

CHAPTER 6 -ALTERNATIVE FUELS

ACTIVITY 1: Identify Oxygenated Fuels

Activity Objective: Identify oxygenated fuels and describe how they help reduce exhaust emissions

Definition: Oxygenated chemical compounds contain oxygen as a part of their chemical structure. The term refers to oxygenated fuels. Oxygenates are used as gasoline additives to reduce carbon monoxide and soot that is created during the burning of the fuel. Polyaromatic hydrocarbons (PAHs) and nitrated PAHs, compounds are also reduced in the oxygenation process.

In the US, the EPA (Environmental Protection Agency) had authority to mandate that minimum proportions of oxygenates be added to automotive gasoline on regional and seasonal basis from 1992 until 2006 in an attempt to reduce air pollution, in particular ground-level ozone and smog. In addition to this North American automakers have in 2006 and 2007 promoted a blend of 85% ethanol and 15% gasoline, marketed as E85, and their flex-fuel vehicles, e.g. GM's "Live Green, Go Yellow" campaign. U.S. Corporate Average Fuel Economy (CAFE) standards give an artificial 54% fuel efficiency bonus to vehicles capable of running on 85% alcohol blends over vehicles not adapted to run on 85% alcohol blends. There is also alcohols' intrinsically cleaner combustion, however due to its lower energy density it is not capable of producing as much energy per gallon as gasoline. Much gasoline sold in the United States is blended with up to 10% of an oxygenating agent. This is known as *oxygenated fuel* and often as *reformulated gasoline*.

REVIEW VIDEO: 300 Years of Fossil Fuels In 300 Seconds:

<https://www.youtube.com/watch?v=cJ-J91SwP8w>

Materials: Chapter 6, paper, computer, printer. Internet Access

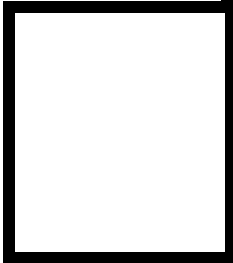
Procedure:

1. Work as partners or small teams
2. Research and brainstorm oxygenated fuel and process to create them.
3. In a paper create three columns as shown below with the following information:
Fuel Additive, How it is compounded, and what effect does it have on exhaust emissions if any.
4. Based on the text in chapter 6 and an Internet search, create an oxygenated fuels vocabulary.



RUBRIC

4 World-Class Learner	3 Proficient Learner	2 Developing Learner	1 Emergent Learner
Learner at this level has gone beyond mastery of knowledge, skills, & attitudes described in project. World-class learner consistently exhibits high-quality performance.	Learner at this level has had opportunities to apply knowledge, skills, & attitudes of component of project. Proficient learner has mastered essential attributes, thus proving mastery.	Learner at this level has been exposed to & had opportunity to apply knowledge, skills, & attitudes of project. Developing learner may have only a few essential attributes to master before mastery.	Learner at this level may or may not have been exposed to knowledge, skills, & attitudes required by academic standards of the project.



- 1= Emergent Learner
- 2 = Developing Learner
- 3 = Proficient Learner
- 4 = World-Class Learner