Cipher Hunt - Tutor Answers

Each team has a sequence of puzzles to solve.
They should also have a collection of cipher wheels to use.

1. **Caesar Cipher**
   Gives them the key to the vigenere cipher. Try and get all the kids using their wheels to help finish solving the problem faster.

2. **Vigenere Cipher**
   Students should take the keyword from the previous question. They can use multiple wheels to decrypt for the different letters in the key word.

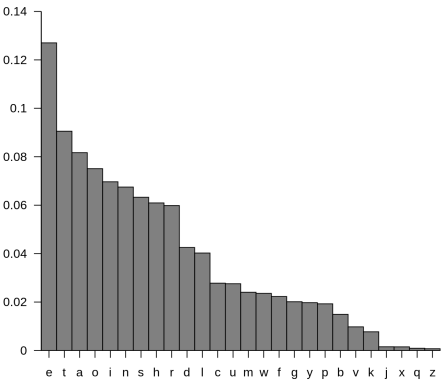
   Students just need to work out what are the letters that will be in the coloured boxes. These match up to the coloured bars in the chart for the frequency distribution chart.

   Students should start by writing the key repeated over the message. Then they can decrypt on the parts they care about.

   They should decrypt letters and words around the coloured sections. They only need to find out what is in the coloured boxes, they don't need to complete the whole cipher.

3. **Substitution Cipher**
   Students use frequency distribution tables of the different symbols to translate them back to letters. They use their hints from the vigenere cipher by matching the colours, the letters correspond to the emoji of that column of the bar chart.

   They use standard frequency analysis on the rest by comparing to their frequency distribution chart on the instruction sheet. They should try to find common letters like E, A, S, T and so on. Then they should be able to figure out words from the fragments of words they have translated.

   The highlighted text reveals the secret agent's name and password.

4. **Find the agent**
   They should find the secret agent (A tutor wearing a name tag) and tell them the password

There are 3 separate sets of puzzles

(so students can't just copy or what other students find is the secret agent)

The puzzles are colour coded (Green, Purple, Blue)

Green Puzzle

Caesar Cipher (key = 8)

mary had a little lamb its fleece was white as snow. to solve the vigenere cipher **lamb** is the key to know.

Vigenere Cipher (key = lamb)

The line where the sky meets the **s**ea. It calls me. And no one k**n**ows, how far it goes. If the wind in my sail on the sea stays be**h**ind me. One day I'll know, how **f**ar I'll go.

Green - H
Purple - N
Blue - S
Yellow - F

Substitution Cipher

Joan Clarke was an English cryptanalyst who was a code-breaker at Bletchley Park during the Second World War. She was best known for her role in the **Enigma** project that cracked ciphers on intercepted Nazi messages. The information in the messages helped end the war.

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
												

Secret Agent Name: **Joan Clarke**
Password: **enigma**

Make sure students look for a tutor wearing the secret agent's name on a name tag.

Purple Puzzle

Caesar Cipher (key = 15)

jack and jill went up the hill to fetch a pail of water. jack fell down and jill used the key **hill** to solve the vigenere cipher.

Vigenere Cipher (key = hill)

My power flurries throug**h** the air into the ground.
My soul is spiraling in frozen fractals all around.
And one thought crystallizes like an icy blas**t**.
I'm never going bac**k**, the past is in the past.

Green - M
Purple - T
Yellow - H
Blue - K

Substitution Cipher

Ada Lovelace was an English mathematician while working on a theoretical mechanical computer she realised the bigger potential of the theorised machine and wrote the first **algorithm** even though the machine wasn't built yet. She is now known as the first ever computer programmer.

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
												

Secret Agent Name: **Ada Lovelace**
Password: **Algorithm**

Make sure students look for a tutor wearing the secret agent's name on a name tag.

Blue Puzzle

Caesar Cipher (key = 15)

red and yellow and pink and green. purple and orange and blue. I can sing a rainbow and solve the vigenere cipher with the key **blue**

Vigenere Cipher (key = blue)

E**v**erything is better when we stick together. Some have said you and I are gonna win forever? Lets pa**r**ty forever. We're the same unlike y**o**u, you're like me we're all working in **h**armony.

Purple - H
Blue - R
Green - O
Yellow - V

Substitution

Grace Hopper was an American computer scientist and united states rear admiral. She invented the first computer program **compiler** and is also known for popularising the term “bug” in computer programming after finding a moth in her computer that was causing the computer to fail.

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
												

Secret Agent Name: **Grace Hopper**
Password: **Compiler**

Make sure students look for a tutor wearing the secret agent's name on a name tag.