SAMPLE CHAPTER

INTERACT WITH INFORMATION TECHNOLOGY

New Edition

2

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DYNAMIC LEARNING
HODDER EDUCATION

Contents

1 Being IT safe – taking care of IT things (2)

Objectives

At the end of the chapter, you will be able to:

- identify the common ports and cables used in a computer system and its peripherals
- explain the proper hardware-handling methods when connecting and disconnecting peripheral devices
- identify ways to properly care for and maintain your computer equipment and accessories.

If you look at your laptop or computer, you will notice a number of different types of ports. A port is a physical dock that allows you to connect an external or peripheral device to your computer.

A peripheral device is an external device that works with the computer to perform a specific function when it is connected. Many of these devices cannot function without the use of the computer. Some examples of peripheral devices are:

- keyboards
- mice
- printers
- projectors
- flash drives
- speakers
- microphones.

In Chapter 1, we will look at the types of ports located on your computer, the cables that connect the devices to these ports and how to take care of them.

Figure 1.1 Cables connected to ports on a laptop

Types of computer ports and cables

The following main ports and cables allow devices to connect to computers:

* Computer power cords
* Universal serial bus (USB) ports and cables
* Video ports and cables
* Audio ports and cables
* Ethernet ports and cables.

Note!

Take care when trying a different adaptor on your laptop as it may not fit. Never force a power cord or adaptor into the power port, as this can damage the port, and prevent your laptop or computer from charging.

Computer power cords

Figure 1.2 A computer power cord

The computer power cord supplies electrical power to your computer from an alternating current (AC) wall power socket. Always make sure that you turn off your computer before you connect or disconnect your power cord. Pulling out your computer power cord without shutting down your computer can corrupt the data on your computer hard drive or damage the computer's hardware.

Laptops need an adaptor that can convert the electrical power from the wall socket to the correct wattage that they need to work. Laptop adaptors come in many shapes and sizes, with each specific to the brand and model of laptop.

Figure 1.3 Laptop adaptors showing different power connectors

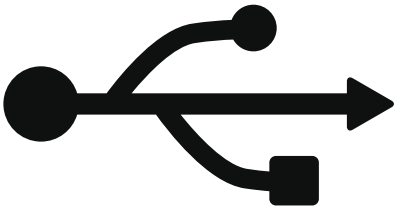


Figure 1.4 The USB logo

Universal serial bus (USB) ports and cables

Most peripherals will connect to your computer using an external universal serial bus (USB) port. This port is rectangular in shape and inscribed with a small logo. USB ports come in three sizes:

- The standard size
- The mini size
- The micro size.

Three types of USB ports are available in the standard size:

- USB type A port
- USB type B port
- USB Type-C® port (USB Type-C® and USB-C® are registered trademarks of the USB Implementers Forum).

The USB type A ports

The USB 2.0 port, which is usually black, and the USB 3.0 port, which is usually blue, are both USB type A ports. The main difference between the two is the speed at which the transfer of data takes place. The USB 3.0 transfers data at a faster speed than the USB 2.0. A variety of devices can be connected to these ports, such as external hard drives, printers, mice, scanners, flash drives and many more. The USB cable plugs directly into the USB port.

Figure 1.6 USB type A 2.0 (black) and USB 3.0 (blue) ports

Figure 1.7 USB type A and type B cables

Once you have finished using a USB device, you must disconnect it safely from the computer. This ensures that the action being performed by the computer is stopped before the USB device is disconnected. For example, in the case of a flash drive, stopping the drive ensures that data is not being written to the flash drive. If the flash drive is not stopped before it is disconnected, the data on it can become corrupted.

Figure 1.8 USB type B port (printer port)

USB type B ports

A USB type B port is usually used for the cable that sends data from the computer to the printer.

Did you know?

The PS2 ports and cables are rarely used today, although they are still found on much older computers and some gaming systems. These cables and ports are both colour-coded, with purple for the keyboard and green for the mouse.

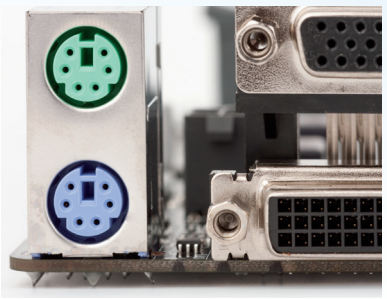


Figure 1.5 PS2 ports and cables

Figure 1.9 Thunderbolt 2.0 connector and cable

Figure 1.10 Thunderbolt 2.0 port

Figure 1.11 Thunderbolt 3.0 connector and cable

Figure 1.12 Thunderbolt 3.0 port

USB Type-C® ports

The USB Type-C® port is usually used for the cable known as the Thunderbolt cable. The two types of ports and cables are the Thunderbolt 2.0 and the Thunderbolt 3.0, which is the later version and transmits data at a faster rate. They usually have a lightning bolt symbol on the cable and near the port.

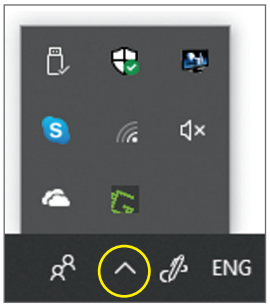


Figure 1.13 The Show/hide icon on the taskbar

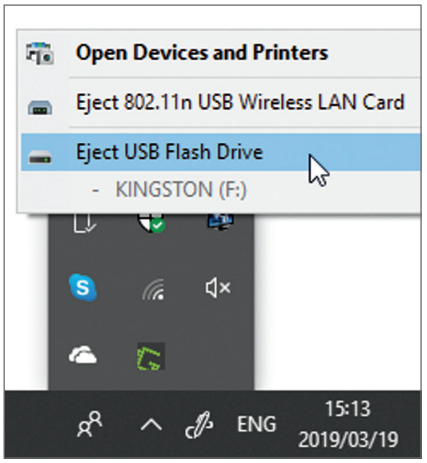


Figure 1.14 Ejecting a USB device

Follow these steps to disconnect your USB device safely, as shown in Figures 1.13 and 1.14.

Step 1: Click the **Show/hide** icon on the taskbar to display the icons that are not shown.

Step 2: Click on the **Flash drive** icon or the device icon that you want to disconnect.

Step 3: Click **Eject**.

You can also eject the USB device from the Explorer folder, as shown in Figure 1.15. Follow these steps:

Step 1: Right click on the device in your Explorer folder.

Step 2: A pop-up menu will appear.

Step 3: Select **Eject** from the menu.

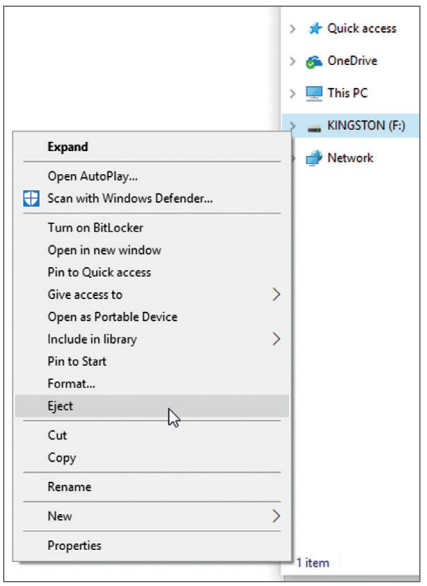


Figure 1.15 A pop-up menu from the Explorer folder showing 'Eject'

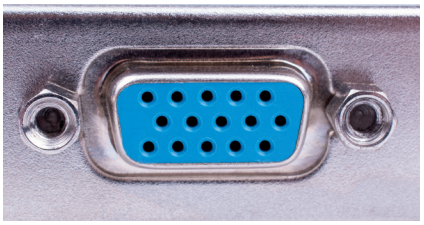


Figure 1.16 Video port

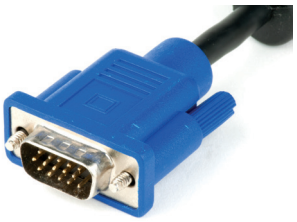


Figure 1.17 Video cable and connector

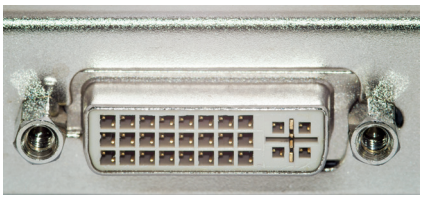


Figure 1.18 DVI port

Figure 1.19 DVI cable and connector

Video ports and cables

The different types of video ports include the following:

- Video graphics array (VGA) ports
- Digital video interface (DVI) ports
- High-definition multimedia interface (HDMI) ports
- Display ports.

Video graphics array (VGA) ports

The video graphics array (VGA) port allows you to attach a monitor or screen to your computer's video card. This port is found mainly on older computers, monitors and television sets. Many laptops, projectors and monitors also still have VGA ports.

This port has 15 holes and requires a 15-pin cable connector. The shape of the port indicates how the pins fit into it. The cable connector can only fit in one direction. Forcing the cable into the port will only bend the pins and damage both the port and the cable. Therefore, you will need to make sure that the connector and the port are lined up in the correct position before you insert the cable. Figures 1.16 and 1.17 show a video port and a cable with a connector.

Digital video interface (DVI) port

The digital video interface (DVI) port also connects your computer to a monitor. The DVI is a high speed digital interface between the computer and monitor. Some laptops and computers still carry this type of port. Take note of the curve of the port and the cable connector, as well as the position of the pins, as this indicates the direction in which the cable should be inserted into the port. Figures 1.18 and 1.19 show a DVI port and a cable with a connector.

Figure 1.20 Standard HDMI, mini-HDMI and micro-HDMI ports

Figure 1.21 Standard HDMI, mini-HDMI and micro-HDMI connectors on cables

High-definition multimedia interface (HDMI) ports

Most new computers, monitors, televisions and projectors have HDMI ports. These ports come in three sizes:

- The standard HDMI port
- The mini-HDMI port
- The micro-HDMI port.

The mini-HDMI and micro-HDMI ports are usually found on small and highly portable devices such as digital cameras and camcorders and mini projectors known as pico or pocket projectors.

Display ports

A display port is the latest development in types of video ports. It gives a much better picture quality, in other words a higher-resolution picture, than the HDMI port. Figure 1.22 shows a display port cable and connector, and Figure 1.23 shows display ports.

Figure 1.22 A display port cable and connector

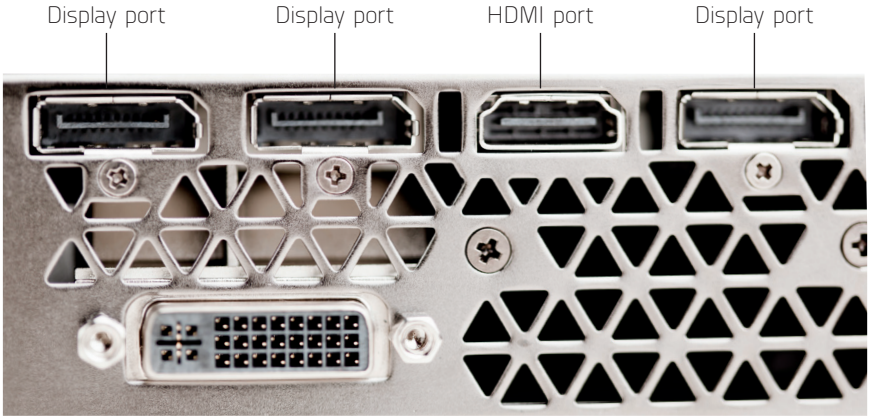


Figure 1.23 Display ports

Emerging technology

USB 4.0 port technology

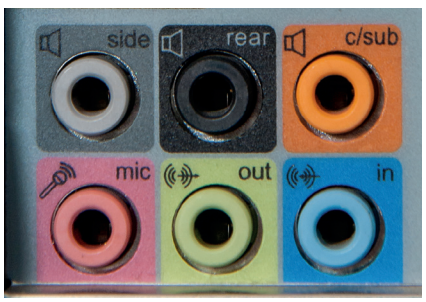
According to estimates, the USB 4.0 port technology will be released in the year 2020. This new technology is likely to provide a data transfer rate of approximately 10,000 Mbps (megabits per second), which means that the USB 4.0 will be 16 times faster than the USB 3.0, which offers a data transfer rate of 625 Mbps.

Audio ports and cables

Audio ports allow you to connect your speakers, headphones and microphone to the computer. The cable is known as a 3.5 mm jack audio cable. You will usually see the pink and green or blue audio ports, or you may see the symbol of a headphone or microphone near the port, which indicates the type of port that it is.

- The pink port connects the microphone to the computer.
- The green port connects the computer speakers and headphones to the computer.
- The blue port, usually called the **in-line port**, is used to playback and record sounds from devices such as an MP3 player, electric guitar, turntables and DVD players.

If a computer has grey, black and orange ports, then these are used for surround sound speakers. Figure 1.24 shows the different types of audio ports, and Figure 1.25 shows audio cables.



a Audio ports – different colours

b Audio ports – symbols

Figure 1.24 Different types of audio ports

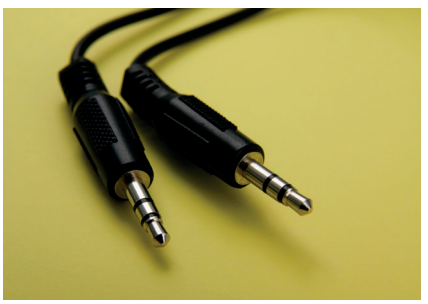


Figure 1.25 Audio cables (3.5 mm)

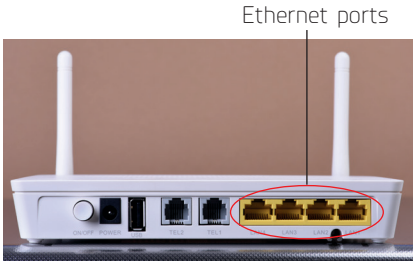


Figure 1.26 Ethernet (RJ-45) ports on a modem

Figure 1.27 RJ-45 cables with connectors (jacks)

Ethernet (RJ-45) ports and cables

An ethernet port is a networking port that connects your computer directly to the internet or to other computers. It looks like an oversized telephone port. Ethernet ports can be found on your computer, laptop, printer, television and internet modem.

Exercise 1

1 Explain what a port is.
2 Explain the difference between a DVI port and a display port.
3 Explain the difference between a USB port and an HDMI port.
4 Thunderbolt ports can be found on what type of device?
5 Why is ejecting a flash drive safely important?

Did you know?

The 'RJ' in RJ-45 stands for 'Registered Jack'. An RJ-45 is an ethernet jack, while an RJ-11 is a telephone jack. Although these jacks and ports look alike, the RJ-11 telephone jack is smaller than the RJ-45 ethernet jack. See Figure 1.28 and Figure 1.29.

Figure 1.28 RJ-45 ethernet jack and port

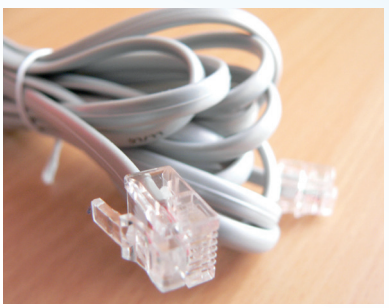


Figure 1.29 RJ-11 telephone jack

Caring for and maintaining your computer equipment

Care and maintenance of devices are important. As many of these devices are expensive, you may need them to last a long time in order to get the full benefit of the device. Always power down and disconnect your devices before cleaning them to prevent damage.

In *Interact with IT* Book 1 Chapter 3, we discussed how to care for computers devices. Here are a few key points to remember:

* Always use the correct 'on-screen' procedure to shut down your computer, rather than directly using the on/off switch.
* Avoid exposing your computer to too much dust by covering it with a dust cover when you have finished using it. An excess of dust may affect the circuitry.
* Avoid using USB drives, CDs and DVDs that were used to store information in computers from outside the lab. These storage devices may contain viruses that will affect your computer. A virus is a piece of **software** that may cause your computer to malfunction.
* Do not pile objects onto the computer keyboard, as their weight may damage the keys.
* Do not move a computer system when it is switched on and operational.
* Do not eat or drink in the computer laboratory. Liquids can cause short circuits or electric shocks, and the crumbs from food can cause inner computer parts to malfunction.
* Do not install any software without your teacher's permission.
* Avoid excessive printing, as paper and printing cartridges are expensive. Be sure that what you print is something you really need to see or store as a printed version.

Some devices, such as memory cards, disks and ink cartridges, can be easily damaged and should be stored in a cool dry place.

Keyboard, mouse and ports

Dust and dirt can affect your mouse and keyboard. These devices may eventually stop working if dust and dirt are allowed to accumulate in them. Dust and dirt clog ports, reduce airflow into and out of the system, and can eventually cause your system to overheat.

You can clean these devices by wiping them down with a lint-free damp cloth. Do not spray water directly onto the device or the port. You can also use a can of compressed air to blow out any dust particles from hard-to-reach places. Do not use any chemicals or cleaning agents on your devices.

Figure 1.30 Using compressed air to clean a keyboard

Monitor or screen

Dust particles, fingerprints, smudges and stains can make your computer monitor dirty. Use a soft, dry lint-free cloth, such as a micro-fibre cloth. You can also dampen the micro-fibre cloth with a little water. However, make sure that you wring as much water as possible out of the cloth, so that it does not run down into the sides or corners of the screen.

Do not use any abrasive chemicals such as alcohol, ammonia-based cleaners, sprays and other glass cleaners on your screen. Your screen is coated with anti-reflective coating and these chemicals will strip the coating, which can make your screen cloudy or cause more serious damage. Do not use paper towels or household rags, they are also abrasive and can scratch the surface of the screen. Do not spray water directly onto the screen, as it may run down into the corners and seep under the housing. This can damage the sensitive materials and parts inside in the monitor or screen.

Figure 1.31 Roll cables neatly and tie them with cable ties so that they do not become twisted and tangled.

Printers, scanners, projectors exteriors and hand-held peripherals

Clean these devices, which include printers, scanners, projectors exteriors and hand-held peripherals, using a soft, dry lint-free micro-fibre cloth. You can also dampen the micro-fibre cloth with a little water. However, make sure that you ring as much water as possible out of the cloth to avoid damaging the devices.

Cords and cables

Use cable ties to organise cords and cables, as jumbled cords can be easily damaged if they are twisted or tugged. Cords that are jumbled or disorganised also look unsightly and can be a tripping hazard if not organised neatly and packed away. Do not overload outlets or power strips by plugging in too many devices, as they may become a fire hazard.

Computer batteries

Do not overcharge your laptop batteries by keeping them plugged in all the time. This affects the ability of the battery to recharge, which reduces its lifespan (length of time it can function). As a result, the battery eventually will not be able to hold its charge, and you may even need to use the power adaptor for your computer or laptop to work. Rather wait until your laptop or computer runs down to 20% of its full charge before you plug it in again to fully charge it again.

Blocked vents

Blocked vents obstruct the airflow into and out of your computer system. This can cause the system to overheat and damage the parts of it. Your system needs to remain cool in order to function correctly. Therefore, remove all clutter from around your computer so that the airflow is not obstructed. Try to work on a solid surface, as resting your laptop on your bed or lap while working can obstruct the airflow into and out of the computer, and cause it to overheat.

Shutting down your computer

Shut down your computer correctly every night. This will save on electricity, and allow important Microsoft updates to be installed on your Windows computer, which only happens in shutdown mode.

Avoid holding down the power button to shut down the computer. This is called **cold booting** and should only be done in emergencies, such as when your computer is frozen. Cold booting can also damage your hardware and software. Make sure that you shut down your computer correctly by using the shutdown button of your operating system.

Figure 1.32 Used office printers ready to be disassembled inside a recycling plant.

Protecting the environment from digital technology

Follow these guidelines to protect the environment from digital technology:

* Do not print information unless it is absolutely necessary. Cutting down on paper usage reduces the number of trees that need to be harvested.
* Reduce the need for electricity by switching off your devices when they are not in use. This will reduce the need for fuel (usually oil, gas or coal) to generate electricity.
* Dispose of computers and other electronic devices safely by taking them to disposal sites designated specifically for electronics. These sites have the facilities to safely extract any heavy metals from the devices and dispose of it as hazardous waste. Then the parts are sorted for recycling.

Summary 1

1 A port is a physical dock that allows you to connect an external or peripheral device to your computer.

2 The computer power cord or adaptor supplies electrical power to your computer from an AC wall power socket.

3 A USB port is a rectangular-shaped port that can connect most peripherals to your computer.

4 Video ports allow you to attach a monitor or screen to your computer's video card.

5 Video graphics array (VGA), digital video interface (DVI), high-definition multimedia interface (HDMI) and display ports are all video ports.

6 The HDMI ports and cables come in three sizes: standard, mini and micro.

7 Audio ports connect your speakers, headphones and microphones to the computer.

8 The ethernet (RJ-45) cable and port, also called the networking port, connects your computer to the internet or another computer.

9 Cleaning and maintaining your computer equipment can keep your system functioning correctly for a long time.

Questions 1

Matching questions

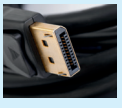
Match each name to its correct image.

1 Display
2 Power cord
3 VGA
4 USB

a 

b 

c 

d 

True or false questions

1 There can be as many as six audio ports on a computer.

2 The ethernet port is also known as a telephone port.

3 The Thunderbolt port is a USB port.

4 You should not spray water directly onto a computer screen while cleaning it.

5 You should not use compressed air to clean your computer ports.

6 You should shut down your computer using the shutdown button in your computer's operating system.

Short-answer questions

1 List three common types of computer cable.

2 Explain why it is necessary to use cable ties to keep your cables and cords organised.

3 Explain how to shut down a computer correctly.

4 Explain why it is important to safely disconnect a USB flash drive from a computer.

5 You are told that your computer has two USB 2.0 ports and a USB 3.0 port. Explain the difference between the two ports.

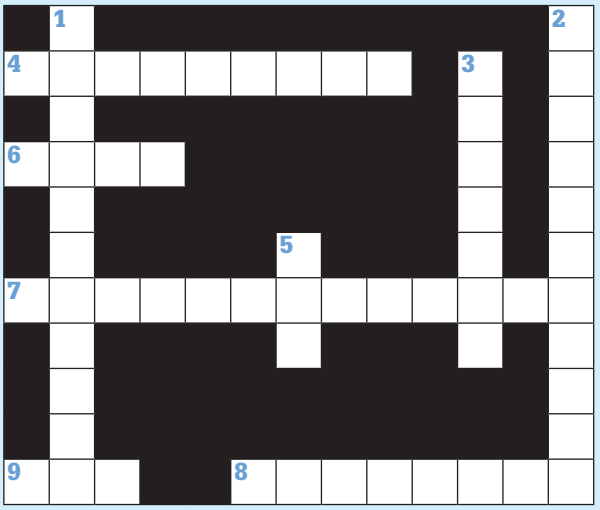
6 What do the following acronyms stand for?

a HDMI
b DVI
c VGA
d USB

Project

1. Create a poster to illustrate how to care for and maintain a peripheral device of your choice.
2. Create a picture chart to show at least six (6) examples of cables and matching ports.

Crossword



Across

4. This supplies electrical power to your computer
6. This video port comes in three sizes: standard, mini and micro
7. This is used to clean debris out of a keyboard
8. The name given to the port that connects a computer to the network or internet
9. A video port found on older computer systems that attaches the monitor or screen to the computer's video card

Down

1. The name given to shutting down the computer while holding down the power button
2. A type of USB port that has a lightning bolt symbol
3. This video port is the latest development in video ports
5. A type of port that most peripherals use to connect to your computer

STEM project

Jody is a civil engineer and takes her company-issued laptop computer to worksites on a daily basis. Her laptop sometimes falls, gets wet or is exposed to dust and different chemicals. After only six months, she notices that some ports on the laptop and keys on the keyboard no longer work. Her company's IT Department is issuing her a new laptop, but it also plans to send along 'worksite-friendly' guidelines to Jody and other field employees with precautions that they must follow in the future to care for their laptops. You and your classmates have been asked to help the IT Department write these guidelines and advise on the most suitable and user-friendly presentation format for this particular type of work situation.

1. Which possible aspects of caring for her laptop computer could Jody have been careless about? List all aspects that you and your classmates can think of.
2. Decide on the content and format of the guidelines. What process did you and your classmates follow to decide on the content and format? Write a brief outline of this process.
3. Put the guidelines together and present to a form or grade doing CSEC IT.
4. What feedback did you get? From the feedback, are there any improvements you can make?

Hints

1. Revise all that you have learnt about the proper care of a computer.
2. What durable, portable material can be used to put the guidelines on?
3. A checklist at the end of your guidelines can be useful.

Provide an accessible approach to theory and practice with this new edition updated to comprehensively cover recent IT developments and the latest Caribbean curricula for Forms 1 to 3 (Grades 7 to 9).

- Consolidate learning through a range of question types such as Multiple Choice, True or False, Short Answer and a fun Crossword puzzle.
- Build critical thinking and project work skills with research and STEM projects using real life situations.
- Develop understanding with new topics covered such as computer ethics, algorithm development and emerging careers.
- The answers can be found here: www.hoddereducation.co.uk/interactanswers

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