Key Stage 3

Encryption

Pupil worksheet

Sending data

We’ve all seen adverts for super fast optical fibre internet. Data is sent from computer to computer as pulses of light via long optical fibres.

The data sent from one computer, whether it is text, images, sound or video, is turned into binary code - a series of 1s and 0s; the 1s being a pulse of light and 0s no light. This code is sent down the fibres and converted back to data when it reaches another computer.

Using a key

Often we want to be able to send secret information through the internet, for example our credit card information which we use to shop online. This information is encrypted so only the right people can understand it.

This involves using a key to scramble the information, which is then decoded when it reaches its destination. Any eavesdroppers that may intercept the information won’t be able to decode it without the key.

If you use a website that starts with https:// then it is a secure website. All of the information you are reading or sending is being encrypted.

http://www.oxfordsparks.ox.ac.uk/run-for-your-light
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Your task

Encryption has been used to send secret messages for hundreds of years even before the invention of computers and the internet. People used to use codes called cyphers.

- Use the cyphers to send a secret word to another person.
- You will need to send the key first, and then the encrypted word. You can choose to use one cypher, or try them all.
- Watch out - eavesdroppers can read your messages - can you still keep them a secret?

Atbash cypher

Key:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| Z | Y | X | W | V | U | T | S | R | Q | P | O | N | M | L | K | J | I | H | G | F | E | D | C | B | A |

How to use: Replace each letter in the secret word with the one of the line below.

Example: oxford would become lculiw

Substitution cypher

Key: Similar to above, but you can choose what letter each represents. An example could be:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| P | H | Q | G | I | U | M | E | A | Y | L | N | O | F | D | X | J | K | R | C | V | S | T | Z | W | B |

Example: sparks would become rxpklr

The Caesar cypher

Key: A number

How to use: Replace each letter with one so many places away in the alphabet.

Example: if the key is +5 then rules would be encrypted as wzqjx

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