# Activity 16. The Cipher Challenge (STEMworks)

1. **Learning outcome(s):** (list up to 3)
   * 1. Use mathematics knowledge to develop a cipher.
     2. Use mathematical skills and logical thinking to break ciphers.
     3. Creatively develop a solution(s) to code transmission.
2. **Relation of activity with the STEM, gender inclusiveness and Entrepreneurship:** (text, not bullets, explaining the relation of the activity to 3 above)

This activity requires teams to use skills central to entreprenuership and STEM to creatvitely and ingeniously respond to a problem with no obvious or single solution. This activity offers participants the opportunity to work in a variety of ways that facilitates inclusiveness and necessarily requires good teamwork, communication and creativity.

1. **Indicate the area of focus:**

**☒ STEM**

**☐ Gender inclusiveness**

**☐ Entrepreneurship**

1. **Materials:** (including ppts, videos, hands-on material)

* Craft equipment (card, coloured paper, colouring pencils, string, tape, glue, dowel, pegs, post-it notes etc. ). Refer to PPT for a full list.
* Basic circuit equipment including batteries, wires, LEDs (various colours, ideally), and filament bulbs. Terminal blocks could be useful for making connections.
* Tools (scissors, screwdrivers, wire strippers/ cutters).
* Projector and PPT.

1. **Preparation:**Layout materials and prepare slides.
2. **Duration:** 60-90 (minutes)
3. **Target group:** 11-14 (student age)

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1. **Description of the activity:**

Objective: in a team of 3 – 5 design and build a communication device that can be used to transmit a coded message across the classroom using their own cipher without being deciphered by other teams.

0-10 mins: Introduce challenge, the history, uses and concept of ciphers (refer to PPT)

10-25 mins: Pupils plan their communication tower construction and develop a cipher within the bounds of the scenario outlines in the PPT.

25-50 mins: Pupils construct and test their communication tower

50-60 mins: Provide students a 4 letter word that they must transmit using their device within 2 minute time limit. Provide other teams time to decipher.

1 hour is minimum recommended time with 90 minutes providing students time to develop more sophisticated ciphers and communication tower designs.

**9. Link to curriculum:** Team work, communication,problem solving using maths logic.