

# Assessment for ASEEN Curriculum on Energy from Biomass

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1) Answer: \_\_\_\_\_

Waste vegetable oil belongs to which biofuel generation?

- A. 1st generation
- B. 2nd generation
- C. 3rd generation
- D. 4th generation

2) Answer: \_\_\_\_\_

Generally, non-woody biomass such as soybeans are processed to produce different liquid biofuels.

- A. True
- B. False

3) Answer: \_\_\_\_\_

Which comparatively yields the least ethanol per acre cultivated?

- A. Corn
- B. Sugar cane
- C. Soybeans

4) Answer: \_\_\_\_\_

In relation to biofuels, gasification converts carbon-based materials into:

- A. Carbon monoxide
- B. Hydrogen
- C. Carbon dioxide
- D. All of the above

5) Answer: \_\_\_\_\_

Which of these energy sources is renewable but not green?

- A. Biofuels
- B. Solar
- C. Wind
- D. Geothermal

6) Answer: \_\_\_\_\_

Biofuels are classified into how many generations?

7) Answer: \_\_\_\_\_

To qualify as 2nd generation, feedstock must:

- A. Not be suitable for human consumption
- B. Grown on marginal (non-agricultural) land
- C. Not require significant amounts of water or fertilizer
- D. All of the above

8) Answer: \_\_\_\_\_

In relation to biofuels, gasification, pyrolysis and torrefaction are a type of \_\_\_\_\_ conversion.

- A. Thermochemical
- B. Centrifugal
- C. Biochemical
- D. Statistical

9) Answer: \_\_\_\_\_

Currently (2015), the net energy invested into producing biofuel from algae is greater than the amount of energy that can be extracted from the fuel.

- A. True
- B. False

10) Answer: \_\_\_\_\_

The energy content of biodiesel is \_\_\_\_\_ % of its fossil fuel counterpart petroleum diesel.

- A. 70
- B. 80
- C. 90
- D. 100

11) Answer: \_\_\_\_\_

Which country is the world leading producer of corn and ethanol made from corn (2015)?

- A. China
- B. Brazil
- C. Ukraine
- D. United States of America

12) Answer: \_\_\_\_\_

Which of the following extraction technologies can be utilized to make 2nd generation biofuels?

- A. Thermochemical conversion
- B. Centrifugal conversion
- C. Biochemical conversion
- D. A and C

13) Answer: \_\_\_\_\_

Second generation biofuels are:  
A. Produced from food products  
B. Produced from sustainable feedstock  
C. Threaten the food chain  
D. All of the above

14) Answer: \_\_\_\_\_

Which method of cultivating algae is least efficient?  
A. Open ponds  
B. Closed-loop systems  
C. Photobioreactors  
D. Nuclearbioreactors

15) Answer: \_\_\_\_\_

Biodiesel is the biofuel counterpart to which of these traditional fossil fuels?  
A. Gasoline  
B. Methane  
C. Butane  
D. Diesel

16) Answer: \_\_\_\_\_

2nd generation biofuels are:  
A. Conventional biofuels  
B. Advanced biofuels  
C. Algae-based biofuels  
D. None of the above

17) Answer: \_\_\_\_\_

Biofuels are used for:  
A. Transportation  
B. Power generation  
C Heat  
D. All of the above

18) Answer: \_\_\_\_\_

Carbon fixation converts carbon dioxide into \_\_\_\_\_.  
A. Water molecules  
B. Hydrocarbon molecules  
C. Nitrogen molecules  
D. All of the above

19) Answer: \_\_\_\_\_

Which of the following algae cultivating systems could potentially be connected to carbon dioxide sources?

- A. Open ponds
- B. Closed-loop systems
- C. Photobioreactors
- D. Nuclearbioreactors

20) Answer: \_\_\_\_\_

Which yields the most ethanol per acre cultivated?

- A. Corn
- B. Sugar cane

21) Answer: \_\_\_\_\_

All "Green" energy is considered renewable but not all renewable energy is green.

- A. True
- B. False

22) Answer: \_\_\_\_\_

"Renewable" and "Green" are interchangeable. They mean the same thing.

- A. True
- B. False

23) Answer: \_\_\_\_\_

In relation to biofuels, torrefaction is a thermochemical conversion process similar to pyrolysis but performed at \_\_\_\_\_ temperatures.

- A. Higher
- B. Lower

24) Answer: \_\_\_\_\_

In relation to biofuels, pyrolysis yields the following product(s):

- A. Tars
- B. Char
- C. A and B
- D. None of the above

25) Answer: \_\_\_\_\_

Algae can grow in waste water.

- A. True
- B. False

26) Answer: \_\_\_\_\_

Which of the following is a 3rd generation biofuel?

- A. Switchgrass
- B. Soybeans
- C. Algae
- D. Municipal solid waste

27) Answer: \_\_\_\_\_

Most biofuels are at least as energy dense as coal but produce less carbon dioxide when burned.

- A. True
- B. False

28) Answer: \_\_\_\_\_

Photosynthesis is an example of:

- A. Biological carbon fixation
- B. Accidental mutations
- C. Cross-pollination
- D. Oxidation reactions

29) Answer: \_\_\_\_\_

To make ethanol, \_\_\_\_\_ requires heating and then fermentation while \_\_\_\_\_ requires only fermentation.

- A. Corn / sugar cane
- B. Sugar cane / soybeans
- C. Sugar cane / corn
- D. Coconuts / soybeans

30) Answer: \_\_\_\_\_

Fossil fuels are not renewable because they are:

- A. Toxic
- B. Limited in supply
- C. Made over millions of years
- D. All of the above

31) Answer: \_\_\_\_\_

First generation biofuels are:

- A. Conventional biofuels
- B. Food-based
- C. Threaten the food chain
- D. All of the above

32) Answer: \_\_\_\_\_

Which is a fossil fuel?

- A. Ethanol
- B. Biobutanol
- C. Methane
- D. Biodiesel

33) Answer: \_\_\_\_\_

Oils from jatropha or algae can be heated and used as fuel for diesel engines.

- A. True
- B. False

34) Answer: \_\_\_\_\_

To produce 2nd generation biofuels, pyrolysis involves heating up sustainable feedstock at \_\_\_\_ temperatures in the \_\_\_\_ of oxygen and the presence of an inert gas such as halogen.

- A. Low / presence
- B. Low / absence
- C. High / presence
- D. High / absence

35) Answer: \_\_\_\_\_

Green energy sources are replenishable AND they are good for the planet because they do not harm the ecosystems, contribute to acid rain, nor do they elevate global warming.

- A. True
- B. False

36) Answer: \_\_\_\_\_

Which are methods of cultivating algae?

- A. Open ponds
- B. Closed-loop systems
- C. Photobioreactors
- D. All of the above

37) Answer: \_\_\_\_\_

The structure of biofuels changes from one generation to the next.

- A. True
- B. False

38) Answer: \_\_\_\_\_

Henry Ford originally designed his famous Model T car to run on ethanol.

- A. True
- B. False

39) Answer: \_\_\_\_\_

Renewable energy sources are replenishable but not necessarily green.

- A. True
- B. False

40) Answer: \_\_\_\_\_

The energy content of ethanol is about \_\_\_\_\_ % that of its fossil fuel counterpart gasoline.

- A. 40%
- B. 50%
- C. 60%
- D. 70%

41) Answer: \_\_\_\_\_

Generally, woody biomass such as pine are burned to heat space or heat water to produce steam to generate electricity via a turbine generator.

- A. True
- B. False

42) Answer: \_\_\_\_\_

Any biofuel made from a feedstock that is edible is also a first generation biofuel.

- A. True
- B. False

43) Answer: \_\_\_\_\_

In relation to biofuels, which is true?

- A. Algae provide the largest yield per acre
- B. Algae can be genetically modified
- C. The use of algae has facilitated the production of butanol
- D. All of the above

44) Answer: \_\_\_\_\_

Generally, woody biomass such as coconuts are processed to produce different liquid biofuels.

- A. True
- B. False

45) Answer: \_\_\_\_\_

Which countries combined produce approximately 87% of the world's ethanol fuel?

- A. U.S. and Canada
- B. Canada and China
- C. U.S. and Brazil
- D. Brazil and Mexico

46) Answer: \_\_\_\_\_

Which of the following biological processes is associated with producing biofuels?

- A. Cellular differentiation
- B. Fertilization
- C. Hybridisation
- D. Carbon fixation

47) Answer: \_\_\_\_\_

Biomass is:

- A. Dead inorganic matter
- B. Living plant tissue
- C. Dead organic matter
- D. Inorganic waste

48) Answer: \_\_\_\_\_

Ethanol can be made by fermenting sugar crops or starch.

- A. True
- B. False



49) Answer: \_\_\_\_\_

What is needed to accomplish photosynthesis?

- A. Water
- B. Carbon dioxide
- C. Light
- D. All of the above

50) Answer: \_\_\_\_\_

\_\_\_\_\_ is more popular in the Americas while \_\_\_\_\_ is more popular in Europe.

- A. Biodiesel / bioethanol
- B. Bioethanol / biodiesel

51) Answer: \_\_\_\_\_

What is a product of photosynthesis?

- A. Water
- B. Oxygen
- C. Carbohydrates
- D. All of the above

52) Answer: \_\_\_\_\_

The energy content of butanol is about \_\_\_\_\_ % that of its fossil fuel counterpart gasoline.

- A. 70
- B. 80
- C. 90
- D. 100

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