

## Computing Data Handling: Mars Rover



**What I should already know:** IN EYFS children learn how to represent data through sorting and categorising objects in unplugged scenarios and through physical pictograms. They explore branch databases through physical games. In Year 1 they learn that technology can be used to represent data in different ways: pictograms, tables, pie charts, bar charts, block graphs etc. and use software to explore and create pictograms and branching databases. In Year 2 children learn to collect and input data into a spreadsheet and how to interpret data from a spreadsheet. In LKS2 they learn that a database is a collection of data stored in a logical, structured and orderly manner and that computer databases can be useful for sorting and filtering data. They learn that visual representations of data can be made on a computer. They know that computers can use different forms of input to sense the world around them so that they can record and respond to data. This is called 'sensor data'. Children learn that a weather machine is an automated machine that responds to sensor data, and that weather forecasters use specific language, expression and pre-prepared scripts to help create weather forecast films.

### Enquiry Questions

How and why is data collected from space?

How do you read and calculate numbers using binary code?

What is the computer architecture of the Mars Rovers?

How do you use simple operations to calculate bit patterns?

How do you represent binary as text?

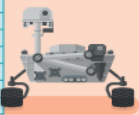
The Mars Rover had to travel 380,000km to get to Mars, it took eight and a half months.



Binary:

When a robot thinks independently, it needs to be able to calculate a range of data. All decisions carried out by a robot, or any computer, are done in binary - including the Mars Rover.

Binary value	Decimal value
0 0 0 0	0 zero
0 0 0 1	1 one
0 0 1 0	2 two
0 0 1 1	3 three
0 1 0 0	4 four
0 1 0 1	5 five
0 1 1 0	6 six
0 1 1 1	7 seven
1 0 0 0	8 eight
1 0 0 1	9 nine
1 0 1 0	10 ten



### Key Vocabulary

8-bit binary - An 8 bit binary number can represent a maximum of decimal 255= binary 11111111.

ASCII - American Standard Code for Information Interchange, a set of codes used to represent letters, numbers, a few symbols, and control characters.

Binary code - binary code uses only two numbers, "0" and "1".

Boolean - a result that can only have one of two possible values: true or false.

Byte - a unit of measurement of the size of information on a computer or other electronic device. A single byte is usually eight bits.

Communicate - the sharing or exchange of messages, information, or ideas.

CPU - an electronic machine that works on a list of computer things to do, called instructions. It reads the list of instructions and runs (executes) each one in order. A list of instructions that a CPU can run is a computer program.

Data transmission - the conscious act of moving any kind of information from one space to another.

Decimal numbers - a number that consists of a whole and a fractional part.

Hexadecimal - a numeral system made up of 16 symbols (base 16). The standard numeral system is called decimal (base 10) and uses ten symbols: 0,1,2,3,4,5,6,7,8,9. Hexadecimal uses the decimal numbers and includes six extra symbols.

Input - information that is "put in" to something. When someone types on a computer, the thing that they type is input.

Mars Rover - robotic vehicle that explored the surface of Mars

Moon - Orbits round planet Earth and is Earth's only natural satellite.

Numerical data - data in the form of numbers.

Output - the signals or data sent from a system

RAM - Random-access memory (or simply RAM) is the memory or information storage in a computer that is used to store running programs and data for the programs.

Sequence - a series of events that must be performed in order to achieve a task.

### Computing Skills

Pupils will:

- Learn that external devices can be programmed by a separate computer.
- Recognise how the size of RAM affects the processing of data.
- Learn the vocabulary associated with data: data and transmit.
- Recognise that computers transfer data in binary and understanding simple binary addition. Relating binary signals (Boolean) to the simple character-based language, ASCII. Learning that messages can be sent by binary code, reading binary up to eight characters and carrying out binary calculations.
- Understand how data is collected in remote or dangerous places.
- Understand how data might be used to tell us about a location.
- Learn about different forms of communication that have developed with the use of technology.

**Links to other curriculum areas:** Maths - convert between different units of metric measure. Solve problems involving addition, subtraction, multiplication and division. Solve practical problems.

Science - describe the movement of the Earth and other planets relative to the sun in the solar system.

