Biodiesel Notesheet C. Kohn, Waterford WI

Name: Hour Date:

Date Assignment is due: Why late? Score: + ✓ -
 Day of Week Date If your project was late, describe why

**Weekly Schedule: See Board and record**
Mon

Tues

Wed

Thurs

Fri

How does an internal combustion engine work?

How is a gasoline engine different from a diesel engine?

Why is diesel fuel more commonly used for semi trucks, trains, and ships?

What would be the advantages of using biodiesel instead of diesel?

*Page through this notesheet and your notes. Then answer the questions below:*
Circle one: *I need to review my notes & practice before the quiz.* Definitely – Yes – Sort of - No

Circle one: *I have never seen or heard of some of these concepts.* Definitely – Yes – Sort of - No

Circle one: *This may be a challenging unit for me personally.* Definitely – Yes – Sort of - No

Circle one: *I may need extra strategies for some topics/vocab.* Definitely – Yes – Sort of - No

**Directions**: Use the accompanying PowerPoint (*available online*) to complete this sheet. This sheet will be due upon the completion of the PowerPoint in class. These assignments are graded on a +/✓/- scale.

1. The internal combustion engine moves a vehicle by

 . When the mixture of fuel and air is , it

creates a that down a

turning a and
2. What enabled the internal combustion engine to become the primary source of power for transportation?
3. Why was the internal combustion engine not feasible until 1859?
4. The internal combustion engine developed through

 namely
5. Why were electricity and steam largely eliminated as means of transportation?
6. What are the two key characteristics of four stroke spark ignition engine?
7. Summarize what occurs during each of the four strokes. Shorten by rewriting in your own words:

Intake:

Compression:

Power:

Exhaust:
8. What is a compression ignition engine?
9. True or false: the compression ignition engine has no spark plugs. Explain:
10. Rudolph Diesel calculated that the required for the diesel engine would

also lead to . Diesel engines are very efficient because
11. Why would a greater concentration of oxygen enable a higher fuel efficiency?
12. Summarize the four strokes of a compression ignition engine in the spaces below. Shorten by rewording it to fit:
13. Summarize the primary problem with older models of diesel engines:
14. True or false: the more completely combusted a substance, the darker the smoke.

Explain:
15. What is particulate matter?
16. How has this problem been fixed? Answer by summarizing how modern diesel engines function:
17. What would be necessary in order to use diesel engines to substantially reduce US dependence on fossil fuels. Describe three key changes or developments that would be needed:
18. What is biodiesel?
19. True or false: biodiesel burns more cleanly than petroleum diesel fuel.
20. Biodiesel is both and .
21. How does the fuel economy of biodiesel compare to diesel fuel?
22. What is B100? What is B20?
23. What is a transesterification reaction?
24. What is wrong with a triglyceride molecule that is changed by transesterification?
25. What role does a strong base (such as KOH or NaOH) play in transesterification?

What is a catalyst?
26. The transesterification will convert the , , and into
27. Draw the transesterification process below:
28. The term ‘transesterification’ refers to
29. What is an ester?
30. Draw an ester here:
31. During transesterification, the triple-ester (or ) oil molecule will
32. How efficient is transesterification?
33. Summarize the four stages of transesterification below. Shorten by rewriting in your own words:
34. List the five main advantages of biodiesel below:
35. What is different about a biodiesel molecule that enables it to combust more completely than petroleum?
36. True or false: biodiesel has far less CO2 emitted when it is combusted than petroleum.
37. If this is true, then why is biodiesel a potential option for reducing atmospheric CO2? Explain using the term “carbon neutral”:
38. How does the flashpoint of biodiesel make it safer than petroleum?
39. How can the use of biodiesel lengthen the life of an engine? Explain by describing lubricity:
40. What is a cetane rating?
41. True or false: while B100 has a higher cetane rating than petroleum diesel, B20 is lower. Explain:
42. What is the biggest disadvantage of biodiesel?
43. How could the use of biodiesel actually potentially *increase* CO2 emissions?
44. In what three ways can biodiesel impair engine performance?
45. What are four reasons for using biodiesel despite its drawbacks?
46. Summarize the discovery at Michigan State University that could significantly increase the capacity for biodiesel production:
47. Summarize the discovery at the University of Wisconsin - Madison that could significantly increase the capacity for biodiesel production:
48. How might the successful cultivation of algae change the potential for biodiesel production?

Unit Wrap-up C. Kohn, Agricultural Sciences - Waterford WI

This page is designed to help raise your grade while enabling you to develop skills you will need for after high
school. You will need to complete every question and blank in order to receive full credit for your notes. Note: if you cannot come up with a strategy to remember a difficult concept on your own, see your instructor for help.

1. What is a topic or concept from this unit that you found to be more challenging? Write or describe below:

In the space below, create a mnemonic, rhyme, analogy, or other strategy to help you remember this particular concept:
2. What is a 2nd topic or concept from this unit that you found to be more challenging? Write or describe below:

In the space below, create a mnemonic, rhyme, analogy, or other strategy to help you remember this particular concept:
3. What is a 3rd topic or concept from this unit that you found to be more challenging? Write or describe below:

In the space below, create a mnemonic, rhyme, analogy, or other strategy to help you remember this particular concept:
4. Circle the most appropriate response. You will only be graded on whether or not you completed this section.

Circle one: *I used my notes outside of class to prepare for the quiz.* Definitely – Yes – Sort of - No

Circle one: *I took extra notes in the margins for very difficult concepts.* Definitely – Yes – Sort of - No

Circle one: *I created a personal strategy for at least three difficult items.* Definitely – Yes – Sort of - No

Circle one: *I was very involved and actively studying during the quiz review.* Definitely – Yes – Sort of - No

Circle one: *I think I will be satisfied with the quiz grade I received this week.* Definitely – Yes – Sort of - No

Circle one: *I might need to meet with the instructor outside of class.* Definitely – Yes – Sort of - No