

Primary Level of Microscience Experiments for Grade 4 to 8 of Sudanese Schools

Grade Four for Sudanese Schools

Food of Living Things

What do your teeth look like?

Acids and Bases in the Home

Using senses of taste and touch to classify household substances.
Treating indigestion.

Grade Five for Sudanese Schools

1. Traces of air (I)
2. Traces of air (II)
3. Is air matter?
4. Studying soil types

The Three States Of Water

1. About water vapour
2. The water cycle.
3. Wind and evaporation.
4. Evaporation and Temperature.
5. Is there water in plant leaves?

Grade Six for Sudanese Schools

1. Making a wind vane
2. Air can do work
3. What forms soil?
4. Is soil the same everywhere?
5. Is it a clayey or a sandy soil?
6. What type of soil do you have?
7. Studying soil types
8. Is my garden soil acidic or basic?
9. Leaf patterns
10. Seeds

The Three States of Water

1. Ice and liquid water.
2. Where does the water come from?
3. Measuring evaporation.
4. The states of water.
5. Wind and evaporation.
6. Is there water in plant leaves?
7. Is it still the water I know?

How Do Living Things Reproduce?

1. Do seeds need water to grow into new plants?
2. Do seeds start to grow in all temperatures?

3. New plants from parts of plants.

Food of Living Things

1. How do we find out if plants store starch and sugars?

Variety of Lives

1. Flowering plants: dicotyledon.
2. A monocotyledon flower.
3. A snail zoo.
4. Six jointed legs - Insects.
5. More jointed legs - Spiders.
6. Even more jointed legs - Crustaceans.
7. Many more jointed legs - Millipedes.

Grade Seven for Sudanese Schools

1. Making a wind vane
2. Air can do work
3. What forms soil?
4. Is soil the same everywhere?
5. Is it a clayey or a sandy soil?
6. What type of soil do you have?
7. Studying soil types
8. Is my garden soil acidic or basic?
9. Leaf patterns
10. Seeds

Expansion And Contraction

1. The undecided drop.
2. Where does the extra liquid come from?
3. The tallest liquid.
4. The story of a slender and a plump propette.
5. The lazy thin wire.

The Three States Of Water

1. Is there water in plant leaves?
2. Is it still the water I know?

How Do Living Things Reproduce?

1. What does a seed look like?
2. Growing a new plant.
3. Do seeds need water to grow into new plants?
4. Do seeds start to grow in all temperatures.
5. New plants from parts of plants.

About Air

1. Even flames need air to keep going.
2. Is all the air used in burning?
3. Studying my breath.
4. Rusting away.
5. Production and testing of carbon dioxide on my comboplate.

6. My micro fire extinguisher.
7. The chemical reactions in bread making.

Exploring Mixtures

3.13 Separating a mixture of water and methylated spirit

Heating and Heat Transfer

1. Is it a good or a bad conductor of heat?
2. Which is the heavy weight: the cold or the hot liquid?
3. Convection, conduction and radiation.
4. Hot air balloons.
5. Ventilation system.
6. Radiation and absorption of heat by black and white surfaces.
7. The magic burning of paper.
8. Fireproof materials.

Magnetism

1. Magnets have strange powers over some things.
2. The magic of magnets.
3. Making a compass.
4. Just how strong is your magnet?

Matter and Measurement

1. How much water can the large well of my comboplate hold?
2. Estimating volumes using items with definite known volumes.
3. What is the volume of the spring in my kit?

Variety of Lives

1. A mould.

Grade Eight for Sudanese Schools

Muddy, muddy water: Can we make it safe to drink?

The Three States of Water

1. About water vapour

How Do Living Things Reproduce?

1. Do seeds need water to grow into new plants?
2. Do seeds start to grow in all temperatures.
3. New plants from parts of plants.

Exploring Mixtures

1. The case of the disappearing sugar.
2. Melting and dissolving: Is there a difference?
3. What type of a mixture is it?

Static and Current Electricity

1. The magic propette.
2. The wiggly falling water.
3. My aluminium strip electroscope.
4. The light bulb on my comboplate

Acids and Bases in the Home

1. Some liquids which look like water can kill you.
2. Chemical indicators.
3. Making your own indicators.
4. Acidic liquid and dry sodium bicarbonate.
5. Neutralization.
6. Acids and bases in our daily lives.
7. The secret message.
8. Using what you know about indicators.

More about Electricity

1. The current in a series circuit.
2. Light bulbs in series.
3. Light bulbs in parallel.
4. The electric lemon.

BIOLOGY

Teaching and Learning Materials for Sudanese Secondary Schools for Grades from one to three

Grade one for Sudanese Secondary Schools

LIVING ORGANISMS

LEARNER WORKSHEETS

- 1: HOW ARE BACTERIA CULTURED?
- 2: WHAT MOULDS WILL GROW ON BREAD?
- 3: WHAT IS THE STRUCTURE OF A MOSS PLANT?
- 4: WHAT IS THE STRUCTURE OF A FERN PLANT?
- 5: WHAT IS THE STRUCTURE OF A GARDEN SNAIL?
- 6: WHAT IS THE STRUCTURE OF A CRUSTACEAN ?
- 7: WHAT IS THE STRUCTURE OF A SPIDER?

Grade two for Sudanese Secondary Schools

ENZYMES

LEARNER WORKSHEETS

- 1: THE ACTION OF AMYLASE ON STARCH
- 2: THE ACTION OF AMYLASE ON STARCH OVER A PERIOD OF TIME
- 3: THE EFFECT OF pH ON THE ACTION OF AMYLASE ON STARCH
- 4: THE EFFECT OF TEMPERATURE ON THE ACTION OF AMYLASE ON STARCH
- ACTIVITY 5: THE ACTION OF THE ENZYME CATALASE ON HYDROGEN PEROXIDE
- 6: WHAT IS THE EFFECT OF THE ENZYME RENNIN ON MILK ?

FOOD TESTS

LEARNER WORKSHEETS

TESTS FOR CARBOHYDRATES

- 1: BENEDICT'S TEST FOR A REDUCING SUGAR
- 2: DOES THE FOOD WE EAT CONTAIN REDUCING SUGARS?
- 3: HOW CAN ONE TEST FOR THE PRESENCE OF A NON-REDUCING SUGAR IN FOOD?
- 4: IODINE TEST FOR STARCH
- 5: DOES THE FOOD WE EAT CONTAIN STARCH?
- 6: IODINE TEST FOR CELLULOSE

7: DOES THE FOOD WE EAT CONTAIN CELLULOSE?

TESTS FOR LIPIDS

- 1: EMULSION TEST FOR LIPIDS
- 2: GREASE SPOT TEST FOR LIPIDS
- 3: DOES THE FOOD WE EAT CONTAIN LIPIDS?

TESTS FOR PROTEINS

- 1: BIURET TEST FOR PROTEINS
- 2: DOES THE FOOD WE EAT CONTAIN PROTEINS?

PHOTOSYNTHESIS

LEARNER WORKSHEETS

- 1: TESTING A LEAF FOR STARCH
- 2: IS CHLOROPHYLL NECESSARY FOR PHOTOSYNTHESIS?
- 3: IS LIGHT NEEDED FOR PHOTOSYNTHESIS?
- 4: IS CARBON DIOXIDE NEEDED FOR PHOTOSYNTHESIS?
- 5: IS OXYGEN RELEASED DURING PHOTOSYNTHESIS?

RESPIRATION

LEARNER WORKSHEETS: RESPIRATION

- 1: THE PRODUCTS OF COMBUSTION
- 2: IS CARBON DIOXIDE RELEASED DURING RESPIRATION IN GERMINATING SEEDS?
- 3: WHAT SUBSTANCES ARE FORMED DURING FERMENTATION?
- 4: IS OXYGEN USED DURING RESPIRATION?
- 5: IS ENERGY RELEASED DURING RESPIRATION?

TROPISMS

LEARNER WORKSHEETS

INFORMATION

- 1: DO THE RADICLES OF SEEDS ALWAYS GROW DOWNWARDS?
- 2: IN WHICH DIRECTION DO YOUNG SHOOTS GROW?

PLANTS & WATER

LEARNER WORKSHEETS: PLANTS AND WATER

GROUP OF ACTIVITIES - OBSERVING DIFFUSION

- 1: DIFFUSION IN A GAS
- 2: MORE DIFFUSION IN A GAS
- 3: DIFFUSION IN A LIQUID
- 4: DIFFUSION IN A SOLID

GROUP OF ACTIVITIES - FINDING OUT ABOUT OSMOSIS

- 1: OBSERVING OSMOSIS USING DIALYSIS TUBING
- 2: HOW DOES OSMOSIS OCCUR IN LIVING TISSUE?

GROUP OF ACTIVITIES - PATH OF WATER THROUGH THE PLANT

- 1: PATH OF WATER THROUGH THE PLANT
- 2: DOES THE ROOT SYSTEM OF A PLANT PUSH WATER UP THE STEM?
- 3: IS WATER LOST THROUGH THE AERIAL PARTS OF A PLANT?
- 4: INVESTIGATING HOW THE LEAVES OF PLANTS LOSE WATER
- 5: LOSS OF LIQUID WATER FROM PLANTS
- 6: LOSS OF WATER FROM PLANTS UNDER VARIOUS ENVIRONMENTAL CONDITIONS

Grade three for Sudanese Secondary Schools

LIVING ORGANISMS

- 1: FLOWERING PLANTS - SEED STRUCTURE
- 2: OBSERVING GERMINATION
- 3: VEGETATIVE STRUCTURES OF ANGIOSPERMS
- 4: STRUCTURE OF ANGIOSPERM FLOWERS
- 5: STRUCTURE OF AN INFLORESCENCE
- 6: WHAT IS THE STRUCTURE OF A FREE-LIVING FLATWORM?
- 7: WHAT IS THE STRUCTURE OF AN EARTHWORM?
- 8: WHAT IS THE STRUCTURE OF A LOCUST?

CHEMISTRY

Grade one for Sudanese schools

PROPERTIES AND CLASSIFICATION OF MATTER

ELEMENTS AND COMPOUNDS

Decomposition of Mercury (II) Oxide

PARTICLE MODEL OF MATTER

Compounds, Elements, Pure Substances and Mixtures - Modeling the Atoms and Molecules.

CHEMICAL CHANGE OF SUBSTANCES

COMBUSTION

HEATING SUBSTANCES

Decomposition of Ammonium Carbonate

Reduction of Copper(II) Oxide

THE ATOM

ATOMIC MODEL

FLAME COLOURS

Grade two for Sudanese schools

PROPERTIES AND CLASSIFICATION OF MATTER

ELEMENTS AND COMPOUNDS

Electrolysis of Water

PARTICLE MODEL OF MATTER

How Fast Does Gaseous Ammonia Diffuse?

OXYGEN, HYDROGEN AND CARBON DIOXIDE

PROPERTIES OF OXYGEN

Preparation and Testing of Oxygen

PROPERTIES OF HYDROGEN

Preparation and Testing for Hydrogen

PROPERTIES OF CARBON DIOXIDE

Preparation and Properties of Carbon Dioxide

Part 1: The Preparation of Carbon Dioxide

Part 2: The Production of Carbon Dioxide during Respiration

Part 3: Dissolving Carbon Dioxide in Water

Part 4: The Effect of Carbon Dioxide on Combustion

The Reaction of Carbon with Oxygen

CHEMICAL CHANGE OF SUBSTANCES

COMBUSTION

The Reaction of Copper with Oxygen

The Reaction of Sulphur with Oxygen
The Reaction of Magnesium with Oxygen

CHEMICAL REACTIONS OF CERTAIN ELEMENTS

REACTIONS OF METALS

The Reaction of Group 1 and 2 Metals with Water

Part 1: The Reaction of Sodium and Potassium with Water

Part 2: The Reaction of Calcium and Magnesium with Water

Part 3: What Gas is Produced When a Group 1 or Group 2 Metal Reacts with Water?

Reactions of Metals with Metal Salt Solutions

Are Metal Oxides Acidic or Basic?

REACTIONS OF NON-METALS

Reactivity of Group 7 Elements

OXIDATION _REDUCTION AND ELECTROCHEMICAL CELLS

OXIDATION-REDUCTION

Reactivity of Group 7 Elements (*See Chapter III: Reactions of Non-metals*)

Grade three for Sudanese schools

CHEMICAL CHANGE OF SUBSTANCES

REACTIONS OF ACIDS

Acid/Base Titration - an Introduction

The Effect of Dilute Acids and Alkalis on Indicators

The Reaction of Sulphuric Acid with Copper(II) Oxide

The Reaction of Acids with Sodium Hydroxide

ACIDS, BASES AND SALTS

PROPERTIES OF ACIDS AND ALKALIS

Acid-Base Indicators

Properties of Acids and Alkalis

NEUTRALISATION

A Thermochemical Determination of the Stoichiometry of Acid-Base Reactions

PREPARATION OF SALTS

Preparation of a Salt: The Reaction between an Acid and a Metal Carbonate

Preparation of a Salt: The Reaction of an Acid with a Metal

Preparation of a Salt: The Reaction between an Acid and a Metal Oxide

CHEMICAL REACTIONS AND ELECTRICITY

EVIDENCE FOR IONS IN SOLUTION

The Conductivity and pH of Solutions of Acids and Bases

Part 1: What is the Effect of the Concentration of a Basic or Acidic Solution on its Conductivity and pH?

Part 2: Does the Nature of a Base or Acid Affect the Conductivity and pH of its solution?

IONIC REACTIONS

QUALITATIVE ANALYSIS:

The Stoichiometry of Precipitation Reactions
Part 1: The Reaction of Potassium Chromate and Barium Chloride
Part 2: The Reaction of Lead Nitrate and Sodium Iodide
Testing for Ions in Aqueous Solutions
Part 1: Testing for the Presence of Sulphate Ions
Part 2: Testing for the Presence of Halide Ions

EQUILIBRIUM IN SOLUTION

Chemical Equilibrium - The Common Ion Effect

ACIDS AND BASES

TITRATIONS

Concentration and Amount of Substance in Solution

Acid/Base Titration - Determining the Concentration of an Acid

OXIDATION _REDUCTION AND ELECTROCHEMICAL CELLS

OXIDATION-REDUCTION

Reactions of Metals with Metal Salt Solutions (*See Chapter III: Reactions of Metals*)

PHYSICS

Microelectricity experiments

Grade three for Sudanese secondary schools

THE ELECTRIC CURRENT

1. GET TO KNOW YOUR MICROELECTRICITY KIT
2. LIGHTEN UP, PREDICT AND EXPLORE
3. CAR HEADLIGHTS
4. MAKING AN ELECTRIC CURRENT DETECTOR
5. THE CURRENT IN A SERIES CIRCUIT
6. LIGHT BULBS IN SERIES
7. LIGHT BULBS IN PARALLEL
8. CELLS AND MORE CELLS
9. FRUIT COCKTAIL

EFFECTS OF THE ELECTRIC CURRENT

1. SOME GOLDEN CHAINS! – ELECTROPLATING
2. COMING ATTRACTION
3. FIELDING
4. THE STRONGEST OF THEM ALL!

CURRENT ELECTRICITY

1. RATES AND FLOWS
2. AMMETER – TO BE OR NOT TO BE
3. GO WITH THE FLOW
4. ONE, TWO, THREE... TROUBLE
5. ONE AFTER THE OTHER CAUSING A GREAT BOTHER
6. FREE ELECTRONS ARE NOT SO FREE!
7. PARALLEL CELLS
8. FIRST CONTACT WITH THE LOOPS

THE ELECTRIC CURRENT

1. WHAT GOES UP MUST FALL DOWN

2. THE CURRENT IN A SERIES CIRCUIT
3. THE REAL & THE IDEAL WORLD
4. THE INVESTIGATION

ELECTROMAGNETISM & ELECTROMAGNETIC INDUCTION

1. FANCY EFFECTS
2. THE SHAPE OF IT
3. SOLENOIDS AND ELECTROMAGNETS
4. FEDERAL BUREAU OF INVESTIGATIONS, FBI
5. ELECTRIC MOTOR 1
6. ELECTRIC MOTOR 2
7. CAN MAGNETISM PRODUCE ELECTRICITY?

ELECTRIC CURRENT & ELECTRICAL RESISTANCE

1. ON, OFF – OFF, ON
2. LET THERE BE LIGHT!
3. WHAT IS ELECTRICAL POTENTIAL DIFFERENCE?
4. THE MAXIMUM POTENTIAL ENERGY OUTPUT OF A BATTERY
5. POTENTIAL DIFFERENCE ACROSS POINTS IN A SERIES CIRCUIT
6. POTENTIAL DIFFERENCE ACROSS POINTS IN A PARALLEL CIRCUIT
7. OHM'S LAW

THE MAGNETIC EFFECT OF AN ELECTRIC CURRENT

1. PARALLELISMS