

Teacher Preface

This activity involves the use of *Mission H₂*, a CD Rom developed by Sentech, Inc. under the sponsorship of the U.S. Department of Energy. This program has excellent graphics and is easy for students to understand. The scavenger hunt provided in this curriculum will serve as a guide for the students and as a check for the teacher that the program has been viewed. There are four different mystery clues at the end of the hunt so that not all groups will have the same word.

The *Mission H₂* CD has been divided into four segments- suburbia, industry, cities, and a hydrogen airport. The scavenger hunts are divided as follows:

Hunts 1-4 are on suburbia and industry
Hunts 5-6 are on the city and the airport

Solutions follow each set of hunts.

Following the scavenger hunts is the first of a series of activities intended to accompany the *Mission H₂* CD Rom. This activity is entitled *Example Challenge Round Activity: The Drivers Behind Vehicle Selection*.

For more information about *Mission H₂* contact, Mary Rose Valladares at (301) 530-6598 or mrsenter@erols.com to inquire about availability.

Mission H₂ Scavenger Hunt #1

Introduction:

The *Mission H₂* CD Rom will take you on a journey through the various uses of hydrogen in suburbia and in the industrial sector. The program will also give you information on the future uses of hydrogen in these areas.

Your Task:

Your task will be to listen and watch carefully while using the program. There are a series of questions that you will need to answer to help you determine the mystery word at the end of your work.

Questions:

1. Name three household products that contain hydrogen.
2. The space shuttle contains _____ pounds of rocket fuel.
3. The largest use of hydrogen is in what industry?
4. Where is hydrogen found?
5. Water can be split into _____ and _____.
6. What do fossil fuels emit when burned?
7. What color was the future car?
8. What liquid would come from the exhaust of a hydrogen powered vehicle?
9. The H₂ auto engine runs _____ compared to the gasoline engine.
10. Americans drive a lot of miles each year. In fact, they drive enough miles to travel to the sun and back _____ times.

11. Suggestions to reduce the number of miles Americans drive each year include carpooling, public transportation and _____.
12. Hydrogen is colorless and _____.
13. You have to add an odorant to hydrogen in order to help detect _____.
14. What color is the bag of trash in the garage?
15. What is a wind farm?
16. An early market for fuel cells was _____.
17. The least expensive method of hydrogen production is _____.
18. Enough hydrogen is made by steam reformation to launch _____ space shuttles.
19. Nitrogen and hydrogen can be combined to produce _____.
20. In the water ponds, algae convert light energy from the sun into _____ energy used in photosynthesis to split _____ into hydrogen and oxygen.
21. What color is the trash truck at the power plant?
22. Each person in the U.S. produces an average of _____ pounds of trash per year.
23. What is biomass?
24. Farm crops can be grown for _____.
25. Hydrogen can be transported by _____ and pipeline
26. When hydrogen is pre-mixed with oxygen and ignited it will _____

27. What are Van der Waals forces?
28. On the main screen, how many windmills are there?
29. On the main screen, how many swimming pools are there?
30. How many buttons are there in the shuttlecock pit prior to launch?
31. What color is the launch button?
32. In large cities _____ might be the least expensive way to distribute hydrogen?
33. Research shows that hydrogen could be transported through existing _____ pipelines with some modifications.
34. The hydrogen plane would have a much _____ wing area than that of today's commercial airplanes.

Now that you have completed the questions from the CD Rom, use your answers and the clues below to decipher the MYSTERY WORD!

CLUES:

1. The letter of the alphabet immediately following the first letter of the answer to #7 is the first letter of the second part of the mystery word.
2. The first letter of the answer to problem #26 appears twice in the mystery word.
3. The first letter of the answer to problem #13 appears three times in the mystery word.

DETERMINE THE MYSTERY WORD!

In the space provided below, use the mystery word in a sentence relating to hydrogen as an energy carrier.

Solutions & Suggestions

Mission H₂ Scavenger Hunt #1

Introduction:

The mission H₂ CD-Rom will take you on a journey through the various uses of hydrogen in suburbia and in the industrial sector. The program will also give you information on the future uses of hydrogen in these areas.

Your Task:

Your task will be to listen and watch carefully while using the program. There are a series of questions that you will need to answer to help you determine the mystery word at the end of your work.

Questions:

1. Name three household products that contain hydrogen.
sugar, ammonia, wood, candle wax, natural gas, plastic, water
2. The space shuttle contains _____ **3,000,000** _____ pounds of rocket fuel.
3. The largest use of hydrogen is in what industry?
petroleum
4. Where is hydrogen found?
It is not found free in nature. It must be manufactured.
5. Water can be split into _____ **hydrogen** _____ and _____ **oxygen** _____.
6. What do fossil fuels emit? **carbon dioxide and water**

$2\text{CH} + (\text{O}_2)$	$2\text{CO}_2 + \text{H}_2\text{O}$	
$\text{CH}_4 + (\text{O}_2)$	$\text{CO}_2 + 2\text{H}_2\text{O}$	Natural Gas
$\text{C}_8\text{H}_{18} + (\text{O}_2)$	$8\text{CO}_2 + 9\text{H}_2\text{O}$	Gasoline
7. What color was the future car?
black
8. What liquid would come from the exhaust of a hydrogen powered vehicle?
water
9. The H₂ auto engine runs _____ **quietly** _____ compared to the gasoline engine.

MISSION H₂
Scavenger Hunts

NAME _____

10. Americans drive a lot of miles each year. In fact, they drive enough miles to travel to the sun and back 8,500 times.
11. Suggestions to reduce the number of miles Americans drive each year include carpooling, public transportation and driving less.
12. Hydrogen is colorless and odorless.
13. You have to add an odorant to hydrogen in order to help detect leaks.
14. What color is the bag of trash in the garage?
green
15. What is a wind farm?
a field full of wind mills to generate electricity
16. An early market for fuel cells was golf carts, buses or fleet vehicles
17. The least expensive method of hydrogen production is steam reforming
18. Enough hydrogen is made by steam reformation to launch 100,000 space shuttles.
19. Nitrogen and hydrogen can be combined to produce ammonia.
20. In the water ponds, algae convert light energy from the sun into chemical energy used in photosynthesis to split water into hydrogen and oxygen.
21. What color is the trash truck at the power plant? yellow
22. Each person in the U.S. produces an average of 1,500 pounds of trash per year.
23. What is biomass? a general term to describe plant materials.
24. Farm crops can be grown for Food.
25. Hydrogen can be transported by truck and pipeline.
26. When hydrogen is pre-mixed with oxygen and ignited it will explode.
27. What are Van der Waals forces?
low energy attraction between molecules or atoms over a short distance

28. On the main screen, how many windmills are there?
one
29. On the main screen, how many swimming pools are there?
one
30. How many buttons are there in the shuttlecock pit prior to launch?
152
31. What color is the launch button?
Red
32. In large cities **pipelines** _____ might be the least expensive way to distribute hydrogen?
33. Research shows that hydrogen could be transported through existing **natural gas** _____ pipelines with some modifications.
34. The hydrogen plane would have a much **smaller** _____ wing area than that of today's commercial airplanes.

Now that you have completed the questions from the CD Rom, use your answers and the clues below to decipher the MYSTERY WORD!

_ F _ _ U _ _ E _ _ L _ _ _ C _ _ E _ _ L _ _ L _ _

CLUES:

1. The letter of the alphabet immediately following the first letter of the answer to #7 is the first letter of the second part of the mystery word.
2. The first letter of the answer to problem #26 appears twice in the mystery word.
3. The first letter of the answer to problem #13 appears three times in the mystery word.

DETERMINE THE MYSTERY WORD!

In the space provided below, use the mystery word in a sentence relating to hydrogen as an energy carrier.

Mission H₂ Scavenger Hunt #2

Introduction:

The *Mission H₂* CD Rom will take you on a journey through the various uses of hydrogen in suburbia and in the industrial sector. The program will also give you information on the future uses of hydrogen in these areas.

Your Task:

Your task will be to listen and watch carefully while using the program. There are a series of questions that you will need to answer to help you determine the mystery word at the end of your work.

Questions:

1. Name three household products that contain hydrogen.
2. The space shuttle contains _____ pounds of rocket fuel.
3. The largest use of hydrogen is in what industry?
4. Where is hydrogen found?
5. Water can be split into _____ and _____.
6. What do fossil fuels emit?
7. What color was the future car?
8. What liquid would come from the exhaust of a hydrogen powered vehicle?

SCAVENGER HUNTS
MISSION H₂

NAME _____

11. Suggestions to reduce the number of miles Americans drive each year include carpooling, public transportation and _____.
12. Hydrogen is colorless and _____.
13. You have to add a colorant and an odorant to hydrogen in order to help detect _____.
14. What color is the bag of trash in the garage?
15. What is a wind farm?
16. An early market for fuel cells was _____.
17. The least expensive method of hydrogen production is _____.
18. Enough hydrogen is made by steam reformation to launch _____ space shuttles.
19. Nitrogen and hydrogen can be combined to produce _____.
20. In the water ponds, algae convert light energy from the sun into _____ energy used in photosynthesis to split _____ into hydrogen and oxygen.
21. What color is the trash truck at the power plant?
22. Each person in the U.S. produces an average of _____ pounds of trash per year.
23. What is biomass?
24. Farm crops can be grown for _____.
25. Hydrogen can be transported by _____ and pipeline.
26. When hydrogen is pre-mixed with oxygen and ignited it will _____.

27. What are Van der Waals forces?
28. On the main screen, how many windmills are there?
29. On the main screen, how many swimming pools are there?
30. How many buttons are there in the shuttlecock pit prior to launch?
31. What color is the launch button?
32. In large cities _____ might be the least expensive way to distribute hydrogen?
33. Research shows that hydrogen could be transported through existing _____ pipelines with some modifications.
34. The hydrogen plane would have a much _____ wing area than that of today's commercial airplanes.

Now that you have completed the questions from the CD Rom, use your answers and the clues below to decipher the MYSTERY WORD!

CLUES:

1. The first letter of the major fuel discussed in the program is the first letter of the mystery word.
2. The first letter of the answer to #14 is in the mystery word somewhere.
3. The mystery word and the answer to problem # 14 both end in the same letter.
4. The first letter of the answer to problem #31 is also in the mystery word.
5. The first letter of the answer to #21 is the second letter of the mystery word.

DETERMINE THE MYSTERY WORD!

In the space provided below, use the mystery word in a sentence relating to hydrogen as an energy carrier.

Solutions & Suggestions

Mission H₂ Scavenger Hunt #2

Introduction:

The *Mission H₂* CD Rom will take you on a journey through the various uses of hydrogen in suburbia and in the industrial sector. The program will also give you information on the future uses of hydrogen in these areas.

Your Task:

Your task will be to listen and watch carefully while using the program. There are a series of questions that you will need to answer to help you determine the mystery word at the end of your work.

Questions:

1. Name three household products that contain hydrogen?
sugar, ammonia, wood, candle wax, natural gas, plastic, water
2. The space shuttle contains _____ **3,000,000** _____ pounds of rocket fuel.
3. The largest use of hydrogen is in what industry? **petroleum**
4. Where is hydrogen found? **It is not found free in nature. It must be manufactured.**
5. Water can be split into hydrogen and oxygen.
6. What do fossil fuels emit? **carbon dioxide and water.**

$2\text{CH}_4 + (\text{O}_2)$	$2\text{CO}_2 + \text{H}_2\text{O}$	
$\text{CH}_4 + (\text{O}_2)$	$\text{CO}_2 + 2\text{H}_2\text{O}$	Natural Gas
$\text{C}_8\text{H}_{18} + (\text{O}_2)$	$8\text{CO}_2 + 9\text{H}_2\text{O}$	Gasoline
7. What color was the future car? **black**
8. What liquid would come from the exhaust of a hydrogen powered vehicle? **water**
9. The H₂ auto engine runs quietly compared to the gasoline engine.
10. Americans drive a lot of miles each year. In fact, they drive enough miles to travel to the sun and back 8,500 times.

MISSION H₂

Scavenger Hunts

NAME _____

11. Suggestions to reduce the number of miles Americans drive each year include carpooling, public transportation and driving less.
12. Hydrogen is colorless and odorless.
13. You have to add a colorant and an odorant to hydrogen in order to help detect leaks.
14. What color is the bag of trash in the garage? **green**
15. What is a wind farm? **a field full of wind mills to generate electricity**
16. An early market for fuel cells was golf carts.
17. The least expensive method of hydrogen production is steam reforming.
18. Enough hydrogen is made by steam reformation to launch 100,000 space shuttles.
19. Nitrogen and hydrogen can be combined to produce ammonia.
20. In the water ponds, algae convert light energy from the sun into chemical energy used in photosynthesis to split water into hydrogen and oxygen.
21. What color is the trash truck at the power plant? **yellow**
22. Each person in the U.S. produces an average of 1,500 pounds of trash per year.
23. What is biomass? **a general term to describe plant materials**
24. Farm crops can be grown for hydrogen production.
25. Hydrogen can be transported by truck and pipeline.
26. When hydrogen is pre-mixed with oxygen and ignited it will explode.
27. What are Van der Waals forces?
low energy attraction between molecules or atoms over a short distance.
28. On the main screen, how many windmills are there? **one**
29. On the main screen, how many swimming pools are there? **one**
30. How many buttons are there in the shuttlecock pit prior to launch? **152**

31. What color is the launch button? **Red**
32. In large cities pipelines might be the least expensive way to distribute hydrogen?
33. Research shows that hydrogen could be transported through existing natural gas pipelines with some modifications.
34. The hydrogen plane would have a much smaller wing area than that of today's commercial airplanes.

Now that you have completed the questions from the CD Rom, use your answers and the clues below to decipher the MYSTERY WORD!

 H Y D R O G E N

CLUES:

1. The first letter of the major fuel discussed in the program is the first letter of the mystery word.
2. The first letter of the answer to #14 is in the mystery word somewhere.
3. The mystery word and the answer to problem #14 both end in the same letter.
4. The first letter of the answer to problem #31 is also in the mystery word.
5. The first letter of the answer to #21 is the second letter of the mystery word.

DETERMINE THE MYSTERY WORD!

In the space provided below, use the mystery word in a sentence relating to hydrogen as an energy carrier.

Mission H₂ Scavenger Hunt #3

Introduction:

The *Mission H₂* CD Rom will take you on a journey through the various uses of hydrogen in suburbia and in the industrial sector. The program will also give you information on the future uses of hydrogen in these areas.

Your Task:

Your task will be to listen and watch carefully while using the program. There are a series of questions that you will need to answer to help you determine the mystery word at the end of your work.

Questions:

1. Name three household products that contain hydrogen.
2. The space shuttle contains _____ pounds of rocket fuel.
3. The largest use of hydrogen is in what industry?
4. Where is hydrogen found?
5. Water can be split into _____ and _____.
6. What do fossil fuels emit?
7. What color was the future car?
8. What liquid would come from the exhaust of a hydrogen-powered vehicle?
9. The H₂ auto engine runs _____ compared to the gasoline engine.
10. Americans drive a lot of miles each year. In fact, they drive enough miles to travel to the sun and back _____ times.

11. Suggestions to reduce the number of miles Americans drive each year include carpooling, public transportation and _____.
12. Hydrogen is colorless and _____.
13. You have to add a colorant and an odorant to hydrogen in order to help detect _____.
14. What color is the bag of trash in the garage?
15. What is a wind farm?
16. An early market for fuel cells was _____.
17. The least expensive method of hydrogen production is _____.
18. Enough hydrogen is made by steam reformation to launch _____ space shuttles.
19. Nitrogen and hydrogen can be combined to produce _____.
20. In the water ponds, algae convert light energy from the sun into _____ energy used in photosynthesis to split _____ into hydrogen and oxygen.
21. What color is the trash truck at the power plant?
22. Each person in the U.S. produces an average of _____ pounds of trash per year.
23. What is biomass?
24. Farm crops can be grown for _____.
25. Hydrogen can be transported by _____ and pipeline.

26. When hydrogen is pre-mixed with oxygen and ignited it will _____.
27. What are Van der Waals forces?
28. On the main screen, how many windmills are there?
29. On the main screen, how many swimming pools are there?
30. How many buttons are there in the shuttlecock pit prior to launch?
31. What color is the launch button?
32. In large cities _____ might be the least expensive way to distribute hydrogen?
33. Research shows that hydrogen could be transported through existing _____ pipelines with some modifications.
34. The hydrogen plane would have a much _____ wing area than that of today's commercial airplanes.

Now that you have completed the questions from the CD Rom, use your answers and the clues below to decipher the MYSTERY WORD!

CLUES:

1. The fourth letter of the answer to #25 is the first letter of the mystery word.
2. The first letter of the answer to #12 is in the mystery word twice.
3. The first letter of the answer to #17 is in the mystery word twice.
4. The third to last letter of the mystery word is also the first and last letter of the answer to #26.
5. The first letter of the answer to #13 appears in the mystery word twice.

DETERMINE THE MYSTERY WORD!

In the space provided below, use the mystery word in a sentence relating to hydrogen as an energy carrier.

Solutions & Suggestions

Mission H₂ Scavenger Hunt #3

Introduction:

The *Mission H₂* CD Rom will take you on a journey through the various uses of hydrogen in suburbia and in the industrial sector. The program will also give you information on the future uses of hydrogen in these areas.

Your Task:

Your task will be to listen and watch carefully while using the program. There are a series of questions that you will need to answer to help you determine the mystery word at the end of your work.

Questions:

1. Name three household products that contain hydrogen?
sugar, ammonia, wood, candle wax, natural gas, plastic, water
2. The space shuttle contains 3,000,000 pounds of rocket fuel.
3. The largest use of hydrogen is in what industry? **petroleum**
4. Where is hydrogen found? **It is not found free in nature. It must be manufactured.**
5. Water can be split into hydrogen and oxygen.
6. What do fossil fuels emit? **carbon dioxide**
7. What color was the future car? **black**
8. What liquid would come from the exhaust of a hydrogen powered vehicle? **water**
9. The H₂ auto engine runs quietly compared to the gasoline engine.
10. Americans drive a lot of miles each year. In fact, they drive enough miles to travel to the sun and back 8,500 times.
11. Suggestions to reduce the number of miles Americans drive each year include carpooling, public transportation and driving less.
12. Hydrogen is colorless and odorless.

13. You have to add a colorant and an odorant to hydrogen in order to help detect leaks.
14. What color is the bag of trash in the garage? **green**
15. What is a wind farm? **a field full of wind mills to generate electricity**
16. An early market for fuel cells was golf carts.
17. The least expensive method of hydrogen production is steam reforming.
18. Enough hydrogen is made by steam reformation to launch 100,000 space shuttles.
19. Nitrogen and hydrogen can be combined to produce ammonia.
20. In the water ponds, algae convert light energy from the sun into chemical energy used in photosynthesis to split water into hydrogen and oxygen.
21. What color is the trash truck at the power plant? **yellow**
22. Each person in the U.S. produces an average of 1,500 pounds of trash per year.
23. What is biomass? **a general term to describe plant materials**
24. Farm crops can be grown for hydrogen production.
25. Hydrogen can be transported by truck and pipeline.
26. When hydrogen is pre-mixed with oxygen and ignited it will explode.
27. What are Van der Waals forces? **low energy attraction between molecules or atoms over a short distance**
28. On the main screen, how many wind mills are there? **one**

29. On the main screen, how many swimming pools are there? **one**
30. How many buttons are there in the shuttle-cock pit prior to launch? **152**
31. What color is the launch button? **red**
32. In large cities pipelines might be the least expensive way to distribute hydrogen?
33. Research shows that hydrogen could be transported through existing natural gas pipelines with some modifications.
34. The hydrogen plane would have a much smaller wing area than that of today's commercial airplanes.

Now that you have completed the questions from the CD Rom, use your answers and the clues below to decipher the MYSTERY WORD!

 C O L O R L E S S

CLUES:

1. The fourth letter of the answer to #25 is the first letter of the mystery word.
2. The first letter of the answer to #12 is in the mystery word twice.
3. The first letter of the answer to #17 is in the mystery word twice.
4. The third to last letter of the mystery word is also the first and last letter of the answer to #26.
5. The first letter of the answer to #13 appears in the mystery word twice.

DETERMINE THE MYSTERY WORD!

In the space provided below, use the mystery word in a sentence relating to hydrogen as an energy carrier.

Mission H₂ Scavenger Hunt #4

Introduction:

The *Mission H₂* CD Rom will take you on a journey through the various uses of hydrogen in suburbia and in the industrial sector. The program will also give you information on the future uses of hydrogen in these areas.

Your Task:

Your task will be to listen and watch carefully while using the program. There are a series of questions that you will need to answer to help you determine the mystery word at the end of your work.

Questions:

1. Name three household products that contain hydrogen.
2. The space shuttle contains _____ pounds of rocket fuel.
3. The largest use of hydrogen is in what industry?
4. Where is hydrogen found?
5. Water can be split into _____ and _____.
6. What do fossil fuels emit?
7. What color was the future car?
8. What liquid would come from the exhaust of a hydrogen powered vehicle?
9. The H₂ auto engine runs _____ compared to the gasoline engine.
10. Americans drive a lot of miles each year. In fact, they drive enough miles to travel to the sun and back _____ times.

NAME _____

11. Suggestions to reduce the number of miles Americans drive each year include carpooling, public transportation and _____.
12. Hydrogen is colorless and _____.
13. You have to add a colorant and an odorant to hydrogen in order to help detect _____.
14. What color is the bag of trash in the garage?
15. What is a wind farm?
16. An early market for fuel cells was _____.
17. The least expensive method of hydrogen production is _____.
18. Enough hydrogen is made by steam reformation to launch _____ space shuttles.
19. Nitrogen and hydrogen can be combined to produce _____.
20. In the water ponds, algae convert light energy from the sun into _____ energy used in photosynthesis to split _____ into hydrogen and oxygen.
21. What color is the trash truck at the power plant?
22. Each person in the U.S. produces an average of _____ pounds of trash per year.
23. What is biomass?
24. Farm crops can be grown for _____.
25. Hydrogen can be transported by _____ and pipeline.

26. When hydrogen is pre-mixed with oxygen and ignited it will _____.
27. What are Van der Waals forces?
28. On the main screen, how many windmills are there?
29. On the main screen, how many swimming pools are there?
30. How many buttons are there in the shuttle cock pit prior to launch?
31. What color is the launch button?
32. In large cities _____ might be the least expensive way to distribute hydrogen?
33. Research shows that hydrogen could be transported through existing _____ pipelines with some modifications.
34. The hydrogen plane would have a much _____ wing area than that of today's commercial airplanes.

Now that you have completed the questions from the CD Rom, use your answers and the clues below to decipher the MYSTERY WORD!

CLUES:

1. The answer to #28 plus the answer to #29 is the number of times the letter "S" appears in the mystery word.
2. There are the same number of O's in the mystery word as there are S's.
3. The fourth letter of the mystery word is the same as the first letter of the answer to #31.
4. The second letter of the mystery word is the first letter of the answer to #11.

DETERMINE THE MYSTERY WORD!

In the space provided below, use the mystery word in a sentence relating to hydrogen as an energy carrier.

Solutions & Suggestions

Mission H₂ Scavenger Hunt #4

Introduction:

The *Mission H₂* CD Rom will take you on a journey through the various uses of hydrogen in suburbia and in the industrial sector. The program will also give you information on the future uses of hydrogen in these areas.

Your Task:

Your task will be to listen and watch carefully while using the program. There are a series of questions that you will need to answer to help you determine the mystery word at the end of your work.

Questions:

1. Name three household products that contain hydrogen.
sugar, ammonia, wood, candle wax, natural gas, plastic, water
2. The space shuttle contains _____ **3,000,000** _____ pounds of rocket fuel.
3. The largest use of hydrogen is in what industry? **petroleum**
4. Where is hydrogen found? **It is not found free in nature. It must be manufactured.**
5. Water can be split into _____ **hydrogen** _____ and _____ **oxygen** _____.
6. What do fossil fuels emit? **carbon dioxide**

$2\text{CH}_4 + (\text{O}_2)$	$2\text{CO}_2 + \text{H}_2\text{O}$	
$\text{CH}_4 + (\text{O}_2)$	$\text{CO}_2 + 2\text{H}_2\text{O}$	Natural Gas
$\text{C}_8\text{H}_{18} + (\text{O}_2)$	$8\text{CO}_2 + 9\text{H}_2\text{O}$	Gasoline
7. What color was the future car? **black**
8. What liquid would come from the exhaust of a hydrogen powered vehicle? **water**
9. The H₂ auto engine runs _____ **quietly** _____ compared to the gasoline engine.
10. Americans drive a lot of miles each year. In fact, they drive enough miles to travel to the sun and back _____ **8,500** _____ times.

MISSION H₂
Scavenger Hunts

NAME _____

11. Suggestions to reduce the number of miles Americans drive each year include carpooling, public transportation and driving less.
12. Hydrogen is colorless and odorless.
13. You have to add a colorant and an odorant to hydrogen in order to help detect leaks.
14. What color is the bag of trash in the garage? **Green**
15. What is a wind farm? **a field full of wind mills to generate electricity**
16. An early market for fuel cells was golf carts.
17. The least expensive method of hydrogen production is steam reforming.
18. Enough hydrogen is made by steam reformation to launch 100,000 space shuttles.
19. Nitrogen and hydrogen can be combined to produce ammonia.
20. In the water ponds, algae convert light energy from the sun into chemical energy used in photosynthesis to split water into hydrogen and oxygen.
21. What color is the trash truck at the power plant? **yellow**
22. Each person in the U.S. produces an average of 1,500 pounds of trash per year.
23. What is biomass? **a general term to describe plant materials**
24. Farm crops can be grown for hydrogen production.
25. Hydrogen can be transported by truck and pipeline.
26. When hydrogen is pre-mixed with oxygen and ignited it will explode.
27. What are Van der Waals forces?
low energy attraction between molecules or atoms over a short distance
28. On the main screen, how many windmills are there? **one**
29. On the main screen, how many swimming pools are there? **one**
30. How many buttons are there in the shuttlecock pit prior to launch? **152**

31. What color is the launch button? **red**
32. In large cities **pipelines** might be the least expensive way to distribute hydrogen?
33. Research shows that hydrogen could be transported through existing **natural gas** pipelines with some modifications.
34. The hydrogen plane would have a much **smaller** wing area than that of today's commercial airplanes.

Now that you have completed the questions from the CD Rom, use your answers and the clues below to decipher the MYSTERY WORD!

_ O _ _ D _ _ O _ _ R _ _ L _ _ E _ _ S _ _ S _ _

CLUES:

1. The answer to #28 plus the answer to #29 is the number of times the letter "S" appears in the mystery word.
2. There are the same number of O's in the mystery word as there are S's.
3. The fourth letter of the mystery word is the same as the first letter of the answer to #31.
4. The second letter of the mystery word is the first letter of the answer to #11.

DETERMINE THE MYSTERY WORD!

In the space provided below, use the mystery word in a sentence relating to hydrogen as an energy carrier.

Mission H₂ Scavenger Hunt #5

Introduction:

The *Mission H₂* CD Rom will take you on a journey through the various uses of hydrogen in the city and at an airport. The program will also give you information on the future uses of hydrogen in these areas.

Your Task:

Your task will be to listen and watch carefully while using the program. There are a series of questions that you will need to answer to help you determine the mystery word at the end of your work.

Questions:

1. Hydrogen can be found all over our metropolitan city, both for transportation uses and for _____ power uses.
2. The 25-kilowatt PV systems pictured are being tested at _____.
3. Hydrogen gas needs _____ to be ignited.
4. Who was the Leak detection System developed for?
5. Hydrogen is the _____ and _____ of all elements.
6. Large amounts of hydrogen can be absorbed on the surface of microscopic carbon tubes called _____.
7. Are hydrogen-fueled vehicles actually on the road today?
8. The NEBUS can travel at speeds up to _____.
9. What provided the electricity for the drive system and auxiliary units of the NEBUS?

NAME _____

11. What three states have zero emission standards?
12. Where was the first hydrogen operating station built?
13. Converted Ford Rangers have a highway range of _____.
14. The volume of hydrogen required to fuel a plane is _____.
15. The hydrogen plane would require a _____ wing area than today's commercial planes.
16. Engine noise from airplanes is measured at _____.
17. Research indicates that hydrogen could be shipped in existing _____ with few modifications.
18. Hydrogen could be used to fuel commercial aircrafts in place of jet fuel as advancements are made to develop airplanes that are _____, _____, and perhaps _____.
19. The hydrogen plane is so quiet it can be compared to decibel levels of _____.
20. Hydrogen has _____ times the energy of conventional jet fuel.

Now that you have completed the questions from the CD Rom, use your answers and the clues below to decipher the MYSTERY WORD!

CLUES:

1. The first letter of the answer to question #2 is in the mystery word three times.
2. The first letter to the answer to question #10 is the fifth letter in the mystery word.
3. The first letter to the answer for question # 4 is the third letter in the mystery word.

DETERMINE THE MYSTERY WORD!

In the space provided below, use the mystery word in a sentence relating to hydrogen as an energy carrier.

Solutions & Suggestions

Mission H₂ Scavenger Hunt #5

Questions:

1. Hydrogen can be found all over our metropolitan city, both for transportation uses and for stationary power uses.
2. The 25-kilowatt PV systems pictured are being tested at Edward's Air Force Base.
3. Hydrogen gas needs air to be ignited.
4. Who was the Leak detection System developed for? **NASA**
5. Hydrogen is the lightest and smallest of all elements.
6. Large amounts of hydrogen can be absorbed on the surface of microscopic carbon tubes called nanotubes.
7. Are hydrogen-fueled vehicles actually on the road today?
Yes - You bet!
8. The NEBUS can travel at speeds up to 80 km/hr.
9. What provided the electricity for the drive system and auxiliary units of the NEBUS?
10 Fuel Stacks
10. The waste heat emitted from the cooling unit on the roof of the bus is actually just water vapor.
11. What three states have zero emission standards?
MA, CA, NY
12. Where was the first hydrogen operating station built?
South of Los Angeles International Airport, SunLine Transit
13. Converted Ford Rangers have a highway range of 140 miles.

14. The volume of hydrogen required to fuel a plane is very large.
15. The hydrogen plane would require a smaller wing area than today's commercial planes.
16. Engine noise from airplanes is measured at 110 decibels.
17. Research indicates that hydrogen could be shipped in existing natural gas pipelines with few modifications.
18. Hydrogen could be used to fuel commercial aircrafts in place of jet fuel as advancements are made to develop airplanes that are more efficient, quieter, environmentally friendly, and perhaps safer.
19. The hydrogen plane is so quiet it can be compared to decibel levels of waves at the seashore.
20. Hydrogen has three times the energy of conventional jet fuel.

Now that you have completed the questions from the CD-Rom, use your answers and the clues below to decipher the MYSTERY WORD!

 R E N E W A B L E

DETERMINE THE MYSTERY WORD!

In the space provided below, use the mystery word in a sentence relating to hydrogen as an energy carrier.

Mission H₂ Scavenger Hunt #6

Introduction:

The *Mission H₂* CD Rom will take you on a journey through the various uses of hydrogen in the city and at an airport. The program will also give you information on the future uses of hydrogen in these areas.

Your Task:

Your task will be to listen and watch carefully while using the program. There are a series of questions that you will need to answer to help you determine the mystery word at the end of your work.

Questions:

1. Hydrogen can be found all over our metropolitan city, both for transportation uses and for _____ power uses.
2. The office building produces premium power from a _____ fuel cell.
3. Hydrogen gas needs _____ to be ignited.
4. As long as hydrogen is self-contained there is no possibility of _____.
5. Hydrogen is the _____ and _____ of all elements.
6. Large amounts of hydrogen can be absorbed on the surface of microscopic carbon tubes called _____.
7. Are hydrogen-fueled vehicles actually on the road today?
8. The NEBUS can travel at speeds up to _____.
9. What provided the electricity for the drive system and auxiliary units of the NEBUS?

11. What three states have zero emission standards?
12. Where was the first hydrogen operating station built?
13. The ___ ___ light duty vehicles at the Palms Springs Regional Airport were each converted to run on a 9kW PEM fuel cell using hydrogen.
14. The volume of hydrogen required to fuel a plane is _____.
15. The hydrogen plane would require a _____ wing area than today's commercial planes.
16. Engine noise from airplanes is measured at _____.
17. Research indicates that hydrogen could be shipped in existing _____ with few modifications.
18. Hydrogen could be used to fuel commercial aircrafts in place of jet fuel as advancements are made to develop airplanes that are _____, _____, and perhaps _____.
19. The hydrogen plane is so quiet it can be compared to decibel levels of _____.
20. Hydrogen has _____ times the energy of conventional jet fuel.

NAME _____

Now that you have completed the questions from the CD Rom, use your answers and the clues below to decipher the MYSTERY WORD!

CLUES:

1. The first letter to the mystery word is the same letter as the first letter to the answer for question # 3.
2. The first letter of the mystery word is used one additional time somewhere in the mystery word.
3. The last letter of both answer choices for question #5 is used twice in the mystery word.
4. The first letter of the second word to the answer for question #10 is used somewhere in the mystery word.

DETERMINE THE MYSTERY WORD!

In the space provided below, use the mystery word in a sentence relating to hydrogen as an energy carrier.

Solutions & Suggestions

Mission H₂ Scavenger Hunt #6

Questions:

1. Hydrogen can be found all over our metropolitan city, both for transportation uses and for stationary power uses.
2. The office building produces premium power from a natural gas fuel cell.
3. Hydrogen gas needs air to be ignited.
4. As long as hydrogen is self-contained there is no possibility of ignition.
5. Hydrogen is the lightest and smallest of all elements.
6. Large amounts of hydrogen can be absorbed on the surface of microscopic carbon tubes called nanotubes.
7. Are hydrogen-fueled vehicles actually on the road today?
Yes - You bet!
8. The NEBUS can travel at speeds up to 80 km/hr.
9. What provided the electricity for the drive system and auxiliary units of the NEBUS?
10 Fuel Stacks
10. The waste heat emitted from the cooling unit on the roof of the bus is actually just water vapor.
11. What three states have zero emission standards?
MA, CA, NY
12. Where was the first hydrogen operating station built?
South of Los Angeles International Airport, SunLine Transit
13. The Gator light duty vehicles at the Palms Springs Regional Airport were each converted to run on a 9kW PEM fuel cell using hydrogen.

14. The volume of hydrogen required to fuel a plane is very large.
15. The hydrogen plane would require a smaller wing area than today's commercial planes.
16. Engine noise from airplanes is measured at 110 decibels.
17. Research indicates that hydrogen could be shipped in existing natural gas pipelines with few modifications.
18. Hydrogen could be used to fuel commercial aircrafts in place of jet fuel as advancements are made to develop airplanes that are more efficient, quieter, environmentally friendly, and perhaps safer.
19. The hydrogen plane is so quiet it can be compared to decibel levels of waves at the seashore.
20. Hydrogen has three times the energy of conventional jet fuel.

Now that you have completed the questions from the CD Rom, use your answers and the clues below to decipher the MYSTERY WORD!

A L T E R N A T I V E

DETERMINE THE MYSTERY WORD!

In the space provided below, use the mystery word in a sentence relating to hydrogen as an energy carrier.
