# Activity 22. Traffic Lights (EUC)

1. **Learning outcome(s):** (list up to 3)
   * 1. Design engineering solutions to a complex problem using systems approach.
     2. Demonstrate the knowledge, skills and attitude of a professional engineer.
     3. Develop collaborative skills in mixed gender groups.
2. **Relation of activity with the STEM, gender inclusiveness and Entrepreneurship:** (text, not bullets, explaining the relation of the activity to 3 above)

Traffic lights are part of our daily life. Optimising their operation can reduce the time people spend on the roads as well as improve fuel consumption and reduce pollution. Students are required to analyse the current design / operation of traffic light systems and come up with possible solutions. This involves mathematics for (traffic engineering), electronics (control systems), economics (estimate fuel consumption). They will also be called to prepare their business strategy on promoting their new improved product.

1. Indicate the area of focus:

**☐ STEM**

**☐ Gender inclusiveness**

**☐ Entrepreneurship**

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

* Arduino Uno
* LEDs, Sensors (ultrasonic, motion, sound)
* Computer (PC / MAC)

1. **Preparation:**None
2. **Duration:** 90 (minutes)
3. **Target group:** 15-18 (student age)

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1. **Description of the activity:**

In this activity, participants are asked to explore the current traffic light systems used in their area. They can choose a set of traffic lights in their their neighborhood that believe requires optimization and understand how it works. Then, they will be required to spend about 30 minutes to redesign the traffic lights recording their suggestions / ideas. Part of the team (2 students) will be required to build a set of traffic lights while the rest of the team (2 students) will be required to look into calculating the improved consumption of a simple car and the estimated CO emissions of a medium sized car being stopped at the traffic lights. The last 30 minutes (out of 90 minutes), the whole team will be required to spend their time for designing their marketing strategy for promoting their ideas / product.

Activity Timeline:

• Brainstorming: inquiry, planning and design, team selection, and drawing on a sheet (up to 30 min).

• The building of a complete set of operating traffic lights (Team A: 30 min).

• Preparation of the calculations on how consumption / levels of pollution are improved (Team B: 30 min).

• Prepare their presentation (15 min).

• Present their design/actual artefact to their classmates / "Clients" (15 min).

This activity is suitable for 15-18 years old students to carry out in the classroom. Ask participants to choose whether they would use Task H, V or C and to provide a justification for that.

The participants will generate creative solutions to a challenging problem and work like engineers (electronic, traffic, software). These tasks focus on STEM (Science, Technology, Engineering and Mathematics) practices and the relationships between STEM practices and concepts. Through such practical real-world connections, participants will have an opportunity to see how STEM is part of their everyday world.

**9. Link to curriculum:**