Oxford International Primary

Computing
Student Book

3
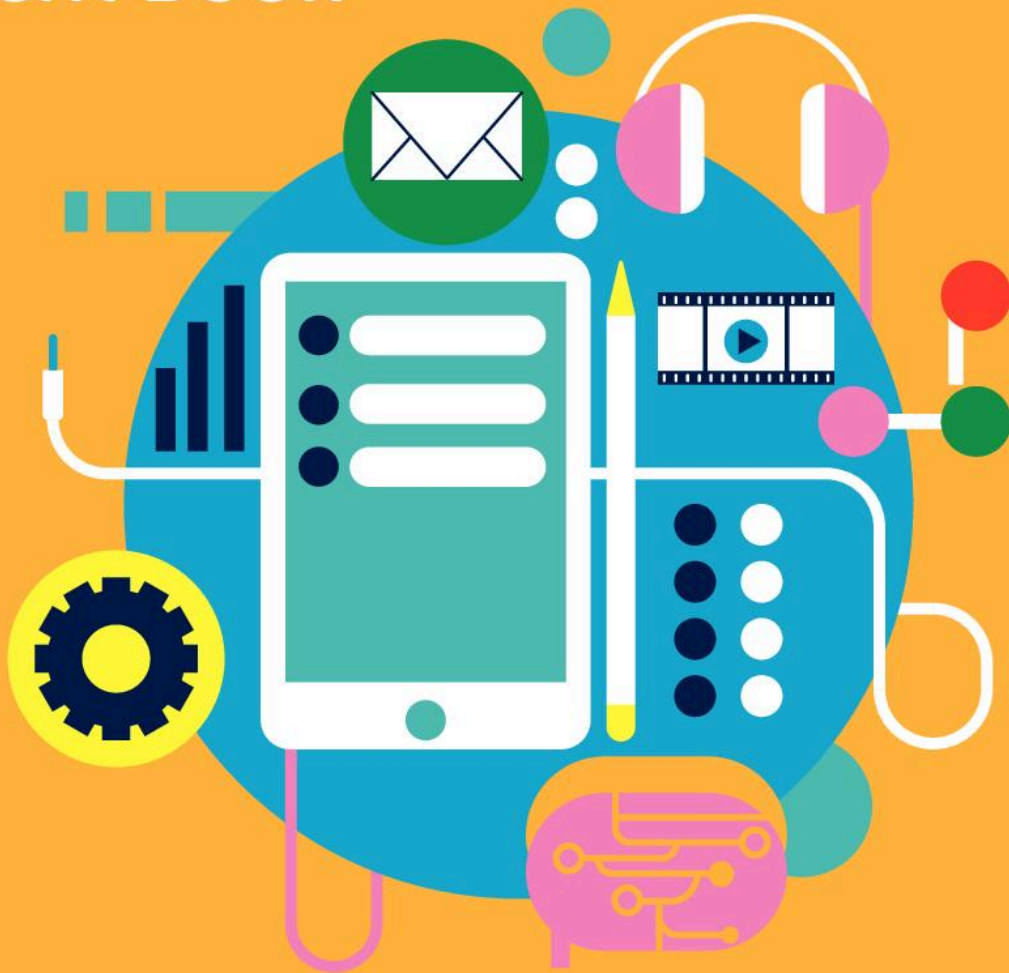
OXFORD

Computing

Student Book

3

Alison Page

Diane Levine

Howard Lincoln

OXFORD

Contents

Introduction

Delivering computing to young learners

Oxford International Primary and Lower Secondary Computing is a complete syllabus for computing education for ages 5–14 (Years 1–9). By following the program of learning set out in this series, teachers can feel reassured that their students have access to the computing skills and understanding that they need for their future education.

Find out more at: www.oxfordprimary.com/computing.

Structure of the book

This book is divided into six chapters, for Year 3 (ages 7–8).

1 **The nature of technology:** Learning how digital devices can help

2 **Digital literacy:** Using technology to communicate

3 **Computational thinking:** Making a program with inputs and outputs

4 **Programming:** Setting and changing values to produce different outputs

5 **Multimedia:** Improving a slide show with text and images

6 **Numbers and data:** Using software to make calculations

What you will find in each unit

- Introduction: An offline activity and a class discussion help students to start thinking about the topic.
- Lessons: Six lessons guide students through activity-based learning.
- Check what you know: A test and activities allow you to measure students' progress.

What you will find in the lessons

Although each lesson is unique, they have common features: learning outcomes for each lesson are set out at the start; learning content delivers skills and develops understanding.

Activity Every lesson involves a learning activity for the students.

Extra challenge Activities to extend students who are able to do more.

Think again Questions check students' understanding of the lesson.

Additional features

You will also find these features throughout the book:

Word cloud The word cloud builds vocabulary by identifying key terms from the unit.

Be creative Suggestions for creative and artistic work.

Explore more Extra tasks that can be taken outside the classroom and into the home.

Digital citizen of the future Advice on using computers responsibly in life.

Glossary Key terms are identified in the text and defined in the glossary at the end.

Assessing student achievement

The final pages in each unit give an opportunity to assess student achievement.

- Developing: This acknowledges the achievement of students who find the content challenging but have made progress.
- Secure: Students have reached the level set out in the programme for their age group. Most should reach this level.
- Extended: This recognises the achievement of students who have developed above-average skills and understanding.

Questions and activities are colour-coded according to achievement level. Self-evaluation advice helps students to check their own progress.

Software to use

We recommend Scratch for writing programs at this age. For other lessons, teachers can use any suitable software, for example: Microsoft Office; Google Drive software; LibreOffice; any web browser.

Source files

You will see this symbol on some of the pages.

This means that there are extra files you can access to help with the learning activities. For example, Scratch programming files and downloadable images.

To access the files, click 'Download resources' at: www.oxfordprimary.com/computing.

Teacher's Guides

For more on these topics, look at the Teacher's Guide that accompanies this book.

1 The nature of technology: Digital devices

You will learn

→ what a digital device is
→ the digital devices you can use
→ how computers can help you
→ things computers cannot do.

In this unit you will learn about digital devices. Devices are things people make to help them. Digital devices have got a computer inside them. The computer makes the devices even more useful.

Did you know?

A computer can check your heartbeat. The computer uses safe electrical sensors. A doctor looks at the computer screen. The doctor can tell if your heart is healthy.
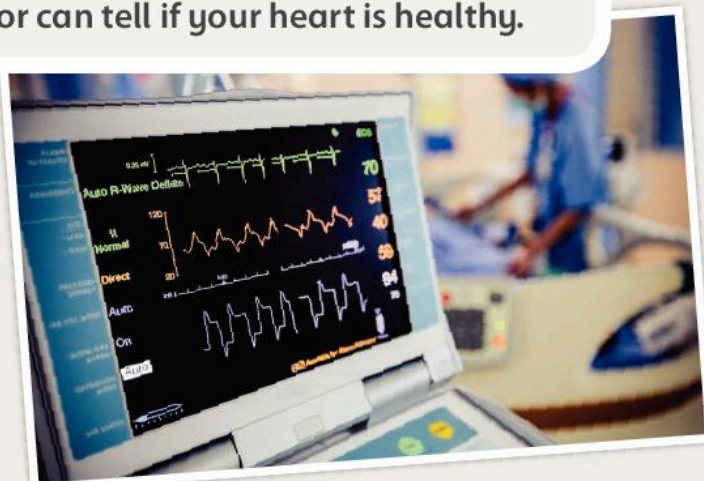
Talk about...

What job would you like to do when you grow up? Will you use computers in the job? How will computers help you?

Learning outcomes: Describe a range of familiar digital devices; Describe tasks where computers can be helpful

Some people have jobs that help you. For example, a doctor helps people get better if they are ill.

What other jobs can you think of that help people? Make a class list of these jobs. Next to each job say one way the person might use a computer.

digital device
processor   input device
output device   touchscreen
hand-held   mobile device
tablet computer   smartphone

In this lesson

You will learn:

→ what digital means

→ what devices are digital.

Switches

A computer works by electricity. Inside the computer there are millions of electrical switches. They are not switches like the light switch. You cannot see them or touch them. They are tiny switches that work by electricity.

The switches inside the computer can be on or off.

● You show an off switch as the number 0.

● You show an on switch as the number 1.

The switches are always changing. Electricity goes through the computer. The flow of electricity turns the switches on and off.

Digital

Computers use the on-off switches to make electronic numbers. That is all there is inside a computer. There are millions and millions of electronic numbers.

Everything inside a computer is made out of those numbers.

Digital means made out of numbers. Everything inside a computer is digital.

Digital device

A device is anything that people make that is useful and helpful. A **digital device** is any device that has a computer in it.

There are many types of digital device. Which ones do you know?

Smartphone   Desktop computer   Tablet   Laptop computer

Activity

Match the devices to the names. Write down the names and numbers. Or draw the devices and write the names next to the drawing.

Extra challenge

Another type of digital device is called a wearable device. Have you heard of that before? Find out more. Draw or write to show what you found.

Think again Say something that is not a digital device. Explain your answer.

In this lesson

You will learn:

→ about the parts of a typical computer.

Processor

Inside every computer is a **processor**. A processor is an electronic device. The processor controls all the other parts of the computer.

Input and output

Other devices are attached to the processor:

- **Input devices** send signals to the processor. Examples of input devices are the mouse and keyboard.

- **Output devices** get signals from the processor. Examples of output devices are the screen and speaker.

The input and output devices let you use the computer.

Desktop computer

In a desktop computer all the devices are quite big. For example, the screen is big. There might be more than one screen.

The devices are separate from each other. They might be joined by wires. They might be wireless.

A desktop computer is big and heavy. It is difficult to carry.

Screen

Keyboard

Mouse

Laptop computer

A laptop computer has smaller parts. The screen and the keyboard are small. All the parts are held in the same case. They are fixed in place.

A laptop is small and light. It is easy to carry.

The touchpad is used instead of a mouse. Some people take a mouse with them and plug it into the laptop.

Screen

Touchpad

Keyboard

What is a desktop computer used for?

You can use a desktop computer when you want to do lots of work. You can sit and do a lot of typing. You can see your work clearly on a big screen.

Many people like to play games on desktop computers. They like the big screen. They like to use the keyboard and other controls that plug in to the computer.

Which would you choose?

Adnan and Jerry disagreed about computers.

Jerry liked his desktop computer best.

I like to look at a very big screen.

I like to move the keyboard to a comfortable position.

Adnan liked his laptop best.

I like to carry my computer about.

I like to work in different places.
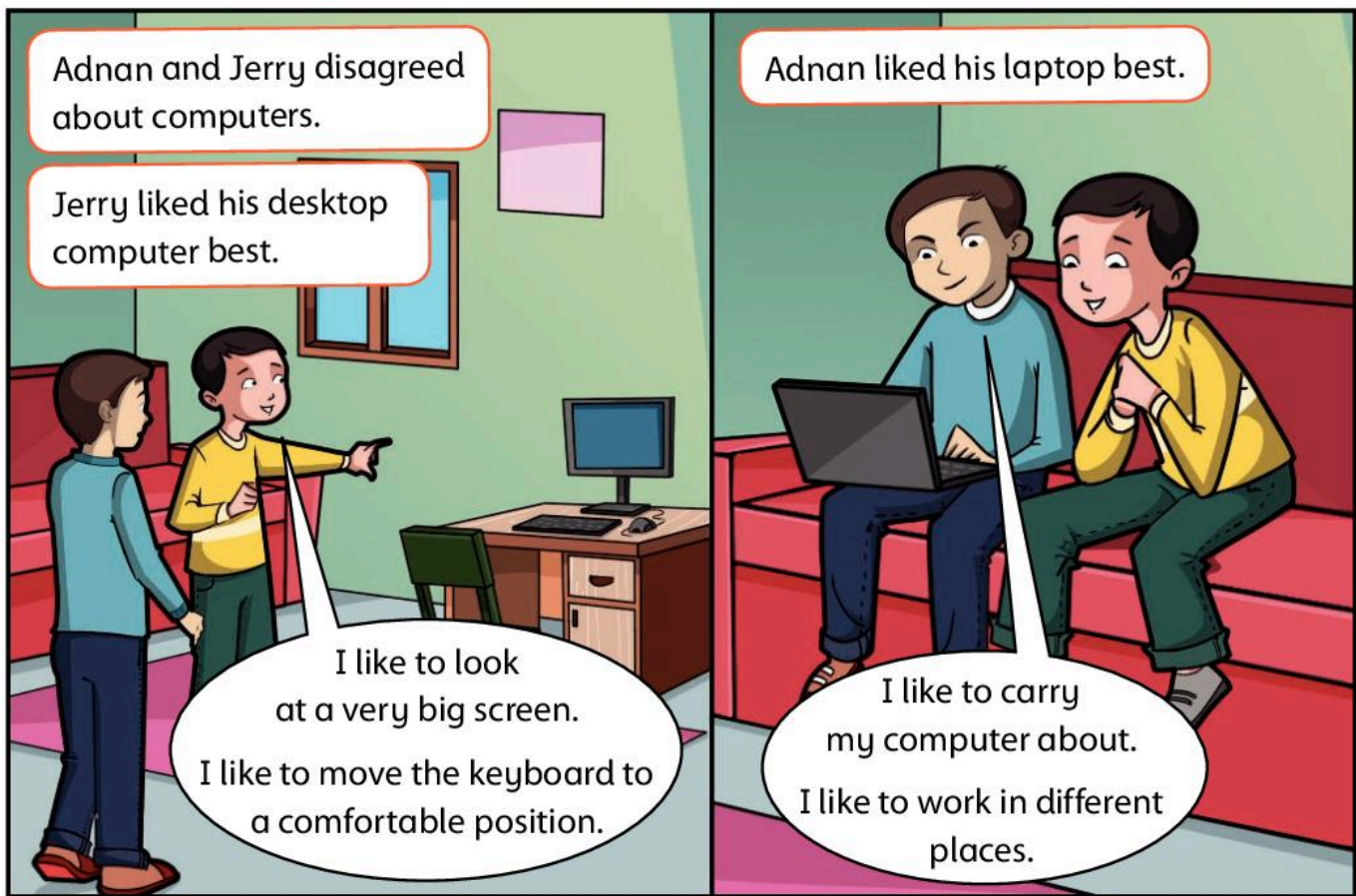
Activity

What type of computer do you use most at school? Draw the computer and label the parts.

Extra challenge

Which do you like best – a desktop or a laptop? Make an advert for the one you prefer.

Think again What device is at the centre of a computer system? (**Hint:** It is not an input or output device.)

In this lesson

You will learn:

➔ about the features of mobile devices.

Touchscreen

Some computers have a **touchscreen**. A touchscreen is used for input and output.

- The screen shows you pictures, words and video.

- You can touch the screen to tell the computer what to do.

If you have a touchscreen, you do not need a keyboard. A picture of a keyboard appears on the screen. You can touch the screen to use the keys.

Hand-held computers

A computer with a touchscreen can be very small and light. You can hold it and use it in your hands. You can carry it with you wherever you go. Computers like this are called **hand-held** computers. Another name is a **mobile device**.

A **tablet computer** has quite a big screen. It is about as big as a book.

A **smartphone** is a mobile phone with a computer inside. It is much smaller than a tablet.

What are mobile devices used for?

People use mobile devices to look at the internet. Mobile devices have a wireless connection.

- A tablet uses the wireless network in a building. For example, there may be a wireless network in your school or home.

- A smartphone has its own internet connection. You can use it outdoors, in the country or the town.

People use mobile devices mainly to look and read. They might watch a TV show or read a website. They might type a short message to a friend. They might type quick notes.

People do not usually use mobile devices to make a big document with lots of typing.

Activity

Write a list of all the digital devices you can see in this picture.

Extra challenge

Choose one of the people in the picture. Write a paragraph about:

- what type of digital device they are using

- what they might be doing with it.

You can write about anything you like.

Think again

What are the differences between a smartphone and a tablet?

In this lesson

You will learn:

➜ how computers are used in different jobs.

The doctor

Doctors help you when you are sick. They help you to get better.

Computers can help the doctor do her work. For example, the doctor can use the computer to:

- find out about diseases and treatments
- send messages to doctors in other hospitals
- make appointments for patients
- look inside the human body to take accurate pictures and measurements
- print out charts and diagrams to help spot illness
- store facts about patients
- control machines to care for a patient day and night.
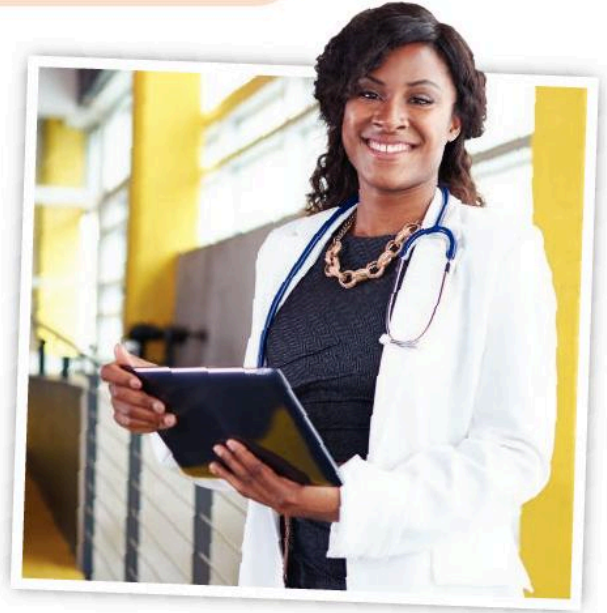
The shopkeeper

Shopkeepers help you. They help you buy the things you need.

Computers can help the shopkeeper do his work. For example, the shopkeeper can use the computer to:

- sell things on the internet to people all over the world
- find out about new products
- store facts about the items for sale

- add up your bill quickly and accurately
- make colourful posters and leaflets to advertise
- take payments from customers
- pay wages to staff
- store food at an even temperature at all times.

Activity

Think of a job you would like to do when you become an adult. Think of one way you might use a computer in that job. Draw and write to show how you would use a computer.

Extra challenge

You may not use a computer in all parts of the job. Draw and write to show the things you would do without a computer.

Think again

Talk to an adult who has a job, for example, someone in your family. Ask them if they use a computer. Find out how the computer helps them.

In this lesson

You will learn:

➔ about the benefits of using a computer.

Benefits

'Benefit' means to make things better. People use computers because they bring benefits. Computers can help you to do things better.

Here are some benefits of using computers:

- **Make work easier.** The computer can make it easier to do some tasks.

- **Fast and accurate.** The computer does accurate sums and measurements.

- **Store facts and find things out.** The computer can store facts and find answers, including using the internet.

- **Long-distance communication.** The computer can send messages to people all over the world.

- **Clear and neat work.** The computer makes output that is neat and clear.

- **Work without rest.** The computer can control machines and devices day and night without rest.

In the last lesson you learned about some ways the computer helped a doctor and a shopkeeper.

The table on the next page shows these benefits for a doctor and a shopkeeper. There are some gaps.

Benefits	Doctor's work	Shopkeeper's work
Make work easier	Make appointments for patients.	Take payments from customers. Pay wages to staff.
Fast and accurate		
Store facts and find things out		Find out about new products. Store facts about the items for sale.
Long-distance communication	Send messages to doctors in other hospitals.	
Clear and neat work	Print out charts and diagrams to help spot illness.	
Work without rest		Store food at an even temperature at all times.

Activity

Make a copy of the table. Look back at the last lesson. Look at all the tasks a doctor and a shopkeeper do. Put each task into the right box of the table. Some have already been done for you.

Extra challenge

You have looked at the job of a doctor and a shopkeeper. Now think of the job of a teacher. Think of all the ways a teacher might use a computer.

- Write down all the benefits you can think of.
- Can you link them to the benefits on this page?
- Make a final column for the table to show the benefits to a teacher.

Be creative

Choose one of the jobs shown on this page (doctor, shopkeeper or teacher). Instead of words, draw cartoons to show how they would use computers.

Think again Give examples from your school work where the computer has helped you:

- to find out facts
- to do clear and neat work.

In this lesson

You will learn:

→ how to choose tasks where a computer can or cannot help

→ how to choose the right computer for a task.

Limitations

Computers have limitations. That means things the computer is not so good at.

Here are some things that computers cannot do.

- **Do something creative.** The computer cannot invent new things or be creative.

- **Understand people.** The computer cannot understand how people feel. The computer cannot show human feelings or make friendships.

- **Take responsibility.** Computers can give people information to help them make decisions. But you must make your own choices.

Limitations	Doctor's work	Shopkeeper's work
Doing something creative		
Understanding people		
Taking responsibility		

Here are some examples of tasks that a doctor or a shopkeeper might do.

Decide between two treatments.

Listen to a patient talk about their worries.

Talk to a customer about what they want to buy.

Create an advert for the shop.

Decide to change the prices in the shop.

Invent a new way to cure a disease.

Activity

Make a copy of the table on the previous page. Put the activities into the table to show things a doctor or shopkeeper can do that a computer cannot do.

Choose the right device

If you use a computer for a task you need to choose the right device. Here are the devices you have learned about in this unit.

Desktop computer	
Laptop computer	
Tablet	
Smartphone	

Activity

Here are some things people said. Recommend the ideal digital device for each person.

- "I want to do a lot of typing sitting at my desk."

- "I want to play a computer game on the bus to school."

Extra challenge

Pick a digital device you did not choose. Say one thing a person might do with that device.

Think again

Say one thing a teacher can do that a computer cannot do.

Digital citizen of the future

At school you often have to use a computer because your teacher says so! But when you are grown up you will be able to make decisions.

- Do you want to use a computer?

- What device do you choose?

Learning about computers at school will help you make good decisions in the future.

Check what you know

You have learned

→ what a digital device is

→ the digital devices you can use

→ how computers can help you

→ things computers cannot do.

Test

1 Say one task you have done at school using a computer.

2 How did the computer help you do the task?

3 An artist used a computer to help with his work. Explain two ways a computer could help him.

4 Explain some parts of an artist's job that a computer could not help with.

1 What device are the boys using? Draw a picture of the device. Show it as clearly as you can.

2 One part of the device is used for input and output. Label this part.

3 Think about how you use the device.

- Is the device easy to carry about from place to place?

- Would you use this device to type for 1 hour?

4 Say one way you might use the device in a future job.

Self-evaluation

- I answered test questions 1 and 2.

- I completed activity 1. I drew a picture of a device.

- I answered test questions 1–3.

- I completed activities 1 and 2. I drew a picture of a device and added a label.

- I answered all the test questions.

- I completed all the activities.

Re-read any parts of the unit you feel unsure about. Try the test and activities again – can you do more this time?

2 Digital literacy: Explorers

You will learn

→ how to use technology to send and receive messages

→ to describe the parts of a message

→ how to respond to a communication you are not sure about, or find worrying.

People are curious. For thousands of years, people have been curious to find new places, far away from their homes.

In this unit you are going to pretend to be explorers. An explorer travels to new places. An explorer might learn about plants, animals and the environment. An explorer might search for treasure or a place to build a home.

Talk about...

We communicate with each other in lots of different ways. How many different ways of communicating can you think of?

Learning outcomes: Use technology to send and receive messages; Describe the parts of a message; Explain how to respond to an unsuitable communication
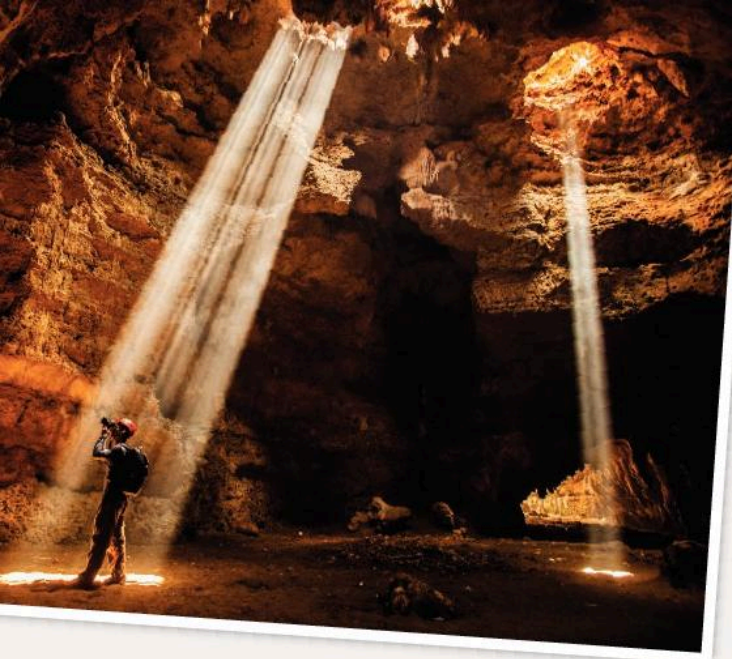
email

spam   phishing   attachment

inbox   email address

domain   pharming

Class activity

Work in a group. Draw and write to show the journey of an explorer. Show some of the places they went and what they did. If you know about a real explorer from your country you can use them as an example. Or you can use an imaginary example, such as the first person to go to Mars.

Did you know?

Ibn Battuta was a famous explorer from Morocco. He lived more than 600 years ago. Ibn Battuta travelled over Africa, the Middle East and much of Asia.

In this lesson

You will learn:

→ about different ways of communicating

→ what email is.

Spiral back

Last year you learned how to use the internet to find information. You learned how to say what kinds of information are personal and private, and how to stay safe and happy in the computer room. In this unit you are going to learn how to use the internet to send and receive messages.

Ways of communicating

We can communicate in lots of different ways. To communicate means to share ideas or information with another person.

Taja is writing a letter. First she thinks about what she is going to say.

Then she starts to write.

Oh no! She has made a mistake.

She writes again.

Now she writes the address on an envelope, and sticks a stamp on it.

Then she goes to the post box and sends her letter.

Two weeks later her letter reaches her father, who is very happy to read it.

Some letters are personal. Some letters are about practical things.

Sometimes we need to send a message very quickly. We can use electronic mail, called **email**, to send messages immediately. Email uses the internet to send the message.

Some ways of communicating are very reliable. 'Reliable' means that the message will definitely get to the other person.

Some ways of communicating are private. They will only be seen by one person.

Some ways of communicating are very quick.

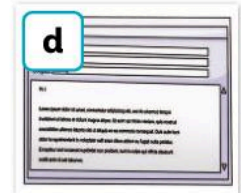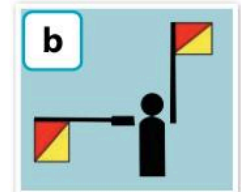Some ways of communicating are easy to use.

Activity

Look at these ways of communicating.

Which way or ways are reliable?

Which way or ways are private?

Which way or ways are quick?

Which way or ways are easy to use?

a

b

c

d

e

f

g

h

Extra challenge

Can you make up your own way of communicating?

Think again

Email is very popular. Why do you think email is so popular?

Digital citizen of the future

Some email systems seem to be free to use. You do not have to pay for a stamp to send the email.

We call the companies who make email systems 'email providers'. How do you think email providers make money?

In this lesson

You will learn:

→ about the different parts of an email.

Parts of an email

Most emails have similar parts.

This is the sender's email address.

What an adventure!

From: jamshid@explorer.com
Sun 19/04/2020 09:46
To: family@home.net

Dear family

This is the greeting.

I have spent the last two weeks travelling in a boat on the Amazon River in Brazil. It is very beautiful here, and very warm.

I have seen many squirrel monkeys, and even an Amazon River dolphin, which was very special.

This is the email address of the person the email is being sent to.

But most exciting, I have discovered a new plant! As we were rowing down the river, I spotted a strange flower in the water. I had never seen anything like it. I emailed an image of it to my laboratory back home and the team are checking if it is really new. If it is, we will have to think of a great name for it.

This is the body of the email.

I miss you all, and am looking forward to seeing you soon.

From
Jamshid

This is the closing.

This is the signature. An email has an electronic signature. It can include an image, a quote or information about the sender.

You are going to open your own email account.

Follow the instructions from your teacher for the type of email system your school uses.

Open a new email.

Can you find the right places to put the:

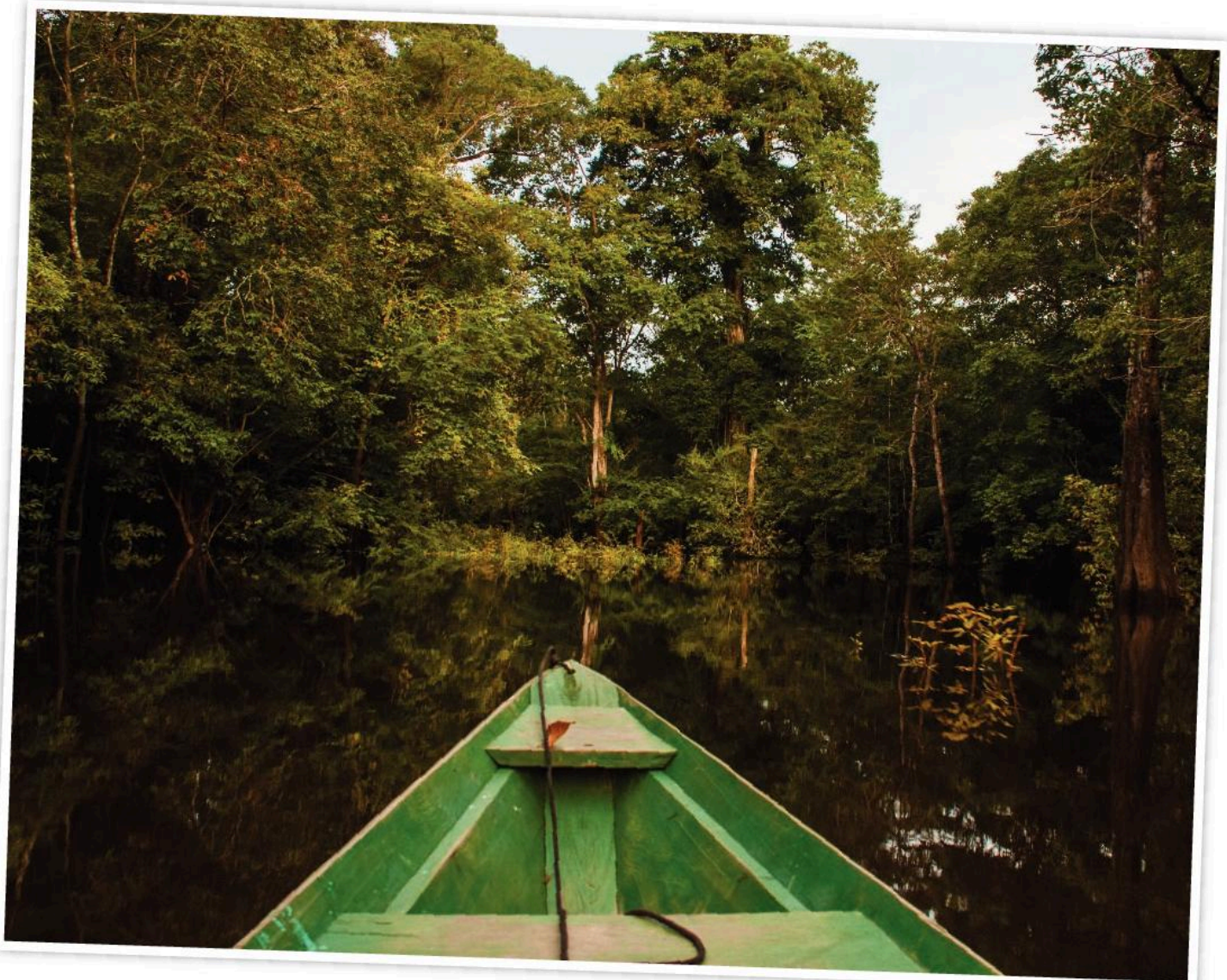- email address you are sending to
- subject
- body
- signature?

What is the best way to send different messages? Talk with a classmate about different kinds of messages and the best ways to send them. For example, phone, talking face-to-face or a letter.

Think again

Where should you click to send the email? Draw or write your answer.

In this lesson

You will learn:

→ how to send an email.

Email address

The **email address** tells the computer which email box the message needs to go to.

Look at Ynes' email address. What do you notice? It has three parts.

1 This is the local-part. The local-part can be something like a name, or something that does not say who you are.

3 This is the **domain**. The domain can be a place like a school or business. The domain can be an email provider.

ynesmexia@botanistexplorer.com

2 @ means 'at'

All email addresses have these three parts.

Emails can be sent in two ways. Emails can be sent from an email client. An email client is software on a computer. Emails can also be sent through web-based email clients. This means emails can be sent from anywhere with an internet connection.

Sending an email

Start a new email. Different email providers do this in different ways. Click on 'Compose', 'New' or 'New Message'.

New Message — ⤢ ✕

To   Cc Bcc

Subject

↩ ↪   Sans Serif ▾   🇹 ▾   **B**   *I*   U̲   A̲ ▾   ☰ ▾   ☰   ▾

Send   A̲   📎   🔗   🙂   🔺   🖼   📷 $ 🗑   ⋮

1 Type the email address here.

2 Type the subject of the email here.

3 Type your email message here.

4 Use this toolbar to change the font of your text.

5 Click on 'Send'.

Activity

Imagine you are an explorer travelling in a desert.

Write an email to your teacher about what the desert is like.

Use the internet to find out about hot and cold deserts if you need more information.

Extra challenge

Find out the email address of someone in your class. Send them an email about a country you would like to visit one day.

Explore more

Use the internet to find out about an explorer. This picture shows the explorer and botanist Ynes Mexia.

In this lesson

You will learn:

➜ how to open an email.

How to open an email

You will find new emails in your **inbox**. Your inbox is an electronic folder in your email where your new emails arrive.

A new email is often shown in bold.

Click on the bold text to open the email.

| ☐ ☆ me | **A new camp** We arrived in Drake Passage last night. The penguins were | **11:16am** |

How to reply to an email

To reply to an email, click on the word 'Reply', or the 'Reply' icon.

Type your email and click on 'Send'.

Send

Activity

Last lesson, for 'Explore more' you found out some facts about an explorer. Think of one fact. Write your fact as a sentence.

Send an email to a classmate with the fact.

Open and read the email a classmate sends you.

Extra challenge

A classmate has sent you an email. Reply to the email. Tell the sender what you found interesting about the fact.

Think again Why could it be useful to have a copy of the emails you send?

In this lesson

You will learn:

→ what an attachment is

→ how to send an attachment.

What is an attachment?

The word 'attach' means to join onto something else. An **attachment** is an extra file that you can send with an email. The attachment is joined onto the email.

An attachment can be a:

- photograph
- document
- sound file
- video.

New Message

To   Cc Bcc

Subject
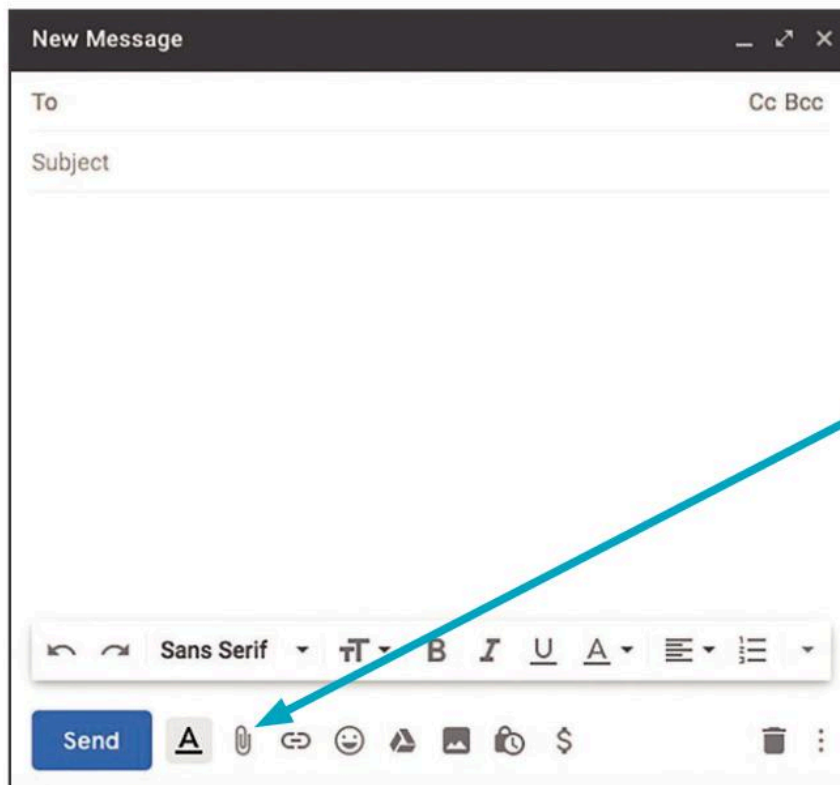
> Click the 'paperclip' symbol. The symbol means 'attachment'. A box will open. Choose the file you want to attach. Double-click on the file you want, or click on 'Attach' or 'Open'.

Send   A 🔗 😊 ⌾ 🖼 $ 🗑 ⋮

Activity

Imagine you are a mountain explorer.

Find an image of a mountain on the internet that is free to use.

Save the image.

Open a new email.

Type 'Mountain' in the subject.

Type one sentence about the image you have chosen.
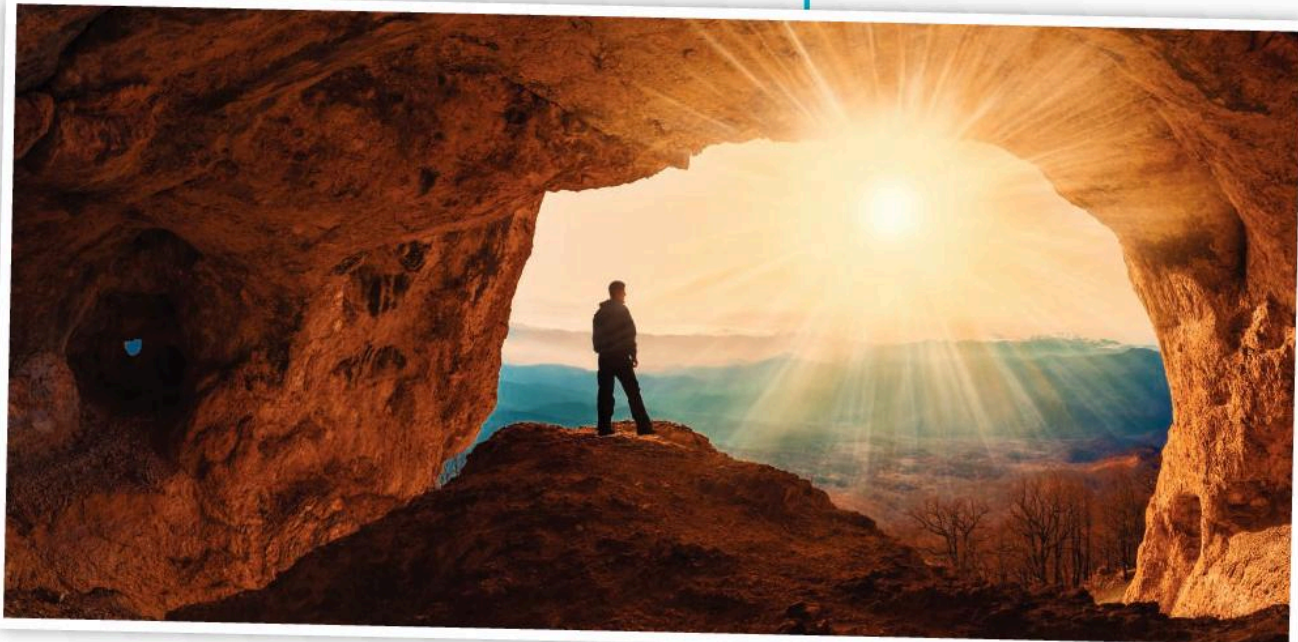
Attach the image.

Send the email to a classmate.

New Message _ ⤢ ✕

To   Cc Bcc

Subject   Mountain

↶ ↷ Sans Serif ▾ ⪪T ▾ B *I* U A ▾ ≡ ▾ ≔ ▾

Send   A 📎 🔗 🙂 △ 🖼 🕙 $ 🗑 ⋮
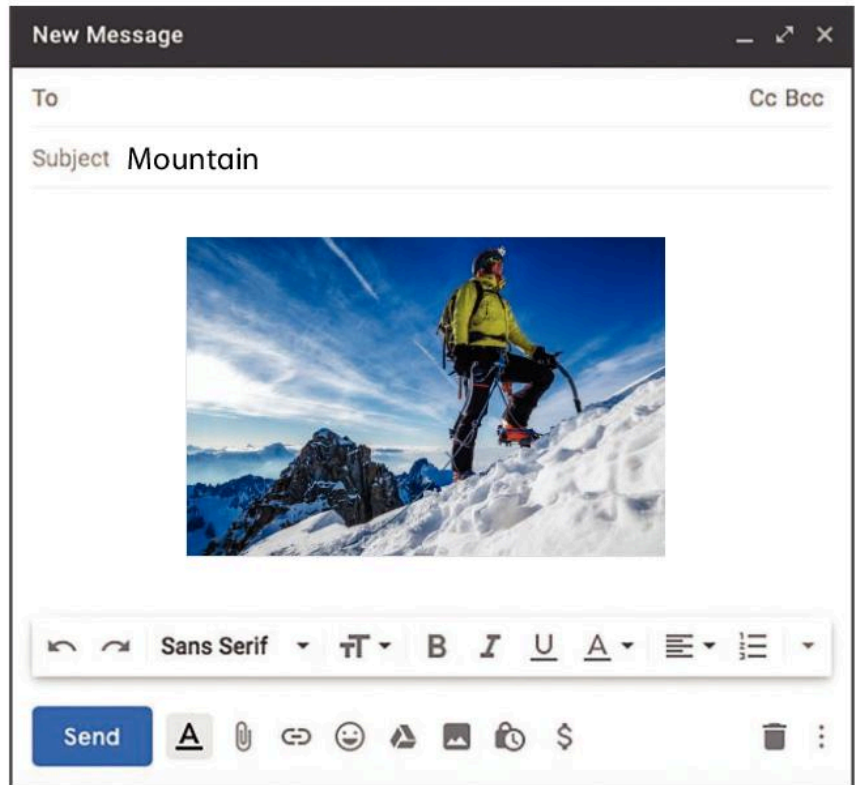
Extra challenge

Open the email you received from a classmate. Double-click on the attachment to open it. Describe the picture in one sentence.

Think again

Say one thing you can attach to an email as well as a picture.

In this lesson

You will learn:

→ what spam, phishing and pharming are

→ how to stay safe when you use email.

Spam, phishing and pharming

Most people use email to communicate with other people.

Sadly, some people use email to do things that harm other people.

Spam email tries to sell you something when you have not asked for it. Spammers send thousands of emails.
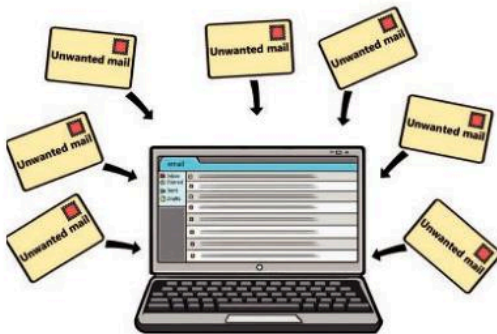
Phishing means sending an email with an address that is not real. The phishing email is trying to get personal and private information from you.

Pharming emails send you to a fake website. The website asks for your personal and private information.

Stay safe

Protect yourself with the three email safety rules.

1 Keep it closed!

Never open emails that look a bit strange, or have a strange subject. If you do not recognise the sender, do not open the email. Show it to an adult you trust.

2 Protect!

Make sure your computer has good virus protection. This is software that prevents problems on your computer. It also finds problems and removes them.

3 Do not reply!

Never reply to an email from someone you don't know without showing an adult first.

Activity

Make a poster for your classroom with the three email safety rules.

Extra challenge

Send an email to your teacher saying what pharming and phishing are.

Check what you know

You have learned

→ how to use technology to send and receive messages

→ to describe the parts of a message

→ how to respond to a communication you are not sure about, or find worrying.

Test

Deep-sea creatures

From: jack@deepsea.com
Mon 13/01/2020 14:02
To: maya@home.com

photo_anglerfish.jpg
2 MB

Dear Sister

We went on a deep-sea dive today, into a trench no one has explored before.

I saw a beautiful angler fish. I have attached a photograph of the fish.

Love
Your brother
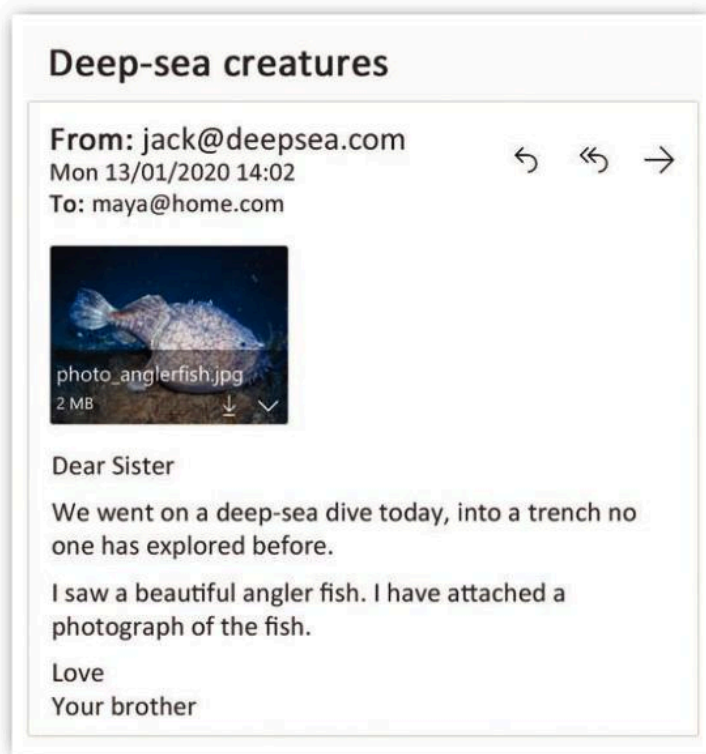
1 What is this email about?

2 Who sent this email?

3 What date did they send it?

4 This is a friendly email. What would you do if you received an email you were unsure or worried about?

5 What is the name of the file attached to this email?

6 Describe one risk from opening this file attachment.

Activities

Your teacher has sent you an email.

1 Open and read the email. Write down what it is about.

2 Write a reply to the email.

3 If you can, add a suitable attachment.

4 Send the email reply to your teacher.

Self-evaluation

- I know how to stay safe when I use email.

- I answered test question 1.

- I completed activity 1.

- I have opened and sent an email in class.

- I answered test questions 1–4.

- I completed activities 1 and 2 and sent the email.

- I have attached an image to an email and sent the email in class.

- I answered all the test questions.

- I completed all the activities.

Re-read any parts of the unit you feel unsure about. Try the test and activities again – can you do more this time?

You will learn

➜ how to plan a program
➜ how to make a program with inputs and outputs
➜ how to change inputs into outputs using operators.

What is a program?

A **program** is a set of commands. The commands control the computer.

In this unit you will make a program with Scratch. In Scratch, the commands are blocks. You fit the blocks together. That makes the program.
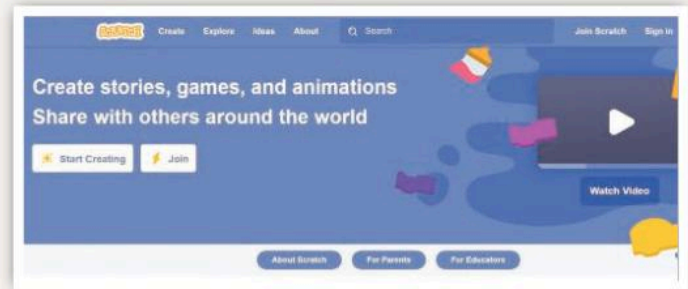
Programmer and user

The person who makes a program is called a **programmer**. The programmer chooses the commands and puts them in order.

Anyone can **run** the program. Running a program means the computer carries out the commands in the program. The person who runs the program is called a **user**.

The programmer and user can be different people. In this unit, you will be the programmer and the user. You will make a program. Then you will use the program.

Talk about...

Do you like using software on a computer with a keyboard and mouse? Or do you prefer to use software on a phone or tablet with a touchscreen? Which is best for children? Say why.

Learning outcomes: Describe a simple plan for a program that changes inputs into outputs

Inputs

Every program has **inputs**.

- One way to make inputs is to type with the keyboard.

- Another way to make inputs is to move and click the mouse.

- On a tablet you can touch the screen.

- Some computer game consoles have other types of input.

Outputs

Every program has **outputs**. The outputs are what comes out of the program.

- Visual outputs appear on the screen.

- Sounds can be outputs.

The user sees and hears the program outputs.

Class activity

What computer software have you used before? It might be a computer game, word processing or graphics. Think about the last time you used that software. Draw what you saw on the screen. Write about the inputs and outputs of the software.

Did you know?

'Scratching' is what DJs do when they mix sounds together to make music. The programming language Scratch is named after this. Scratch programmers can mix sounds, images and other outputs in their programs.
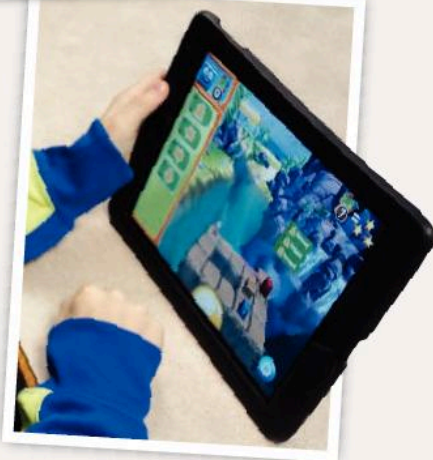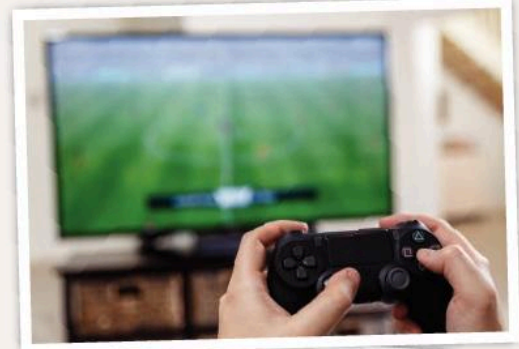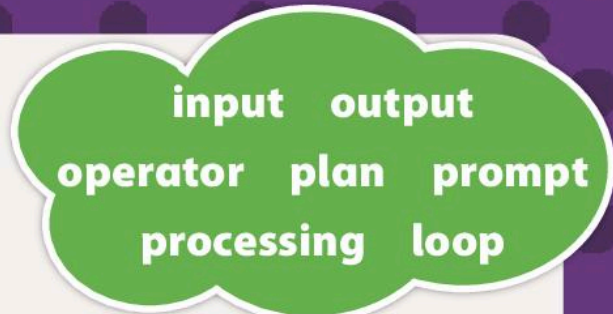
In this lesson

You will learn:

→ how to make a Scratch program with output.

Scratch

Go to the Scratch website. Click on 'Create' to open the area where you can create your own programs.

The Scratch screen is in three parts:

The command blocks are on the left of the screen.

The script area is in the centre of the screen.

The stage is where the sprite moves.
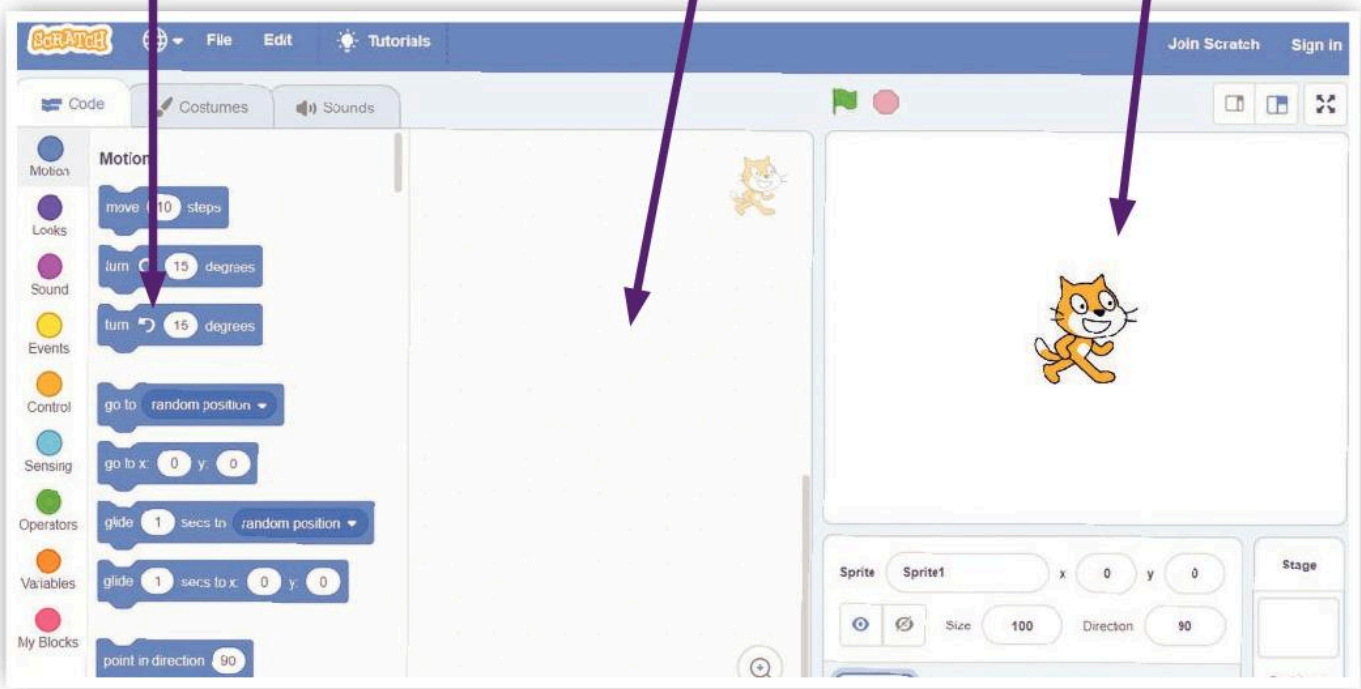
'Looks' blocks

You are going to make a program with one simple output. The sprite will say "Hello!"

The commands to create visual outputs are called 'Looks'. The 'Looks' blocks are purple. Click on the purple dot to see the 'Looks' blocks.

Can you see a block that makes the sprite say "Hello!"? There are two blocks like this.

Drag one block onto the script area. Click on the block and see what happens.

Now try the other block. What is the difference?

Make changes and save

Find the word 'Hello!' on the block. Delete that word and type any words you like.

Run the program. The sprite will say the words you typed.

Saving a program means copying the program to storage, so you can work with it again another time. Click on 'File' at the top of the screen. Choose 'Save' from the File menu.
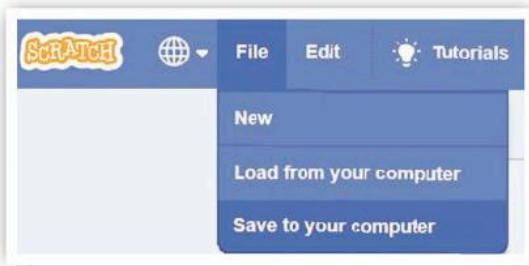
Activity

Create a one-block Scratch program to produce visual output. Run and save the program.
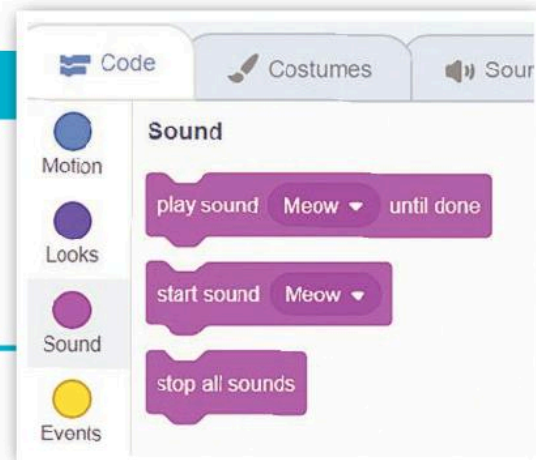
Extra challenge

The pink 'Sound' blocks let you add sound output to the program. Add a second block to the program to make sound output. Run and save the program.
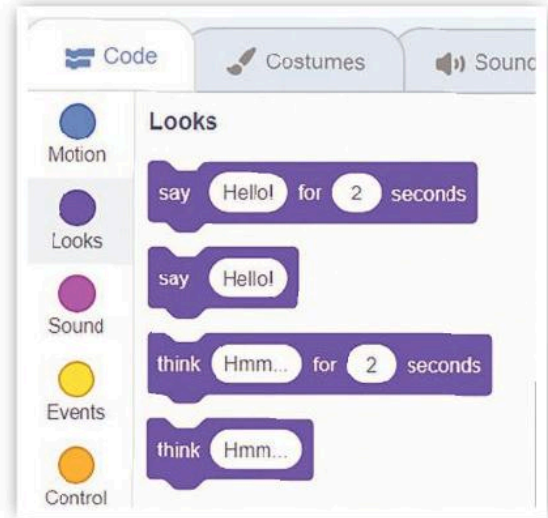
Think again

What command block did you use in this lesson?

Draw a picture to show the output made by the block.

In this lesson

You will learn:

→ how to make a program with input and output.

Load the program

In the last lesson you made a simple Scratch program with an output. Now you will load the program. 'Load' means bring the program back from storage. Click on 'File' on the top bar. Choose the option 'Load' from the menu.

Sensing blocks

You will change your program so it includes input.

Input means that information or instructions go into the computer. In Scratch the input commands are the 'Sensing' blocks. They are light blue.

Click on the light blue dot to see the 'Sensing' blocks.

One light blue block says 'ask "What's your name?" and wait'. Drag this block into the script area and join it to the other block. Now you have a program with two commands.
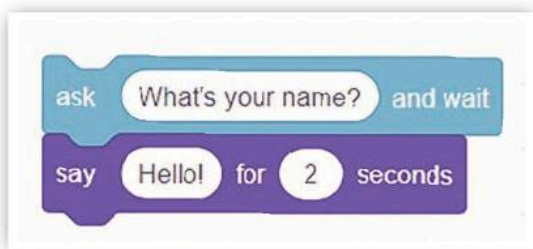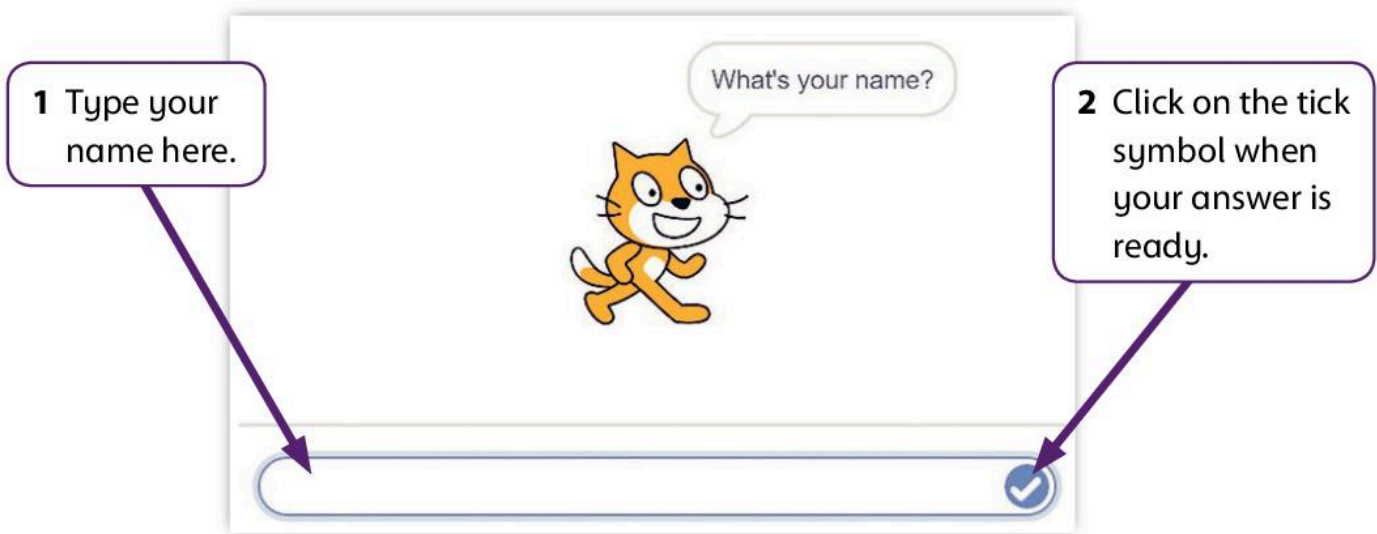
Run the program and see what happens.
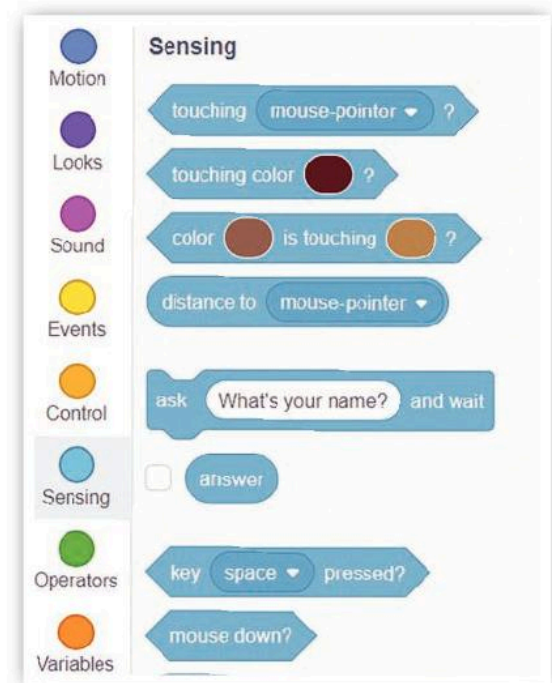
Run the program

When you run the program, the sprite asks your name. There is a space on the screen so you can type the answer. Your answer is the input to the program.

1 Type your name here.

What's your name?

**2** Click on the tick symbol when your answer is ready.

Start event

To start this program you must click on the blocks. But there are other ways to start a program. The yellow blocks with curved tops are 'Start Events'.

Click on the yellow dot to see the yellow 'Event' blocks. Find the block that says 'when this sprite clicked'. Join the event to the top of the program.

Click on the sprite and the program will run.

```
when this sprite clicked
ask   What's your name?   and wait
say   Hello!   for   2   seconds
```
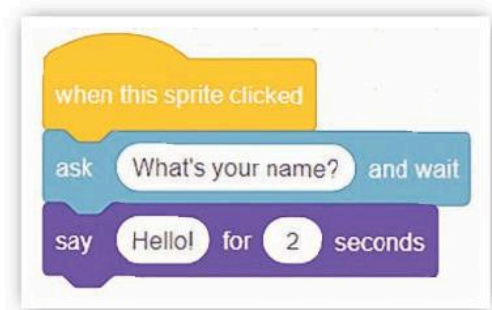
Activity

Make a program where the sprite asks you your name. Run the program. Save the file.

Extra challenge

You made a program where the sprite asked your name. Change the question to "What is your age?"

Think again

The mouse and keyboard are used for input.

- Describe how you used the keyboard for input.
- Describe how you used the mouse for input.

In this lesson

You will learn:

➔ how to make a program which turns inputs into outputs.

Say my name

Load and run the program you made in the last lesson.

- The sprite asks your name.

- Then the sprite says "Hello!"

Now you will change the program so that instead of saying "Hello!", the sprite says your name.

Answer block

When you ran the program you typed some input. The computer saves the input that you typed. You can use that saved input later in your program.

Look in the light blue 'Sensing' blocks. Find the block that says 'answer'.

Drag the 'answer' block to the script area. Put the 'answer' block into the 'say' block. It fits exactly. Now the sprite will say your answer.

Run the program. You can type any input. The sprite will say your words back to you.

Join

The sprite will say your name. Now you will change the program. The sprite will say two things. It will say "Hello" and then your name.

To join two words together we use a special block called 'join'. The join block is green. Click on the green dot to see all the green blocks. Find the block that says 'join'.
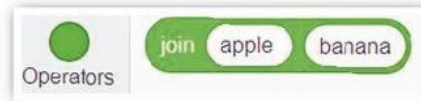
At the moment it joins the words 'apple' and 'banana'.

Drag this block into the script area. Delete 'apple' and 'banana' (you don't want the sprite to say that!). Instead type 'Hello' in one space. Put the answer block in the other space.

Run the program. Can you see how it has changed?

Hint: Are 'Hello' and your name squashed together like this?

> HelloSam

Put a space after 'Hello'. The output will look better.

Activity

Make a program that asks your name and then says your name. Change the program so it asks your name and then says "Hello" and your name. Save the file.

Extra challenge

Make a new program, with a new sprite and backdrop that you have chosen. This program asks for your favourite computer game and then says "I like to play" and the name of the game.

Think again In this program you used the 'answer' block. Say what the 'answer' block does.

In this lesson

You will learn:

→ how to use operators to do maths.

Operators

In the last lesson you used two new blocks.

Operators

- The **'answer' block**: This block stores your input.

- The **'join' block**: This block joins two words together. In the last lesson it joined the answer block and 'Hello'.

The 'join' block is an example of an **operator**. Operators are used to transform or change values. Operators turn inputs into outputs. Click on the green dot to see the operators.

In this lesson you will use some new operators. You will use operators that do maths.

A new program

Start with a new empty screen. Choose any sprite and backdrop that you want.

Choose the right blocks. Fit them together to make the program shown here.

Run the program to see what it does. The program is not completed yet.

Now do maths

Look at the 'Operator' blocks. Find the operator that has the add symbol (the plus sign). Drag it into the script area.

There are two spaces in the 'add' block. In one space put the 'answer' block. In the other space type the number '5'.
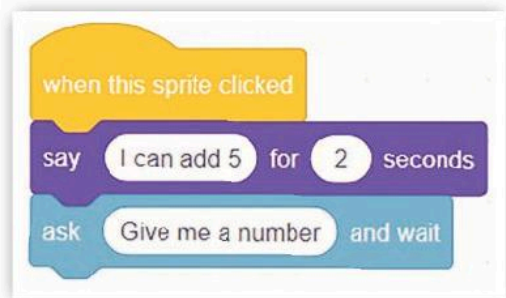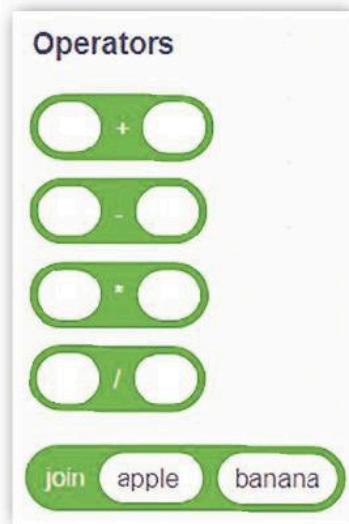
This operator adds the value 5 to the value that you input.

To complete the program, put the 'add' block into a 'say' block. Add this block to the program. Now the sprite will say the answer.

Activity

Make a program that asks for a number and then tells you that number plus five.

Extra challenge

Look at the picture showing the green 'Operator' blocks. Several maths operators are available.

Make a program that multiplies a number by seven.

Make a program that uses another maths operator.

Explore more

Make a program with many different sprites. Make each sprite do a different maths operation.

Digital citizen of the future

The work you do in this unit is about making the computer do maths. This is a common way to use computers. Many adults use technology to help with number problems. But it is also important to develop skills to solve maths problems without technology. That will help you to use technology wisely and spot mistakes if they occur.

In this lesson

You will learn:

➔ how to plan a program that changes inputs into outputs.

Make a plan

A program **plan** sets out the main commands of the program. A programmer makes a plan before they make the program. A good plan will help the programmer to:

● know what to do before they start work

● share the plan with others

● work out what to do if they get stuck.

The plan shows the program commands in the right order. The commands usually go in this order:

> **1** Get the inputs.
>
> **2** Process the inputs using operators.
>
> **3** Show the outputs.

In this lesson you will make a plan for a program. The program will get a word from the user. It will say the length of the word. That is, it will say how many letters there are in the word.

Plan the inputs

You must tell the user what input is needed. Then they will know what to type. The message that tells the user what to do is called the **prompt**.

So the plan is:

● **Prompt:** Type any word.

● **Input:** Get the answer.

Plan the processing

Now you must plan the **processing**. Decide what operators to use. Click on the green dot to remind yourself what operators there are.

This block has the operator you need for this task.

Add this line to the plan:

- **Processing:** Find the length of the answer.

length of apple

Plan the outputs

The last part of the program will output the result.

- **Output:** Say the result

The complete plan

Here is the complete plan.

- **Prompt:** Type any word.
- **Input:** Get the answer.
- **Processing:** Find the length of the answer.
- **Output:** Say the result.

Activity

Write out the plan from this lesson. Here are the blocks you need to make the program. Fit the blocks together to make a program that matches the plan.

ask Type any word and wait

answer

length of

say for 2 seconds

when this sprite clicked
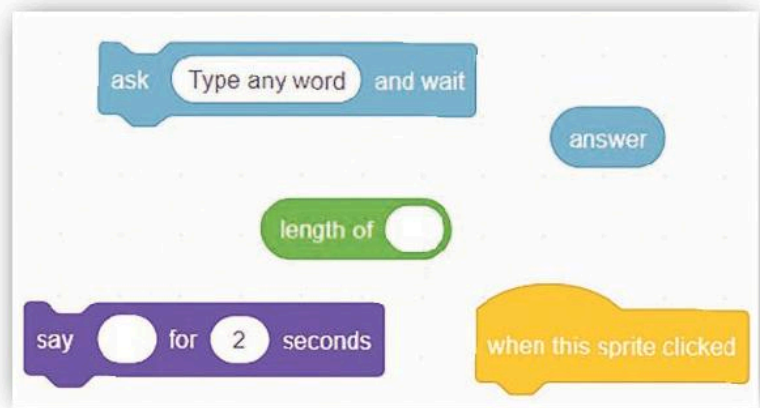
Extra challenge

A student made a longer version of the program. She ran the program. This is what she saw.

- Write a plan for a program that makes this output.
- Write a program to get this output.

8 letters

Explore more

Write a plan for a program that inputs a number, then outputs the number times two. Make a program to match your plan.

In this lesson

You will learn:

→ how to make a program with several inputs.

Forever loop

The program you planned and made does one task. But often we want a program that does a task many times. That can be more useful.

To make a program repeat we can use a 'forever' loop. A 'forever' loop looks like this.

Commands inside the 'forever' loop are repeated 'forever' (at least, until the program stops).

Plan your loop

You must plan which commands go inside the 'forever' loop.

- If commands happen once, put the blocks before the 'forever' loop.

- If commands are repeated, put the blocks inside the 'forever' loop.

A programmer wanted to write a program to double any number and output the answer. He wanted that program to repeat. Here are the actions in the plan.

| **Processing:** Multiply answer by two | **Output:** Output answer times two |

| **Output:** Say "I can multiply any number by two" | **Prompt:** Say "Type a number" |

He put the commands in the correct order and showed which commands go inside the loop.

Output: Say "I can multiply any number by two"

LOOP:

Prompt: Say "Type a number"
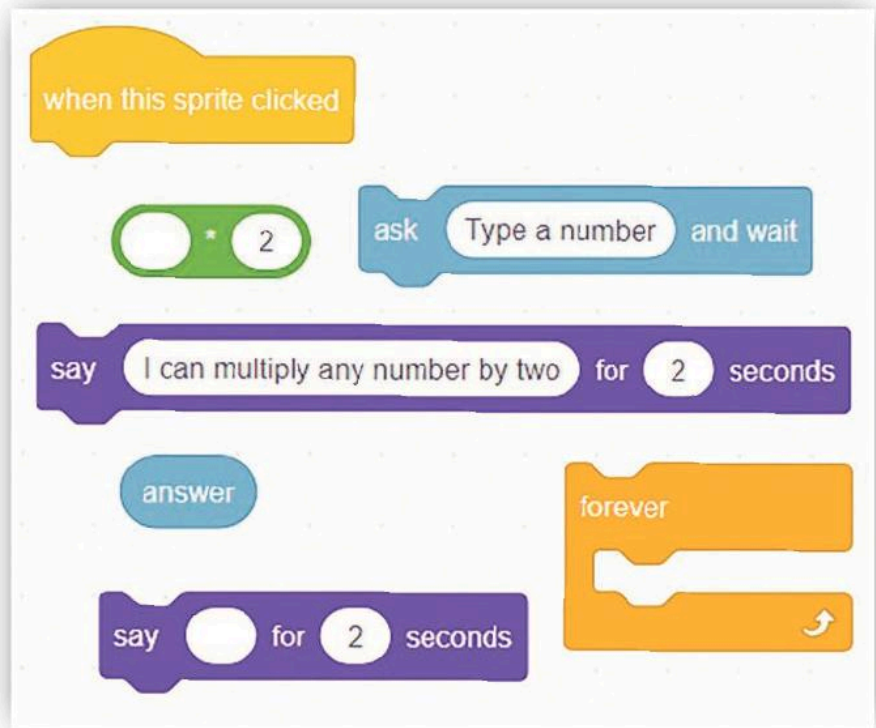
Processing: Multiply answer by two

Output: Output answer times two

Make the program

Here are the blocks you need to make the program. Fit them together to match the plan.

Stop the loop

A 'forever' loop doesn't really go on forever. You can stop the program by clicking on the red stop sign at the top of the stage.

when this sprite clicked

◯ * 2

ask [Type a number] and wait

say [I can multiply any number by two] for 2 seconds

answer

forever

say ◯ for 2 seconds

Activity

Plan a program with a 'forever' loop. It inputs numbers and then outputs that number times two.

Make a program to match your plan.

Extra challenge

Make a plan for a new program with a 'forever' loop. The user enters a series of numbers. Each time the program outputs the number times 10 and then the number times 11.

Make a program to match the plan.

Explore more

What are operators?

Pick an operator that works with numbers. Draw the block. Say what it does.

Pick an operator that works with words and letters. Draw the block. Say what it does.

If you have time, make a directory of operators explaining all the ones you know.
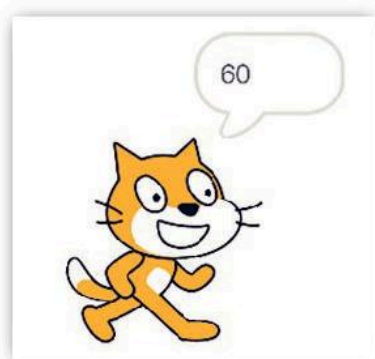
Check what you know

You have learned

➔ how to plan a program

➔ how to make a program with inputs and outputs

➔ how to change inputs into outputs using operators.

Test

A student wrote a program. When she ran the program, this is what she saw first.
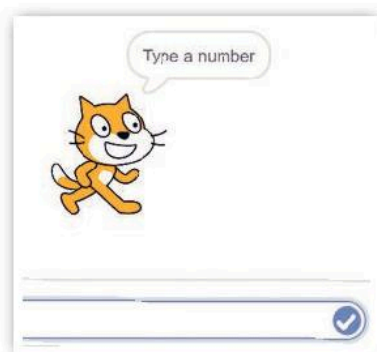
The student entered the number 10. This is what she saw next.

1 In your own words, say what this program does.

2 What operator is used in the program?

3 What are the inputs and outputs of the program?

4 Write a plan for the program.

5 Write a new plan for the program, using a 'forever' loop.

Activity

Now make a program that does the same thing. Here are the blocks you will need.

```
when this sprite clicked

ask [Type a number] and wait

(  ) * ( 6 )

answer

forever

say (  ) for ( 2 ) seconds
```

Self-evaluation

- 🔴 I answered test questions 1 and 2.
- 🔴 I started the activity to make a program.
- 🟢 I answered test questions 1–4.
- 🟢 For the activity, I made a program to match my plan.
- 🔵 I answered all the test questions.
- 🔵 I completed the activity. I made a program with a 'forever' loop in it.

Re-read any parts of the unit you feel unsure about. Try the test and activities again – can you do more this time?

4 Programming: The Drawing Bug

You will learn

→ to set values inside a program to produce the outputs you want

→ to write a program that uses variable values input by the user

→ to change values in a program to produce different outputs

→ to find and fix errors in your code.

In this unit you will learn more about the Scratch programming language. You will use Scratch to produce colourful patterns and shapes. The style and size of the patterns will be set by number values that you choose.

There are two ways that you can set number values in programs:

● A number value can be included as part of the program. It will not change. It will be the same every time the program runs.

● A number value can be input by the user. It can change. Each time the program runs, the user can type a different value.

You will look at both types of number value. You will use them in your programs.
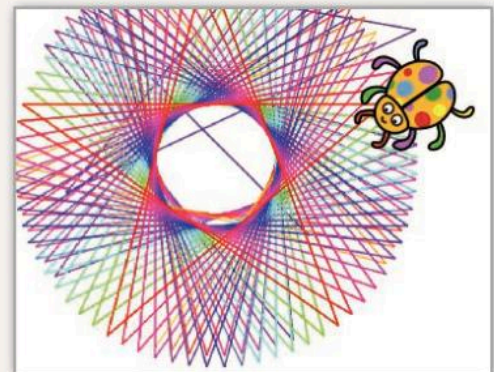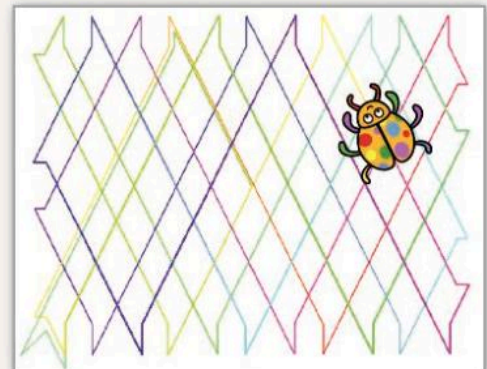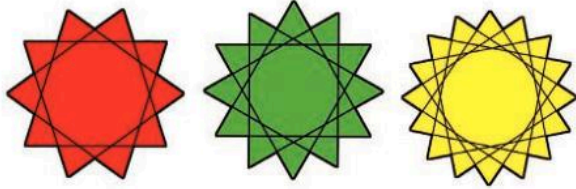
Class activity

You will make a program that draws neat, coloured stars on screen using the computer. See if you can draw these shapes using a coloured pencil and a ruler. Don't worry if you are not as neat as a computer.

12-pointed star

10-pointed star

16-pointed star

Did you know?

The slogan of the Scratch language is 'Imagine, Program, Share'. People who make programs can share them on the Scratch website. You can use programs that other people made. You can look at the blocks they used and make changes to try out your own ideas.

Talk about…

In this unit you will make drawings using a computer program. A computer is a tool some people use to make art. Is this an acceptable way of making art? How can computers help people to be better artists? Or is this cheating? What do you think?

Digital citizen of the future

In this unit you will find and fix errors in your program. Learning any skill means learning how to find and fix errors. Every time you find an error in your work, remember that finding and fixing errors is a key skill. It is a sign of successful learning.

In this lesson

You will learn:

→ how to make the Scratch sprite draw with a pen.

The Drawing Bug

This unit uses a beetle as a sprite. The sprite is called 'Ladybug 1' on the Scratch website. But you can use any sprite you like, and you can pick a new backdrop too if you want.
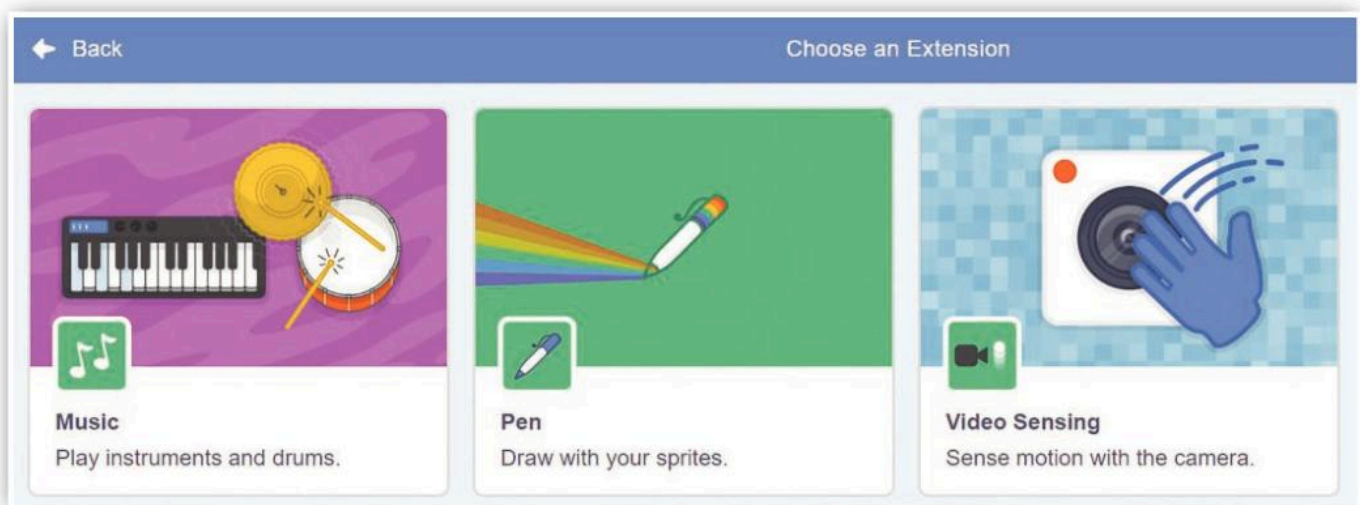
Pen blocks

Open the Scratch website and get ready to start a new program.

In this program you will use some new blocks that you have not used before. Look at the column on the left where the coloured dots are. At the bottom you will see a symbol with the label 'Add Extension'.

Click on the 'Add Extension' symbol. It will open a new screen. This screen shows lots of fun things you can do with Scratch such as music and video.
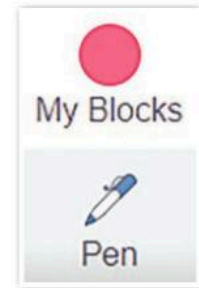
Click on the one that says 'Pen'.

← Back   Choose an Extension

Music
Play instruments and drums.

Pen
Draw with your sprites.

Video Sensing
Sense motion with the camera.

A simple program

After you have clicked on 'Pen' you will go back to the Scratch screen. But something has changed. At the bottom of the dots you will see a picture of a pen. You have added this feature to Scratch.

Click on the pen symbol. You will see a set of blue-green 'Pen' blocks. These are the blocks that make the pen work.

Pen

erase all

stamp

pen down

Can you see the block that says 'pen down'? This is the one you will use in this lesson.

Drag the 'pen down' block onto the script area. Join it with other blocks to make a program like this.

Run the program and see what happens. What does the sprite draw?
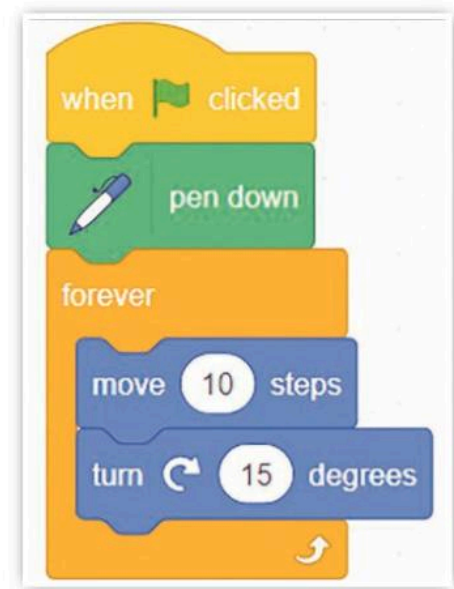
when 🏳 clicked

pen down

forever

move 10 steps

turn ↻ 15 degrees

Activity

Make the program shown in this lesson. Run and save the program.

Explore more

This program includes a block that says 'turn 15 degrees'. What are degrees? Find out more.

Extra challenge

The program has two blocks where you can add numbers. Try changing these numbers. Run the program again. Explore what happens if you use a range of different number values.

In this lesson

You will learn:

→ how to change the program by changing number values.

Set the program start values

In the last lesson you made a simple program. The sprite drew with a pen. Now you will make changes to the program. Load the program from where you saved it.

First, you will set values at the start of the program. Find these blocks and add them to the program:

● 'erase all': **Erase** means rub out. This block will rub out any old drawings on the screen.

● 'set pen size to 5': This block will make the pen line wider.

Now add a movement block:

● 'go to position 0 0': This will move the sprite to the middle of the screen.
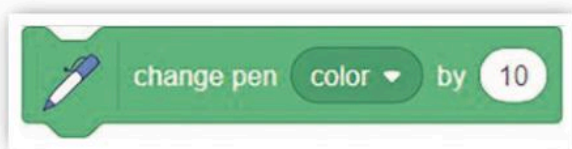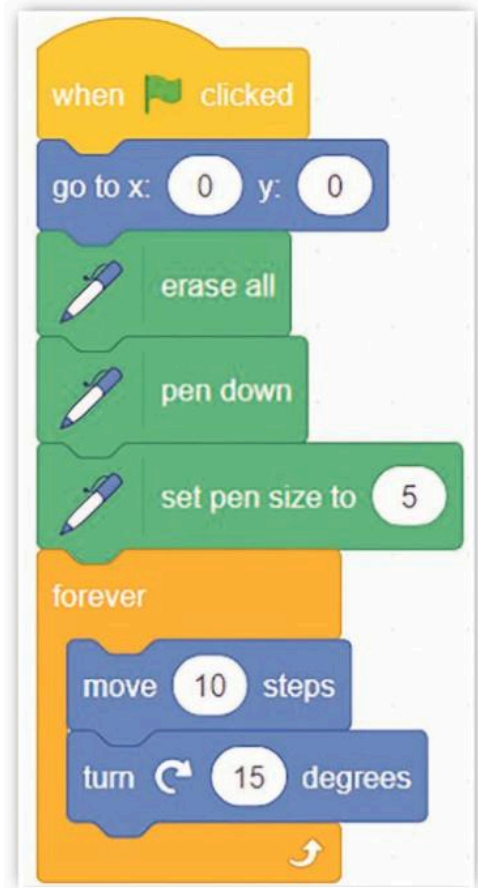
Here is the program showing these changes.

Run the program to see what it does.

Commands inside the loop

Now you will change the commands inside the loop so that the bug draws a different and more colourful shape.

This block will change the colour of the pen.

Put the 'change pen color' block inside the 'forever' loop. The pen colour will change forever. You will see a rainbow line.

There are two 'Motion' blocks inside the 'forever' loop. Change the values inside the block.

- Change the number of steps to 100.
- Change the number of degrees to 150.

This is the completed program.

Run the program to see what shape the sprite draws.


```
when 🏳 clicked
go to x: 0 y: 0
🖊 erase all
🖊 pen down
🖊 set pen size to 5
forever
    🖊 change pen color ▼ by 10
    move 100 steps
    turn ↻ 150 degrees
```

Activity

Make the program shown in this lesson. Run and save the program.

Think again
Write down all the blocks you have used that have numbers you can change. Say what each block does.

Extra challenge

Make changes to the program you made:
- Replace the 'forever' loop with the loop that says 'repeat 10'.
- Change the numbers in all the blocks and see what happens.

In this lesson

You will learn:

→ how to use inputs to change what a program does.

Fixed values

Load the program you made last time. The program has a 'forever' loop. Inside the loop are commands to:

- 'move 100 steps'
- 'turn 150 degrees'.

You set these values in the last lesson. When you run the program, the sprite draws a small rainbow star. It will draw the same star every time you run the program.

A program is a set of stored commands. The stored commands will carry out the same tasks in the same order each time you run the program. We say the values are **fixed**. The numbers do not change.

Variable values

To change program values, you can get input from the user. The new values will make the program do a different thing. In this lesson you will change the number of steps.

- If the number of steps is big, the star will be big.
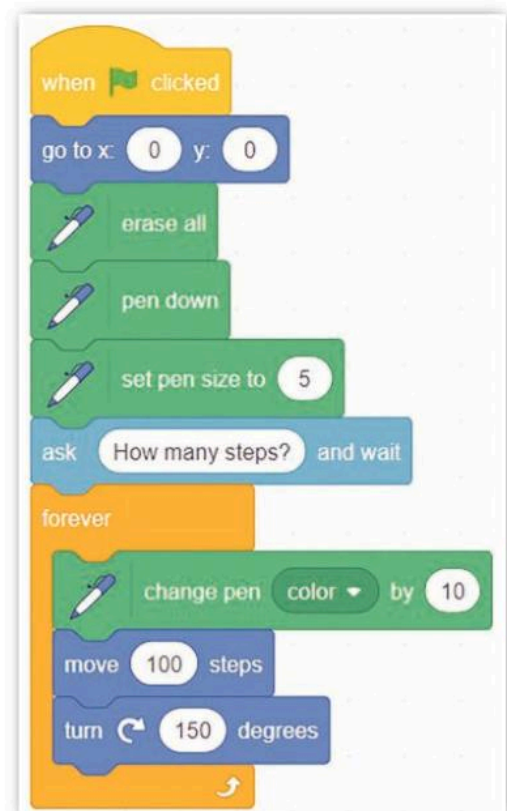- If the number of steps is small, the star will be small.

The number of steps is a **variable** value. The number can change.

Get input

Do you remember the 'ask' block? It is one of the light blue 'Sensing' blocks.
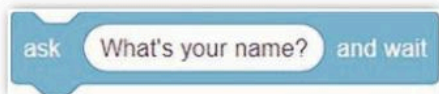
Drag the 'ask' block into the script area. Change the words in the block so that it says "How many steps?"

You will get input once, before the loop starts. So put the 'ask' block into the program, just above the 'forever' loop.

You will have to pull the blocks apart, fit in the new block, and then join the whole thing together again.

Remember, the 'answer' block represents the input from the user. Find the 'answer' block and fix it into the program. It goes inside the 'move… steps' block.

Result!

When you run the program, the sprite asks "How many steps?" A small number will make a small star, and a big number will make a big star.

A student gave the number 300. The star looked this big.
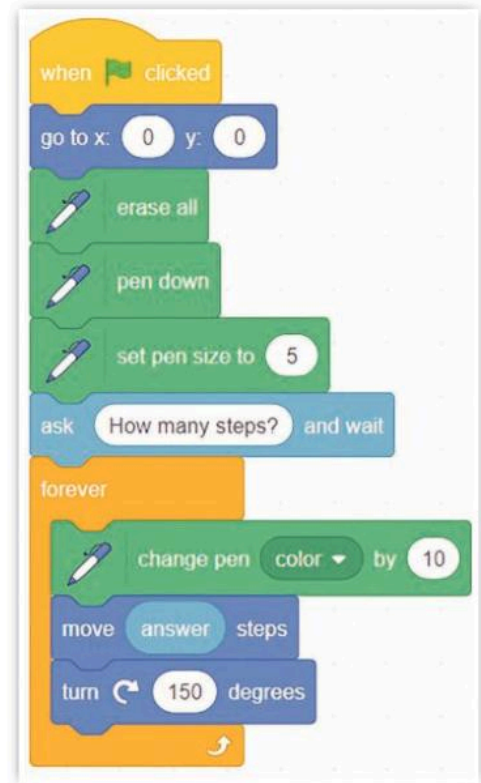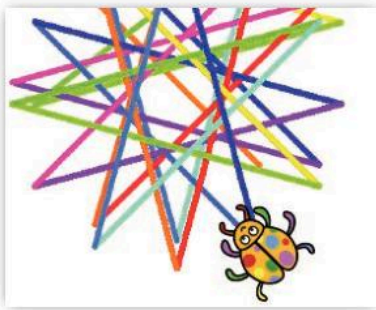
Activity

Make the program shown in this lesson. Run the program to see the result of different number inputs. Save the program.

Extra challenge

In this program the pen size is set to 5. Make changes to the program so that:

- The sprite asks "What pen size?"
- The answer to this question goes into the 'pen size' block.

Explore more

Because Scratch is on a website, you can use it on any computer that has an internet connection. At home you could open Scratch and make the star program. Why not challenge family or friends to see if they can make the program too? Perhaps you could help them with the tricky parts.

In this lesson

You will learn:

→ what degrees are and how they change movement

→ how changing the number of degrees changes a program.

Degrees

An **angle** is where two lines join to make a corner. **Degrees** are used to measure the size of an angle. Degrees measure how far something turns to the left or right.

90 degrees is called a right angle. Square corners are 90 degrees. You sometimes write 90 degrees like this:

90°

The number of degrees is shown inside the 'turn… degrees' block. Changing the number of degrees will change the shape that the sprite draws.

This block makes the sprite turn 145 degrees.
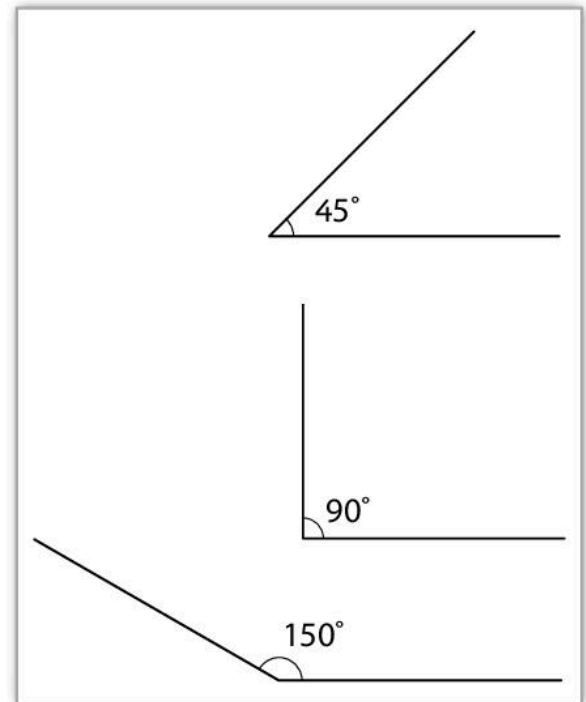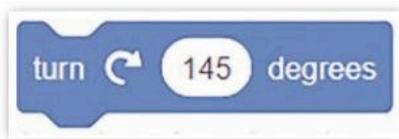
Change the program

Load the program you made in the last lesson. Now you will change the program so that the user inputs the number of degrees.

Here are the changes you must make:

- Change the question "How many steps?" to "How many degrees?"

- Move the 'answer' block out of the 'move… steps' block. This goes back to 100 steps.

- Move the 'answer' block into the 'turn… degrees' block.

Find the block that changes the pen colour. Enter the number 1 in this block. This gives a colourful effect as the sprite draws the shape.

 Activity

Make a program that asks "How many degrees?" and uses the answer in the 'turn' block.
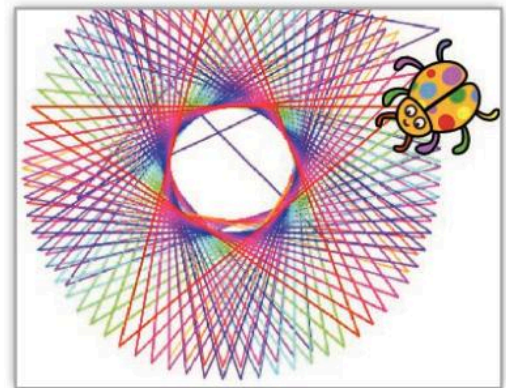
You can make other changes to the numbers in the program blocks.

This picture was made using these values:

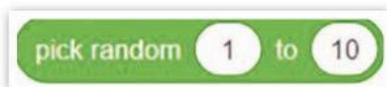- pen size 1

- change pen colour by 1

- move 300 steps.

The user answered the question "How many degrees?" with the number 145.

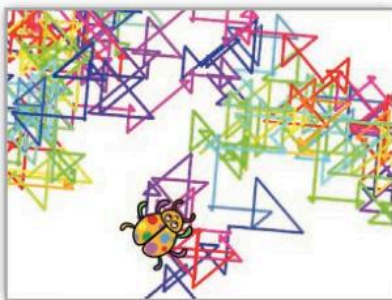Try these values and any others that you have time for.

Extra challenge

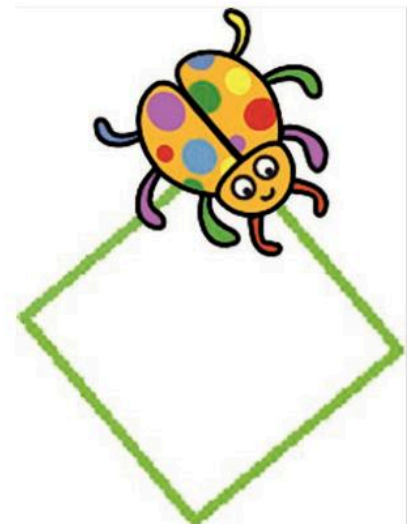This block will make a random number. Set the second value to 100.

Put this block into the 'move… steps' block. This will make the sprite draw an interesting random pattern.

What happens if you make the number of degrees random?

Think again

Here is a shape made by this program. What number of degrees did the user enter to make this shape? Try it for yourself.

In this lesson

You will learn:

→ how to recognise errors in a program

→ how to fix errors so the program works properly.

Errors

A program can have **errors** in it. Errors are mistakes. For example, a program might have the wrong commands. Or the commands might be in the wrong order.

If a program has errors, it might not run. Or it might run but do the wrong thing.

Missing blocks

Every command block in a program is important. If any of the command blocks are missing, then the program will not work properly.

> Here is a program with an error in it. Can you see which block is missing?
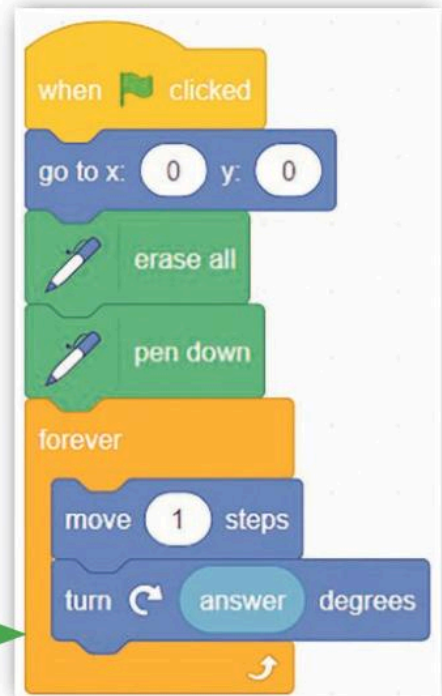
The 'ask' block is missing. That is the block that asks "How many degrees?" Without that block the computer does not have an input value.

Make this program with the mistake in it. Run the program. What happens? Can you fix this program to remove the error?

Fixed values

Many command blocks have fixed values in them. If the values are wrong, then the program will not work properly.

> One of the blocks in this program has the wrong value. Can you see which one?
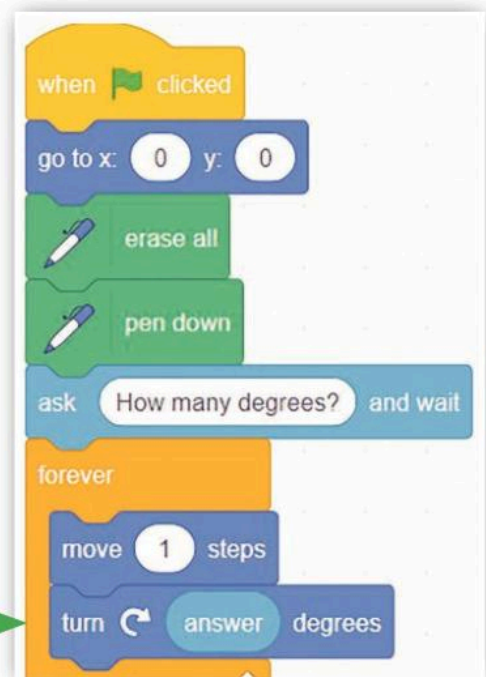
The 'move' block makes the sprite move one step. That means the shape it draws is too small. Can you think of a number that is too big? Try it out.

Loop errors

Commands inside the loop are repeated many times. Commands before the loop happen only once. Some blocks belong inside the loop. Some belong outside.

Here is a program with an error in it. Can you see what the error is?

The 'ask' block is inside the loop. That means the program will ask for the number of degrees over and over again. That's not what the program is supposed to do!
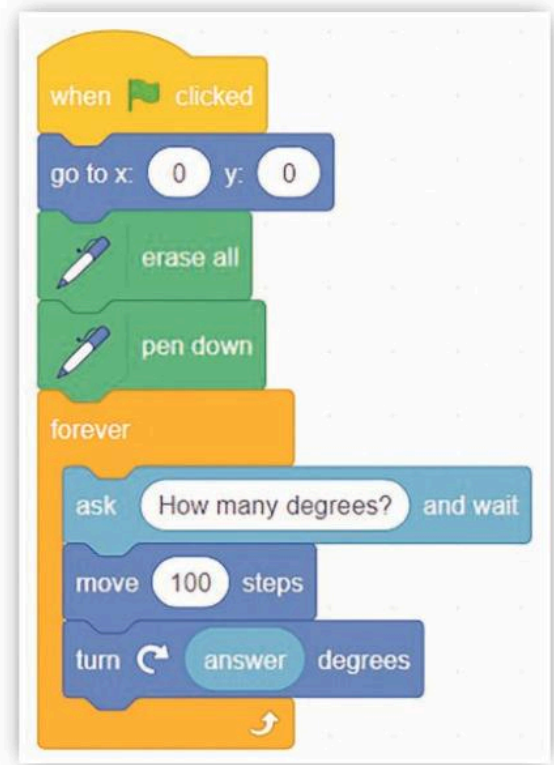
Activity

Write a program with an error in it.

Work with a partner. Look at your partner's work. Find and fix the error in the other person's program.

Extra challenge

A six-sided shape is called a hexagon. To draw a hexagon the sprite needs to turn 60 degrees. Write a program to make the sprite draw a hexagon. Remove any errors from the program.

Think again

In your activity you looked at a program with an error. Write down the commands in that program. Write a note to say what the error is and how you fixed it.

In this lesson

You will learn:

➔ how to search carefully for errors.

Finding errors

When you make a program, you start by thinking of the output you expect to see. This is the program **requirement**.

A programmer was asked to make a program. This was the requirement.

Draw an endless rainbow line on the screen using a 'forever' loop.

Here is the program they made. The program has errors in it.

You will learn about different ways to find and fix errors.

Look and find

One way to find errors is just to look at the program. You might spot straight away that there is a problem.

In this program the 'erase all' block is inside the 'forever' loop. Remember, commands inside the loop are repeated. With every loop, everything on the screen is erased. That is an error.

To fix the error:

● Move the 'erase all' block to the start of the program.

Run and check

Another way to find errors is to run the program. The programmer ran the program and found the sprite did not move. What you see when you run a program gives a clue to the error.

In this case, there is a problem with the 'move' block. The 'move' block uses the 'answer' block. But there is no input question. So the 'answer' block has no value.
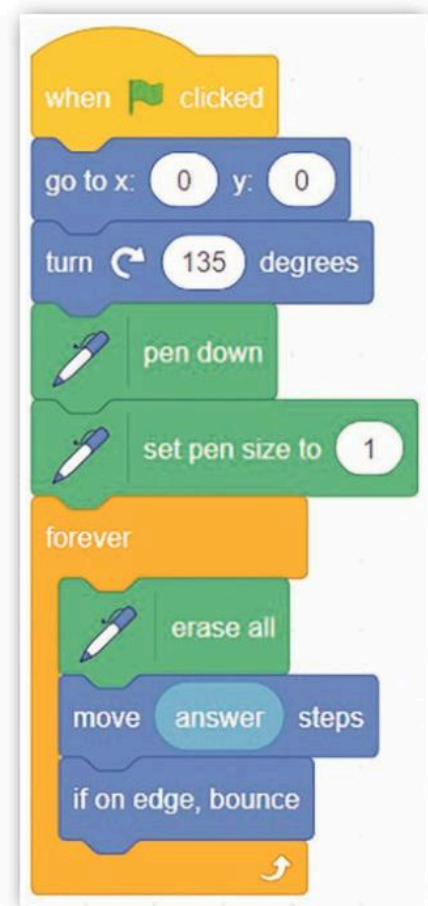
To fix the error:

- Make a block that asks, "How many steps?" Put that block into the program – you decide where.

Compare output to requirement

If you have fixed these two errors, then the program will run. But there is another error to fix. Read the requirement.

*Draw an endless **rainbow** line on the screen using a 'forever' loop.*

Compare this requirement with the output you see. It is not the same. To fix this error you must put a block inside the 'forever' loop to change the colour.

Now when you run the program you should see an output like the one shown below.

The pattern will change depending on the number of steps you type in.

Activity

Make the program shown in this lesson, with all the errors fixed.

Think again

In this lesson you learned three ways to find errors in a program. Draw a poster to remind programmers of the three ways to find errors.

Extra challenge

This block will make a random number. The first value is set to 0. The second value is set to 180. That means it will make a random value from 0 to 180.

pick random 0 to 180

Use this block in place of the number of degrees. Change the pen size to 3. Run the program to see what different patterns you can make.

Check what you know

You have learned

→ to set values inside a program to produce the outputs you want

→ to write a program that uses variable values input by the user

→ to change values in a program to produce different outputs
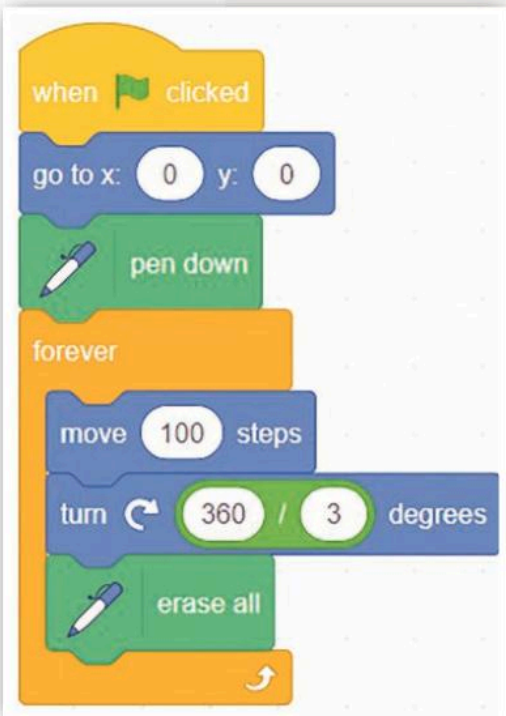
→ to find and fix errors in your code.

Test

Here is a program requirement.

Make a program that draws a square on the screen.

Here is a program made to meet this requirement.

1 Find one error in this program and say what it is.

2 Find and fix all the errors in the program.

3 Think of times that you have found and fixed errors in programs. It might be any work from this book, or any other program you made.

    a Describe an error you found by looking at the blocks.

    b Describe an error you found by running the program.

    c Describe an error you found by comparing the output to the requirement.


```
when [flag] clicked
go to x: 0 y: 0
pen down
forever
    move 100 steps
    turn ↻ 360 / 3 degrees
    erase all
```

Activities

1 For the test you wrote about the errors in a program. Make that program now without errors. It should draw a square on the screen.
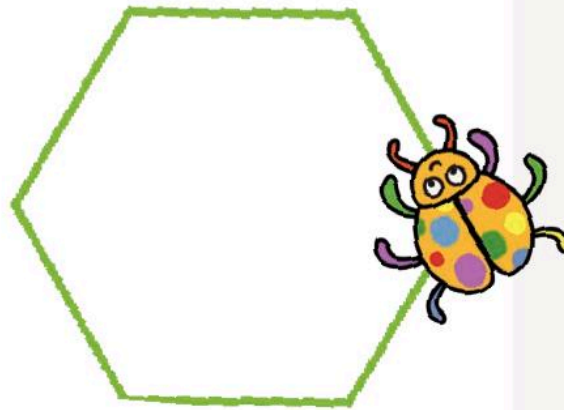
2 To make a four-sided shape you divide 360 by 4. Change the program so it divides 360 by a number input by the user. Run the program and see what the output is.
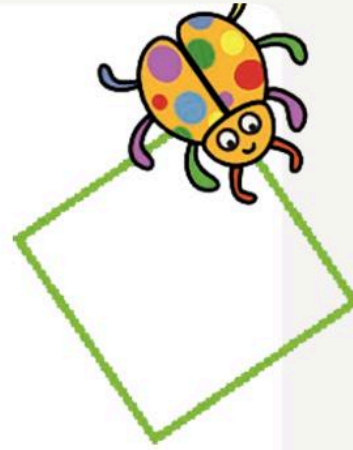
How many sides?

Self-evaluation

- ● I answered test question 1.
- ● I started activity 1, making a program by putting blocks together.
- ● I answered test questions 1 and 2.
- ● I completed activity 1. I made a program that works.
- ● I answered all the test questions.
- ● I completed both activities.

Re-read any parts of the unit you feel unsure about. Try the test and activities again – can you do more this time?

You will learn

→ how to use software to make a slide show with text and images

→ how to improve the way a slide show with text and images looks

→ how to correct a slide show

→ how to add animations to a slide show.

In this unit you are going to write a digital story in a **slide show**.

A slide show is a way of sharing a set of ideas, text and images with other people.

You can use a presentation program to make **slides**. A slide is a page in a slide show. You can use words and images in slides.

Learning outcomes: Use software to improve the appearance of a document that includes text and images

slide
slide show   animation
import   image   text box
theme

Class activity

Many stories have a beginning, a middle and an end.

Write down as many ways of beginning a story as you can think of.

Did you know?

People have been telling stories with pictures for thousands of years.

Be creative

Draw a picture of one part of your favourite story. Scan or take a photograph of your picture so you can open it on a computer.

Talk about...

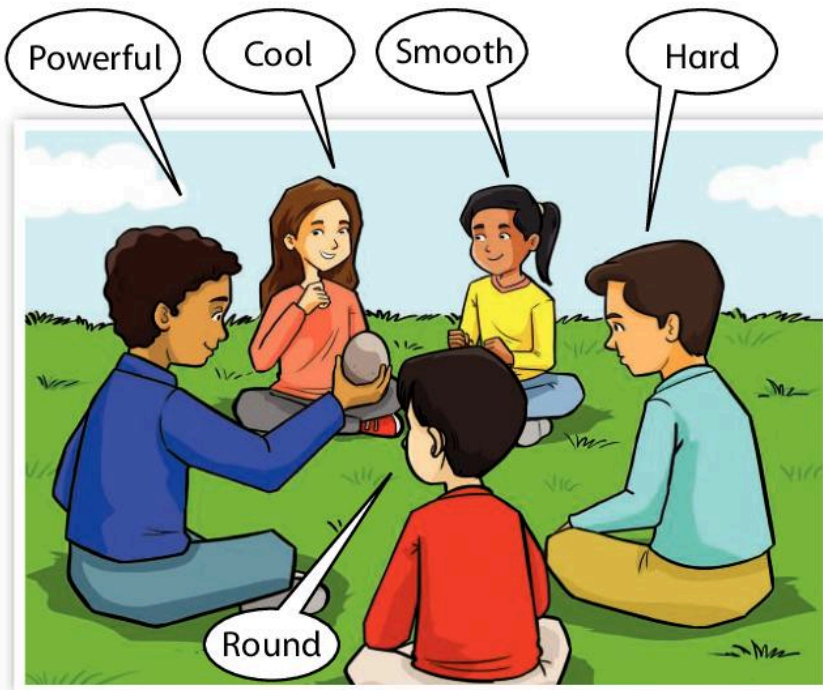What is your favourite story? Share the story with your classmates.

In this lesson

You will learn:

→ how to make up a story.

Use powerful words

The children are looking at a beautiful stone. The children are passing the stone around the circle. The children are each sharing one word that describes the stone.

The children used powerful words to describe the stone. You can use words like these in your story.

Plot

The plot is what happens in the story. What is the plot of your favourite story?

In this lesson you are going to make up a plot for your own story.

Draw a picture on a piece of paper.

Think of a character. It could be a boy, a girl, an animal, a machine, a plant, or anything else you like. Draw your character.

Think of a setting. Where does your story happen? Is it now, long ago, or the future? Is it in a city, mountains, or desert? Draw the setting.

Think of a problem for your character. Maybe a child has lost something important. Maybe an older person was lonely. Draw the problem.
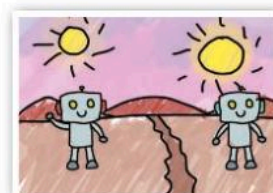
Think of a solution to the problem. Maybe the child's brother helped them find the lost thing. Maybe the older person found a friend. Draw the solution.
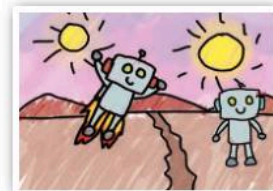
Extra challenge

Make a storyboard of your story. Draw boxes on plain paper. In each box draw the next thing that happens in your story.
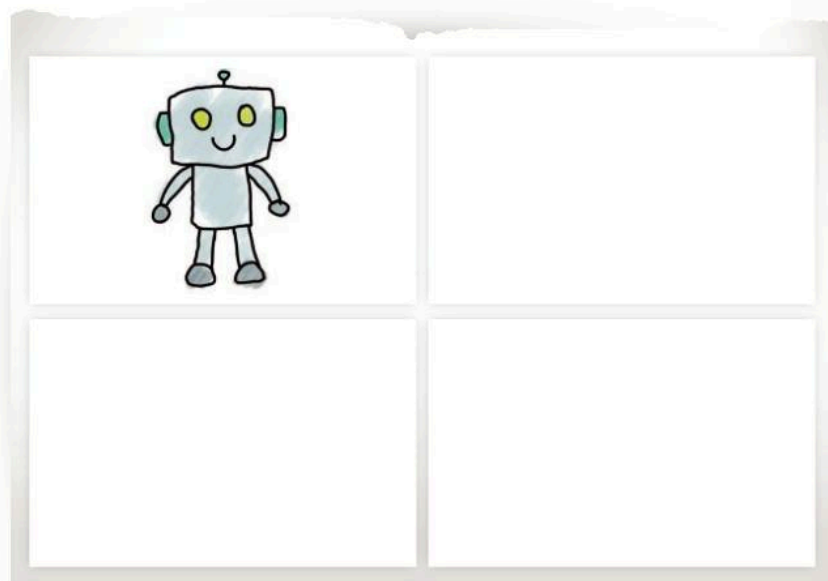
Think again
Write the title and first sentence of your story.

In this lesson

You will learn:

→ how to use software to make a slide show with text.

Digital stories

A digital story uses images, words and sometimes sounds to tell a story.

The story can be about anything you like.

In this lesson you will start a digital story using the plot you made up in the last lesson.

When you open a new slide show, or presentation, you will see the title slide.

This is the navigation panel. You can see all your slides. You can move your slides around.

Playing at the beach

By Anita
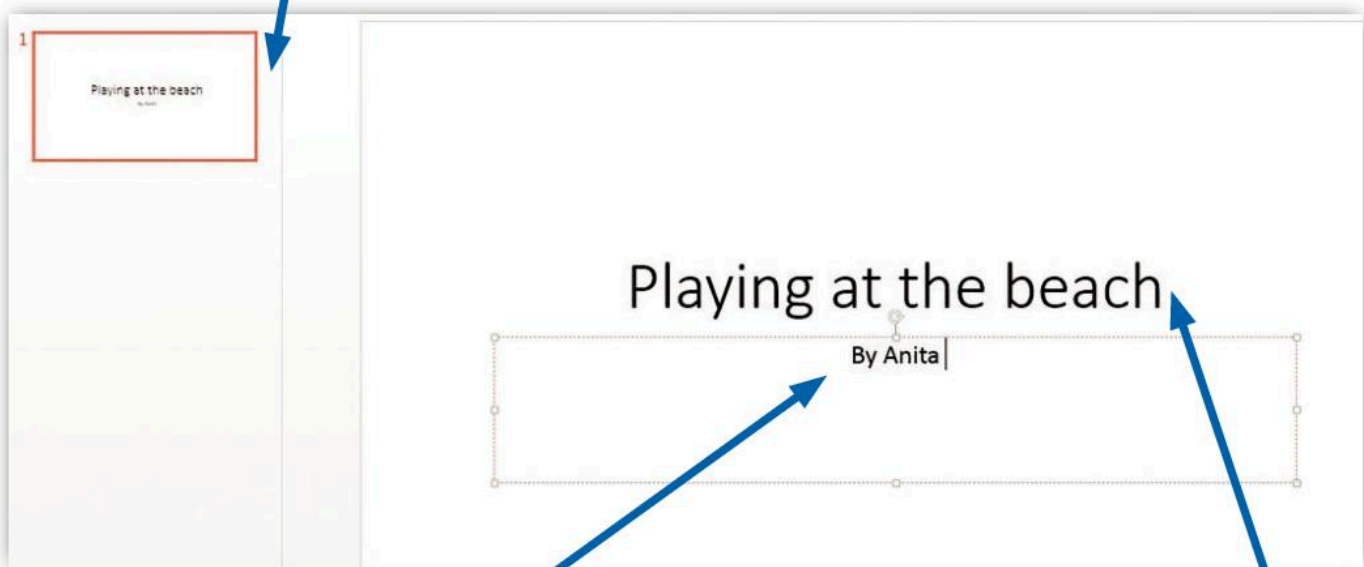
You are writing the story. You are the author of the story. Type your name here.

Type the story title here. The title is the name of the story.

Add a slide
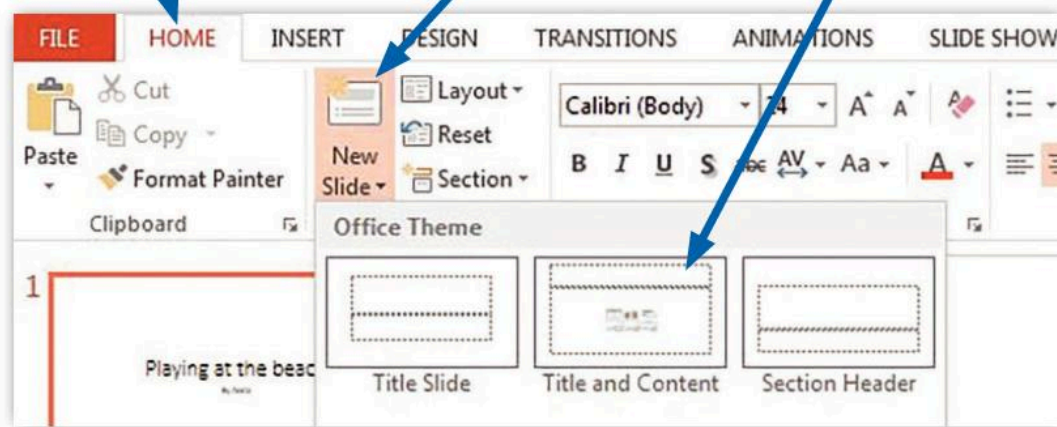
In your new slide, type the first sentence of your story.

Activity

Start a new slide show.

Make a title slide for your digital story.

Make the first slide of your digital story.

Save your slide show.

Explore more

Tell an adult at home the story you have made up. If you wish, you can ask for ideas to change the story. If you agree with their ideas, note them down.

Extra challenge

Change the font size, style or colour of your title slide. Click and drag the mouse over the words you want to change. The words are highlighted.

In this lesson

You will learn:

→ how to add an image to your slide show

→ how to add a text box to your slide show.

Add images and text

You can make your digital story more interesting. You can add **images**. You can add text.

You can **import** an image you have already saved on your computer. Images can be:

- a drawing you have made in another program
- a photograph you have saved
- a free image from the internet.

How to add an image

1 Click here to import an image from your computer.

2 Click here to find a free image on the internet.
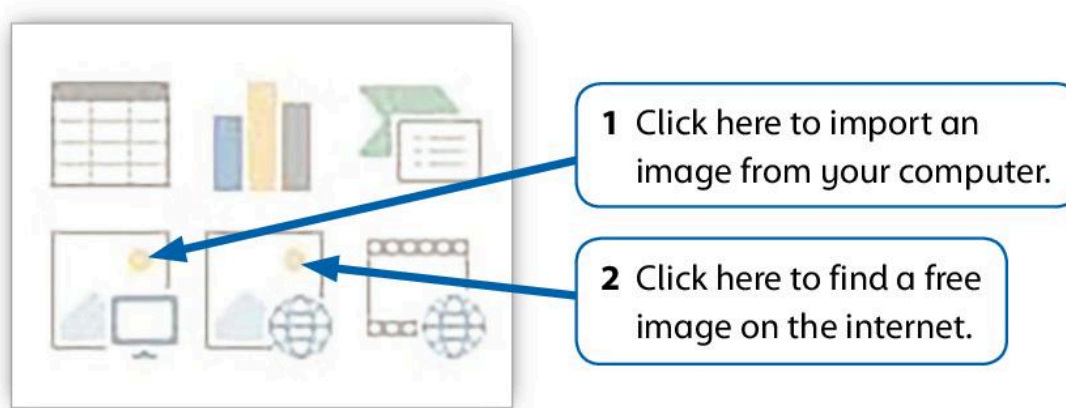
- Use the skills you learned last year to resize or move your image.
- You also learned to add a border to an image – do this if you wish.
- Remember to save your work.

Open your saved slide show.

Import an image.

Save your file.

Talk with a classmate about what happens when a slide has too many words or pictures.

Extra challenge

You can add other text to your slide using a **text box**. You can draw a text box and then write words in it.

rock pool. Anita saw many

A flowing fish.

Type here

An amazing anemone.
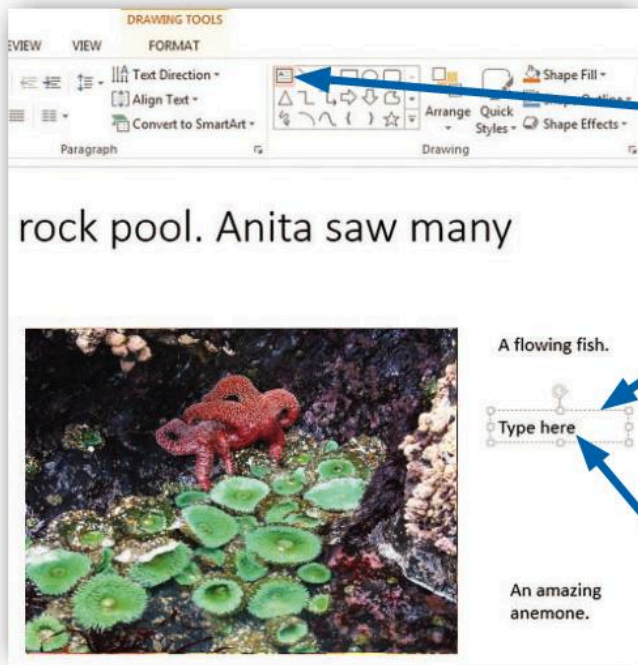
1 In the 'Drawing' section, click on the text box shape.

2 Click, hold and drag your mouse to make a text box.

3 Type into the text box.

Digital citizen of the future

When you search for an online image, you might see the words 'Creative Commons' in the search engine. Creative Commons means that the person who made the image is choosing to let other people use their work. It is still good to say or write who made the image when you use it.

In this lesson

You will learn:

→ how to correct a slide show.

Sometimes a slide show is not quite correct.

It might have some spelling mistakes.

It might have some grammar mistakes.

It might not look too good.

When you use computers to create a slide show, you can make changes quite easily. You can:

- delete words
- add new words
- change images
- change font, size or colour
- move things around on a slide.

Activity

Open the file named 'Exploring the desert'.

There are spelling mistakes.

There are lots of words on this slide. It might look better if it were split into two slides.

Exploring the dessert

- A desert is any place that gets 25cm or less watter every year.
- Some deserts are veri hot. The Sahara Desert reaches 50 degrees Celcius.
- Somme deserts are very cold. The Gobi Desert can be -45 degrees Celcius in the winter.

- To survive in the desert you need:
  - Special clothing
  - Shelter
  - Access to water. You can carry water with you, or use irrigation canals.

This image is of a dessert, not a desert.

Correct the spelling mistakes.

Delete the image of the dessert. Replace it with a free image of a desert you find on the internet.

Change the font, colour or size of the title. You can choose any font, colour or size you like.

Extra challenge

The slide 'Exploring the desert' has lots of words on it.

Add a new slide.

Cut and paste some of the text onto the second slide.

Add a new image for the second slide.

Move things around in the first slide so that the words and picture look good on the screen.

Think again Why is it easier to correct a presentation on a computer than on paper?

In this lesson

You will learn:

→ how to add animations to a slide show.

You can make your digital story more exciting by adding movement to the text and images.

Each movement is called an **animation**.

You can use animations to make text or images appear or disappear on a slide.

What happens next in the story?

1 Click on the 'Animations' tab.

2 Click the edge of the image or the text you want to animate. The number is the order that the animation happens.

3 Choose the type of animation you want.

The sky grew dark with clouds. Thunder rumbled. A storm came.

4 Choose if you want the animation to appear when you click on the mouse.

Anita found shelter. Anita drank a hot chocolate.
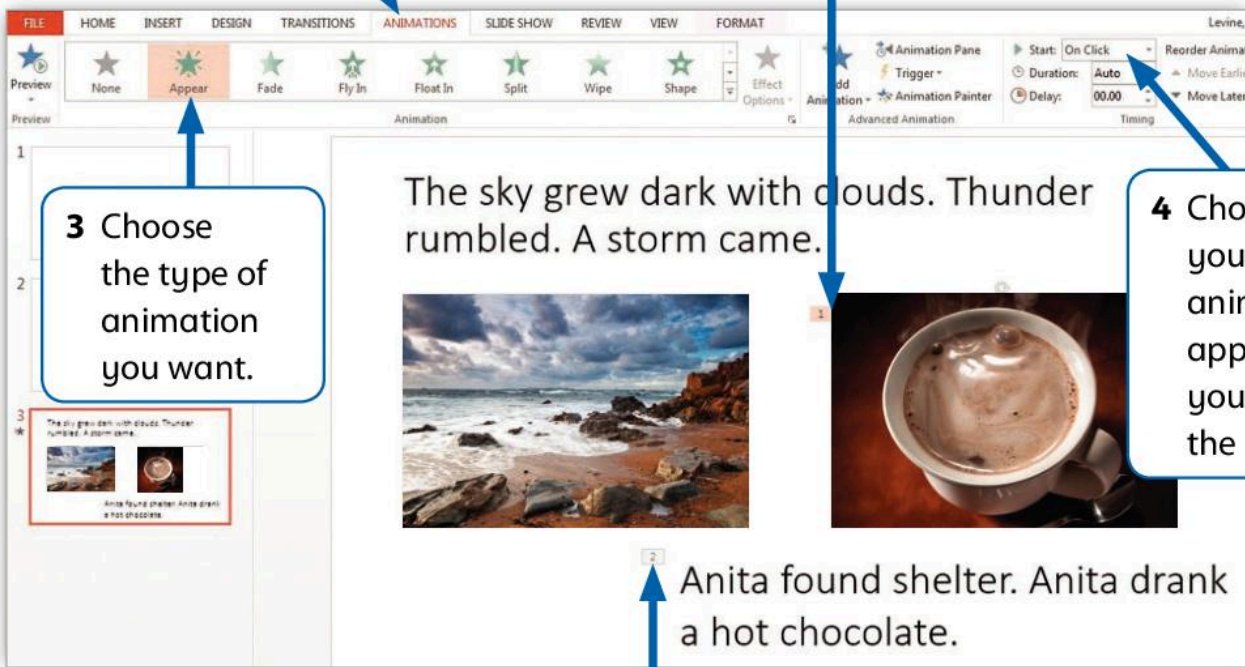
5 You can choose a different type of animation for another part of the slide.

You can see what your story looks like with animation by clicking on the 'Preview' tool.

Preview
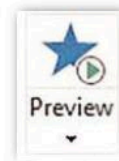
Activity

Open your digital story.

Add at least one more slide. Use animation to make an image appear.

Save your file.

Be creative

Finish your story. What do you really like about what you have made?

Think again

When is it useful to use animation in a slide show? When is it not useful to use animation in a slide show?

In this lesson

You will learn:

➜ how to improve the way a slide show with text and images looks.

Themes

A **theme** makes a slide look more colourful. A theme is a slide with colours, fonts and effects that are already there when you open the slide.

This is the same slide with different themes. Spot the difference between the themes.
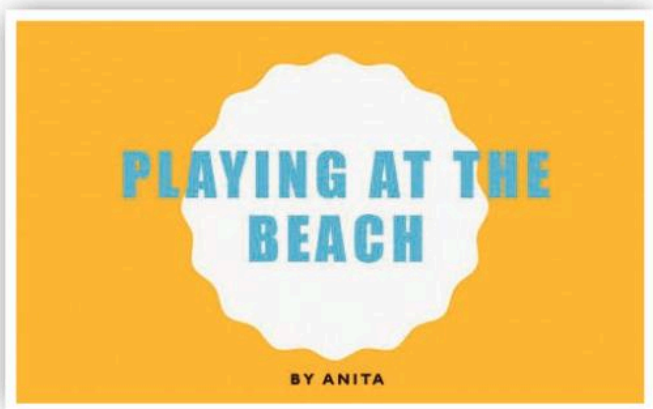
How to change the theme

1 Click on the 'Design' tab.

2 Click on a theme.

3 These are variants. They are the same theme with different colours. Click on a variant.

Activity

Open your digital story file.

Add a theme to your story.

Save your file.

Think again What is the mood of your story? Does the theme you have chosen match the mood of your story?

Extra challenge

Show your digital story to a classmate. Ask your classmate to tell you two things they like about your story, and one thing they think you could improve.

You have learned

➔ how to use software to make a slide show with text and images

➔ how to improve the way a slide show with text and images looks

➔ how to correct a slide show

➔ how to add animations to a slide show.

Test

1 What software application can you use to make a presentation?

2 Which icon would you click to add a text box to a presentation?

a $\underline{A}$ ∨   b ☰ ∨   c 🖌   d A

3 Here is a presentation slide.

Once there was a queen who ruled over a rich and happy kingdom. The queen's favourite place in her palace was her garden. In the queen's garden there were many beautiful flowers, sweet-singing birds, and strange fruit trees. The queen would sit underneath her favourite trees, and meet with her people. They would talk about problems the people had, and together they would try to find solutions to the problems.

Explain one way that you can improve the appearance of this presentation slide.

4 Draw a picture of how you would design a slide with the same information.

Activities

What is your favourite food? Now you will make a short slide show about it.

My favourite ice cream is chocolate
- Ice cream is made of milk and sugar
- There are lots of different flavours

1   Open your presentation software. Add a title slide with the name of the food as the title. Add your name below it.

2   Add another slide with more facts about the food. For example, you could say the ingredients.

3   Look through your slide show. Find and fix any spelling mistakes.

4   Add an image to the slide show.

5   This slide show is for small children. Make sure the letters are big and easy to read.

6   Choose a suitable theme for your slide show.

Self-evaluation

- I answered test questions 1 and 2.
- I completed activities 1 and 2. I started a slide show and added text.
- I answered test questions 1–3.
- I completed activities 1–4. I fixed errors and added an image to the slide show.
- I answered all the test questions.
- I completed all the activities.

Re-read any parts of the unit you feel unsure about. Try the test and activities again – can you do more this time?

6 Numbers and data: Sunflowers

You will learn

➔ how to put values and labels into a spreadsheet

➔ how to do calculations with spreadsheet formulas

➔ how to draw charts to show values in a visual way.

In this unit you will make a spreadsheet. It will record the height of sunflowers growing in a school garden. You could grow your own sunflowers and measure them. If not, you can use the numbers shown in the unit.

Did you know?

Scientists study plant growth so they can develop new crops. Better crops mean more food for the people of the world.

Learning outcome: Use software to enter number data and make calculations

formula   cell reference
chart   line chart
copy down

Make measurements and record the results. Here are two suggestions.

- Grow sunflowers from seeds. It will take at least 2–4 weeks for the first shoots to appear. Once the sunflowers have started to grow, you can measure them every day.

- Weigh or measure any growing thing. It can be a plant or an animal.

Talk about...

A **chart** is a way to show number information in a visual way. A chart can also be called a graph. Make a class collection of charts from school books, magazines or the internet.

- What information is shown in the charts?

- What features make charts easy to understand?

- Which charts do you like best?
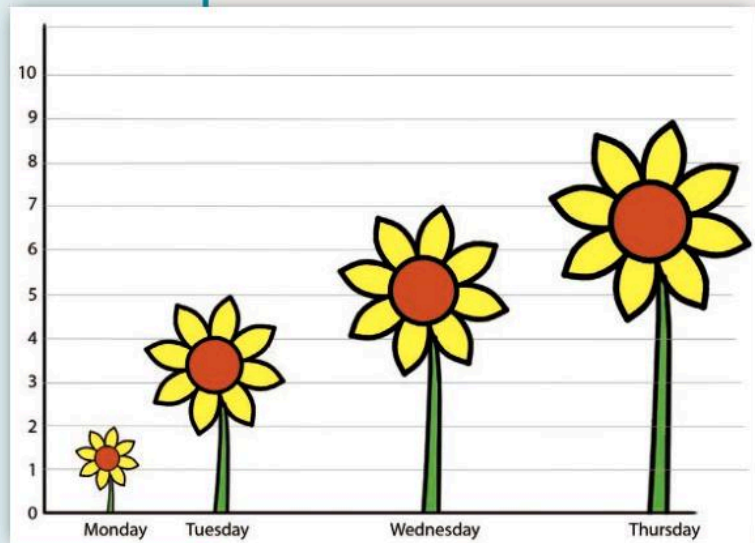
In this lesson

You will learn:

→ how to make a spreadsheet by entering text and numbers.

Sunflowers

Students at City Park School grew sunflowers. They measured the sunflower shoots every day. They recorded the measurements in a spreadsheet.

What is a spreadsheet?

A spreadsheet is a grid of columns and rows. The rows are numbered. The columns have letters.

Where a column crosses a row it makes a cell. The name of a cell is made of the column letter and the row number. This is called the **cell reference**.

You use spreadsheets to store information:

- number **values**
- labels which tell us what the number values mean.

You will make a spreadsheet which records the growth of a plant.

Add data to a spreadsheet

Select a cell by clicking on it. Add a title.

Cell A1 is selected.

	A	B
1	Growing sunflowers	
2		

Type the title 'Growing sunflowers' and press 'Enter'.

The students measured the sunflower every day.

● Labels show the day when the plant was measured.

● Number values show the height of the plant in centimetres.

Here is the spreadsheet with labels and numbers.

	A	B	C	D	E
1	Growing sunflowers				
2		Monday	Tuesday	Wednesday	Thursday
3	Plant 1	2	5	7	9
4					

Activity

Create a spreadsheet which looks like the example shown on this page.

You can use the data on this page to make your spreadsheet.

If you have grown a sunflower yourself, you can use your own measurements.

Extra challenge

You have learned how to format text. For example, you have learned how to make the text bigger. Use these skills now. Make the text of the spreadsheet title big and bold. You can change the colour too if you like.

Think again The values are in centimetres. Give the name of a cell where you can put this fact.

In this lesson

You will learn:

→ how to make a chart of spreadsheet data.

Showing growth

The students at City Park School wanted to show how their sunflowers had grown. They decided to make a chart. A chart shows number data in visual form.

It is easy to make charts from spreadsheet data.
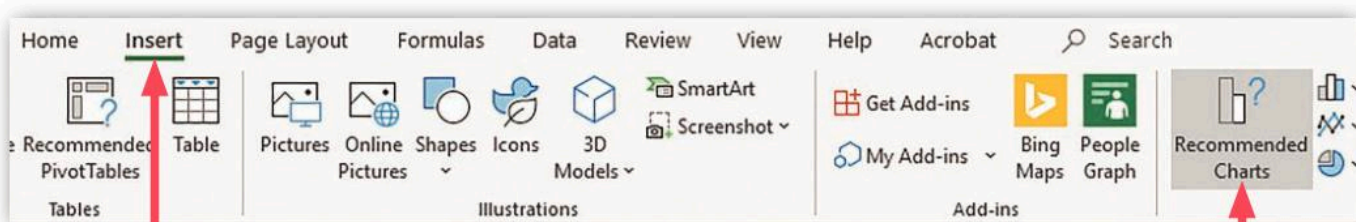
What is a line chart?

A **line chart** shows values changing over time. Where the line is low, the value is low. Where the line is high, the value is high. Your line chart will show the height of the sunflower. It will show how it changes.

Make the chart

A chart is made of values. Choose the cells with values. Drag the mouse over the cells.

	A	B	C	D	E
1	Growing sunflowers				
2		Monday	Tuesday	Wednesday	Thursday
3	Plant 1	2	5	7	9
4					

The tabs at the top of the window let you do different actions.

Home	Insert	Page Layout	Formulas	Data	Review	View	Help	Acrobat	🔍 Search

Recommended PivotTables · Table · Pictures · Online Pictures · Shapes · Icons · 3D Models · SmartArt · Screenshot · Get Add-ins · My Add-ins · Bing Maps · People Graph · Recommended Charts

Tables   Illustrations   Add-ins

1 Click on the 'Insert' tab.

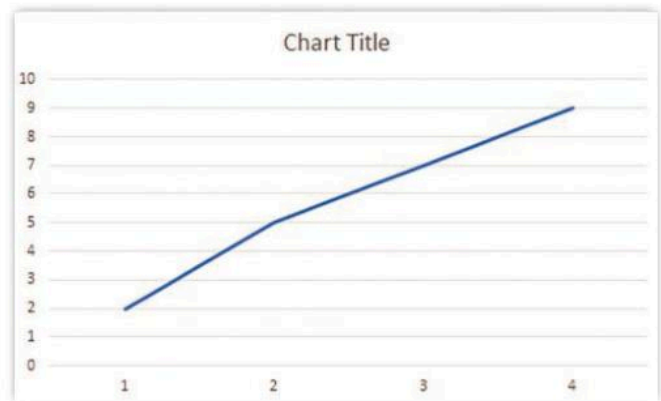**2** Click on 'Recommended Charts'.

A chart window opens. There are many different chart types. You will explore these in later lessons.

1 Click on the 'Line' chart.

2 Click on 'OK'.
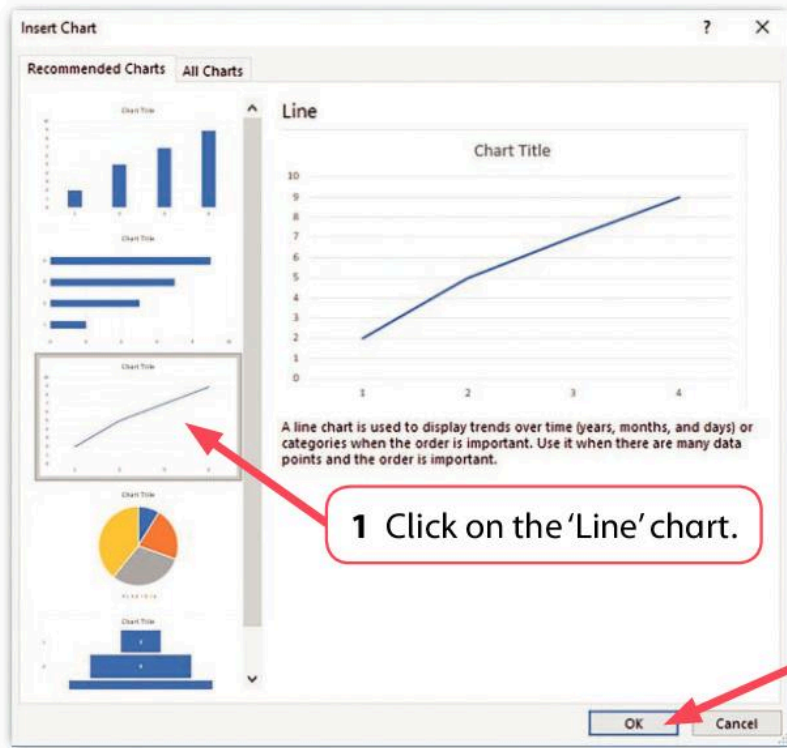
The finished chart

The software makes this chart. In the next lesson you will improve the chart.

Activity

Make a line chart of your sunflower data.

Extra challenge

Make changes to the numbers in the spreadsheet. What happens to the chart?

Think again

Next lesson you will add labels to the chart. Suggest one label you can add to the chart.

Be creative

Make a drawing to show the sunflower growing bigger day by day.

In this lesson

You will learn:

→ how to make a chart more useful

→ how to change the style of a chart.

Explaining the chart

The students at City Park School wanted to share the charts they made. They decided to show the charts to their families on Parents Day. But they were not sure that the charts were easy to understand. In this lesson you will make changes to the charts so that they are easier to understand.

Select values and labels

Last lesson you selected the values to make the line chart. Now try again, but this time select the labels too.

|	A	B	C	D	E
1	Growing sunflowers				
2		Monday	Tuesday	Wednesday	Thursday
3	Plant 1	2	5	7	9

Do exactly the same as you did last lesson. Open the 'Insert' tab and click on 'Recommended Charts'. The line chart looks like this.
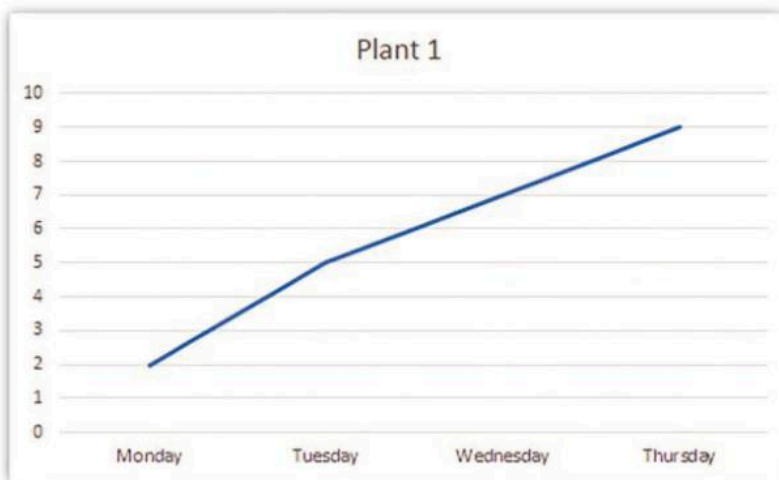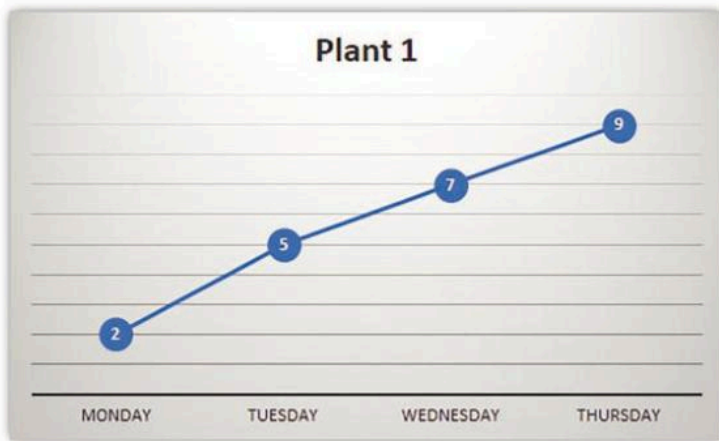
Now the chart has values and labels. It is more useful. You can tell what the chart is about just by looking at it.

Change the design

Click on the chart and open the 'Chart design' tab at the top of the screen. You can choose different styles and colours.
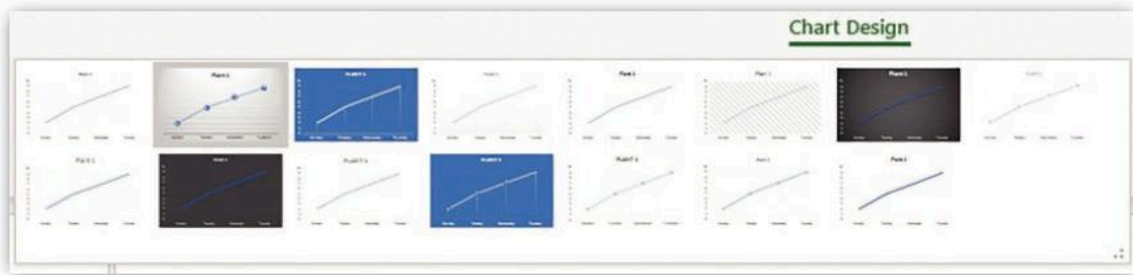
You can make your chart look different by using one click. Here is one example – choose the design you like best.

Activity

Improve your chart by including labels.

Extra challenge

Change the colour and design of your chart.

Explore more

Print out the chart you made.

- Make a classroom display of your charts.

- Take the chart home and show it to a grown-up. Ask them to say what they can see in the chart. Do they understand what it shows?

In this lesson

You will learn:

➔ how to use spreadsheet formulas to calculate useful information.

How much growth?

The students at City Park School wanted to know how much the sunflower had grown from Monday to Friday. The answer is:

How high it is on Friday

MINUS

How high it was on Monday

Now you will make a **formula** to work out the answer. A formula is an instruction. It tells the spreadsheet to work out a result. It uses operators. You learned about operators in programming.

Add labels

You must always use labels to explain the values in a spreadsheet. The spreadsheet shows the days from Monday to Thursday. Add a new label 'Friday'. Type a new number under that label. Now you have growth data for the whole week.

● You will calculate the total growth for the week. Put the word 'Growth' at the end of the row. That is cell G2.

● Select cell G3. That is where the formula will go.

	A	B	C	D	E	F	G
1	Growing sunflowers						
2		Monday	Tuesday	Wednesday	Thursday	Friday	Growth
3	Plant 1	2	5	7	9	12	
4							
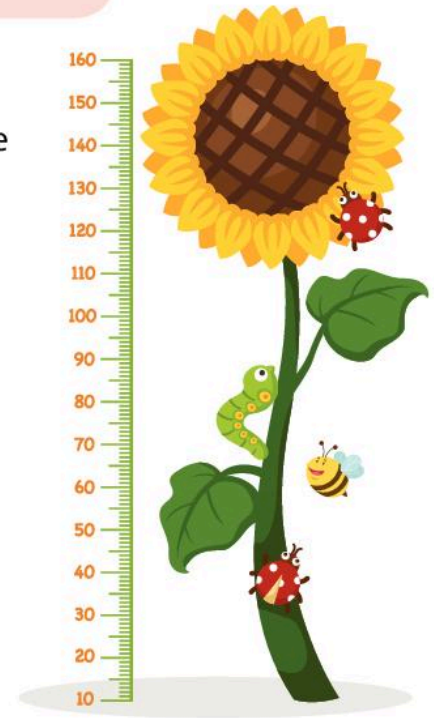
Make the formula

Look at the top of the last page to see the formula that you need. Follow these steps to make the formula:

1 Type the equals sign. Every formula begins with an equals sign.

2 Click on the value for Friday.

3 Type the minus operator (a dash).

4 Click on the value for Monday.

The formula looks like this.

	A	B	C	D	E	F	G
1	Growing sunflowers						
2		Monday	Tuesday	Wednesday	Thursday	Friday	Growth
3	Plant 1	2	5	7	9	12	=F3-B3
4							

Press 'Enter' and the computer will work out the result. The answer you see will depend on the value you entered for Friday.

Cell references

By clicking on cells you made a formula that looks like this:

=F3-B3

F3 and B3 are cell references. By clicking on a cell you put the cell reference into the formula. When the computer sees the cell reference it uses the value stored in that cell.

Activity

Extend the spreadsheet as shown on this page. Use a formula to work out how much the plant has grown. Change a number in the spreadsheet and see how the result in the final column changes.

Extra challenge

In real life you would grow more than one plant. Extend the spreadsheet by adding further rows. Can you make a graph to show the growth of more than one plant?

Think again What is the advantage of using a formula instead of working out the result in your head?

In this lesson

You will learn:

→ how to extend a spreadsheet to show more information.

Another plant

The students at City Park School grew more than one plant. They measured each plant. They wanted to compare the different plants. They extended the spreadsheet to show one more plant. Then they extended it to show lots of plants.

Make a new row

Spreadsheets are made of rows and columns.

- **Columns** hold different items of data (such as height on Monday, Tuesday, Wednesday and so on).

- **Rows** hold all the data about a single item (such as plant 1).

You will add the data about plant 2. You will use row 4 of the spreadsheet. Add labels and values so the row looks like this. You can use any values you like.

	A	B	C	D	E	F	G
1	Growing sunflowers						
2		Monday	Tuesday	Wednesday	Thursday	Friday	Growth
3	Plant 1	2	5	7	9	12	10
4	Plant 2	4	5	8	9	11	

Copy the formula

Now you need a formula to calculate growth from Monday to Friday. You could make the formula again, just like you did for plant 1. But there is a quicker way. You can copy the formula to the next row. The name for this is **copy down**.

The formula you want to copy is in cell G3.

F	G
day	Growth
12	10
11	+

1 Move the pointer to the lower right corner of the cell – it will change to look like a cross.

2 Hold the mouse button down and drag the pointer to the cell below (cell G4).

The new formula

You should see the result for plant 2. The exact values will depend on the numbers you chose earlier.

	A	B	C	D	E	F	G
1	Growing sunflowers						
2		Monday	Tuesday	Wednesday	Thursday	Friday	Growth
3	Plant 1	2	5	7	9	12	10
4	Plant 2	4	5	8	9	11	7

Click on cell G4 to see the new formula. It looks like this:

=F4-B4

Compare it to the formula in cell G3:

=F3-B3

The cell references have changed. Because the cell references have changed, the formula gives the right answer for plant 2.

Activity

Make the spreadsheet shown on this page, with results for plant 1 and plant 2.

Extra challenge

Extend the spreadsheet to show five more plants. Copy the formula down to all rows. If you have time, make a graph to show the growth of all the plants.

Think again What is the advantage of copying a formula instead of typing it again?

In this lesson

You will learn:

→ how to understand the values in a spreadsheet

→ how to show values in a way that makes sense.

Showing the values

The students at City Park School wanted to show the sunflower data in a way that made sense.

They made charts. But some of the charts were wrong. In this lesson you will see how a chart can go wrong.

Extend the spreadsheet

Make the spreadsheet bigger, by adding three more plants. Make up values. Use 'copy down' to calculate the growth for each plant.

Pie charts

Some students made pie charts. This pie chart shows the results for plant 1.

This chart does not make sense. A pie chart shows how a whole is divided into parts. But the heights of the plant each day are not parts. The pie chart does not help us to see how the plant has grown.

Plant 1

■ Monday   ■ Tuesday
■ Wednesday ■ Thursday
■ Friday
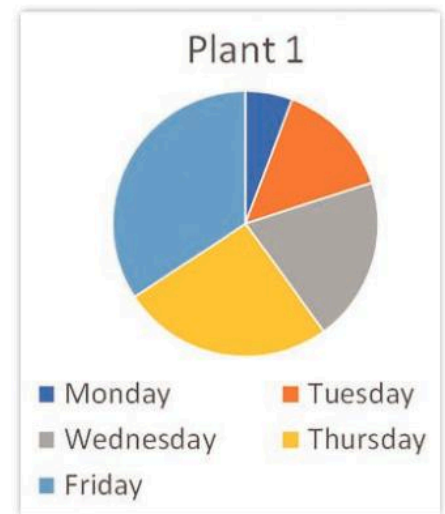
Line charts

Some students made line charts. This line chart shows the results for all five plants.

This chart is better, but it has a mistake. A line chart shows how something changes over time. The final value is the total growth. It is not the same measurement as the other values. It should not be included in the chart.

Sunflowers

—Plant 1 —Plant 2 —Plant 3 —Plant 4 —Plant 5
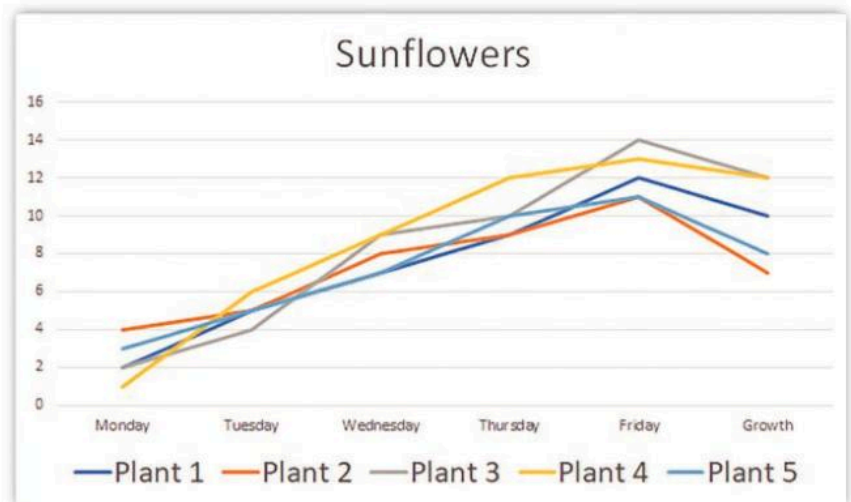
Make a line chart of the plant data. Only include the day-by-day results.

Click on 'Chart Title' and type a suitable name.

Bar charts

Some students wanted to compare the total growth for each plant. They decided to make a bar chart. A bar chart is a good way to compare single values for different items. The height of the bar shows how big the value is.

You need to select a single value for each plant. Select the plant names. Then hold down the 'Control' key. Select the growth data.

	A	B	C	D	E	F	G
1	Growing sunflowers						
2		Monday	Tuesday	Wednesday	Thursday	Friday	Growth
3	Plant 1	2	5	7	9	12	10
4	Plant 2	4	5	8	9	11	7
5	Plant 3	2	4	9	10	14	12
6	Plant 4	1	6	9	12	13	12
7	Plant 5	3	5	7	10	11	8

Turn this data into a bar chart using the methods you have learned. Choose a design and add a suitable title.

Sunflower growth in 5 days (cm)

Extra challenge

Make a bar chart to compare the growth of each plant.

Think again

A pie chart shows how a whole is divided into parts. Think of a good use for a pie chart. It does not need to be on the topic of sunflowers.

Digital citizen of the future

Charts are used to show data. Accurate charts are very helpful. They let you see the facts at a glance. But be careful – some charts are misleading. Learn to read and understand charts, so you know whether they make sense.

You have learned

➔ how to put values and labels into a spreadsheet

➔ how to do calculations with spreadsheet formulas

➔ how to draw charts to show values in a visual way.

Test

Fahim worked in a shelter for homeless cats. Some kittens were born in the shelter. Fahim weighed the kittens every week. He recorded their weights in a spreadsheet.

	A	B	C	D	E	F
1	Weight of kittens in grams					
2		Week 1	Week 2	Week 3	Week 4	
3	Fluffy	150	226	283	340	
4	Ginger	280	370	450	580	
5	Patch	200	310	380	420	

1. Fahim wanted to add a new week of data. Where will he put the label 'Week 5'?

2. In week 5, Fluffy weighed 400 grams. Give the cell reference where you will enter this data.

3. Give the formula to calculate the total weight gain for Fluffy from week 1 to week 5.

4. Fahim wanted to see the weight gain for every kitten. What could Fahim do instead of typing the formula again?

5. What type of chart can you use to compare the weight gain of each kitten? Explain your answer.

Activities

Fahim made a spreadsheet to show all the kittens that lived in the shelter. The kittens are grouped by colour and by whether they are boy or girl kittens.

	A	B	C
1	Our kittens		
2		Boys	Girls
3	Black	2	4
4	Tabby	5	4
5	Ginger	4	0
6	Other	7	8

1 Make the spreadsheet to show this data.

2 Calculate the total number of kittens of each colour by adding the number of boys and the number of girls.

3 Make a graph to show the number of kittens of each colour.

Self-evaluation

- I answered test questions 1 and 2.

- I completed activity 1. I made a spreadsheet by typing words and numbers.

- I answered test questions 1–4.

- I completed activities 1 and 2. I added formulas to the spreadsheet and found the total number of kittens of each colour.

- I answered all the test questions.

- I completed all the activities. I made a graph to show the number of kittens of each colour.

Re-read any parts of the unit you feel unsure about. Try the test and activities again – can you do more this time?

Glossary

angle the shape formed where two lines meet to make a corner. For example, the corners of a square or triangle are angles . The size of an angle is measured using degrees
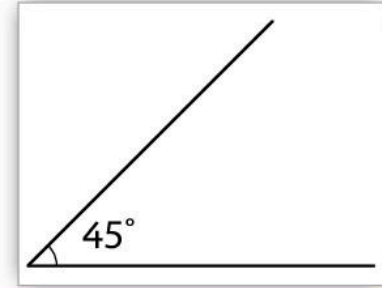
animation a way of making the text or pictures on your slides move

attachment an additional file that is sent with an email, for example, a picture or a document

cell reference the name of a spreadsheet cell. Made of column letter and row number (for example, B3)

chart a graph used to show values in a visual way

copy down copy a spreadsheet formula down to the rows below. The cell references will change so you get the right result

degrees used to measure the size of an angle or turn. A right angle (the corner of a square) is 90 degrees. It can be written as 90°

digital made out of numbers. Everything inside a computer is digital

digital device any device that has a computer in it

divide, division separating something into parts. The sign '÷' means divide. The sign '/' means divide in a spreadsheet

domain a place like a school or business, or an email provider

email written message that is shared electronically – short for 'electronic mail'

email address tells the computer which email box the message needs to go to

email client a program or an app that sends and receives emails with the server

equals 'the same as'. The sign '=' means equals

erase to rub out or wipe out

error a mistake in a program. If a program has errors, it might not run, or it might do the wrong thing

fixed value a value in a program that does not change. For example, the number might be written on one of the blocks of the program

formula instructions for a spreadsheet to calculate a value

	A	B	C	D	E	F	G
1	Growing sunflowers						
2		Monday	Tuesday	Wednesday	Thursday	Friday	Growth
3	Plant 1	2	5	7	9	12	=F3-B3
4							

hand-held device that is small enough to hold and use in your hand

image a picture

import to add text or pictures from another place on the internet, a camera or your computer to a file such as a presentation

inbox an electronic folder in your email where your new emails arrive

input information and signals that go into a program, for example, typed by the user.

input device device that sends information and instructions to the processor

line chart a chart that uses a line to show the change in something over time

Plant 1
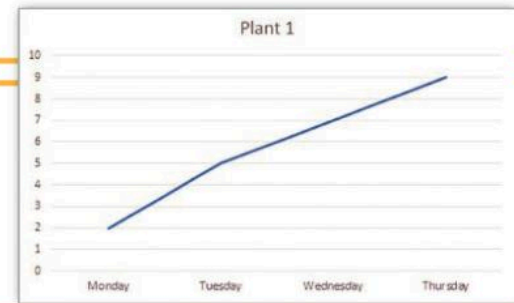
load to bring a file from storage. After a file has been loaded the computer can run the file

loop a program structure. The commands inside the loop will repeat

mobile device a hand-held device you can carry and use anywhere

operator a symbol or word that transforms inputs to make outputs. For example, the plus sign is an operator that adds two numbers together

output information and signals that come out of a program. The output may be seen or heard by the user. The information can be pictures, sounds, words or numbers

output device device that gets information from the processor and turns it into output

pharming tricking people by using a fake website

phishing emails that try to get personal information about you

plan sets out the commands of a program. The programmer makes a plan before they make the program

processing changing inputs into outputs

processor an electronic device inside a computer. The processor controls all the other parts of the computer using electrical signals

program a series of commands telling the computer what to do

programmer a person who writes programs

prompt a message to the user telling them what input to provide

requirement a statement of what output a program must produce. You should be clear about the program requirement before you write the program

run when you run a program, the computer carries out the commands in the program

slide a page in a slide show

slide show a way of sharing a set of ideas, text and images with other people

smartphone a mobile phone with a computer inside

software a general term for programs. When you buy software, you buy a program that someone has made

spam a message you haven't asked for and isn't important to you. Spam often tries to sell you something or to cause problems on your computer

tablet computer a mobile device which is larger than a smartphone

text box a box you can draw that you can type words into
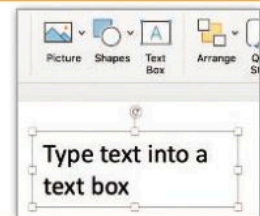
theme colours, fonts and effects that are set in advance, for example, when you make a presentation

touchscreen a screen that detects when you touch it. It is used for input and output

user the person who uses a program. They enter the input and see the output

value a number used in a computer file such as a program or spreadsheet

variable value a value in a program that can change. For example, the number may be an input from the user

OXFORD
UNIVERSITY PRESS

Oxford International Primary

Computing 3

Student Book

This **new edition of** *Oxford International Primary Computing* has been designed to teach students the vital computing skills they need for today's digital world. Across the six levels, students grow into digital citizens who have the confidence to apply their knowledge and skills in real life situations.

- **More project-based work** better promotes **active learning**, encouraging every student to participate in lessons
- The new **spiral approach to learning** sees students revisiting key concepts to build their digital literacy skills
- New in-built, **three-level differentiation** allows teachers to cater to the needs of every student
- A new focus on **computational thinking** prepares students for the demands of the rapidly evolving digital landscape
- New enhanced Teacher Guides make the course content even more **accessible for all teachers**, whether a computing specialist or not

Also available:

9780198497790   9780198497806   9780198497820   9780198497837   9780198497844   9781382007450   9781382007467

Leading on to:

9780198497851   9780198497868   9780198497875   9781382007474