

A STEP TOWARDS SUSTAINABLE DEVELOPMENT IN TRANSPORTATION

OVERVIEW

DURATION: 45 – 50 MINUTES

CATEGORY: TRANSPORTATION

NUMBER OF STUDENTS: 30 IN EACH SESSION APPROXIMATELY

ENRICHMENT COMPONENTS: D.I.Y., STEAM, TRANSPORTATION, ENGINEERING

QUALITY STANDARDS: CALIFORNIA STANDARDS OF LEARNING

LEARNING OBJECTIVE

STUDENTS WILL UNDERSTAND BASIC GAS-POWERED VEHICLES OPERATIONS/TECHNOLOGY AND HOW THEY ARE CONTRIBUTING TO POLLUTION. ALSO, STUDENTS WILL LEARN HOW WE CAN OVERCOME THEM AND COME UP WITH MORE SUSTAINABLE ALTERNATIVES AND HOW EACH OF US CONTRIBUTES TO THIS CHANGE FOR GOOD.

ENGINEERING VOCABULARY

- **Sustainable Transportation:** A sustainable transportation system can be defined as one in which fuel consumption, vehicle emissions, safety, congestion, and social and economic access are at levels that can be sustained and used repeatedly without causing any severe damage or irreversible harm to future generations of people throughout the world and also the environment in general.
- **Pollution - Land, Air, and Water:** Pollution occurs when toxins are introduced into the natural environment and cause harm. Chemical substances or energy, such as noise, heat, or light, can pollute the environment. Pollutants are either foreign substances/energies or naturally occurring pollutants that contribute to pollution.
- **Internal Combustion Engine (ICE):** An internal combustion engine (ICE) is a heat engine in which fuel is burned in a combustion chamber that is part of the working fluid flow circuit with the help of oxygen or air and in turn, produces power as the driving force for the vehicle.
- **Solar Powered Vehicles:** A solar-powered vehicle, is a vehicle that runs on solar energy. They are powered entirely or partially by electricity and stored solar energy. They have minimal operating expenses since they have few moving or mechanical parts to maintain, and they are also very eco-friendly because they consume little to no fossil fuels (petrol or diesel) as per their design. They are very similar to Electric Vehicles (EV's) as far as operation is concerned.



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STEPS FOR THE ACTIVITY

- 1.FSTI team members introduction.
- 2.Dividing students into equal groups.
- 3.Pre-Assessment forms distribution.
- 4.Introduction to how vehicles move by discussion (Q&A)
- 5.DIY – ICE model (discussions on the principles of it and how is it causing pollution) – emphasizing how engines are run on fuel which leads to harmful carbon emissions
- 6.Introduction to air pollution and how ICE causes pollution (discussion with each group). The naming of various harmful gasses
- 7.DIY – Solar Car model assembly and working – emphasizing how they do not use fossil fuel at all
- 8.Meaning of a sustainable future and how are we going to achieve it. Responsible actions.
- 9.Giveaways to students.
- 10.Completion survey and post-assessment for the teachers and students.

DISCUSSION/ENGAGEMENT QUESTIONNAIRE

- How many types of Engineering do you know?
- What is sustainability?
- What are a piston and stroke?
- How many no. of cylinders and possible configurations?
- ICE meaning and why called so?
- What are exhausts from ICE? How is ICE related to pollution?
- Why is pollution a problem? What are the impacts of pollution?
- How do Solar Cars derive their energy?
- What other alternatives are available?
- What do you think about the future of gas-powered vehicles?
- Why is pollution a problem?
- How is ICE related to pollution?
- What are the exhausts from ICE?
- If ICE is causing a problem, why are we continuing with it, what do you think?
- Can you think of any similar alternatives as solar cars?



SOCIAL EMOTIONAL LEARNING

- **Growth Mindset:** Young people believe that they can, through their efforts, grow in their intelligence and abilities.
- **Self-Awareness:** Young people can recognize and understand their identity and feelings.
- **Interpersonal Skills:** Young people use effective communication and collaboration skills to establish and maintain positive and productive relationships.
- **Social Awareness:** Young people have the capacity for empathy, can consider and appreciate the diverse feelings, perspectives, and personal contexts of others.