



Unit 10 • Materials Used in Daily Life: acid, base and salt

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. indicator → **h.** a substance that shows by its color whether another is an acid, a base or a salt K • 4
2. litmus → **a.** a dye made from lichens
3. organic acid → **f.** an acid that comes from plants or animals
4. mineral acid → **g.** a strong acid made from minerals, such as sulphuric acid
5. alkali → **i.** a base that dissolves in water
6. formic acid → **b.** the acid an ant squirts into the skin
7. lactic acid → **c.** the acid in curd
8. neutral salt → **e.** a salt whose solution changes the color of no indicator

Each carries 0.5 mark.

2 Multiple choice

- i. **a.** it turns blue litmus paper red K • 1
Apple juice contains malic acid, and acids turn blue litmus red. (Phenolphthalein stays colorless in an acid.)
- ii. **b.** soap K • 1
Soap is bitter, slippery and turns red litmus blue: a **base**. Curd, vinegar and grapes are all sour, so acidic.
- iii. **c.** litmus paper K • 1
Litmus is a dye made from lichens. Methyl orange and phenolphthalein are made in factories, and cabbage juice comes from red cabbage.
- iv. **d.** Phenolphthalein turns pink when dropped into a base. U • 1
Phenolphthalein turns pink in a **base**. Each of the others is backwards: red litmus turns blue in a base, blue litmus turns red in an acid, and methyl orange turns red in an acid.
- v. **b.** a base A • 1
Turning red litmus blue and phenolphthalein pink are both signs of a **base**. An acid would turn blue litmus red; a neutral liquid wouldn't change either indicator.

3 Complete the table

ANSWER

K • 2

Indicator	Acid	Base	Salt (neutral)
methyl orange	red	yellow	no change
litmus paper	red (blue litmus turns red)	blue (red litmus turns blue)	no change
phenolphthalein	colorless	pink	no change

MARKING SCHEME

- ✓ Methyl orange in a base: yellow; phenolphthalein in a base: pink.
- ✓ Litmus in an acid: red (blue litmus turns red); litmus in a salt: no change.



4 Very short answers

- a. MARKING SCHEME K · 1
✓ Citric acid.
- b. MARKING SCHEME K · 1
✓ Hydrochloric, sulphuric or nitric acid.
- c. MARKING SCHEME K · 1
✓ A salt and water.
- d. MARKING SCHEME U · 1
✓ Washing soda or baking soda.

5 Short answers

- a. MARKING SCHEME U · 2
✓ Any one difference, e.g. an acid tastes sour, a base bitter (and soapy).
✓ Any second difference, e.g. an acid turns blue litmus red, a base turns red litmus blue (or methyl orange red / yellow, phenolphthalein colorless / pink).
- b. MARKING SCHEME U · 2
✓ The hairs of a nettle are tiny hollow needles whose tips break off in the skin.
✓ They inject formic acid (and other irritating chemicals), which burns.
- c. MARKING SCHEME U · 2
✓ Strong acids are corrosive.
✓ They burn the skin and eyes, make holes in clothes and eat into metals.
- d. MARKING SCHEME U · 2
✓ Ash contains bases (mostly potassium carbonate).
✓ Bases feel slippery and soapy: they turn the oils on the skin into a kind of soap.
- e. MARKING SCHEME K · 2
✓ A salt is formed, with water, when an acid and a base cancel each other out (e.g. common salt).
✓ Its types: neutral, acidic and basic salts.

6 Long answer

ANSWER

A · 4

Add two drops of **methyl orange** to each tube.

- The tube in which it turns **red** holds the **acid**.
- In the other two it stays **yellow**, because methyl orange is yellow in both a base and a neutral salt. To tell them apart, add a drop of **phenolphthalein** to each (or dip red litmus): the one that turns **pink** (or turns red litmus blue) holds the **base**, and the one that shows **no change** holds the **salt**.

MARKING SCHEME

- ✓ Add two drops of methyl orange to each tube.
- ✓ The tube in which it turns red holds the acid.
- ✓ In the other two it stays yellow (methyl orange is yellow in a base and in a neutral salt).
- ✓ Add phenolphthalein (or red litmus) to those two: the one that turns pink (red litmus blue) is the base; the one with no change is the salt.



7 Think

ANSWER

HA - 2

No. Bases taste bitter, but bitterness can come from other substances too, so taste is only a hint (and tasting is not a safe test). Test the juice with an indicator: if it turns red litmus blue it is a base. In fact it hardly changes litmus: it is about neutral.

MARKING SCHEME

- ✓ No: bitterness can come from other substances, so taste is not a test.
- ✓ Test it with an indicator (e.g. red litmus turns blue only if it is a base).

8 Activity: Testing with litmus paper (Activity 10.3)

(not marked)

WHAT STUDENTS SHOULD FIND

Lemon juice and curd turn blue litmus red: acids. Soap water turns red litmus blue: a base. Water changes neither: neutral.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	14	10	5	2	31





Unit 10 • Materials Used in Daily Life: metals and non-metals

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. malleable
2. ductile
3. mineral
4. ore
5. bauxite
6. hematite
7. galvanizing
8. sublimation

K • 4

Each carries 0.5 mark.

2 Multiple choice

- i. c. they are soft or brittle

K • 1

Solid non-metals such as sulphur are soft or brittle: they crumble rather than flatten. Shine, conduction and high melting points are properties of metals.

- ii. d. zinc

K • 1

Zinc is coated on iron to stop it rusting: that is galvanizing.

- iii. a. iron

K • 1

Rust is the brown crust that forms on iron (and steel) in moist air. Gold doesn't react at all; silver and copper only tarnish slowly.

- iv. d. iodine

U • 1

Iodine is added to make iodized salt, to prevent goiter. (Common salt itself is sodium chloride: sodium and chlorine.)

- v. b. a non-metal, such as iodine

A • 1

Shine alone can fool you. It breaks when hammered (brittle) and doesn't conduct: these are properties of a non-metal. Iodine is just such a shiny non-metal.

3 Complete the table

ANSWER

K • 4

Metal	Main ore	One use (any one)
iron	hematite	tools, utensils, buildings and bridges, steel
silver	argentite	jewelry, coins and medals, plating
copper	chalcoppyrite	electric wires, utensils, brass and bronze
aluminium	bauxite	airplanes and vehicles, utensils, foil, power lines

MARKING SCHEME

- ✓ Iron: hematite, and one use.
- ✓ Silver: argentite, and one use.
- ✓ Copper: chalcoppyrite, and one use.
- ✓ Aluminium: bauxite, and one use.



4 Very short answers

- a. MARKING SCHEME K • 1
✓ Gold.
- b. MARKING SCHEME K • 1
✓ Iron.
- c. MARKING SCHEME K • 1
✓ Sulphur.
- d. MARKING SCHEME K • 1
✓ Iodine.

5 Short answers

- a. MARKING SCHEME U • 2
✓ The body needs a little iodine; without it the thyroid gland swells (goiter) and babies' brains may not develop properly.
✓ Everyone eats salt every day, so iodized salt gives everyone enough.
- b. MARKING SCHEME U • 2
✓ Gold is very unreactive: it doesn't combine with oxygen, water or most other substances.
✓ So it stays as pure metal in rocks and river sand.
- c. MARKING SCHEME U • 2
✓ Aluminium is light (and strong when mixed with a little of other metals), so less fuel is needed.
✓ It doesn't rust: a thin oxide layer protects it.
- d. MARKING SCHEME U • 2
✓ Plastic is a bad conductor of heat.
✓ So the handle stays cool enough to hold while the metal body gets very hot.
- e. MARKING SCHEME U • 2
✓ Any one difference, e.g. a mineral is any substance found naturally in the Earth's crust; an ore is a mineral from which a metal can be extracted easily and profitably.
✓ Any second difference, e.g. every ore is a mineral, but not every mineral is an ore (or an example of each: clay; bauxite).

6 Long answer

ANSWER

U • 4

Metal	Non-metal
Usually hard and shiny.	Usually dull; solid ones are brittle.
Good conductor of heat and electricity.	Bad conductor of heat and electricity.
Can be beaten into sheets and drawn into wires.	Breaks or crumbles when hammered.
Makes a ringing sound when struck.	Doesn't ring.

MARKING SCHEME

- ✓ Metals are usually hard and shiny; non-metals usually dull (solid ones brittle).
- ✓ Metals conduct heat and electricity well; non-metals are bad conductors.
- ✓ Metals can be beaten into sheets and drawn into wires; non-metals break or crumble.
- ✓ Metals ring when struck; non-metals don't (or an example of each: iron; sulphur).



7 Think

ANSWER

HA - 2

They are gases burning: near volcanoes, very hot sulphur gases catch fire as they meet the air; elsewhere, more often, natural gas seeping from the ground. The flame is faint (sulphur's is blue), so it can be seen only in the dark.

MARKING SCHEME

- ✓ Burning gas: hot sulphur gases meeting the air (or natural gas seeping from the ground), not a ghost.
- ✓ The flame is faint (sulphur's is pale blue), so it shows only in the dark.

8 Activity: Metals at home and school (Activity 10.8)

(not marked)

WHAT STUDENTS SHOULD FIND

For example: aluminium, a pressure cooker (cooking); zinc, roof sheets of zinc-coated iron (roofing) or a torch battery case; copper, wires (carrying electricity) or a karuwa (keeping water); iron, nails, a karahi or a gate; silver or gold, jewelry or coins.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	15	15	1	2	33

