

■ Cyber Safe: Codebreakers and Data Defenders

BTEC Level 2 Information and Creative Technology – Unit 1: The Online World

You will work in pairs to solve cyber security challenges using Maths. Each of you has your own role. If one of you does not complete your part, your pair cannot move on to the next milestone.

Milestone 1 – The Maths Behind Security (0–15 mins)

You have just started your mission as trainee cyber defenders. You need to warm up your brain and understand how Maths connects to cyber security.

- Convert 2.5 MB into KB.
- If 3 out of 10 users fall for phishing emails, what is the probability one random user will?
- In a company of 200 staff, 15% click unsafe links. How many people is that?
- Milestone complete when: at least 2 answers are correct and you can explain how Maths supports cyber safety.

Milestone 2 – Password Probability (15–45 mins)

You have been asked to prove how Maths protects online accounts. You need to calculate password combinations and test their strength.

- Partner A: Calculate how many possible passwords exist if (1) 4 letters (A–Z), (2) 6 letters or digits (A–Z,0–9), (3) 8 characters including symbols (A–Z,0–9,32 symbols).
- Partner B: Create and test 3 passwords online. Record time to crack each one.
- Together: Discuss how length and variety improve security.
- Milestone complete when: calculations and testing match. Write a short summary.

Milestone 3 – Encrypted Exchange (45–75 mins)

You have intercepted a secret message encrypted with a Caesar Cipher (shift of 4). You need to decrypt it together – each of you has half of the cipher key.

- Partner A: Decrypt letters A–M.
- Partner B: Decrypt letters N–Z.

- Combine results to reveal message.
- Calculate file size as plain text (1 byte/character) and Unicode (2 bytes/character).
- Find the percentage increase in file size.
- Milestone complete when: the full message is correct and calculations are accurate.

Milestone 4 – Data Breach Probability Simulation (75–105 mins)

You have been hired to assess how human behaviour affects cyber security. You need to gather and analyse data using Maths.

- Partner A: Collect data from at least 10 classmates (password reuse, suspicious links, device updates).
- Partner B: Calculate percentages and create a pie chart.
- Together: Discuss results – which behaviour is riskiest?
- Milestone complete when: data and calculations are both accurate.

Milestone 5 – Secure the System (105–120 mins)

You have reached the end of your cyber maths mission. You need to reflect on what you achieved.

- Discuss with your partner:
- One example of how Maths helps protect systems.
- One challenge you faced while depending on your partner.
- One way you could improve teamwork next time.
- Milestone complete when: reflection is written and ready to share.

Milestone Tracker

Milestone	Task Name	Your Role	Partner's Role	Completed?
1	Maths Warm-Up	Solve problems	Solve problems	■
2	Password Probability	Calculate	Test	■
3	Encrypted Exchange	Decrypt A–M	Decrypt N–Z	■

4	Data Breach Simulation	Collect data	Calculate & chart	■
5	Reflection	Discuss & write	Discuss & write	■