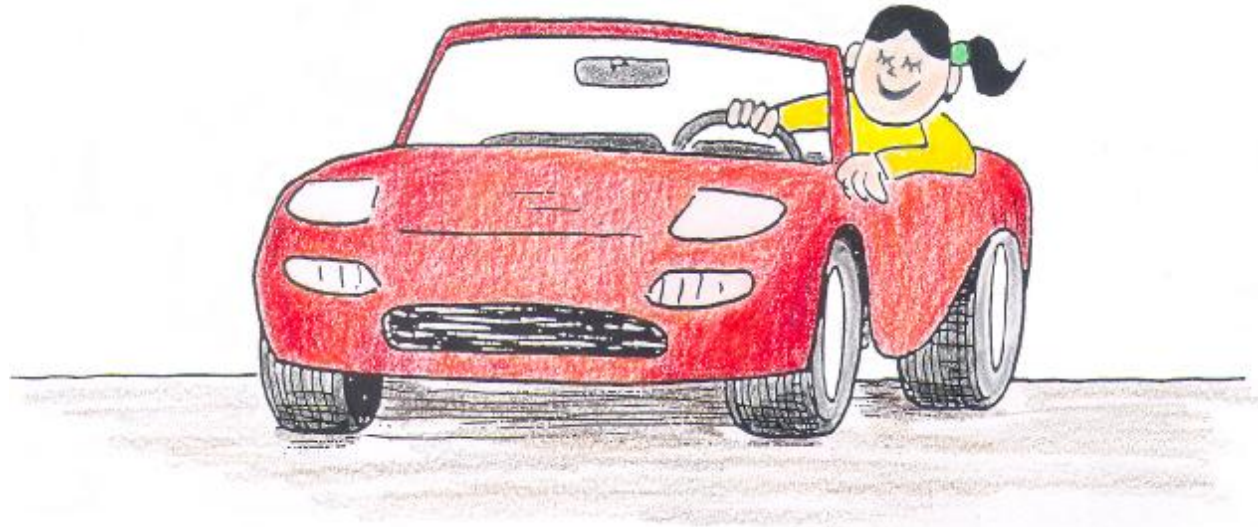


# NEXT-TIME QUESTION

CONCEPTUAL Physics



Nellie Knowital says that the gasoline in an automobile's gas tank is only about one-fourth the amount of fuel that runs the engine.

Is she correct? Defend or refute Nellie's statement.



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# NEXT-TIME QUESTION



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Answer:

"Fuel" usually means the material that combusts with oxygen. So in this sense, an auto gasoline tank contains all the fuel. But if "fuel" is meant to be all the material that feeds combustion then Nellie is correct. Internal combustion engines normally run on one part gasoline to 14 parts air by mass. About 21% of the air is oxygen which means about 3 parts oxygen by mass to 1 part gasoline. Since there is so much oxygen in the air, it needn't be put in a tank.

The amount of oxygen decreases with altitude, which is often compensated for in aircraft by superchargers that supply increased amounts of air to the engines.



The fact that most of an engine's fuel is atmospheric oxygen is evident when a helicopter or plane cruises over an active volcano. When flying through a region of volcanic gases deplete in oxygen, the engine runs out of "fuel" and conks out even though the gasoline tank may be full!



When hydrogen replaces gasoline in tomorrow's cars, what percentage of fuel will be atmospheric oxygen? Will these engines guzzle more or less oxygen?

