsheet software is a tool that can help us store, organise, and analyse data in a table format. Give some examples of data that can be entered in a spreadsheet, such as grades, budget, inventory, etc. Ask the pupils to read and list the four common features of all spreadsheet software. Ask them to explain each feature in their own words and give an example of how it can be used. Write the best examples on the board. Then ask them to refer to page 23 and read the 'Leap Forward' box. Ask them to summarise the main idea of the paragraph in one sentence.

Ask the pupils to refer to page 23 and read the section on the uses of spreadsheets. Ask them to choose one of the uses and explain how they can use spreadsheet software for that purpose. For example, if they choose accounting, they can explain how they can use spreadsheet software to keep track of their income and expenses, calculate their savings, and create a budget plan.

Ask the pupils to go to page 24 and look at the image of the Google Sheets interface. Ask them to identify the different elements of the interface, such as the menu bar, the toolbar, the sheets tabs, and the cells. Ask them to explain the function of each element and how they can use it to create and edit a spreadsheet.

Ask the pupils to read the 'Leap Forward' box on page 24 about popular spreadsheet software applications. Ask them to compare and contrast the three applications: Google Sheets, Microsoft Excel, and Apache OpenOffice. Ask them to list the advantages and disadvantages of each application and explain which one they would prefer to use and why.

Now, in the same manner, have the pupils read page 25 and ask them to identify the components of the Apache OpenOffice interface on the software.

Conclusion (5 min)

Ask:

- What are some of the fundamental functions of a spreadsheet, and how might they be useful in organising information?
- How might spreadsheets be used in everyday life or different professions?
- Can you think of a specific scenario where using a spreadsheet would be more efficient than other methods of organising information?

Classwork (5 min)

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

Homework assignment

- ✓ Do questions 1 and 2 from part D
- ✓ Do questions 1 and 2 from part E
- ✓ Practice making spreadsheets at home on Google sheets. Following is a sample homework assignment to practice creating and formatting a spreadsheet using Google Sheets.

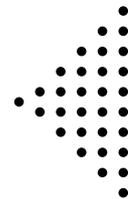


Class Activity

Instructions:

Part 1: Creating a budget spreadsheet

1. Open Google Sheets and create a new spreadsheet.



2. Title the spreadsheet 'My Monthly Budget'.
3. Set up the following column headers:
 - Category
 - Budgeted Amount
 - Actual Amount
 - Difference (Actual - Budgeted)
4. Choose at least five expense categories (e.g. groceries, entertainment, transportation, etc.) and list them under the 'Category' column.
5. Assign a reasonable budgeted amount for each category under the 'Budgeted Amount' column (make sure the amounts are different for each category).
6. Pick a month for your budget (e.g. January) and fill in the 'Actual Amount' column with hypothetical expenses for each category.

Part 2: Formatting and calculations

7. Format the cells in the 'Budgeted Amount' and 'Actual Amount' columns as currency.
8. Use the SUM function to calculate the total budgeted amount and total actual amount. Place these totals below the respective columns.
9. Use a formula to calculate the difference between the 'Actual Amount' and 'Budgeted Amount' for each category. Place the results in the 'Difference' column.

Part 3: Chart creation

10. Create a bar chart to visually represent the budgeted and actual amounts for each category.
11. Add a title to your chart (e.g. 'Monthly Budget Analysis').
12. Adjust the chart colours and style to make it visually appealing.

Part 4: Saving and sharing

13. Save your spreadsheet with an appropriate name.
14. Share the spreadsheet with your teacher using the sharing options in Google Sheets.

Lesson Plan 2

Resources:

- ✓ Textbook pages 25-34
- ✓ Lab access and computers for hands-on practice
- ✓ Computers with MS Excel installed

Starter activity (5 min)

Ask the pupils the following question:

- How does Excel differ from a regular word processor, and in what scenarios would you choose to use Excel over a word processor?

Reading and explanation (30 min)

Ask pupils to brainstorm some examples of how they use or encounter data in their daily lives.

Write their responses on the board. Explain that MS Excel is a powerful tool that can help them organise, analyse, and present data in various ways.

Ask pupils to refer to pages 26-33 and tell them that they will be using it as a guide to learn MS Excel. Explain that the book covers the basics of MS Excel, such as entering data, formatting cells, using formulas, creating charts, and printing worksheets. Tell them that they will be focusing on creating and editing spreadsheets.

Make sure each pupil has access to a separate computer system. If that is not possible then divide pupils in small groups with not more than 4 pupils per group. Assign each group a computer system.

Have them open MS Excel on their own using the instructions and screenshots given on page 26. Now ask pupils to familiarise themselves with each of the elements of an Excel Workbook using the Excel interface and page 27 of the textbook. Follow the instructions on pages 28-33 of the book. Monitor their progress and assist them as needed. Check their understanding by asking them questions and having them explain their steps.

Conclusion: (5 min)

Ask:

- In your opinion, what is the most valuable skill you gained during this Excel lesson?
- How confident do you feel about using Excel independently after today's session?
- What additional features or topics would you be interested in learning about in future Excel lessons?

Homework assignment

- ✓ Do question 2 and 3 from part D
- ✓ Do question 3 from part E
- ✓ Practice making spreadsheets at home on MS Excel. Following is a sample homework assignment to practice creating and formatting a spreadsheet using MS Excel.



Activity

Part 1: Choosing a template

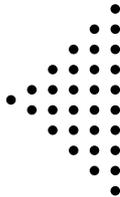
1. Open Microsoft Excel on your computer.
2. Navigate to the 'New' tab and explore the available templates.
3. Choose a template that interests you (e.g. budget, class schedule, grade tracker, etc.).

Part 2: Customising the template

4. Open the selected template and examine its structure.
5. Update the template with your own information. For example:
 - If you chose a budget template, replace the sample expenses and incomes with your own.
 - If you chose a class schedule template, input your class names, days, and times.
 - If you chose a grade tracker, enter your subjects and grades.

Part 3: Formatting and styling

6. Format the cells, fonts, and colours to make your spreadsheet visually appealing.
7. Add conditional formatting to highlight important data (e.g. use colour scales to represent different grade ranges).



8. Include a title at the top of your spreadsheet related to the template you chose.

Part 4: Using formulas

9. If applicable, use formulas to calculate totals, averages, or any other relevant information.

10. Ensure that all formulas are accurate and update automatically when changes to the data.

Part 5: Saving and sharing

11. Save your customised spreadsheet with an appropriate name.

12. Ensure that all customisations are accurately applied to the chosen template.

13. The spreadsheet should be well-formatted and visually appealing.

Suggested answers to end-of-chapter questions on pages 33 to 34

A. Fill in the missing blanks

- | | | |
|----------------|-----------|-----------|
| 1. Formula bar | 2. Labels | 3. Insert |
| 4. Bottom | 5. Next | |

B. True/false statements

1. False. Spreadsheets are primarily used for organizing and analysing data, not for creating letters and documents.
2. True
3. False. The term 'active cell' is typically used to refer to the currently selected cell, not 'open cell'.
4. True
5. True
6. True
7. True

C. Choose the correct option

- | | | |
|------|------|------|
| 1. d | 2. a | 3. b |
| 4. c | | |

D. Short-answer questions

1. Microsoft Excel and Google Sheets
2. A row is a horizontal line of cells in a spreadsheet.
A column is a vertical line of cells in a spreadsheet.
A cell is the intersection of a row and a column and is where you enter data or formulas.
3. The Formula Bar displays the active cell address on the left and the cell contents on the right. Data entered in a cell is displayed in the Formula Bar. Editing of the cell contents is also done in the Formula Bar.

E. Long-answer questions

1. Pupils will answer this question according to their understanding of the topic and overall chapter.
2. Formatting options in spreadsheets, such as bolding, colouring, and aligning cells, can make information more relevant for readers. For example, in a sales report, highlighting the top-selling products with a different colour or using bold fonts can draw attention to key insights.
3. Pupils will answer this question according to their understanding of the topic. An example includes:
Bold or coloured text for categories like 'Fruits,' 'Vegetables,' and 'Dairy.'
Bullet points or checkboxes to mark items as you shop.
Borders or cell shading to separate sections for different store aisles (e.g. 'Produce,' 'Canned Goods').

After completing this chapter, pupils should be able to:

- use advanced MS Excel features such as data validation, conditional formatting, and sorting and filtering,
- create and edit charts and graphs to display data visually,
- apply formulas and functions to perform calculations and analysis on data.

Lesson plan 1

Resources:

- ✓ Textbook pages 35- 53
- ✓ A computer with MS Excel installed for each pupil.
- ✓ A projector or a smart board to display the teacher's screen (if possible).

Starter activity (5 min)

- Review the previous lesson on basic MS Excel skills such as entering and formatting data, copying and pasting, and using simple formulas and functions.

Reading and explanation (30 min)

Ask pupils to open MS Excel and their textbooks to page 35.

Explain what data validation is and why it is useful to restrict the type and range of data that can be entered in a cell or a range of cells. Demonstrate how to use data validation to create a drop-down list, a date picker, and a custom rule using the examples on page 36. Ask pupils to follow along and try the examples on their computers. Check for understanding by asking some questions and having pupils share their screens or answers.

Explain what conditional formatting is and how it can be used to highlight or format cells based on certain criteria or rules. Demonstrate how to use conditional formatting to apply colour scales, data bars, icon sets, and custom rules using the examples on pages 37 and 38 of the book. Ask pupils to follow along and try the examples on their computers. Check for understanding by asking some questions and having pupils share their screens or answers.

Explain what sorting and filtering are and how they can be used to organise and analyse data in a table or a range of cells. Demonstrate how to use sorting and filtering to sort data alphabetically, numerically, or by colour, and to filter data by values, text, or criteria using the examples on pages 39 and 40. Ask pupils to follow along and try the examples on their computers. Check for understanding by asking some questions and having pupils share their screens or answers.

Explain what charts and graphs are and how they can be used to display data visually and to compare and contrast data sets. Demonstrate how to create and edit different types of charts

and graphs such as column, bar, line, pie, and scatter using the examples on pages 41 to 47 of the document. Ask pupils to follow along and try the examples on their computers. Check for understanding by asking some questions and having pupils share their screens or answers. Microsoft Excel offers a variety of chart types, each designed to represent different types of data and display patterns or trends effectively. Here are some common types of charts and graphs in Excel along with their best-use scenarios:



Concept Cloud



1. Column chart:

- **Best use:** Comparing values across different categories or displaying data over time.
- **Example:** Sales figures for different months or product categories.

2. Bar chart:

- **Best use:** Similar to column charts, but better for comparing values when categories have long names.
- **Example:** Comparing the performance of different departments in a company.

3. Line chart:

- **Best use:** Showing trends over a continuous interval, such as time.
- **Example:** Tracking stock prices over months or years.

4. Pie chart:

- **Best use:** Displaying the proportion of parts to a whole.
- **Example:** Market share of different products within a company.

5. Area chart:

- **Best use:** Showing the cumulative total of a value over time.
- **Example:** Displaying the growth of revenue over several quarters.

6. Scatter plot:

- **Best use:** Displaying the relationship between two variables.
- **Example:** Correlation between study hours and exam scores.

7. Bubble chart:

- **Best use:** Extending the scatter plot to show three dimensions of data.
- **Example:** Comparing three variables like sales, profit, and market share.

8. Radar chart:

- **Best Use:** Comparing multiple quantitative variables for different data points.
- **Example:** Analysing the performance of athletes in various sports categories.

9. Doughnut chart:

- **Best use:** Similar to a pie chart but allows for the display of multiple data series.
- **Example:** Showing the distribution of budget across different expense categories.

10. Gantt chart:

- **Best use:** Representing project schedules and timelines.
- **Example:** Displaying tasks, their start and end dates, and dependencies.

11. Histogram:

- **Best use:** Representing the distribution of a dataset.
- **Example:** Displaying the distribution of pupil exam scores in a class.

12. Waterfall chart:

- **Best use:** Showing the cumulative effect of sequentially introduced positive or negative values.
- **Example:** Displaying changes in profit over different stages of a project.

Choosing the right chart depends on the nature of your data and the story you want to convey. Always consider the audience and the message you want to communicate when selecting a chart type in Excel.

Review the basic arithmetic operations and the order of operations in MS Excel. Explain what formulas and functions are and how they can be used to perform calculations and analysis on data. Demonstrate how to use some common formulas and functions such as SUM, AVERAGE, MIN, MAX, COUNT, IF, and VLOOKUP using the examples on pages 48 to 53 of the document. Ask pupils to follow along and try the examples on their computers. Check for understanding by asking some questions and having pupils share their screens or answers.

Conclusion (5 min)**Ask:**

- In your opinion, what is the most valuable skill you gained during this Excel lesson?
- How confident do you feel about using Excel independently after today's session?
- What additional features or topics would you be interested in learning about in future Excel lessons?

Classwork(5 min)

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

Homework assignment

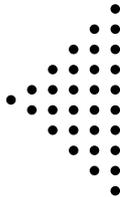
- ✓ Do part D and E from the workstation.

Suggested answers to end-of-chapter questions on pages 54 to 55**A. Fill in the missing blanks.**

- | | | | |
|---------------------|-------------------|--------------|------------|
| 1. (=) | 2. SUM | 3. Insert | 4. SQRT(4) |
| 5. Function Library | 6. SUM (re-check) | 7. Pie chart | |

B. True/False Statements.

1. True
2. True
3. False. The POWER function in Excel has two numbers in its syntax, not three.



4. False. The PRODUCT function in Excel can be used with more than three numbers.
5. False. The options for creating and formatting charts in Excel are primarily accessed from the 'Insert' tab, not the 'Home' tab.

C. Choose the correct option.

- | | | | |
|------|------|------|------|
| 1. a | 2. b | 3. c | 4. c |
| 5. a | 6. c | 7. a | 8. b |

D. Short-answer questions.

1. The AutoFit Selection feature adjusts the width of columns and the height of rows in a worksheet to fit the content.
2. A formula is a mathematical expression used in spreadsheets to perform calculations. It consists of elements like cell references, operators (+, -, *, /), and functions (e.g., SUM) that define the calculation.
3. The advantage of using functions is that they simplify complex calculations, reduce errors, and make it easier to update and maintain formulas in spreadsheets.
4. We use charts on a worksheet to visually represent and communicate data, making it easier to understand trends, comparisons, and patterns in the data.

E. Long-answer questions.

1. The AVERAGE function would be useful to calculate the average test scores of pupils or the average monthly expenses of a household.
2. Pupils will answer this question according to their understanding of the topic. An example includes:
The MAX function could help a teacher find the highest score in a class, while the MIN function could help identify the lowest score, aiding in understanding the range of pupil performance.
3. Rabia should use a line chart to show the price increase of books over five years. A line chart is suitable for displaying trends and changes over time, making it ideal for illustrating how prices have evolved annually. Pupils can elaborate on this response to demonstrate a thorough understanding of the topic.
4. Conditional formatting is a feature that allows you to format cells based on specific conditions or criteria. It's useful to highlight important data, identify outliers, or visualise patterns in your data. Pupils can elaborate on this response to demonstrate a thorough understanding of the topic.
5. A condition in the IF function is used to specify a logical test. It helps determine which action or value to take or return based on whether the condition is true or false, enabling customised calculations or formatting. Pupils can elaborate on this response to demonstrate a thorough understanding of the topic.

04

ALGORITHMIC THINKING

Teaching Objectives

After completing this chapter, pupils should be able to:

- define and infer simple and complex problems, and how to identify each,
- define basis for calculating efficiency of an algorithm (e.g. number of steps, memory used, etc),
- discuss the scope and limitations, and that some problems cannot be solved computationally (e.g. factoring very large numbers in a small amount of time, or Turing's Halting problem, how a computer can never reliably inspect someone's code and tell you whether it will halt or run forever),
- describe that there are ways to characterise how well algorithms perform and that two algorithms can perform differently for the same task,
- explain, with examples, some problems, which cannot be solved computationally,
- discuss basics of writing pseudocode,
- discuss the concept of constants and variables,
- discuss the concept of nesting.

Introduction for the teacher

Algorithmic thinking involves breaking down complex problems into smaller, more manageable parts. It teaches pupils how to approach problems logically and systematically, making it easier to find solutions. It encourages pupils to think critically about problems and solutions. It helps them analyse situations, consider multiple perspectives, and make informed decisions.

While algorithms follow a set of rules, there is often room for creativity in designing them. Teaching algorithmic thinking encourages pupils to think creatively and come up with innovative solutions to problems. It involves understanding how algorithms work and how to implement them. This enhances pupils' computational skills and helps them become more proficient in coding and programming. Moreover, it requires pupils to think logically and make connections between different parts of a problem. This improves their logical reasoning skills, which are essential in many aspects of life.

Lesson Plan 1

Resources:

- ✓ Textbook pages 56-63

Starter activity (5 min)

Ask the pupils the following questions:

- What do you think of when you hear the word 'algorithm'? Any ideas or guesses?

- Have you ever followed a set of instructions or steps to solve a problem? Can you give an example?
- How do you think computers solve problems? Do they think like humans, or is there a different process involved?

Reading and explanation (25 min)

Introduce the new topic of algorithmic thinking and problem-solving. Explain that algorithmic thinking is a way of thinking and solving problems that is essential for computer science and mathematics. It involves breaking down complex problems into smaller and simpler parts, finding patterns and similarities, focusing on the relevant information, and creating step-by-step instructions or solutions that can be understood by humans and computers.

Ask pupils to give some examples of problems or tasks that they encounter in their daily lives that require algorithmic thinking. For example, making a sandwich, getting ready for school, playing a game, etc. Write their responses on the board and discuss how they would approach these problems using algorithmic thinking.

Explain that there are different ways to represent algorithms or solutions, such as pseudocode, flowcharts, and structured language.



Concept Cloud



Pseudocode is a combination of human language and programming keywords that describes the logic of an algorithm.

Flowcharts are graphical representations of an algorithm that use different shapes and symbols to show the flow of execution.

Structured language is a formal and precise way of writing an algorithm using specific syntax and rules.

Show some examples of pseudocode, flowcharts, and structured language for simple algorithms, such as finding the maximum of two numbers, printing the first 10 natural numbers, or checking if a number is even or odd. Explain the meaning and purpose of each element and symbol in the representations. Ask pupils to compare and contrast the different representations and identify their advantages and disadvantages.

Divide the class into small groups of 3-4 pupils. Distribute the worksheets and assign each group a different problem or scenario from the textbook (pages 56-63). The problems or scenarios are:

- ✓ Creating a solar lamp for pupils (page 57)
- ✓ Solving the traffic problem using the problem-solving process (page 60)
- ✓ Making a peanut butter sandwich (page 61)
- ✓ Checking whether an input number is a palindrome or not (page 63)

Instruct the groups to work together to apply the stages of computational thinking (decomposition, pattern recognition, abstraction, and algorithm) to their assigned problem or scenario. They should write down their answers on the worksheets using pseudocode, flowcharts, and structured language. They should also explain their reasoning and justify their choices.

Monitor the groups and provide guidance and feedback as needed. Encourage the groups to use the textbook, the Internet, and the visual programming tool as references and resources. Remind them to check their work for accuracy, completeness, and clarity.

After the groups finish their work, ask them to present their solutions to the class. Have the other groups listen and ask questions or provide comments. Discuss the similarities and differences among the solutions and evaluate their efficiency, correctness, and simplicity.

Ask the pupils to work individually on their computers or laptops. Assign them a new problem or scenario from the textbook (pages 56-63) that they have not worked on before. The problems or scenarios are:

- ✓ Finding the average marks scored by each pupil (page 56)
- ✓ Checking whether a given number is positive, negative, or zero (page 59)
- ✓ Printing day of week name using CASE statement (page 62)
- ✓ Finding the factorial of a given number (page 63)

Instruct the pupils to apply the stages of computational thinking (decomposition, pattern recognition, abstraction, and algorithm) to their assigned problem or scenario. They should create their solutions using the visual programming tool and save their work. They should also write down their solutions on a separate sheet of paper using pseudocode, flowcharts, and structured language. They should explain their reasoning and justify their choices.

Monitor the pupils and provide guidance and feedback as needed. Encourage the pupils to use the textbook, the Internet, and the visual programming tool as references and resources. Remind them to check their work for accuracy, completeness, and clarity.

Conclusion (5 min)

- Summarise the main points and concepts of the lesson. Review the definition and importance of algorithmic thinking and problem solving, the stages of computational thinking, the different ways to represent algorithms, and the problem-solving techniques. Ask the pupils to recall some of the examples and solutions they worked on and discussed in the lesson.

Classwork (5 min)

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

Pre-reading: textbook pages 64-65

Homework assignment

- ✓ Do Question 1 from part D
- ✓ Do Question 1 from part E

Lesson Plan 2

Resources:

- ✓ Textbook pages 64-69

Starter activity (5 min)

Ask:

- Have you ever heard of algorithms before? Can you give an example of something you do in



your daily life that might be considered an algorithm?

- Do you know what a conditional statement is in programming? Can you think of a situation in real life where you might use a conditional statement?
- Have you ever used a loop in programming? What was it for, and how did it work?

Reading and explanation (25 min)

Begin the lesson by explaining what an algorithm is. Use an analogy such as a recipe for making a sandwich, where each step in the recipe is a single instruction in the algorithm. Discuss the importance of algorithms in computer programming and how they help solve complex problems.

Introduce the concepts of time complexity and space complexity. Use the analogy of a chef cooking in a small kitchen (low space complexity) vs. a large kitchen (high space complexity) to explain space complexity. Use the analogy of a chef cooking a dish quickly (low time complexity) vs. taking a long time to cook (high time complexity) to explain time complexity. Discuss how these concepts help in comparing and analysing algorithms.

Explain the concept of nested conditionals using the example of a program that determines whether a number is positive, negative, or zero. Use the pseudocode provided in the on pg.60 to demonstrate how nested conditionals work. Discuss how nesting allows for powerful yet simple programming.

Introduce the CASE statement as a way to select a path based on the value of a variable. Use the example of printing the day of the week based on a number input (1-7) to demonstrate the CASE statement. Discuss how the OTHERWISE keyword handles cases not explicitly specified in the CASE statement.

Explain the concept of iteration as the process of repeating a set of instructions or steps. Introduce the FOR loop as a way to iterate over a sequence of values. Use the pseudocode provided in the book to demonstrate how to print 'n' natural numbers using a FOR loop. Discuss the syntax of the FOR loop and the concept of a nested loop.

Introduce the REPEAT UNTIL loop as another way to iterate over a sequence of values. Use the pseudocode provided in the book to demonstrate how to print n natural numbers using a REPEAT UNTIL loop. Discuss the syntax of the REPEAT UNTIL loop and how it differs from the FOR loop.

Conclusion (5 min)

Summarize the key points of the lesson: algorithms, time and space complexity, nested conditionals, and iteration.

Encourage pupils to practice writing algorithms and using conditional statements and loops in their programming assignments.

Classwork (5 min)

- ✓ Do questions 2,3,4, and 5 form part D

Pre-reading: textbook pages 64-65

Homework

- ✓ Do Question 2 from part E

Suggested answers to end-of-chapter questions on pages 70 to 71**A. Fill in the missing blanks.**

- | | | |
|---------------------------------|-----------------|-----------------------|
| 1. Break down complex problems. | 2. Algorithm | 3. Develop algorithms |
| 4. Else statement | 5. Greater than | 6. Loop |
| 7. Iteration | 8. Recursion | |

B. True/false statements.

- | | | |
|---|---------|---------|
| 1. True | | |
| 2. False. An algorithm should be in the correct order to achieve the desired outcome efficiently. | | |
| 3. True | 4. True | 5. True |

C. Choose the correct option.

- | | | |
|------|------|------|
| 1. a | 2. c | 3. c |
| 4. a | 5. a | 6. d |

D. Short-answer questions.

1. Refer to page 61 and 62 of the chapter.
2. The Halting problem is a decision-making problem based on an arbitrary computer program and its input to determine whether the program will terminate or run forever. Pupils can include an example from the chapter or from their own understanding.
3. A constant is a value that remains unchanged during program execution. It cannot be altered by the program. Whereas a variable is a value that can change during program execution; it can be assigned a new value.
4. Conditional statements are programming tools that help a computer make decisions. They allow the computer to choose different actions to perform based on specific conditions or criteria.
5. A conditional statement contained within another conditional statement is called a nested conditional statement.

E. Long-answer questions.

1. Pupils will answer this question through their understanding of the topic. They can refer to the techniques listed on page 59 and 60 of the chapter.
2. Pupils can write one simple and one detailed algorithm on the given subject and then compare them on the basis of efficiency.

After completing this chapter, pupils should be able to:

- define programming and its purpose,
- identify and explain the basic programming constructs (variables, data types, operators, expressions, statements, comments),
- use Scratch to create simple programs using the basic programming constructs,
- explain the difference between visual and textual programming languages,
- identify and explain the benefits and challenges of textual programming languages,
- use Python to create simple programs using the basic programming constructs.

Introduction for the teacher

The primary focus of this chapter is to introduce pupils to programming languages and to teach them to code in different languages. Coding challenges pupils to approach problems logically and break them down into manageable steps. Writing code allows for creative expression, enabling pupils to bring their ideas to life digitally.

Coding in Scratch might 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. Follow the following steps to self-learn Scratch from the official website:

Concept Cloud

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.

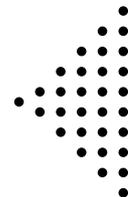
Step 7: Plan for teaching**1. Adapt projects:**

- 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
HTML	Hyper Text Markup Language
CSS	Cascading Style Sheets



Lesson Plan 1

Resources

- ✓ textbook pages 17- 21
- ✓ Computers with Internet access (This class must be connected in the lab)
- ✓ Scratch software

Starter activity (5 min)

Ask the pupils the following questions:

- Have you ever thought about creating your own game? Why or why not?
- What are some basic concepts you think are important for a game to have?
- Do you have any ideas for a game you'd like to create in Scratch?

Reading and explanation (25 min)

Ask pupils what they think programming is and why it is important. Write their responses on the board. Explain that programming is the process of creating instructions for a computer to perform a specific task. Programming is important because it allows us to create software applications that can solve problems, entertain, educate, and improve our lives. Show some examples of software applications that use programming, such as games, websites, mobile apps, etc. Ask pupils to name some more examples and how they use them.

Read page 72. Explain that there are different programming languages that can be used to create software applications. Programming languages have rules and syntax that define how the instructions are written and executed by the computer. Explain that there are two main types of programming languages: visual and textual. Visual programming languages use graphical elements, such as blocks, icons, or symbols, to create programs. Textual programming languages use text, such as words, numbers, and symbols, to create programs.

Introduce Scratch as an example of a visual programming language that is designed for beginners and allows them to create interactive stories, games, and animations. Show the Scratch interface online and explain the main components, such as the stage, the sprites, the block palette, the script area, and the green flag.

Demonstrate how to create a simple program that makes a sprite move and say something when the green flag is clicked. Use the blocks from the Motion, Looks, and Events categories. Refer to page 75. Explain the meaning and function of each block and how they fit together to form a script.

Ask pupils to follow the steps from pages 76 to 83 and create the game 'The Wizard Battle' using Scratch. Encourage them to experiment with different sprites, blocks, and settings. Provide guidance and feedback as needed. Ask pupils to tweak more details or add other features to the game. Encourage them to get creative with it!

Conclusion (5 min)

Ask:

- What coding concepts did you find most challenging or interesting while working on this project?
- How did you use variables, loops, and conditionals in your game, and how did they contribute to the gameplay?

Classwork (5 min)

- ✓ Do Part A and B from the workstation.

Homework assignment

- ✓ Do Question 2 from the part E

Lesson Plan 2**Resources**

- ✓ textbook pages 84- 88
- ✓ Computers with Internet access (This class must be conducted in the lab)
- ✓ Visual Basic software

Starter activity (5 min)

Ask the pupils the following questions, before starting to teach each technology, to gauge their interest:

- Have you ever used any drag-and-drop programming interfaces before?
- How do you think a computer understands and executes code?
- What are your expectations or goals for learning Visual Basic?

Reading and explanation (25 min)**Concept Cloud**

Introduce the topic of variables and data types in Visual Basic, using the following points:

- A variable is a named memory location that can store a value of a certain type.
- Data types are categories of values that determine how much memory a variable needs and what kind of operations can be performed on it.
- Visual Basic has several data types, such as Integer, Double, String, Boolean, etc.
- To declare a variable, we use the Dim statement, followed by the variable name and the data type, for example: Dim age As Integer
- To assign a value to a variable, we use the Let statement, followed by the variable name and the equal sign, for example: Let age = 15
- To get user input, we use the InputBox function, which displays a dialog box with a prompt and returns the value entered by the user, for example: name = InputBox('Enter your name')
- To display output, we use the MsgBox function, which displays a message box with a message and an optional title, for example: MsgBox 'Hello, ' & name, , 'Greeting'
- To perform arithmetic operations, we use operators such as +, -, *, /, and ^, for example: area = length * width

Demonstrate how to use variables and data types in Visual Basic, using the examples from pages 84-88 of the document. Use the projector to show the code and the output on the screen, and explain each step and line of code. Ask questions to check pupils' understanding, such as:

- ✓ What is the data type of the variable score?

- ✓ How do we declare a variable called name as a String?
- ✓ How do we assign the value 3.14 to a variable called pi?
- ✓ How do we get the user's name and store it in a variable called name?
- ✓ How do we display a message that says 'Hello, name' using the MsgBox function?
- ✓ How do we calculate the area of a rectangle with length 10 and width 5?

Circulate around the classroom and assist pupils who need help. Encourage pupils to help each other and share their solutions.

Conclusion (5 min)

Ask:

- What are variables and data types in Visual Basic?
- How do we declare and assign values to variables in Visual Basic?

Classwork (5 min)

- ✓ Do part C and D from the workstation.

Pre-reading:

textbook pages 90-92

Homework assignment

- ✓ Do Question 1 from part E

Suggested answers to end-of-chapter questions on pages 88 to 89

A. Fill in the missing blanks

- | | | |
|------------|---------------|-------------|
| 1. Visual | 2. Move | 3. Go to |
| 4. Forever | 5. High-level | 6. Operator |

B. True/false statements

- | | | |
|----------|----------|---------|
| 1. True | 2. False | 3. True |
| 4. False | 5. False | |

C. Choose the correct option

- | | | |
|------|------|------|
| 1. b | 2. b | 3. b |
| 4. c | 5. c | 6. c |
| 7. b | | |

D. Short-answer questions

1. The if-then-else statement is used in a flowchart to make decisions based on a condition. It allows the flow of the chart to follow different paths depending on whether the condition is true or false.
2. The main difference between a 'while' loop and a 'do-while' loop is that a 'while' loop checks the condition before executing the loop, while a 'do-while' loop checks the condition after executing the loop at least once. In other words, a 'do-while' loop guarantees that its code block will execute at least once, whereas a 'while' loop may not execute if the condition is initially false.

E. Long-answer questions

1. Refer to page 74 and 75 of the chapter.
2. Pupils will answer this question based on their overall understanding of the topic.

After completing this chapter, pupils should be able to:

- discuss the ethics and ethical issues in digital environments,
- explain the importance of being safe, responsible, and respectful online,
- define the key concepts of copyright, plagiarism, and piracy,
- identify improper use of computer resources,
- steps to secure information privacy and confidentiality,
- the possible dangers of the Internet and related security measures,
 - Identify the purpose of major Internet uses such as business, social networking, entertainment, information/news
 - Evaluate digital media bias and messaging

Introduction for the teacher

Technology has become an integral part of our pupils' lives; therefore, it is paramount to equip them with essential skills and knowledge beyond the traditional curriculum. Teaching pupils about digital ethics fosters a sense of responsibility and respect for others online. It lays the foundation for a positive and inclusive digital community.

The Internet is a powerful tool, and with great power comes great responsibility. Teaching pupils to navigate the online world safely, responsibly, and respectfully is akin to providing them with a compass for their digital journey, ensuring their well-being and positive interactions. Moreover, it is important to recognise and avoid improper use of computer resources as it instils a sense of stewardship for digital tools. It encourages responsible usage, helping pupils become mindful and considerate digital citizens.

Understanding the principles of copyright, plagiarism, and piracy is essential in cultivating a culture of creativity and respect for intellectual property. These concepts empower pupils to navigate the digital landscape ethically and responsibly.

As pupils engage with digital platforms, ensuring their information privacy becomes paramount. Teaching them the steps to secure their information fosters a sense of autonomy and control over their digital footprint. The Internet, while a vast resource, also poses potential dangers. Educating pupils about these risks and imparting knowledge on security measures empowers them to make informed decisions and navigate the online world safely. Also, shedding light on the purposes of major Internet uses, such as business, social networking, entertainment, and information/news, enables pupils to comprehend the multifaceted nature of the digital landscape, preparing them for future endeavour. In an era of information overload, teaching pupils to critically evaluate digital media bias equips them with discernment skills. This ability is essential for fostering independent thinking and responsible consumption of digital content.

Vocabulary Cloud	
Digital Footprint	Data trail left behind when we use the Internet
Netizen	A digital Citizen
Plagiarism	Copying other people's work without their permission
Piracy	Stealing author's data by a large-scale reproduction and using it for commercial purposes

Lesson Plan 1

Resources:

- ✓ Textbook pages 90-96
- ✓ Poster and handouts of the pledge from the given link in the lesson plan.

Starter activity (5 min)

Activate prior knowledge by asking pupils the following questions:

- ✓ What do you think is digital Citizenship?
- ✓ Why is it important to be ethical online?

Reading and explanation (25 min)

Write their responses of the starter activity questions on the board. Show the video from 'Common Sense Education' about digital citizenship and ask pupils to pay attention to the key terms and concepts.

Review the video by asking pupils to recall the six domains of digital citizenship: media balance and well-being, privacy and security, digital footprint and identity, relationships and communication, cyberbullying, digital drama and hate speech, and news and media literacy. Explain that this lesson will focus on the concepts of copyright, plagiarism, piracy, and responsible digital citizenship. The aim will be to identify and avoid copyright infringement, practice ethical online behaviour, and comprehend the responsible uses of digital resources.

Begin with a brief discussion on what pupils understand about ownership and permission. Ask if they have ever created something and how they would feel if someone used it without asking.

Write the definition of copyright on the board and discuss it in simple terms. Use keywords from the word web given on page 91. Explain that copyright protects the rights of creators to control the use of their original work.

Define plagiarism and piracy using relatable examples. Discuss why these actions are considered unethical and the impact they can have on creators. Emphasise the importance of using copyrighted materials ethically. Discuss the principles of respect and kindness in digital interactions. Use the following analogies to describe these concepts further:

 Concept Cloud
1. Copyright:

- **Analogy:** Imagine you bake a delicious batch of cookies. Copyright is like saying, ‘These are my special cookies, and only I get to decide who gets to have them or make more.’ So, when someone else wants to use your recipe or share your cookies, they need to ask for your permission first. In the same way, when someone creates something like a book, song, or artwork, they have the right to control who can use it.

2. Plagiarism:

- **Analogy:** Think of a class project as building a cool Lego castle. Now, if someone else takes a picture of your castle and pretends it's theirs without giving you credit, that's like plagiarism. Plagiarism is copying someone else's work, like using their Lego design, without saying, ‘Hey, I got this idea from [your name].’ It's not fair and can make you feel upset, just like when someone takes credit for your hard work at school.

3. Piracy:

- **Analogy:** Picture this-you create an amazing mixtape of your favourite songs. Piracy is like if someone makes a hundred copies of your mixtape, sells them, and keeps the money for themselves without asking you. They're basically stealing your music and making a profit! Similarly, piracy happens when people copy and sell things like movies, music, or games without permission from the original creators. It's not fair to the creators who worked hard to make those things.

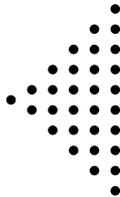
Remember, these are just like the rules we follow every day. You wouldn't take someone's bike without asking, and you shouldn't take someone's creative work without asking either. Copyright, plagiarism, and piracy are all about respecting other people's ideas and hard work.

Refer to pages 92-93 and discuss the principles of being responsible online, setting limits, and avoiding compromise on health one by one. Introduce the importance of securing personal information and the dangers of identity theft and phishing. Discuss the various uses of the Internet, such as in business, entertainment, education, news, healthcare, and navigation. Highlight the positive impacts but also discuss the potential dangers like digital media bias.

Present the two versions of the incident given on page 95 and 96 and have pupils identify biases, if any. Discuss the importance of evaluating multiple sources and avoiding misinformation. Summarise the key points of responsible digital citizenship.

Conclusion (5 min)

- You may log on to 'Common Sense Education' and ask pupils to sign their Digital Citizenship Pledge as a commitment to be respectful, responsible, and safe online.
- Distribute the handouts of the pledge among pupils and display it on the soft board as a poster too. Read it aloud with the pupils. Ask them to write their names on a paper and stick it on the pledge poster.



Classwork (5 min)

- ✓ Do parts A, B, and C from the workstation.

Homework assignment

- ✓ Ask pupils to research and bring examples of positive and negative uses of the Internet.
- ✓ Do Part D and E from the workstation. Suggested answers to end-of-chapter questions on pages 96 to 97

Suggested answers to end-of-chapter questions on pages 96 to 97

A. Fill in the missing blanks

1. Digital footprint
2. Cyberbullying
3. Digital communication
4. Bank details, passwords
5. Respect

B. True/false statements

1. True
2. False. Using someone else's words, ideas, or thoughts without giving them due credit is known as plagiarism
3. True
4. True

C. Choose the correct option

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

D. Short-answer questions

1. Plagiarism is the act of using someone else's work, ideas, or intellectual property without proper attribution or permission.
Copyright refers to the legal protection granted to the creators of original works, giving them exclusive rights to reproduce, distribute, and display their work.
Piracy is the unauthorised reproduction, distribution, or sharing of copyrighted material, such as software, music, movies, or books.
2. Pupils will answer this question based on their overall understanding of the chapter. Examples include online threat awareness, backups and strong passwords.
3. Refer to page 96 of the chapter.

E. Long-answer questions

1. Refer to page 96 of the chapter.
2. Refer to page 97 of the chapter.

After completing this chapter, pupils should be able to:

- explain the concept of promotion, value proposition, and quality assurance,
- define Business Plan and its components,
- understand the difference between payment and transactions; choose safe transaction methods,
- discuss Search Engine Optimization (SEO), using social media websites such as Instagram, Twitter, and blogs,
- analyse how technology is an enabler in entrepreneurship,
- name and describe the digital platforms that can be used for entrepreneurship,
- describe the basic components of a business plan, i.e. market need, product design, costing, operations, and marketing.

Introduction for the teacher

As we prepare our pupils for the challenges and opportunities of the future, it is crucial to equip them with a foundational understanding of key business concepts. Introducing business plans encourages pupils to think creatively and strategically about identifying opportunities and solving problems. It instils an entrepreneurial mindset, fostering skills like critical thinking, adaptability, and innovation. Learning about business plans and digital marketing provides them with practical knowledge applicable to their daily lives. It helps them understand the dynamics of the business world and the role of technology in shaping and promoting ventures.

Teaching digital marketing introduces pupils to essential technological tools and platforms. It enhances their digital literacy, enabling them to navigate and utilise technology effectively, a skill crucial for success in various academic and professional endeavour. Digital marketing introduces pupils to the global nature of business. They learn how technology connects people worldwide and understand the importance of reaching diverse audiences. This global perspective is essential for fostering cultural awareness and adaptability.

Both business plans and digital marketing require effective communication. Pupils learn to articulate their ideas clearly, create persuasive presentations, and understand the impact of communication on business success. Business plans involve understanding financial components like budgeting, costing, and profit and loss statements. This early exposure to financial concepts lays the groundwork for financial literacy, helping pupils make informed decisions about money in their personal and professional lives.

Vocabulary Cloud	
SMART	Specific, Measurable, attainable, relevant, timely
Product	Any item that is sold to customers
E-commerce	Electronic commerce. Refers to trading of goods and services on the Internet

Lesson Plan 1

Resources:

- ✓ Textbook pages 98- 103
- ✓ Set of worksheets (made as per the instructions in the lesson plan)
- ✓ Internet access for research during class activity

Starter activity (5 min)

Ask the pupils the following questions:

- ✓ Are you familiar with the term marketing?
- ✓ What is marketing in your opinion?
- ✓ How do you decide which brand to buy when buying groceries or your shampoo?
- ✓ Have you ever noticed online ads while using the Internet? How do you think they affect people's buying decisions?

Reading and Explanation (25 min)

Begin with a brief discussion on what pupils understand about marketing. Introduce the definition of marketing and its fundamental principles: product, price, place, and promotion from page 98. Discuss real-world examples of each principle using familiar products. You may use the following examples:

Concept Cloud

1. Product: iPhone

- Description: The product is the physical device, its features, and functionalities.
- Example: The iPhone is a sleek, touchscreen smartphone that boasts advanced camera technology, facial recognition, and a user-friendly interface. Its design, performance, and unique features make it stand out in the market.

2. Price: Nike shoes

- Description: Price refers to the amount of money customers pay for a product.
- Example: Nike offers a range of athletic shoes at different price points. The price of a premium running shoe might be higher due to advanced technology and materials, while a basic pair might be more affordable, making Nike accessible to a wide range of consumers.

3. Place: Starbucks coffee

- Description: Place involves the distribution channels through which a product is made available to customers.
- Example: Starbucks strategically places its coffee shops in busy urban areas, shopping malls, and even inside grocery stores. This allows them to reach customers in various locations and make their products easily accessible for a quick coffee fix.

4. Promotion: Coca-Cola

- Description: Promotion involves marketing communications to raise awareness and drive sales.
- Example: Coca-Cola uses various promotional strategies, such as TV commercials, social media campaigns, and sponsorships of major events like the FIFA World Cup. These efforts aim to create a positive image, boost brand visibility, and encourage consumers to choose Coca-Cola over other beverages.

Activate pupils' prior knowledge by asking them what they know about marketing and how it is done in the digital age. Show them some examples of digital marketing campaigns from different platforms (e.g. social media, email, website, etc.) and ask them to identify the product, target audience, and value proposition. Explain that digital marketing is a way of promoting a product or service using online channels and tools. Discuss the four Ps of marketing: product, price, place, and promotion. Tell them that they will learn more about digital marketing and how to create a business plan for their own product or service.

Define Quality Assurance and its importance. Discuss the value proposition using an everyday example. Use the following example:

Concept Cloud

Product: Backpack

'Our backpack, the 'Adventure bag,' is not just a bag; it's your companion on every journey, school day, and outdoor adventure. Designed for comfort, durability, and style, it goes beyond the ordinary to enhance your daily experience.

1. Durability:

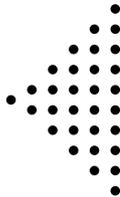
Crafted with high-quality materials, the Adventure bag ensures longevity, resisting wear and tear during your school years and outdoor escapades.

2. Comfort:

Padded shoulder straps and a breathable back panel provide maximum comfort, making it easy to carry all your essentials without strain.

3. Style:

Available in a range of vibrant colours and modern designs, the Adventure bag lets you express your unique personality and sense of style.



4 Functionality:

Thoughtful features such as multiple compartments, a laptop sleeve, and water bottle holders keep you organised and prepared for whatever the day brings.

5. Versatility:

From schoolbooks to sports gear, the Adventure bag adapts to your lifestyle, seamlessly transitioning from the classroom to extracurricular activities.

Choose the Adventure bag – not just a backpack, but a reliable companion on your journey through the exciting adventures of everyday life!

Divide pupils in pairs and ask them to create a value proposition for a hypothetical product. Share and discuss their value propositions.

Discuss different payment methods in business. Share examples and discuss how payment methods impact transactions. Define digital marketing and its significance. Discuss the shift from traditional to digital marketing using page 101. Introduce common digital marketing tools and techniques. Discuss SEO, Google Ads, Blogs, Vlogs, and Social Media Marketing. Discuss the advantages of digital marketing over traditional methods. Encourage pupils to share their experiences with digital media (even if it is as a consumer).

Class Activity

Divide the class into small groups and assign each group a product or service to market (e.g. a book, a game, a gadget, a clothing line, etc.). Give each group a worksheet with the following sections:

- **Product description:** Provide a brief overview of the product or service, highlighting its features, benefits, and unique selling points.
- **Target audience:** Identify the potential customers for the product or service, including their needs, interests, and preferences.
- **Marketing strategy:** Select one or more types of digital marketing channels to promote the product or service (such as social media, email, website, etc.). Explain how and why they will use them, what message they will convey, and what action they want the customers to take.
- **Budget:** Estimate the amount of money required to be spent on the digital marketing campaign and how they will allocate it to different channels and activities.
- **Evaluation:** Define how the success of the digital marketing campaign will be measured, including the indicators that will be used, and how the data will be collected and analysed.

Have the groups work on their worksheets using the textbook pages 98-103 and other online resources as references. Monitor and assist them as needed.

Have each group present their digital marketing plan to the class using a PowerPoint presentation or a poster. Use a rubric to assess their content, creativity, and presentation skills. Provide feedback and suggestions for improvement.

OR

Divide pupils into small groups. Provide each group with a different product and ask them to identify its product, price, place, and promotion strategies. Ask groups to present their findings, encouraging discussions on different marketing strategies.

Discuss the importance of considering all four elements in marketing strategy. Connect the discussion to real-world examples, emphasising the interdependence of the four P's.

OR

Ask pupils to create a Digital Marketing Plan using the following instructions:

In groups, define your fictional brand and target audience and its unique selling points. Identify the target audience and create buyer personas.

Each group then develops a digital marketing plan for their fictional brand. Emphasise the importance of aligning strategies with the brand and target audience. After sharing the group projects with the class, reflect on the challenges and opportunities in digital marketing.

Conclusion (5 min)

- Review the main points of the lesson and ask the pupils to reflect on what they learned. Ask them to share their opinions on digital marketing and its advantages and challenges. Ask them how they can apply project management and media literacy skills to execute their plan. Thank them for their participation and encourage them to explore more about digital marketing and entrepreneurship.

Classwork (5 min)

- ✓ Do part A and B from the workstation

Pre-reading:

textbook pages 103-106

Homework assignment

- ✓ Research and present a real-world example of a successful digital marketing campaign.
- ✓ Reflect on personal preferences for online payment methods and discuss them in the next class.
- ✓ Do Part D from the workstation

Lesson Plan 2

Resources:

textbook pages 103-106

Starter activity (5 min)

Ask the pupils the following questions:

- ✓ What comes to your mind when you hear the term 'entrepreneurship'?
- ✓ Can you think of any successful entrepreneurs and the businesses they started?
- ✓ Why do you think problem-solving skills are crucial for entrepreneurs?
- ✓ How do you think technology has changed the way businesses operate today?

- ✓ Can you name some ways in which technology helps entrepreneurs start and manage their businesses?
- ✓ Do you use social media platforms? How do you see businesses using social media for promotion?

Reading and explanation (25 min)

Begin with a brief discussion on entrepreneurship and why problem-solving skills are essential for success in business. Introduce the concept of entrepreneurial problem solving and its role in identifying and addressing challenges in the business world. Engage pupils by discussing relatable problems and brainstorming creative solutions.

Activate prior knowledge by asking pupils what they know about entrepreneurship and why it is important in the digital age. Explain that entrepreneurship is the process of creating, launching, and running a new business and that entrepreneurial problem-solving is the ability to identify and solve problems creatively and innovatively.

Discuss how technology facilitates entrepreneurship through tools like online stores, social media, crowdfunding, and mobile devices. Use analogies such as comparing technology to a toolbox that entrepreneurs use to build and manage their businesses. Present the steps for developing a digital marketing strategy, including analysis, goal setting, budgeting, and measurement of results. Introduce various digital platforms that support entrepreneurs, such as social media, e-commerce, online advertising, digital payment, food delivery, and logistics. Discuss how these platforms provide opportunities for entrepreneurs to connect with customers, sell products, and streamline operations.

Class Activity

Divide the class into four groups and assign each group one of the following digital platforms: website, blog, social media, or e-commerce. Ask each group to read the relevant section on pages 103-104 and complete a worksheet with the following questions:

- What is the purpose and function of this digital platform?
- What are some examples of entrepreneurs who use this digital platform?
- What are some advantages and disadvantages of using this digital platform?

Have each group present their answers to the class and compare and contrast the different digital platforms.

Explain that a business plan is a document that describes the goals, strategies, and operations of a new or existing business. Explain the key components of a business plan, including market needs, product design, executive summary, business description, structure, costing, and financial documentation. Relate business plan components to building a roadmap for the business and ensuring its success. Ask pupils to brainstorm some questions that a business plan should answer, such as:

- ✓ What is the name and mission of the business?
- ✓ What is the product or service that the business offers?
- ✓ Who are the target customers and competitors of the business?
- ✓ How will the business market and sell its product or service?
- ✓ How much money does the business need and how will it make a profit?

Write the questions on the board and have pupils refer to pages 105-106 of the textbook to find the answers.

Explain that a business plan should also include a SWOT analysis, which stands for strengths, weaknesses, opportunities, and threats, and helps the entrepreneur to evaluate the internal and external factors that affect the business.

Ask pupils to work in pairs and choose one of the examples of digital businesses on page 106 and conduct a SWOT analysis for it.

Explain that project management is the process of planning, organising, and executing a project, such as creating a business plan. Discuss the role of project management in executing a business plan, emphasising communication, budgeting, time management, resource management, and customer satisfaction.

Explain that media literacy is the ability to access, analyse, evaluate, and create media content, such as digital images, videos, or podcasts. Explain how media literacy enables businesses to understand and communicate with their audience, make informed decisions, and measure performance.

Ask pupils why project management and media literacy are important skills for entrepreneurs in the digital age. (Possible answers may include project management helps to set goals, allocate resources, monitor progress, and deliver results; media literacy helps to communicate effectively, attract customers, and avoid misinformation or manipulation.)

Show some examples of media content created by entrepreneurs to promote their businesses. Ask pupils to evaluate the media content using the following criteria:

- ✓ Is the message clear and relevant?
- ✓ Is the tone and style appropriate for the audience and purpose?
- ✓ Is the content accurate and credible?
- ✓ Is the content engaging and persuasive?

Have pupils share their feedback and suggestions for improvement.

Conclusion (5 min)

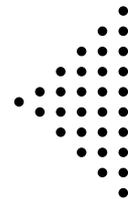
- Summarise key points about entrepreneurial problem solving, technology, digital marketing, and business planning. Emphasise the importance of creativity, adaptability, and continuous learning in entrepreneurship.
- Ask pupils to reflect on their own entrepreneurial ideas and how they can use digital technology to solve problems or create products or services.

Classwork (5 min)

- ✓ Do part C from the workstation

Homework assignment

- ✓ Ask pupils to create a draft of a business plan for their own digital business, using the template on page 106 of the textbook.
- ✓ Do Part E from the workstation



Suggested answers to end-of-chapter questions on pages 107 to 108

A. Fill in the missing blanks

- | | |
|-------------------------------------|---------------------------|
| 1. Digital marketing | 2. Digital marketing |
| 3. Search Engine Optimization (SEO) | 4. Social media marketing |
| 5. Digital media | |

B. True/false statements

- | | |
|--|---------|
| 1. True | |
| 2. False. The 4Ps of marketing refer to Product, Price, Place, and Promotion. | |
| 3. True | 4. True |
| 5. False. SEM stands for Search Engine Marketing, not Special Executive Marketing. | |
| 6. True | 7. True |

C. Choose the correct option

- | | | |
|------|------|------|
| 1. d | 2. d | 3. d |
| 4. b | 5. a | 6. a |

D. Short-answer questions

- Marketing refers to activities a company undertakes to promote the buying or selling of a product or service. Pupils can build on this response to demonstrate their understanding.
- Product refers to an item or items the business plans to offer to the customers.
 - Price refers to how much the company will sell the product for.
 - Place refers to the distribution of the product.
 - Promotion includes a variety of activities such as advertising, selling, sales promotions, public relations, direct marketing and sponsorship.
- Traditional market strategies involve the following activities:

Outdoor Marketing: Billboards, printed advertisements on benches, sticker wraps on vehicles, or advertisements on public transit.

Print Marketing: Brochures, fliers, newspaper ads, or magazine ads.

Direct Marketing: Coupons, vouchers for free goods, or pamphlets.

Electronic Marketing: TV and radio

Event Marketing: Conferences, trade shows, seminars, roadshows, or private events.

- Digital marketing is the promotion of brands to connect with potential customers using the Internet and other forms of digital communication.

E. Long-answer questions

- Refer to page 104 and 105 of the chapter.
- Quality assurance (QA) is the process of ensuring that a product or service meets the established standards and the needs and expectations of customers. Pupils will answer this question based on their understanding of the topic. They can refer to page 104 of the chapter for assistance.

