

# B2: RECYCLING & CARBON CYCLE

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## Learning Objectives

- × Be aware of some issues about rubbish and significance of 'natural recycling'
- × Understand how plants recycle carbon
- × Understand how carbon is cycled in the sea (H)

## Success Criteria

- × Explain the carbon cycle
- × Be able to arrange the carbon cycle from labels and pictures
- × Successfully answer questions on experiment on burning plant material and heating glucose

# TO START

- ✘ Watch the video and write down 2 or 3 reasons why rubbish is become an increasing problem (you will be asked questions!)



- ✘ <http://www.theglobeandmail.com/video/chinas-garbage-problem/article1402177/>

# RECAP ON ENERGY EFFICIENCY

$$\text{efficiency} = \frac{\text{energy used for growth (output)}}{\text{energy supplied (input)}}$$

**A lion gains 2000kJ of energy from anything it eats. It loses 400kj in heat, 600kj in excretion and 700kj in movement (respiration).**

Q1: How much energy is left for growth? 300kj

Q2: What is its energy efficiency?  $300/2000 = 0.15$   
 $= 15\%$

# QUESTIONS

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List the gases in the air.

Nitrogen, oxygen, argon, carbon dioxide

Which has the greatest percentage?

$N_2$ : 78%

$O_2$ : 21%

Ar: 1%

$CO_2$ : 0.04%

What are the gases used for?

Respiration, photosynthesis

# 'NATURAL' RECYCLING



**Carbon is one element that is recycled naturally.....**

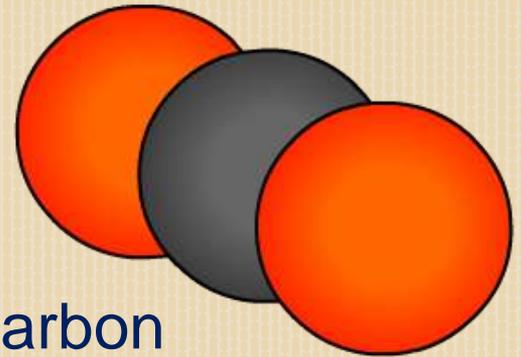
- × Consider the life of a pet fish
  - × Fish eats food
  - × Chemicals in food used for energy and growth
  - × Fish dies and is buried in ground decays
  - × Chemicals released into the ground and used by plants

# WHY IS CARBON IMPORTANT?

Proteins, fats and sugar all contain **carbon**. Life without carbon would be very different and might be impossible.

Carbon is present in the atmosphere in what form? **Carbon dioxide**

Plants use carbon dioxide during **photosynthesis** to produce sugars. The carbon is then transferred to animals along food chains.



What happens to the carbon in organisms when they die?

- As dead matter decomposes, carbon is released back into the atmosphere in the form of carbon dioxide.
- The carbon from dead organisms can also form fossil fuels and sedimentary rocks such as limestone. These are **long-term carbon stores**.

# CARBON CYCLE VIDEO

- × Watch the video of the carbon cycle and answer the following:

<http://www.youtube.com/watch?v=1o4ODWMZq5U> (up to minute 4)

- × Write in your books:

- + Carbon is released into the air by:

- × 1. From the video – write down three ways in bullet points
- × 2.
- × 3.

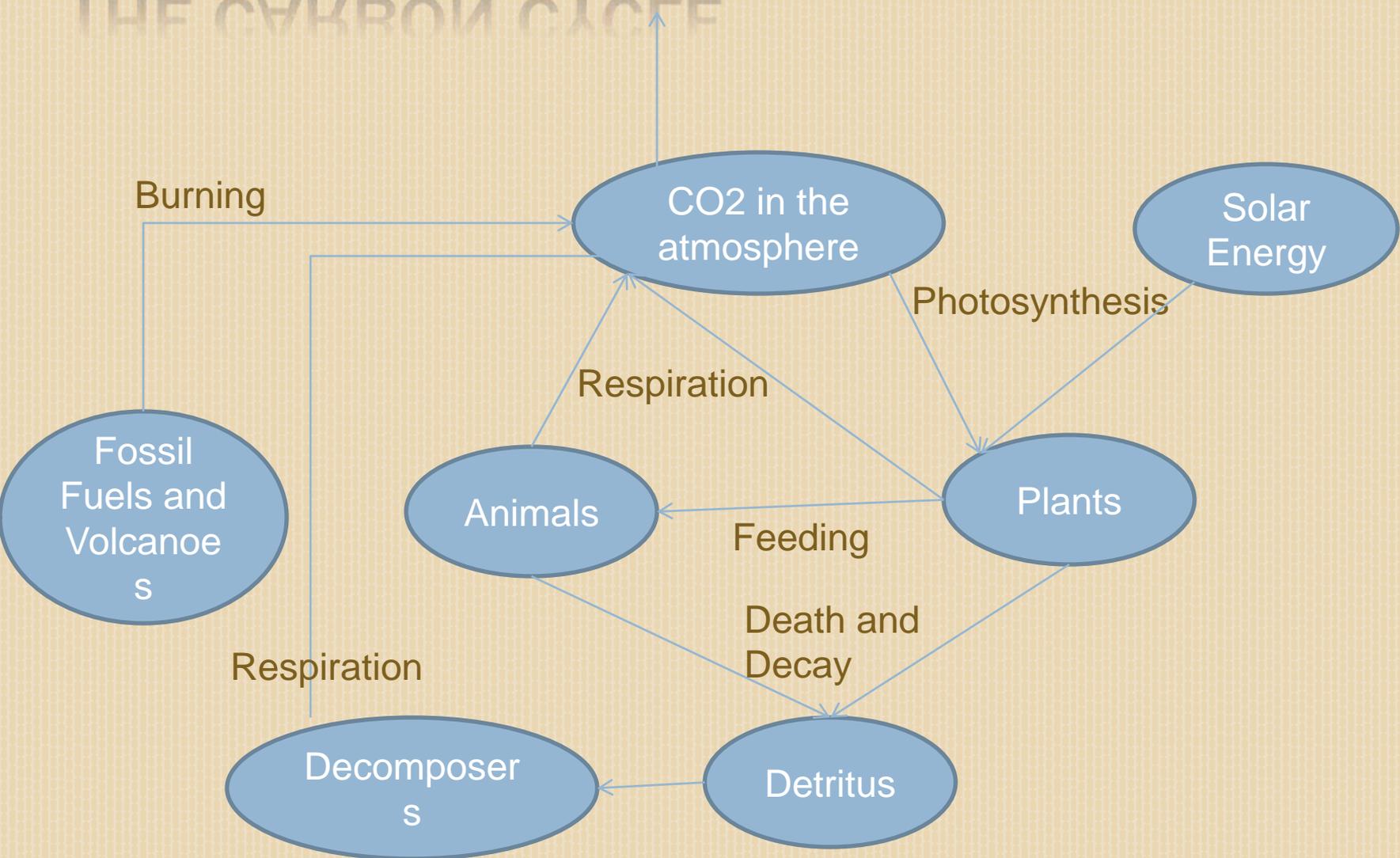
- + Carbon is taken in by plants by the process of .....

- + Carbon moves through the food chain when plants are ..... by animals.

- + When plants and animals die, carbon is released into the air by decomposition. Two examples of decomposers are ..... and

.....

# THE CARBON CYCLE



# MORE ON THE CARBON CYCLE

Carbon is also recycled in the sea:

- Marine organisms such as molluscs, corals and microscopic algae contain **carbonates**.
- When these organisms die their shells collect on the sea floor.
- Over millions of years they form a type of **sedimentary rock** called **limestone (a.k.a calcium carbonate)** (e.g. White cliffs of Dover).
- When it rains, carbon dioxide reacts with the **weathers** the rock – releasing carbon dioxide into the air.



# QUESTIONS – 5 MINUTES TO ANSWER

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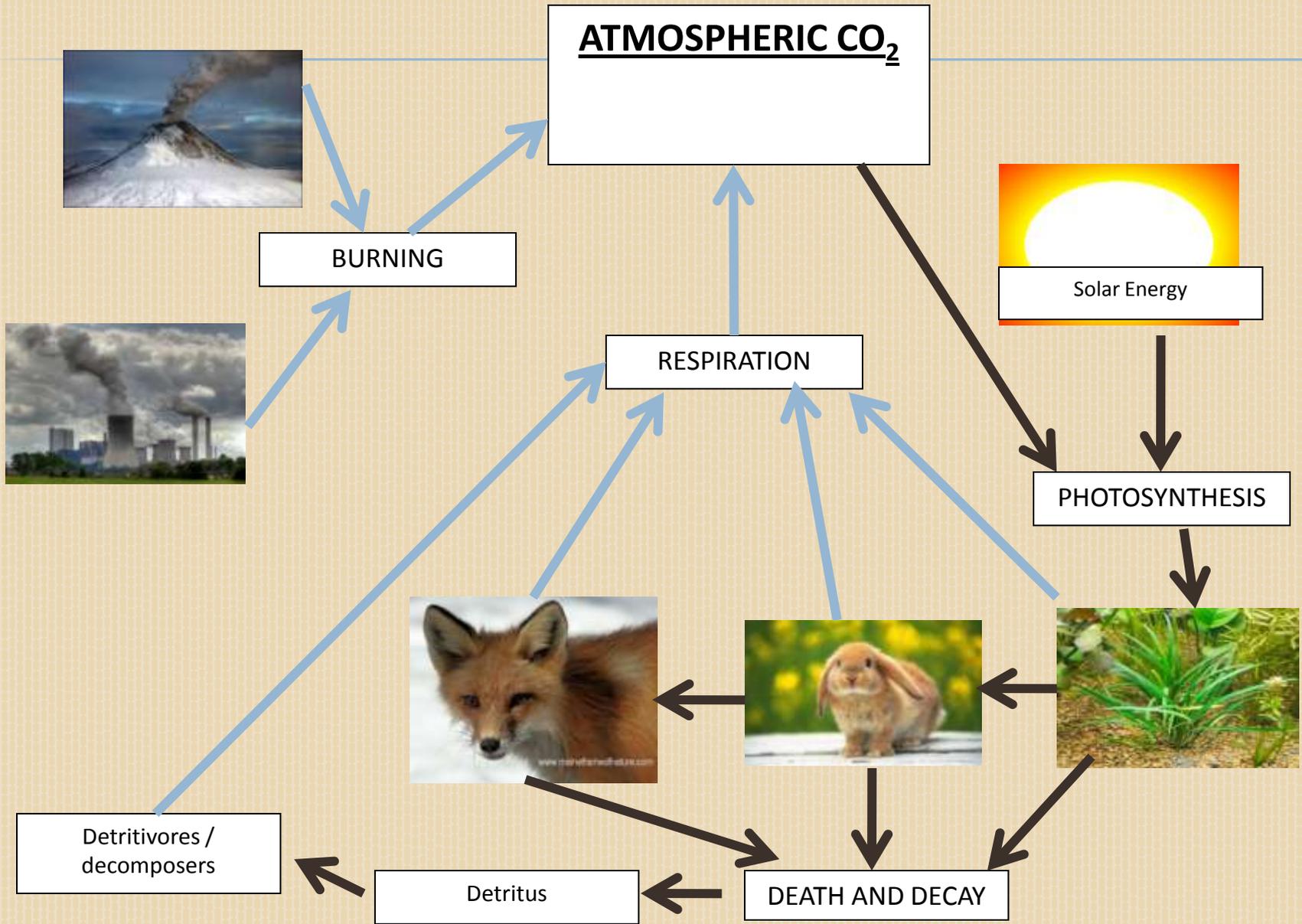
× Answer in your books in full sentences...

1. Why do forest fires release a lot of carbon?
2. Why might scientists describe limestone as a useful 'carbon sink'?
3. Limestone is not a good choice to use in city buildings. Why?

# TASK

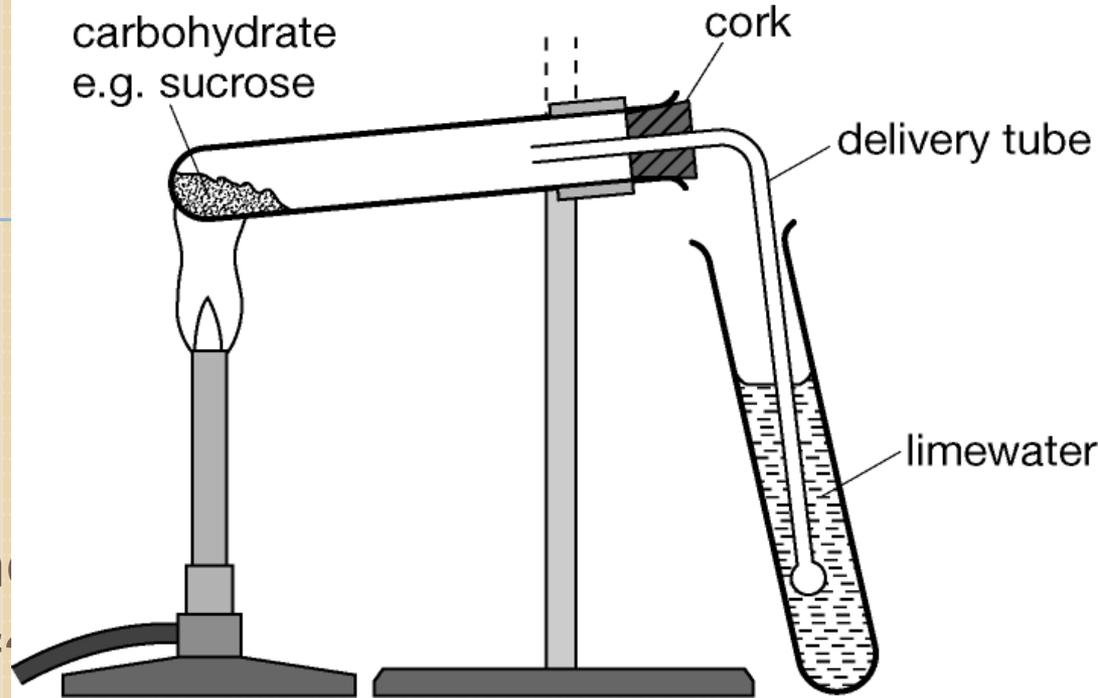
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- ✘ Cut out the labels and pictures and arrange them into the Carbon Cycle on your page
- ✘ Add in the arrows to show the direction the carbon is flowing
- ✘ Now stick it all down



# PRACTICAL DEMO

## Answer questions: BURNING LEAVES



1. What element does the leaf residue consist of?
2. What gas is released from burning leaves?

## HEATING CARBOHYDRATE (above diagram)

1. What happens to the limewater?
2. What does this prove about the gas released when glucose burns?
3. Write down two ways in which the burning of glucose is similar to respiration?



# PLENARY

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- × Close your books.
- × Try and draw the carbon cycle from memory in rough