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Physical Science

Earth & Space Science

Life Science

25 SIMPLE MICROSCOPE INVESTIGATIONS

1. **Wool and thread**: Examine a variety of weights and textures of ribbon, rope, twine, wool and string.
2. **Mold**: Observe the structure of mold on bread or fruit. Leave the moldy food on a slide for one day. Note the changes that have occurred since the first observation.
3. **Cloth fibers**: Compare the structures of cotton, rayon, nylon, silk and polyester.
4. **Fingerprints**: Press a finger on carbon paper or an inkpad and then onto clean paper to make a print. Examine the fingerprint.
5. **Insects**: Collect a variety of dead insects and study their different structures.
6. **Onion skin**: Peel a very thin layer from the white skin of an onion. Locate cells and examine their structures.
7. **Pepper**: Note the structure of pepper. Compare the magnified pepper to salt, sugar and any other spices.
8. **Iron fillings**: Observe several iron fillings. Look for ways that they vary in size and shape.
9. **Money**: Observe the different patterns and markings of various coins and notes.
10. **Hair**: Compare hairs of different people and animals. Examine samples of different colours and thickness.
11. **Chalk**: Rub a piece of chalk on sandpaper and cut a sample to make a slide. Examine the chalk dust and the sandpaper.
12. **Water**: Collect water samples after a rain from puddles, leaves and grass. Examine a drop from each surface and compare it to a drop of tap water, soapy water, salt water, etc.
13. **Colour printing**: Study different colours and patterns in coloured newspaper comics.
14. **Crystals**: Compare the crystal shapes of Epsom salts, boric acid, baking soda, bicarbonate soda, copper sulfate and other crystals.
15. **Seeds**: Collect seeds and compare their shapes, structures and interiors.
16. **Foods**: Examine parts of fruits, vegetables, cereals, breads and other foods.
17. **Wood shavings**: Compare wood shavings from a variety of trees.
18. **Soil**: Study the differences in samples of clay, sand and earth.
19. **Feathers**: Find and examine feathers from different birds.
20. **Rocks**: Look for crystals of varying sizes in pieces of rock.
21. **Salt**: Look for cube-shaped crystals.
22. **Sugar**: Look for interesting crystal shapes. Place a drop of water on the slide and watch the crystals dissolve.
23. **Soap**: Examine and compare shavings from different kinds of soap.
24. **Potato starch**: Scrape a potato and study the starch granules.
25. **Printing**: Study words printed on paper, cloth, or plastic.

PROPERTIES AND USES OF ACIDS & BASES

Common Acids

Name	*Formula*
Boric Acid	H_3BO_3
Carbonic Acid	H_2CO_3
Hydrochloric Acid	HCl
Nitric Acid	HNO_3
Phosphoric Acid	H_3PO_4
Sulfuric Acid	H_2SO_4

Properties of Acids

neutralise bases
turn litmus paper red
taste sour
react with many metals to produce hydrogen
conduct electricity

Uses of Acids

water treatment
household cleaning products
used to etch metals and glass
used in batteries
production of synthetic fibers

Common Bases

Name	*Formula*
Aluminium Hydroxide	$AL(OH)_3$
Ammonium Hydroxide	NH_4OH
Calcium Hydroxide	$Ca(OH)_2$
Potassium Hydroxide	KOH
Sodium Hydroxide	NaOH

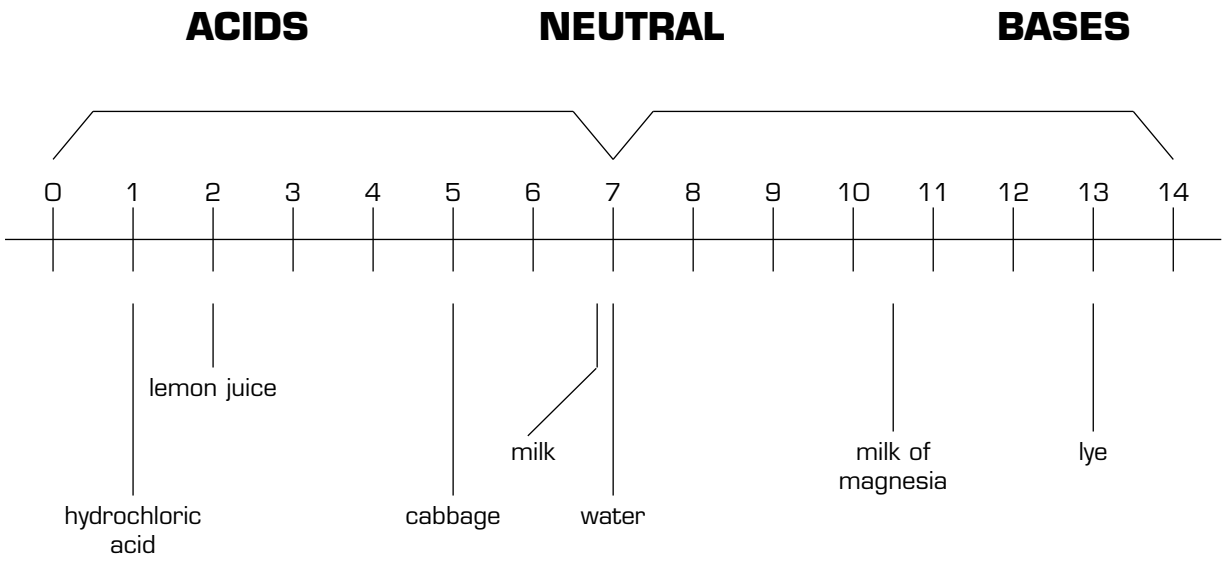
Properties of Bases

neutralise acids
turn litmus paper blue
taste bitter
feel slippery
conduct electricity

Uses of Bases

soap, glass
milk of magnesia
mortar
coagulants for water purification
ammonia water
lye soap

THE pH SCALE



CHARACTERISTICS OF SOME MIXED-UP SUBSTANCES

Characteristics of Mixtures

- A mixture is made up of two or more substances that are mixed together.
- The substances in a mixture retain their individual properties.
- The substances in a mixture can be separated by physical means.
- A mixture has no definite chemical composition.
- A mixture has no chemical formula.

Characteristics of Compounds

- A compound is made up of two or more substances which are chemically combined.
- A compound has new properties unlike those of the substances that make up the compound.
- A compound can be separated only by chemical means.
- A compound has a definite chemical composition.
- A compound has a chemical formula.

Characteristics of Solutions

- A solution is a homogeneous mixture (same in structure).
- A solution is made of one or more liquid, gaseous, or solid substances dispersed in another.
- The particles in a solution dissolve.
- Solutes (substances that are dissolved in a solution) dissolve faster in a solution when they are stirred.
- Solutes dissolve faster in hot solutions than in cool solutions.
- Solutes dissolve faster in a solution when they are broken into small particles.
- A warm solvent (substance in which a solute dissolves) can usually hold more dissolved solute than a cold solvent.
- Saturated solutions contain all of the dissolved solute that they can hold
- Unsaturated solutions can dissolve more solute.

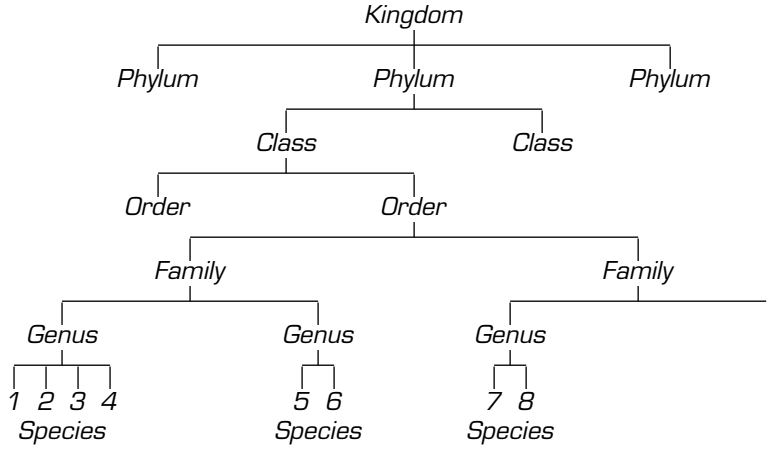
Characteristics of Suspensions

- A suspension is a mixture of two or more substances.
- A suspension is cloudy.
- The particles in a suspension do not dissolve.
- A suspension usually settles on standing.
- Filtering can separate a suspension.
- The particles in a suspension are larger than molecular size.

SYSTEM OF CLASSIFICATION FOR ORGANISMS

A Swedish scientist named Carolus Linnaeus developed the modern classification system for grouping organisms in the 1700s. This system involves seven classification groups. This branch of science that deals with classification is called taxonomy.

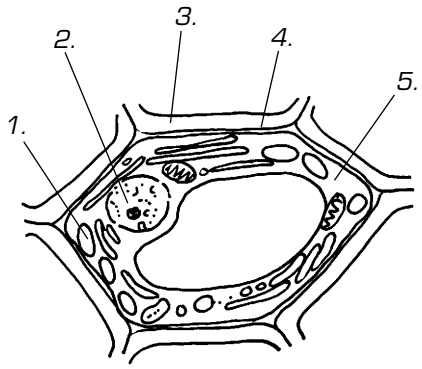
CLASSIFICATION CHART



Example: DOG

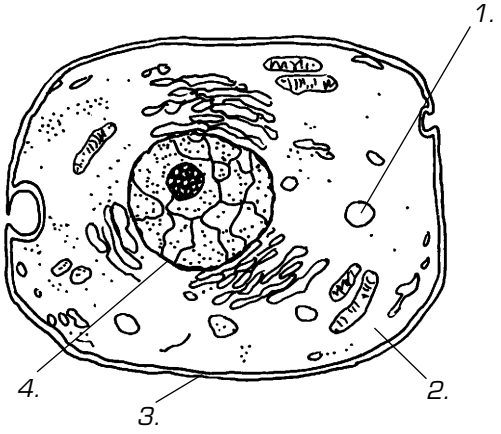
Kingdom – Animal
Phylum – Chordata
Class – Mammalia
Order – Carnivora
Family – Canidae
Genus – Canis
Species – Canis familiaris

PARTS OF A PLANT CELL



1. **Chloroplast** – the oval body in a green plant cell which contains the chlorophyll
2. **Nucleus** – the central mass of protoplasm, which contains most of the hereditary material necessary for such functions as growth, reproduction, etc.
3. **Wall** – the rigid covering of the cell that contains cellulose and other substances
4. **Membrane** – a very thin living membrane surrounding the cytoplasm
5. **Cytoplasm** – the protoplasm (essential living matter) of a cell that is found outside the nucleus

PARTS OF AN ANIMAL CELL



1. **Vacuole** – a clear, fluid-filled cavity within the plasma membrane believed to discharge excess water or wastes
2. **Cytoplasm** – the protoplasm (essential living matter) of a cell that is found outside the nucleus
3. **Cell Membrane** – a very thin living membrane surrounding the cytoplasm
4. **Nucleus** – the central mass of protoplasm that contains most of the hereditary material necessary for such functions as growth, reproduction, etc.