

# INSPIRE COMPUTING

International

Student Book

YEAR 7

# **INSPIRE** **COMPUTING**

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Student Book

**YEAR 7**

**Paul Clowrey**



Pearson

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# Overview contents

Detailed contents	iv
About the Student Book	vi
Unit 1: Safe practice	2
Unit 2: Responsible practice	26
Unit 3: Connectivity and the internet	52
Unit 4: Internet protocol and binary	76
Unit 5: Programming Part 1	98
Unit 6: Programming Part 2	124
Glossary	148

# Detailed contents

## Unit 1: Safe practice

1 The internet and the world wide web.....	4
2 Presentation-based projects.....	6
3 Creating a storyboard for a presentation.....	8
4 Internet research .....	10
5 Building a presentation .....	12
Mid-unit assessment .....	14
6 Presentation interactivity.....	16
7 The importance of passwords.....	18
8 Evaluating a presentation.....	20
9 & 10 Adapting a presentation for a new audience.....	22
End-of-unit assessment.....	24

## Unit 2: Responsible practice

1 Copyright.....	28
2 Legal and illegal use of content.....	30
3 Working safely in the cloud.....	32
4 Researching a newsletter .....	34
5 Planning a group project .....	36
Mid-unit assessment.....	38

6 Document layout.....	40
7 Document page design .....	42
8 Combining text and graphics.....	44
9 Reviewing and proofreading documents.....	46
10 Distributing digital documents.....	48
End-of-unit assessment.....	50

## Unit 3: Connectivity and the internet

1 Wired and wireless networks.....	54
2 Mobile internet access .....	56
3 Wired connections.....	58
4 Satellite communication .....	60
5 Internet bandwidth .....	62
Mid-unit assessment.....	64
6 Comparing web browsers.....	66
7 Comparing search engines .....	68
8 Internet filtering and censorship .....	70
9 & 10 Creating well-presented documents.....	72
End-of-unit assessment.....	74

## Unit 4: Internet protocol and binary

1 Binary representation.....	78
2 Binary computing.....	80
3 Converting from binary to denary.....	82
4 Converting from denary to binary.....	84
5 & 6 ASCII and Unicode .....	86
Mid-unit assessment .....	88
7 IP addresses.....	90
8 Data packets .....	92
9 & 10 Network speeds .....	94
End-of-unit assessment.....	96

## Unit 5: Programming Part 1

1 An introduction to programming.....	100
2 Sorting algorithms .....	102
3 Using operators.....	104
4 BIDMAS .....	106
5 Relational operators.....	108
Mid-unit assessment .....	110
6 Using variables .....	112
7 Sequence, selection and iteration .....	114

8 Modelling and simulations.....	116
9 Error checking .....	118
10 Subprograms.....	120
End-of-unit assessment.....	122

## Unit 6: Programming Part 2

1 Integrated development environments.....	126
2 Trace tables .....	128
3 Data types and converting data.....	130
4 String methods.....	132
5 Escape characters and string slicing....	134
Mid-unit assessment .....	136
6 & 7 String concatenation .....	138
8 Efficient programming.....	140
9 Everyday problems.....	142
10 Creating simple graphics using coding.....	144
End-of-unit assessment.....	146

Glossary.....	148
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# Welcome to Inspire Computing

Whether for school, fun, work or staying in touch with relatives around the world digital technology is all around us.

Through coverage of ICT and Computer Science you will discover how this amazing technology works, how it connects the world together and it has revolutionised the classroom, workplace, and home.

## Related topics

Other topics linked to the subject that can also be explored.

## Real-world examples

How the learning applies to the world outside the classroom.

**Sorting algorithms**

**Related topics**

- Understanding and using variables
- Real-world systems

**Key words**

- ascending
- descending
- list
- numerical
- program
- sort
- string

**Learning objectives**

- Understand the purpose of a sorting algorithm.
- Create, run and edit a simple sorting program.

**A simple sort**

A sorting algorithm orders a list of values into the order required. Most sorts are numerical or alphabetical. Here are two examples of sorts.

Numerical sort	Alphabetical sort
Original values: 3,6,4,9,1,3	Original values: L,O,Z,I,U,P,A
Sorted into ascending order: 1,2,3,4,6,9	Sorted into ascending order: A,D,E,P,I,Z
Sorted into descending order: 9,6,4,3,2,1	Sorted into descending order: Z,U,P,E,D,A

**Real-world examples**

Sorting algorithms are used for:

- high score tables in a computer or smartphone game
- the songs in your playlist
- the contacts in your smartphone
- sales of items in a shop, sorted by price or product.

**A sorting program**

This program demonstrates how to create a simple alphabetical sort using Python. The `sort()` command is applied to the characters stored in the `letters` list.

```
letters = ['B', 'T', 'S', 'M', 'W', 'A', 'C']
letters.sort()
print(letters)
```

You can create a numerical sort in the same way:

```
numbers = [54,5,98,145,68]
numbers.sort()
print(numbers)
```

## Key words

These are important words to know!

## Learning objectives

This is what you will know or be able to do by the end of the lesson.

## Further investigation

Take your learning from the lesson further!

**Real-world examples**

Over 100 years ago, programs for the first digital computers were written using punched cards or paper tape. A hole represented 1 and no hole represented 0.

**Binary place value tables**

A place value table allows a decimal number to be converted to its binary equivalent. When converting computer data, decimal numbers are referred to as **denary** numbers. You will learn more about converting between denary and binary numbers later in this unit (see pages 88-91).

This is a 4-bit place value table, which means it can show numbers with four binary digits. The highest denary number a 4-bit binary sequence can represent is 15.

Denary number	8	4	2	1
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

When a computer represents 4-bit data, each number is created by turning on (1) or off (0) the binary switch that represents each of the values 8, 4, 2 and 1. Look at these two examples of equivalent binary and denary numbers:

Binary: 0011  
Denary:  $0 \times 8 + 0 \times 4 + 2 + 1 = 3$

Binary: 1011  
Denary:  $8 + 0 + 2 + 1 = 11$

**Further investigation**

- Experiment with creating your own image grids like the ones shown in this lesson.
- Investigate the meaning of the term 'denary'.

**Success criteria**

- I can explain how computers use binary numbers.
- I am able to create simple 1-bit binary graphics.
- I can use a 4-bit binary place value table.

## Success criteria

What has been understood from the lesson.

We hope you will find this book useful in developing your knowledge of digital technology, its effective use of applications and in supporting future learning.

Each topic includes easy to understand theory, real-world examples, and ideas for further investigation. You can also test your knowledge of keywords and regular exam-quality questions with supported answers. A checkpoint at the end of each lesson is a quick and easy way to check your own understanding.

### Assessment pages

Example of exam question and answer midway and end of unit to help with exam preparation.


Unit 6 Programming Part 2 Mid-unit assessment

## Unit 6 Mid-unit assessment

**Typical 4-mark exam question**

You have been asked to help build a new school records system for storing data about all the students in the school. You are going to be working with a range of data types.

Explain what is meant by the term data type and state at least two examples of data types.



**Specimen 4-mark answer**

Data types are used to identify any information stored in a program. If the data type is not correctly identified, the data cannot be processed by the computer.

Two examples of data types are whole number integers and Boolean.

142

Unit 6 Programming Part 2 End-of-unit assessment

**What good things can we see in this answer?**

- The answer includes the key terms: joined, string, processed and variable.
- The process of concatenation is clearly described.
- An example of concatenation has been provided joining together a first and second name.

**Which parts of the answer could be better?**

- The first sentence defines concatenation as joining two strings, but two or more strings can be joined.
- The answer does not give a reason for joining the two names together.

**How can we improve this answer?**

- Improve the first paragraph by stating that two or more strings can be joined together.
- Give a reason for joining together the first and second names. For example, the full name could be displayed on screen or added to a printed report.

153

### Analysis

Evaluation of example answer at mid-unit assessment and end-of-unit assessment to hone analytical skills and provide useful guidance.

### End-of-unit checklist

Checklist at the end of every unit to quickly assess your understanding and progress.

Unit 5 Programming Part 1 End-of-unit assessment

**End-of-unit checklist**

- I know what an algorithm and a computer program are.
- I know that there are different styles of programming and many different programming languages.
- I know the purpose of text-based and visual programming languages and why pseudocode is used in planning programs.
- I know what BIDMAS is and why it is used.
- I can create simple programs in the Python programming language.
- I can create simple sorts and use arithmetic and relational operators in a simple program.
- I can search a simple database using programming terms.
- I can describe the purpose of computer models and simulations and their advantages and disadvantages.
- I can use sequences, selection and iteration in a simple Python program.
- I know what a syntax error is and can give some examples.
- I know how to find and fix syntax errors.
- I know what a subprogram is and I can use pre-existing subprograms in a simple program.

**What good things can we see in this answer?**

- The answer includes some key terms: rules, function and spelling.
- There is a clear description of what a syntax error is, and an explanation that it prevents the program from running.
- Two tips have been given, as required.

**Which parts of the answer could be better?**

- It would be helpful to include examples of spelling or character mistakes in the first paragraph.
- The second sentence is a little vague. It is not clear what 'a particular part' refers to.

**How can we improve this answer?**

- Improve the first paragraph by giving examples of syntax errors, such as misspelling the function print or missing out a bracket.
- In the second sentence, explain that an incorrect function will halt the program at that point until the error is resolved.
- Alternative tips for finding syntax errors could include checking the case and checking the layout of functions.

129

# Unit 1

## Safe practice

You are already familiar with the internet and the world wide web; we use it daily. The question is, do we use it well? Do we think about the information we discover, who might have written it and what information we are sharing in return? This new knowledge will be combined with professional presentation skills to plan and create a brilliant presentation.

### **Key objectives:**

1. Understand the difference between the internet and the world wide web.
2. Carry out effective searches online and judge your results.
3. Understand the importance of strong passwords.
4. Understand the process of designing, creating and evaluating a digital presentation.

### **By the end of the unit you will:**

- be able to plan a presentation based on a given brief
- include relevant online research and content in a presentation
- use presentation tools effectively to format and lay out a presentation
- be able to apply a house style to a presentation
- design for a target audience effectively and adapt your work for a new audience.

# The internet and the world wide web

## Related topics

- Internet research
- Network technology
- IP addresses
- Security and privacy
- Digital communication

## Key words

digital divide

email

fake

internet

network

online gaming

online shopping

post

spoof

streaming

web browser

wired

wireless

world wide web (WWW)

## Learning objectives

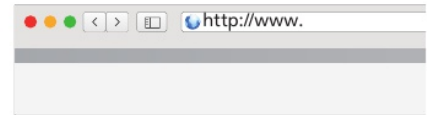
1. Understand the terms internet and world wide web.
2. Know how to spot a fake or spoof website.
3. Understand the importance of being respectful and staying safe online.

## What is the internet?

The **internet** is the international **network** of connected computers all around the world. The internet allows any compatible device to access and share information stored online. Information can be transmitted over the internet using a **wired** connection or a **wireless** signal.

## What is the world wide web?

The **world wide web (WWW)** was created by Tim Berners-Lee in 1989. It is all the shared pages of content stored on the network of servers connected to the internet all around the world. We use a **web browser** to access the content on the WWW.



## Why do people confuse these terms?

People often use the terms internet and WWW to mean the same thing, but they are different.

- The internet is the network of connected devices, including all the devices we have in our homes.
- The WWW is the content of the internet that we see on our computers or smartphones.

## Real-world examples



Access to the internet has become part of almost every aspect of life. Look at the following uses of the internet. How many of them are you already familiar with?

- Sending and receiving **email**
- Accessing the news
- Carrying out research
- **Online shopping**
- **Streaming** music and video
- **Online gaming**

## What is a fake or spoof website?

Anyone can **post** information on the WWW. This means that the information is not necessarily true. Any website that contains untrue information is known as a **fake** or **spoof** website. Many spoof websites are created for fun and to entertain, but sometimes people post false information and news in order to spread lies or cause trouble in the world. You can find advice on searching the internet on pages 10–11.

## How to spot a fake website

It is wise to be cautious about the information you read on the internet. Here are some questions to ask yourself about the websites you visit.

- Have you heard of the website?
- Does the website have a strange web address?
- Can you find the same information on a site you can trust?
- Ask a family member. Do they recognise the author or content?

## The importance of being respectful online

When we communicate online, we should have the same high standards as in the real world. It is important not to spread untrue comments about people or try to get other people into trouble. Posting disrespectful comments about people is a form of bullying. It is just as harmful as saying unkind things to someone in person.

### Real-world advice

- Don't share passwords or personal details.
- Never post or share unkind or false information online.
- Don't believe everything you see and read online. Check with an adult.
- If you see content that worries you, report it to an adult (your parent or guardian or your teacher). If you are using social media, you can also use the Report button.

### Further investigation

- Read about the creation of the WWW.
- Find out how many devices in your home can connect to the internet.
- Research the term **digital divide**. Write a definition in your own words and give some examples.
- Look for some recent examples of 'fake news'.
- Talk to members of your family. Do they know and understand all the key words from this lesson?

### Success criteria

- I can describe the difference between the internet and the WWW.
- I am aware of fake or spoof websites. I know how to recognise them.
- I can describe examples of respectful behaviour online. I can explain to others how to behave respectfully online.



# Presentation-based projects

## Related topics

- Creating digital documents
- Multimedia content

## Key words

animation

design theme

font

graphic

layout

master slide

slides

target audience

transition

## Learning objectives

1. Understand the importance of a target audience for project work.
2. Know how to analyse a given brief.
3. Understand and apply key presentation terminology.

## Creating a presentation for a given brief

A project brief gives information about the key requirements of a project. It should include:

- the topic that the presentation is about
- the main tasks that need to be carried out
- who the presentation is for – the **target audience**
- in what form the work should be presented.

## What is a target audience?

Every product, whether it is a digital or a physical product, is designed for a target audience. The product aims to meet the needs of this particular group of people. A target audience is usually defined by aspects of their lives such as:

- their age
- their interests
- geographical factors, such as where they live
- social and economic factors, such as their family situation, their income or their job.



## Real-world examples

Every day, people give presentations all around the world. Each presentation is aimed at a particular target audience. Examples of presentations and their target audiences include:

- a presentation in a school, college or university, aimed at the students
- the launch of a technology product, aimed at customers
- a presentation by a candidate at a job interview, aimed at the employers.





## Presentation terminology

There are many different software packages that you can use to create a presentation. Key terms that describe the main features of these packages include:

- **slides:** the pages of a presentation
- **layout:** the arrangement of the text, **graphics** and photos on a slide
- **animation:** effects used to make an object (such as an image, a title or a bullet point) appear or disappear on a slide
- **transitions:** a type of animation used when you move from one slide to the next slide
- **design themes:** sets of pre-designed styles that you can choose for the background, text and colour of a slide show
- **master slide:** a layout that you can use for several slides.

## Tips for a successful presentation

When you give a presentation to a specific audience, think about the things that you should and should not do.

Do... 	Don't... 
Space out text, images and graphics.	Fill each slide with too much text.
Use words and language styles that are appropriate for the target audience.	Use too many animation effects or transitions – this will distract your audience.
Choose one clear <b>font</b> and style and stick to it throughout the presentation.	Use low-quality images that look blurred on screen.
Choose a design theme that will appeal to your target audience.	Link to videos and websites without checking them first.

### Further investigation

- Investigate different presentation software packages. Which package might you use in your home or school?
- How does your teacher use presentations in the classroom?
- Ask your classmates what they like to see in a classroom presentation.

### Success criteria

- I understand that it is important to define the target audience for a project.
- I can recognise the key elements in a project brief.
- I can describe the main features of a presentation.
- I can describe things to do and things to avoid when creating a presentation.

# Creating a storyboard for a presentation

## Related topics

- Designing for an audience
- Presentation tools and functionality

## Key words

graphical elements

hyperlink

navigation

slide

storyboard

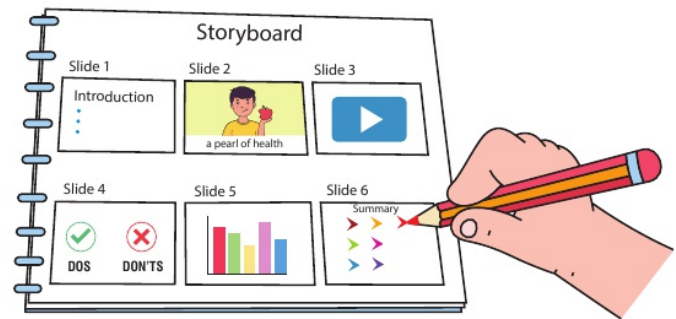
text

## Learning objectives

1. Understand the importance of planning a presentation.
2. Understand the key elements of a storyboard.
3. Know how to plan a storyboard to meet the user's needs.

## What is a storyboard?

A **storyboard** is a visual plan of a presentation or other media project. You create a storyboard at the start of the project and you usually draw it on paper. A storyboard shows the step-by-step sequence of the project. The storyboard for a presentation includes a plan for each **slide** in the sequence.



## Why are storyboards used?

A storyboard allows the author to plan how their project will look. It is tempting to simply jump straight into a project, but a storyboard has some advantages.

- It saves you time because it allows you to spot problems at an early stage.
- It allows you to plan the key information to include, step by step.
- You do not need to use a computer at this stage.

## Real-world examples



Storyboards are not used just for presentations. Other examples include:

- movie and animation planning, imagining how scenes will look before they are recorded
- video game designing
- planning complex movie sequences on a computer (often referred to as pre-visualisation, or pre-vis).

## What should a storyboard include?

Storyboards allow the author to think about what content to include, the order of the content and how much content to include on each slide. A storyboard for a presentation might include:

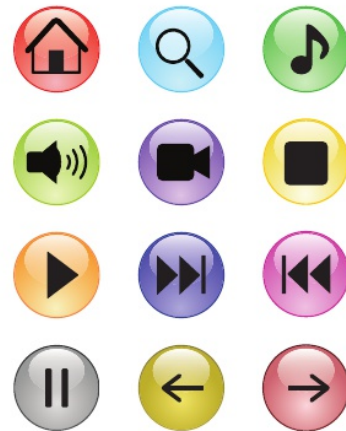
- slide headings or titles
- **text** to be included on the slides
- sketches of images (such as photos and scanned drawings) or text boxes with descriptions of images
- ideas for **graphical elements** (such as diagrams, tables, charts and shapes)
- timings – how long you will spend showing each slide.

## Navigation design

Storyboards often follow a linear sequence. This means that they go through the presentation slide by slide. However, presentation software also offers navigational tools such as buttons and **hyperlinks** so you can:

- return to the start slide
- move forwards or backwards
- jump to the final slide
- link to an external document or web page.

If you want to include **navigation** in your presentation, remember to include it in your storyboard design.



## Real-world advice

A good presentation includes a range of different types of information to keep the audience interested and to inform them in different ways. You can choose from text, images, graphs and charts, tables, and sound and video clips. It's a good idea to plan what you will include at the storyboard stage.

## Further investigation

- Look at some examples of storyboards online. What information do they include? Do they include any additional information that you could use?
- Look at the extra features section of a DVD or Blu-ray movie. Think about what the storyboard used to plan this section might have looked like.
- Research some of the common graphical symbols used for navigation buttons in presentations.

## Success criteria

- I understand the importance of planning a project.
- I can describe the key elements of a storyboard.
- I can create my own storyboard for a project, which includes all the key elements.

# Internet research

## Related topics

- The internet and the WWW
- Security and privacy
- The legal impact of technology

## Key words

content

copyright

download

judge

key word

reliable

resource

save

search engine

search term

source

web browser

## Learning objectives

1. Safely search the internet for text, images and downloadable content.
2. Understand the importance of carefully judging online sources.
3. Develop an awareness of copyright.

## Searching using key words

A **search engine** is a website designed to search other websites according to the **search terms** entered. The search engine provides a list of websites that fit the search terms.

Search engines are designed to respond to **key words** or short phrases. Think about the following when you carry out a search.

- Be as specific as possible. Include additional words to narrow down a search. For example, 'internet safety students UK 2021' should provide more useful results than 'internet tips'.
- Look out for key words with more than one meaning (e.g. 'date') or words that are also brand names (e.g. 'apple'). Again, additional words will narrow down the search.



## Using an advanced search

Many search engines offer an advanced search, which provides additional search options such as:

- focusing on a particular document type
- looking within a particular time period
- listing terms that you do not want to include.

## Real-world examples

There are dozens of search engines, all of which can be accessed using your **web browser**. Some are international and some are designed for a particular geographical area. Popular search engines include Google, Microsoft Bing, Yahoo! and DuckDuckGo.

## How to judge search engine results

Here are some tips for how to **judge** which search engine results might be the most **reliable**.

- The first few links are often advertisements – these companies have paid to be displayed first.
- Shopping sites that are selling products linked to your search often appear high on the list.
- Who is the author of the web page? Is the page produced by an organisation you have heard of or is it an individual's blog page? An individual's opinion might be biased.