

# How are people changing the climate?

## Basics

### 1. Man-made climate change?

#### Solution: Worksheet 3

#### 1.

When trees grow they absorb  $\text{CO}_2$  from the atmosphere through photosynthesis. When trees burn in forest fires, an amount of carbon stored in the trees is released back to the atmosphere in the form of  $\text{CO}_2$ . In this way the release of  $\text{CO}_2$  through forest fires goes through the natural carbon cycle.

When combusting fossil fuels,  $\text{CO}_2$  is emitted to the atmosphere. This  $\text{CO}_2$  is not a natural part of the carbon cycle. Gas, oil and coal are brought up from far underground or under the ocean floor, and would not have played any role in the carbon balance in the atmosphere if it was not for human intervention.

Consequently this excess  $\text{CO}_2$  from fossil fuels, on top of the  $\text{CO}_2$  which naturally goes in the carbon cycle, attract attention and concern, while the release of  $\text{CO}_2$  from forest fires is regarded as a natural process.

Nevertheless - trees, forests and wooden constructions (in building etc.) are seen as a means for storing  $\text{CO}_2$  and thereby keeping  $\text{CO}_2$  away from the atmosphere. Forest fires and fires in buildings counteract this.

#### 2.

a)

A floating ice block that melts in water does not alter the surface level of the water. This reflects Archimedes' Principle.

b)

An ice block melting on top of a pebble will make the surface water level rise.

c)

When ice floating in the sea near the North Pole melts, the sea level will not be altered, while when ice on the continent at the South Pole melts, the sea level will be higher. a) is a model of the North Pole, while b) is a model of the South Pole.

### **3.**

When the temperature of the water increases, the water expands (through thermal expansion) and the surface level of the water rises.

This is a model of what happens with the sea level. Climatic change causing global warming will lead to higher temperatures in the oceans which in turn lead to thermal expansion of the seawater and a sea level rise.