**Biogas**

Please read and complete.

Fossils\_\_\_\_\_\_\_\_\_\_ are running out. There is a \_\_\_\_\_\_\_\_\_\_\_\_\_ supply of gas, coal and \_\_\_\_\_\_\_\_\_\_\_. Biogas is a form of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy. Biogas is made when bacteria breakdown \_\_\_\_\_\_\_\_\_\_\_\_\_\_ material under \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ conditions. This is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This produces the gas \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and some other gases e.g. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Waste material includes\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and plant material. All of which contains \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The bacteria that work to breakdown the organic material work best at \_\_\_\_\_\_\_\_\_\_\_\_ deg C. Biogas generators are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to keep the ideal temperature inside. Reactions that generate heat are known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions. The material that is not broken down can then be used as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Most biogas generators and small and only big enough for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. China’s biogas generators make a lot of excellent \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ but small amounts of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ biogas. However, India’s biogas generator does not make such good fertiliser but makes very good biogas because they use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ only. Farm waste and food waste is now being considered as a source of carbohydrate for the bacteria to ferment.

Complete the table…for a FLOATING DRUM biogas generator

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| --- | --- |
| **Advantages** | **Disadvantages** |
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|  |  |
|  |  |

Complete the table…for a FIXED DOME biogas generator

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| --- | --- |
| **Advantages** | **Disadvantages** |
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|  |  |
|  |  |

Complete the table…for a BATCH biogas generator

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| --- | --- |
| **Advantages** | **Disadvantages** |
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|  |  |

Now, please draw and label a biogas generator.

**Biofuels**

Fill in the flow diagram below.

What are the two sources of carbohydrate? How is the sucrose obtained? How is the glucose obtained? Why is an enzyme used?

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What organism is used to breakdown the sugars?

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What process is used to separate the water from the ethanol? What comes out first? Why does it come out first?

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Ethanol is said to be an ideal fuel. List 3 reasons why. What is it being mixed with to make gasohol?

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Ethanol is carbon neutral. What does that mean?

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What economical and environmental problems / reasons NOT to produce and use ethanol in cra engines?

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| --- |
|  |

Filmi:

[Biomass and climate change: Burning wood for energy in 21st century (cnbc.com)](https://www.cnbc.com/2017/09/15/biomass-and-climate-change-burning-wood-for-energy-in-21st-century.html)