

EXAMEN : BACCALAURÉAT GÉNÉRAL	SESSION 2013
ÉPREUVE : Évaluation spécifique de langue en section européenne	
PHYSIQUE-CHIMIE en langue ANGLAISE	SUJET N° 12
Thème : « Chimie et environnement »	

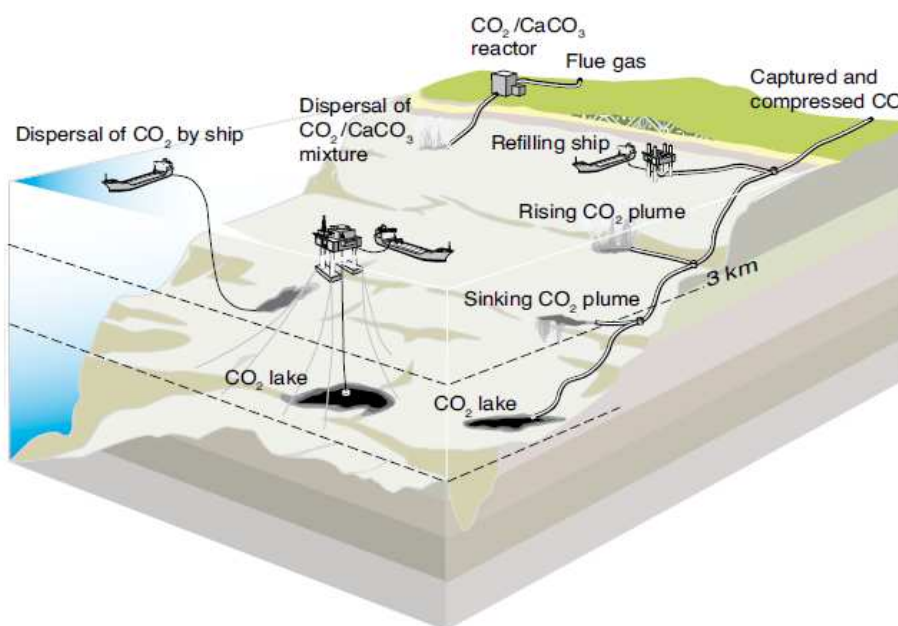
Carbon dioxide storage

Captured CO_2 could be deliberately injected into the ocean at great depth, where most of it would remain isolated from the atmosphere for centuries. CO_2 can be transported via pipeline or ship for release in the ocean or on the sea floor. There have been small-scale field experiments and 25 years of theoretical, laboratory, and modelling studies of intentional ocean storage of CO_2 , but ocean storage has not yet been deployed or thoroughly tested.

The increase in atmospheric CO_2 concentrations due to anthropogenic emissions has resulted in the oceans taking up CO_2 at a rate of about $7 \text{ GtCO}_2\text{yr}^{-1}$. Over the past 200 years the oceans have taken up 500 GtCO_2 from the atmosphere out of 1300 GtCO_2 total anthropogenic emissions.

Anthropogenic CO_2 resides primarily in the upper ocean and has thus far resulted in a decrease of pH of about 0.1 at the ocean surface with virtually no change in pH deep in the oceans.

Models predict that the oceans will take up most CO_2 released into the atmosphere over several centuries as CO_2 is dissolved at the ocean surface and mixed with deep ocean waters. The oceans absorb large quantities of CO_2 from the atmosphere principally because CO_2 is a weak acidic gas, and the minerals dissolved in sea water have created a mildly alkaline ocean. The exchange of atmospheric CO_2 with ocean surface waters is determined by the chemical equilibrium between CO_2 and carbonic acid H_2CO_3 in sea water.



From: <http://www.ipcc.ch/pdf/special-reports/srccs/SRCCS> Intergovernmental Panel on Climate Change website

plume = smoke
 $\text{pK}_\text{A} (\text{CO}_2, \text{H}_2\text{O} / \text{HCO}_3^-) = 6.4$

flue = pipe
 $\text{GtCO}_2\text{yr}^{-1}$ = gigaton of CO_2 per year

Questions:

- Comment on the text and describe the picture.
 - Explain the influence of carbon dioxide on the pH of water.
- Give other examples of uses in the field of sustainable development.