

Some people have proposed that ethyl alcohol (ethanol), which can be produced from corn, should be used in automobiles as a substitute for gasoline.

1. Assuming that gasoline and ethyl alcohol cost the same per gallon, outline a plan for comparing the cost of using gasoline to the cost of using ethyl alcohol.

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Question 1

**Scoring Guide**

Score & Description
<b>Complete</b> Student response provides an appropriate plan to compare the cost of using the two fuels by comparing the miles per gallon obtained. The plan must include appropriate controls such as using the same car and driving it the same distance.
<b>Partial</b> Student response provides a partially appropriate plan to compare the costs of using the two fuels. Appropriate controls are not discussed.
<b>Unsatisfactory/Incorrect</b> Student provides no appropriate plan to compare the cost of using the two fuels.

**Complete - Student Response**

- 1 Assuming that gasoline and ethyl alcohol cost the same per gallon, outline a plan for comparing the cost of using gasoline to the cost of using ethyl alcohol.

*Use two of the same cars one using gas and the other  
using ethyl. See which gets the better mile per gallon  
ratio and see which one is more efficient*

Scorer Comments:

Student response provides an appropriate plan to compare the cost of using the two fuels by comparing the miles per gallon obtained. The plan includes an appropriate control by stating that the same car must be used.

- 1 Assuming that gasoline and ethyl alcohol cost the same per gallon, outline a plan for comparing the cost of using gasoline to the cost of using ethyl alcohol.

You can make a chart and compare how far a car can go on a gallon of gasoline compared to a gallon of ethyl alcohol.

Scorer Comments:

Student response provides an appropriate plan to compare the cost of using the two fuels and outlines a method of comparing the miles per gallon obtained. The plan includes an appropriate control by implying that the same car must be used.

**Partial - Student Response**

- 1 Assuming that gasoline and ethyl alcohol cost the same per gallon, outline a plan for comparing the cost of using gasoline to the cost of using ethyl alcohol.

You could determine it by the amount of miles per gallon.

Scorer Comments:

Student response recognizes that miles per gallon must be determined, but does not provide an appropriate plan that includes controls.

- 1 Assuming that gasoline and ethyl alcohol cost the same per gallon, outline a plan for comparing the cost of using gasoline to the cost of using ethyl alcohol.

find out how far you can go with each type and compare the longer you can drive the less money you use paying for gas or ethyl alcohol

Scorer Comments:

Student response outlines an appropriate plan for obtaining the miles per gallon, but does not provide appropriate controls.

**Unsatisfactory/Incorrect - Student Response**

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Assuming that gasoline and ethyl alcohol cost the same per gallon, outline a plan for comparing the cost of using gasoline to the cost of using ethyl alcohol.

You would save because you would not need so much ethyl alcohol as gas to run a car

Scorer Comments:

Student response does not offer a plan, but simply states the ethyl alcohol would be less expensive.

1

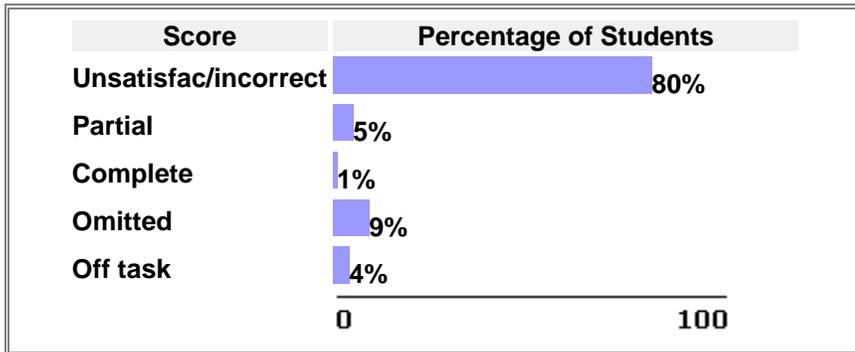
Assuming that gasoline and ethyl alcohol cost the same per gallon, outline a plan for comparing the cost of using gasoline to the cost of using ethyl alcohol.

See how much you spend on both and see which one works the best for you

Scorer Comments:

Student response recognizes that the cost of the two fuels need to be compared, but offers no plan.

## 2000 National Performance Results



Note:

- These results are for public and nonpublic school students.
- Percentages may not add to 100 due to rounding.

**The Fields of Science:** *Physical Sciences* (Sub content classification: *Energy and Its Transformations*)

**Knowing and Doing Science :** *Scientific Investigation*

## **The Fields of Science**

### ***Physical Sciences***

This question measures basic knowledge and understanding of the following:

## **Knowing and Doing Science**

### ***Scientific Investigation***

Scientific investigation probes students' abilities to use the tools of science, including both cognitive and laboratory tools. Students should be able to acquire new information, plan appropriate investigations, use a variety of scientific tools, and communicate the results of their investigations.