# Activity 17. Design, Make and Market an Electric Vehicle (STEMworks)

1. **Learning outcome(s):** (list up to 3)
   * 1. Work and communicate effectively as a team.
     2. Use scientific knowledge to design and build a product to specification.
     3. Deploy and enhance creativity and ingenuity to solve a problem.
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 entrepreneurship and STEM to creatively 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)

* Capacitor (with large capacitance e.g. 10 F)
* 2x 1.5 V batteries
* Motor with worm gear mechanism
* Wires and means of connection (e.g. terminal blocks)
* Craft materials (card, plastic, paper, poster paper, rubber bands, paper plates, tape)
* Selection of wheels (CDs, plastic craft wheels, bottle lids etc.)
* Basic tools: screwdrivers, wire strippers, scissor
* PPT and projector

1. **Preparation:**Lay out materials as a shop. Tool stations are useful. Students work in teams of 5 so room should have a suitable layout. There should also be access to a test track measuring approximately 1.5 x 10 m (or longer).
2. **Duration:** 180 (minutes)
3. **Target group:** 13-14 (student age)

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1. **Description of the activity:**

Objective: design, make and market an electric vehicle

0-5 mins: Introduce electric cars including their development and associated problems using PPT as a guide. Outline the problem provided to the students and the materials on offer.

5-30 mins: students will spend time designing and planning their vehicle. Students may not gather materials from the shop. During this time the teacher should familiarise 1 member of each team (the electrical engineer) with the electric circuit (refer to PPT).

30-110 mins: The shop is opened and students can collect materials and tools to begin construction of their vehicle. Students should be encouraged to test and refine their design.

110-140 mins: Performance testing: teachers should facilitate a competitive display as teams race their vehicles in a sprint and test their vehicles’ range. Data should be collected by teams on these performance indicators.

140-160 mins: students should now reflect on the relative performance and cost of their vehicle and market their product accordingly through a draft poster. This may be better administered by dividing teams into smaller groups.

160-180 mins: teams provide a short marketing presentation, with particular emphasis on the rationale behind their marketing strategy.

**9. Link to curriculum:** Applying their knowledge of electrical circuits, experimentation, problem solving and working as a team.