



## Equipment (per set)

1L measuring cylinder  
1 retort stand and clamps  
200ml 0.1M NaOH  
400ml water  
Universal Indicator solution pH 3-10  
Dry ice  
goggles  
tissue to mop up spills  
glass rod

## Instructions: Ocean Acidification

1. Put goggles on. Clamp the measuring cylinder so it is stable.
2. Add the NaOH and water into the measuring cylinder. Add a few squirts of indicator solution.
3. Slowly add a few pellets of dry ice to the measuring cylinder till the “fog” spills out of the cylinder. **[NB: If the dry ice freezes to the side of the cylinder use the glass rod to break it up. If not removed from the side of the cylinder it may shatter.]**

### What Happens?

The solution in the measuring cylinder starts off alkali and is coloured purple by the indicator solution. After adding the dry ice, the solution changes colours and ends up yellow.

### Context

The purple alkali solution represents the Earth oceans. The dry ice added represents increasing CO<sub>2</sub> levels in the atmosphere. As the dry ice is added to the water it sublimates and the CO<sub>2</sub> gas is dissolved in the solution increasing its acidity.

Atmospheric CO<sub>2</sub> is absorbed by the oceans increasing acidity and temperature in the oceans. Whilst this is a naturally occurring process, anthropogenic CO<sub>2</sub> emissions have accelerated it.

With increasing ocean acidity, ocean temperature also rises. This can cause the erosion of coral reefs – a habitat for a range of sea-life ultimately making it uninhabitable. Effects on life include: increasing ocean acidity affects gene function, reduce cellular stress response, suppress metabolism and decrease cellular renewal. **[see images]**.