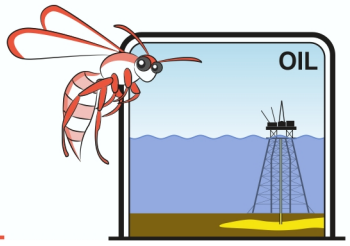
It's A Gas! - Student Activity



Energy from the Sun helps plants and some microbes grow through photosynthesis. Other organisms can then consume the plants and microbes to generate their own energy. Organic material, such as plants and microbes, trapped within sediments can be changed, by increasing temperature and pressure during burial, into ***kerogen*** (a waxy dense ***hydrocarbon***). As these kerogens undergo further burial they are converted into oil and gas. The process of making hydrocarbons is very slow, taking at least 60 million years.

There are many different types of kerogen, depending on the type of organic material it formed from. Some kerogens are more likely to turn into gas than oil and vice versa, there is even a type of kerogen that doesn't turn into oil or gas.

The hydrocarbons are released over time. Being less dense than the rock they are contained within, they rise upward through interlinked pores or fractures in the overlying rock (these rocks are permeable). Both oil and gas can be found together in reservoirs (rock containers they have become trapped within).

If hydrocarbons reach the surface, they are usually digested by microbes.

Please fill in the blanks in the following cloze.

SUN ENERGY is converted to energy by **P**_____, and **M**_____ Animals gain energy by consuming plants and other animals. Plants and microbes in our oceans can be buried and converted into **K**_____. If it is buried between 3 and 4.5 kilometres deep the kerogen is converted into **O**_____. Slightly deeper burial (4-6 km) produces G_____. Both oil and gas are sources of **E**_____.

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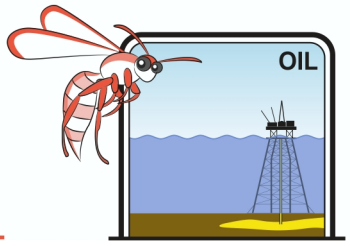
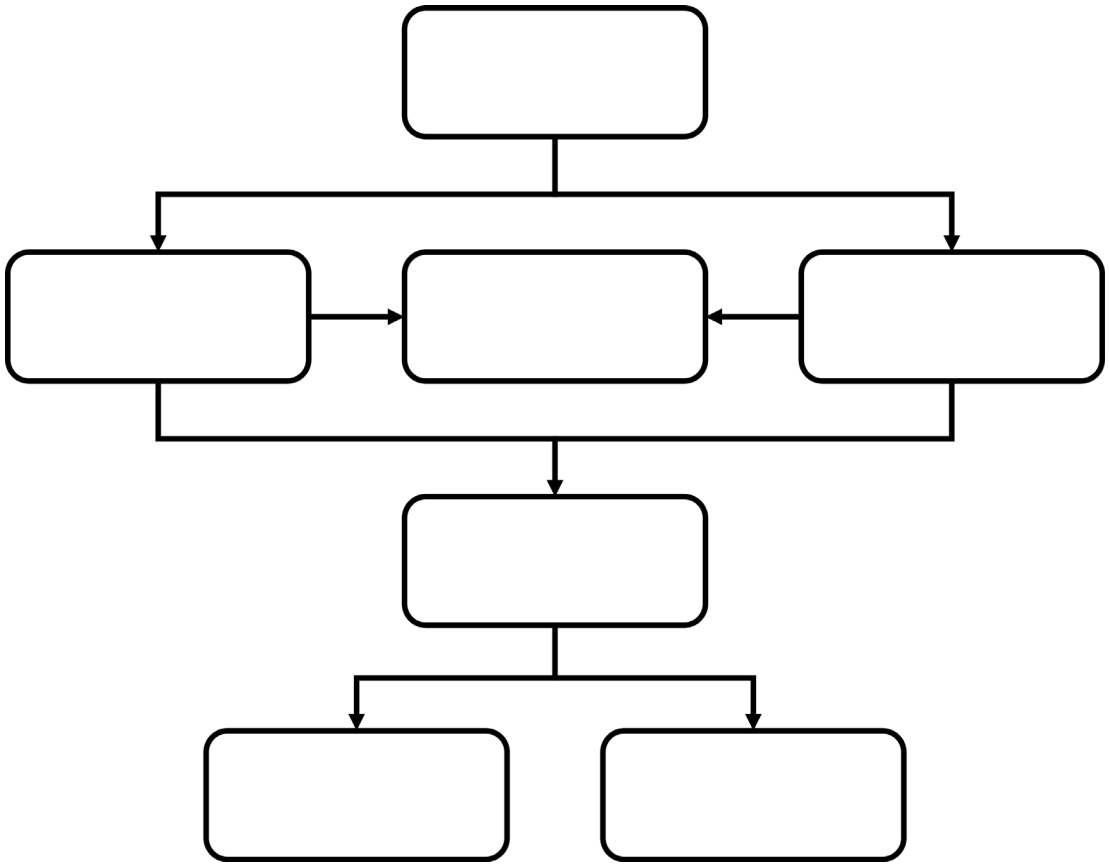
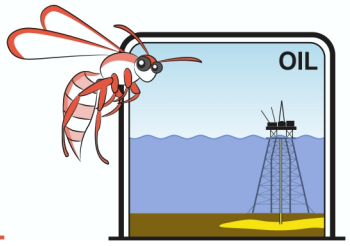


Complete the flowchart below showing the flow of energy using the information given above.

Extension: Add the words Atmosphere, Biosphere and Lithosphere





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Student Activity: It's a gas!

Aim: To model the formation of hydrocarbons

Materials required per person or group:

- Newspaper to cover bench.
- 2L plastic cool drink bottle with biohazard label.
- 1 large balloon – very well stretched.
- Strong sealing tape.
- 5 shredded lettuce leaves (or any soft green plant).
- 1 tablespoon of tinned or fresh fish.
- Sand, soil and a funnel
- 1.5L pond water or water from drainage tray under plant pots.

SAFETY NOTES

- Label bottle "DO NOT OPEN" with a biohazard symbol.
- Do not expose the equipment to open flame.
- Dispose of carefully after use.

Method

1. Spread newspaper to cover the work area.
2. Using the funnel, place some sand in the bottom of the bottle
3. Add alternating layers of shredded lettuce, fish and sand to the bottle. Finish with a layer of soil.
4. Carefully add pond water to the bottle making sure to not damage the layers of organic matter and sand. *Tip: this can be achieved by using a 'rod' for the water to flow down or pouring down the side of the bottle.*
5. Inflate and deflate the balloon multiple times to ensure it is well stretched.
6. Fit the well-stretched balloon over the neck of the bottle and seal well with tape.
7. Create a biohazard label and tape it to the bottle.
8. Gently relocate the bottle to a warm place and record your observations in the table below over the duration of the experiment. You may wish to add photos to the table to track the changes.

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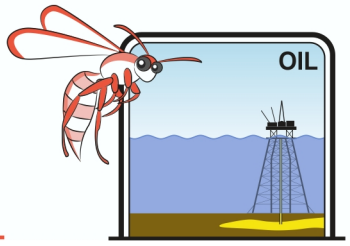

Results

Days	Observations
0	

Discussion

What caused the balloon to inflate? _____

What was the source of this? _____

How can the results of this experiment be used to suggest alternative uses of garbage dumps?

_____

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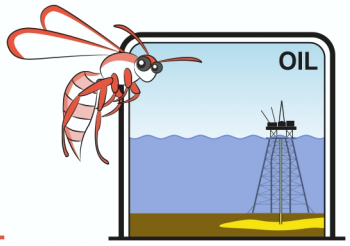

Conduct some research to find where garbage is being used in this way.

a) Give the URL of your information source

_____

b) Give the location this is happening

_____

c) What is the gas used for?

_____

Why did we not create oil in the laboratory?

_____

_____

Are oil and gas resources?

_____

Explain your answer

_____

_____

_____

With the aide of a diagram, explain the change that happens to the balloon

_____

_____

_____

_____

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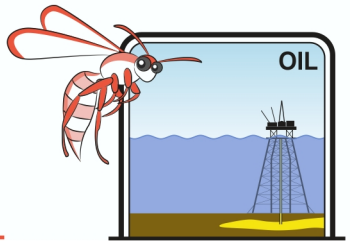

Diagram: