UNIT 1: THINKING ABOUT DATA

Age range: 9 - 13 years

Outline
Learners will discuss what data is. They will explore examples of data collected about their lives, and consider how this data is used by different people and organisations. Learners will collect and present data to show how they spend their time during a typical day. Finally, they will compare their "time use" data with others in the class and speculate how "time use data" might vary among young people in different parts of the UK and elsewhere in the world.

Learning objectives
- To understand what data is and how it can be processed to create information.
- To become familiar with some data collected by organisations and how this data is used.
- To develop skills in collecting and presenting data.
- To recognise that "time use" data will vary among young people and to be aware of some possible reasons for any differences.

Learning outcomes
- Learners will recognise what data is and how can it be processed to create information.
- Learners will describe some examples of data about their lives which are collected by organisations and explain how this data is used.
- Learners will collect and present data about their daily time use.
- Learners will compare their "time use" data with others and identify possible reasons for any differences between young people in their class, the UK and elsewhere in the world.

Key questions
- What is data?
- Why do people collect data and how do they use it?
- What data is collected about me?
- How do I spend my day?
- What similarities and differences do you think there might be between our daily time use and that of young people in other parts of the UK or the world?

Resources
- *Data power* slideshow: slides 2 to 13
- Activity sheets:
  1. *My day*
  2. *My time use bar chart*

Curriculum links

England
Pupils should be taught to:
KS2 Computing
- Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.

KS3 Computing
- Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users.

Wales
Numeracy Framework
- Using data skills: collect and record data, present and analyse.

Digital Competencies Frameworks
- Data and information literacy - explore and analyse data sets.

Scotland
ICT to Enhance Learning
- As I extend and enhance my knowledge of features of various types of software, including those which help find, organise, manage and access information, I can apply what I learn in different situations.
  TCH 1-03a / TCH 2-03a
- I can explore and use the features of a variety of familiar and unfamiliar software to determine the most appropriate to solve problems or issues.
  TCH 3-03a

Important teaching note
These are suggested activities and resources to support your teaching rather than guide it. Additional teaching input may be required to develop learners' knowledge, skills and understanding of some of these concepts. It is assumed that teachers will choose to spread the activities in a unit over more than one lesson.

Activity 1.1 *(30 min+)*

What is data and why do people collect it?

- Show slide 3 and ask learners the question: *What is data?*
- Click forward on the slide and explain that data is a collection of facts which can be used to calculate, analyze or plan something. There are different types of data such as numbers, dates, text, images and sound.
- Explain that people are collecting data about our lives all the time. Use slides 4 to 9 to prompt some whole class discussion around what data is collected by others when we do different activities such as use a phone, go shopping, travel, go to school, use the internet and visit the doctor. Possible ideas for the types of data that might be collected are provided in the slide notes.
- Alternatively you could organise learners into groups and give each group a printed copy of one of the slides. Ask them to work together to think of any data that might be collected when this activity is carried out. Learners could then share their ideas with other groups.
- Ask learners why they think people might collect this data. Explain that data is used and processed in order to find things out. For example, the government uses data about the average amount of traffic on roads to help decide whether or not there is a need to build new roads or provide more public transport. Supermarkets collect data about how much milk they sell to customers each day, in order to work out how much milk they need to order from their suppliers. Teachers collect data about the progress of children in their class to help decide which areas of learning to focus on. Online shopping websites collect data about what items people search for to help them decide which products to advertise.
- Use this activity to prompt discussion about possible ways in which personal data might be misused. Draw out the importance of not sharing personal data with people you don't know, either in person or when you are online.
- Finally, point out that most of the data about us is now collected, recorded and processed by computers. Discuss the advantages of using computers such as reducing the number of mistakes in data entry (compared to recording data manually), being quicker, being able to manage larger and changing data sets and making it easier to carry out complicated calculations. Ask learners whether they can think of any disadvantages. For example, using computers can be expensive and some countries (or areas within a country) may not have enough resources for this use. Using computers also relies on people having the necessary skills to use them, as well as a reliable electricity source and internet connection. You may wish to share that fact that in 2015, only 44 out of every 100 people in the world were internet users.[1]

[1] World Bank Open Data (2015): data.worldbank.org/. *Note: This indicator only measures Internet use among individuals of a certain age range, frequently those aged 16 to 74.*

Activity 1.2 *(45 min+)*

How do I spend my day?

Note: Ideally learners will have access to a computer or tablet for this activity.

- Explain that learners are going to be collecting and processing some data about their own lives. Ask learners what activities they do during a typical school day. Write down their ideas on sticky notes. Some suggestions are provided on slide 10: eating, sleeping, attending school, taking part in after-school clubs and activities, travelling to and from school, playing with friends, caring for others, helping with household chores, doing homework, watching television and using a computer or tablet.
- Show slide 11 and ask learners how long they think they spend doing these different activities during a typical school day. *Which activity or activities do you think you spend the most time doing? How would you find out?*
- Discuss how learners would collect data about how much time they spend carrying out different activities. Possible discussion questions are provided in the notes of slide 11.
- Distribute copies of *My day* (Activity sheet 1). Ask learners to complete their own timetables for a typical school day. Part or all of this activity could be completed for homework. Some learners may need further guidance on how to round and approximate their time use.
- Support learners to then use a computer or tablet to record this data in a table or spreadsheet. Part or all of this activity could be completed for homework.
- Discuss how learners could use a computer to present their "time use" data, for example by creating a bar chart or pie chart. Show slide 12 and discuss the advantages and disadvantages of these different ways of presenting data, as well as the reasons why a line graph would not be appropriate.
- Support learners to present their data using a tablet or computer. If computer access is unavailable, learners could use the bar chart template provided in *My time use bar chart* (Activity sheet 2).
- Ask learners to get into groups of four and to share their "time use" data. *Note: Sensitivity is needed with this activity as some learners may not wish to discuss their time use and family situation with others. For example, those who care for other family members or have other responsibilities at home. You may wish to do this as a whole class discussion and make all individual data anonymous.*
- Discuss which types of activities varied the most among learners and which varied the least. For example, the number of hours in school should be the same. The time use for other activities, such as sleep or watching television, might vary.
- Discuss possible reasons for any differences between how different learners in the class spend their time. Ask learners whether they think "time use" data for other young people in the UK or elsewhere in the world would be the same or different. Use "why" repeatedly to try and develop learners' thinking and reasoning skills. Possible discussion questions are provided on slide 13.
- Finish by asking learners what kind of organisations or individuals might want to know how young people spend their day. For example, people working in health might collect data about how much time young people spend sleeping, doing physical activity or watching television.

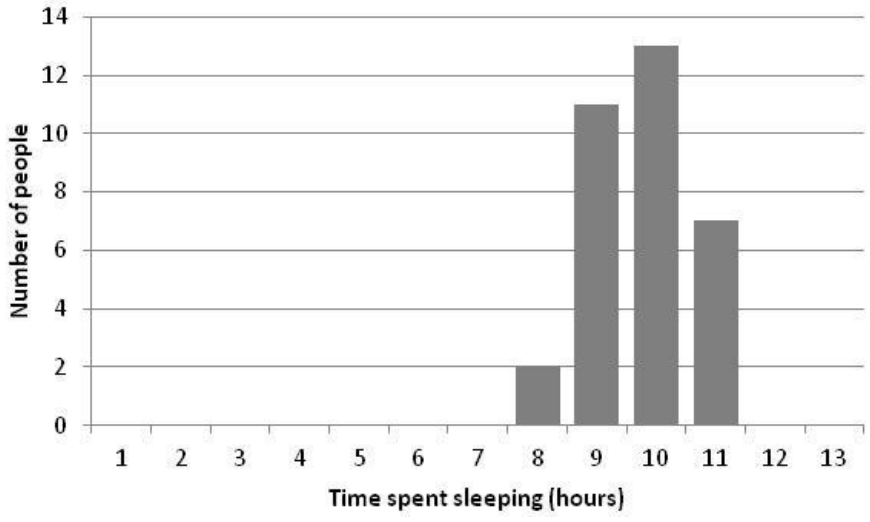
People working in education might want to know how much time young people are spending in school.

Differentiation

- *Make it easier: Learners could round the times that they start and end activities to the nearest 10, 15, or 30 minutes to make the time durations easier to calculate.*
- *Make it harder: Learners could record their time use directly into a spreadsheet rather than first recording the data manually. More able learners could use formulae to calculate the time durations for each activity.*

Further ideas

- Organise a board race to help learners think a bit more about what data is collected about us. Explain that a board race is run like a relay with the person at the front of each team running up to the board or piece of paper and writing something related to the question or topic. As soon as they have written something they run back to their team and hand the pen or pencil to the next person in line, before heading to the back of the queue. The next person then has a go but they must not repeat anything that is already written on their group's board or piece of paper. The process is repeated until the time is up.
    - Tell learners that they will have five minutes to write down as many examples as possible of data collected about their lives. Organise learners into equal groups of four to six and line each group up in front of a piece of paper (or a section of whiteboard) which has "Data" written at the top. Give the first person in each group a pen or pencil.
    - If there is insufficient space to run a board race then you could carry out a similar activity with groups staying at their tables and learners passing around a pen or pencil to take turns writing on a piece of paper.
    - At the end of the race, ask learners to sit down. Count the number of answers for each team. Feed back on the range of ideas focusing on any themes which emerge.
- Learners could create a series of human bar charts showing time use for different activities (see example below).



- More able learners could calculate the mean time spent by their class on different activities, such as sleeping, watching television or using the internet. Ask learners to decide on a list of activities and then create a class spreadsheet to "crowd source" the data. Alternatively, learners could create a template questionnaire that could be used to automatically populate the spreadsheet. Use this activity to illustrate how quickly and easily computers can be used to collect and organise data.
- Learners could use the internet to research the different types of data that are collected when we do various activities. Alternatively, learners could interview members of school staff (such as the head teacher, bursar, caretaker, catering staff and teachers) and/or parents to identify other ways in which data is collected and used.
- Encourage learners to reflect on their use of time and how they could use it more effectively. You might wish to show the following short video clip to illustrate the importance of making the most of the time we have: www.youtube.com/watch?v=BOksW_NabEk (Credit: zefrank1, published 21st Jun 2013*).*

  This video clip uses jelly beans to represent the average American lifespan, a single bean for each day. The video breaks down how most of the jelly beans (days) are spent on average, for example sleeping, eating, working and watching television. The list of different activities ends with slightly less than 3,000 beans which represent the time available to do with what we please.

My day

Activity sheet 1

Activity	Start time	End time	Time spent

My time use bar chart

Activity sheet 2

Use the blank axes below to draw a bar chart which shows your time use during a typical day.