

Exploring biochemistry: Redox via microbial action



· EXPLORE ·
SOILS

Summary:

Redox and oxidation is one of the key chemical reactions that happen commonly within nearly all soils. Redox can be demonstrated by using reddish soils containing high levels of iron by placing the normally aerobic soil into an anaerobic environment. While not an instant demonstration it can be easily taken home and watched over a period of a few days.

Learning Objectives:

- Better understanding of redox reactions which occur in soils
- Understanding of the chemical properties of soil

Equipment:

- 1 clear plastic or glass bottle with air-tight seal
- Sugar water (approximately 1g sugar:100ml water)
- Soil sample that is red, orange or reddish brown in colour
- Funnel

Preparation:

- Estimated time 10 minutes.
- Locate soil sample
- Mix sugar water

Time Required:

Introduction to exercise 3 mins
Mix soil and water, place in bottle and seal.

Exercise total timing 10 minutes.

Time before seeing evidence of redox reaction upon Iron particles within soil, approximately 2-7 days.

Background Learning Needs:

- Understanding of redox/oxidation
- Understanding of process of aerobic and anaerobic respiration

Risk Assessment:

Hazard	Likelihood	Severity	Mitigation
Illness from ingestion of soil	Low	Medium/High	Use gloves when handling soil
Injury from broken glass	Low	Medium/High	Clean away broken glass immediately
Site/local specific risks	Unknown	Unknown	Anyone running this activity is advised to conduct a risk assessment for the specific site and conditions

Description of Activities:

1. Break apart soil until it is a fine crumb, place this in a bowl and mix with the sugar water until it is possible to pass through a funnel.
2. Pour into bottle and seal
3. Place in a warm and dark environment and check colouration changes on a daily basis.

Notes:

Mould can often grow on the surface of the water, this is commonly fungus spores that were present in the soil. The demonstration will continue to happen below the mould as the soil settles out and the colour changes to a blue grey, typical of a gleyed soil.