

Guided Inquiry Activities using the Ideal Internal Combustion Engine Simulator

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The Engine Simulator models internal combustion engines using the Otto cycle for gasoline engines and the Diesel cycle for diesel engines. You can select an appropriate fuel for your engine selection, change vehicle and s

These activities assume

fundamentals of thermodynamic cycles and the basic operation of an internal combustion engine. A more detailed explanation of the input parameters is provided by clicking on the help icons. Information about real world issues associated with each scenario is also presented for each simulation.

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ivities can be combined at the discretion of

parts. The first is intended to guide the student in thinking about what to expect from the simulation. The second guides the student through an investigation of properties of fuel selection and engine parameters. The third is intended as a deliverable for grading purposes. While your grading can be rigorous, the purpose is to compel students to make a reasonable effort and prepare them for a useful discussion during the subsequent class subsequent

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Guided Inquiry Activity 1: Role of Fuel Composition

Part III: Reflection: To do outside of class and hand in. Your answers should be discussed with at least 2 other students and try to come to agreement on the answers and the reasons why.

8. How would you change your answers from Part 1 after using the simulator?
9. What are the strengths and weaknesses of the alternative fuels for each of the engines you investigated? Describe the characteristics of an ideal fuel by combining characteristics of fuels you've considered in this exercise.
10. What are some ethical considerations of using ethanol as a fuel? How do government incentives impact societal choices of fuels?
11. From a thermodynamic perspective, what is the intention of "hybrid" car designs (here, vehicles that use and store electricity sonboar

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10. How would you change your answer from Part 1 after using the simulator?
11. What are the strengths and weaknesses of the alternative fuels you investigated? Describe the characteristics of an ideal fuel by combining characteristics of fuels you've considered in this exercise.
12. One way of improving energy efficiency is reducing the weight of the vehicle. What are some constraints on reducing vehicle size?
13. What are limitations on other means of powering vehicles, including solar power, hydrogen, and electric cars? What are their strengths?