

THE CARBON CYCLE and CLIMATE CHANGE WORKSHEET

A. True or False. Justify each answer in the space provided on the worksheet.

1. Without carbon life in Earth would not exist. _____

2. The amount of Carbon on Earth is infinite – more carbon is created over time. _____

3. Most carbon is stored in Earth's biosphere (plants and animals). _____

4. Oceans are a carbon sink – they absorb carbon. _____

5. Carbon dioxide is a greenhouse gas. _____

6. Erosion and volcanoes release carbon into the atmosphere. _____

7. Carbon is naturally stored as hydrocarbons in the lithosphere. _____

8. Earth's natural systems can effectively remove carbon from the atmosphere. _____

9. Carbon reduction technology is an experimental solution to removing carbon from the atmosphere. _____

10. I can draw a simple diagram of the Carbon Cycle without supporting resources. _____

B. Poster Pack Activities (Teamwork)

Team members: _____

1. Agreed definitions

Phytoplankton:

Photosynthesis:

Respiration:

Hydrocarbon:

Combustion:

Calcium carbonate:

Carbonic acid:

Chemical weathering:

Subduction (crustal):

Gigaton:

Reservoir:

pH:

Anomaly:

COMPLETE QUESTIONS 2 and 3 ON A BLANK PAGE

2. **Draw** a diagram of the natural carbon cycle without using any resources. Label each sphere on the diagram - atmosphere, lithosphere, biosphere and lithosphere.
3. Each team member in turn will visit the large carbon cycle poster and return with additional information to **ADD TO** or **CORRECT** the team diagram. Discuss each addition before adding content to you diagram. Continue until the diagram mimics or improves on the wall poster.

Refer to your **Carbon Cycle Diagram**.

- Describe how the rate of carbon exchange between spheres varies. Suggest reasons for this variation.

- Explain ONE pathway in which carbon cycles between the atmosphere and the lithosphere and back to the atmosphere.

- Describe how carbon moves to and from deep ocean storage.

- How is buried hydrocarbon released into the atmosphere?

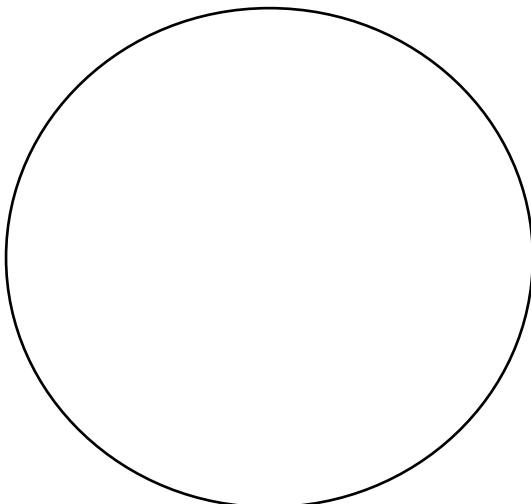
Visit each of the small carbon posters to complete the following worksheet questions.

Refer to the **Carbon Reservoirs** poster.

- List the global storages of carbon from highest to lowest stores.

- Calculate the total weight of global carbon (in Gt)

- Calculate the % of global carbon in each reservoir and represent in a PIE GRAPH (Sector Graph)



Key	Reservoir	Gts	% of total Carbon	Degrees
	Earth	Total =	100%	360 degrees

- Identify two sources on carbon in the biosphere.

- Calculate the total amount of atmospheric carbon in another 50 years.

- Explain potential sources of this additional carbon.

Refer to the **Hydrocarbon Formation** poster

- Describe steps in the formation of coal over time

- Describe steps in the formation of oil and gas over time

- Explain what is happening to hydrocarbon storages in the ‘present day’

- Make a judgement about the rate of change for the ‘Really old’ and ‘Present Day’ stages of hydrocarbon formation.

- Suggest the implications of present-day human activities for global carbon distribution.

Refer to the **Carbon and the Greenhouse Effect** poster

- Identify 4 Greenhouse gases

- What feature of Greenhouse Gases is most important for life on Earth?

- What happens to solar radiation (light) when it reaches Earth?

- What happens to the infrared radiation emitted from earth?

- State two differences between solar radiation and infrared radiation.

- Explain how an increase in Greenhouse gases changes the natural process known as the Greenhouse Effect.

Refer to the **Carbon and Climate Change** poster

- Calculate the change in Atmospheric CO₂ concentrations between 1860 and 2020.

- Describe the trend in Global Atmospheric CO₂ Concentrations since 1940.

- Explain the link between CO₂ concentrations and Ocean pH (acidity) and the impact of the change identified?

- Describe the anomaly shown in the Global Temperature Anomaly Graph.

- What the connection between CO₂ concentration and the Global Temperature Anomaly?

- Why is the relationship between Atmospheric Carbon Concentrations and the Global Temperature Anomaly called a 'positive feedback'.

- List FOUR 'knock on effects' of the Global Temperature Anomaly.

- Differentiate between Sea Ice AND an Ice Mass (Greenland and Antarctica).

- Where has Ice Mass loss been greatest? Use statistics in your answer.

- Assess the Validity, Reliability and Usefulness of the information in this poster.

4. [Add](#) at least one human change to each sphere on your Carbon Cycle Diagram
5. On completion of your Carbon Cycle diagrams and worksheet [compose an original paragraph](#) for your team to explain the Carbon Cycle and connections to climate Change to Year 10 students. Allocate each team member something to say. Test your team explanation with another class group or a selected year 10 class. You can incorporate the posters into your presentation.

