Year 9 Science

Term 2 Study Notes

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Chapter 1 (God is our Saviour)

Unit 1: What is science?

In its original form science simply meant “knowledge.”

There are two types of science: Operational science and historical science

Operational (Observational) Science: a systematic approach to understanding that uses observable, testable, repeatable, and falsifiable experimentation to understand how nature commonly behaves.

Historical (Origins) Science: interpreting evidence from past events based on a presupposed philosophical point of view.

The past is not directly observable, testable, repeatable, or falsifiable; so interpretations of past events present greater challenges than interpretations involving operational science. Neither creation nor evolution is directly observable, testable, repeatable, or falsifiable. Each is based on certain philosophical assumptions about how the earth began. Naturalistic evolution assumes that there was no God, and biblical creation assumes that there was a God who created everything in the universe. Starting from two opposite presuppositions and looking at the same evidence, the explanations of the history of the universe are very different. The argument is not over the evidence—the evidence is the same—it is over the way the evidence should be interpreted.

Operational science is the type of science that one might do in a laboratory, about how the world works. It’s all based on what you actually see. You can perform tests and observe what happens. For example, at sea level, water will always boil at the same temperature (100° C or 212° F). In operational science, anyone can repeat an experiment and see if they get the same results. Testable and repeatable science is why we have smartphones, spaceships, and lots of other inventions.

Historical science deals with what happened in the past, but you cannot do experiments on events in the past. An example of this would be paleontology (the study of fossils). Scientists might unearth a dinosaur fossil and then tell a story of how long ago the dinosaur lived and died. But the scientists’ ideas about how old it is, cannot be directly tested because it happened in the past without direct witnesses.

Is historical science real science? Can creationists use historical science?

Yes; creationists also use it to come up with ideas about what we think happened in the past, just like evolutionists. The difference is that creationists have eye witnesses for the big events of the past, and use historical science to explore the detail. For instance, creation geologists use what we know from small-scale disasters like the Mt St Helens volcanic eruption to explain what may have happened during the global Flood in Noah’s day. The Bible has a better history than evolution. The Bible is the history book of the universe, so it should be our authority when it comes to looking at the past.

Can historical science prove creation or evolution?

No, but it can give people ideas about what possibly happened in the past. Actually, creationists and evolutionists have the same set of facts—the same fossils, rocks, living things, and so on. Those facts are interpreted by creationists and evolutionists as evidence for one view or the other, but the facts themselves aren't automatically 'for' one side or the other. So basically everyone has the same evidence, just different interpretations. A good example is what we think happened to the dinosaurs. An evolutionist might say it was an impact from an asteroid. And a creationist might say they became extinct due to changes in the weather after the Flood, or even possibly as a result of humans hunting them.

So why do people only hear the evolutionary view?

For many reasons, evolution has long been the popular view of most scientists, but it wasn't always that way. Almost all fields of science were started by Bible-believing thinkers. But, since creation is linked with Christianity and not natural processes, people argue that teaching creation in schools and public museums is teaching 'religion', not science. What they don't realize is that evolution is also linked with a religion—atheism, that denies God as the Creator.

How do I know when historical science is right or wrong?

We can't know for sure what happened in the past unless there is an eyewitness—and the Bible has a trustworthy eyewitness—God Himself! So when historical science disagrees with the Bible, it is wrong. Creationists try to develop scientific ideas based upon the Bible's history in areas such as astronomy (the study of stars), geology (the study of rocks and landforms), paleontology (fossils) and archaeology (ancient human artifacts). But even these ideas can change when we make some new discovery.

So the dinosaur isn't millions of years old, after all. The right scientific answer depends on first believing the right history. Dinosaurs were created on Creation Day 6, the same day as human beings. The Bible gives us history we can trust.

How to write up a science experiment

INTRODUCTION

General background to the topic being investigated.

2. AIM

A statement about the purpose of the experiment

3. HYPOTHESIS

Your best educated guess of what you thought you would discover.

4. MATERIALS

List of the equipment and chemicals that were used.

5. METHOD

An account of what was done; usually include a diagram showing how equipment was set up. Provide enough details to allow the reader to repeat your experiment.

6. RESULTS & OBSERVATIONS

A presentation of your data. This might include a list of observations and calculations or tables and graphs.

7. DISCUSSION

An explanation of your results and a description of any difficulties that you had with the experiment and suggestions for improvement.

CONCLUSION

This section should be short and to the point. The conclusion should relate directly to the aim. Has the hypothesis been supported or disproved?

Practical Science experiments

Perform some of the following experiments and write up your report for each one.

1. Make a lava lamp

Overview:

This easy science activity teaches us about density, and uses common ingredients from around the house.

What You Need:

A clean plastic bottle or glass jar

Vegetable Oil

Baking Soda

Food Coloring

Steps:

Add a couple inches of baking soda to the bottom of your bottle or jar. Fill the rest of the bottle or jar up with vegetable oil until it is almost full. Use a funnel if you have one. Notice how it stays separate.

In a separate cup, add a fourth cup or so of vinegar and food coloring. Mix them together.

Slowly pour the vinegar and food coloring solution into the oil.

Finally, if you have a flashlight, turn off the lights and watch your lava lamp in action!

What's Happening:

The oil floats on top of the water because it is less dense (lighter) than water. The food coloring has the same density as the water so it sinks through the oil and mixes with the water. As the baking soda dissolves in the vinegar it creates a gas called carbon dioxide.

Gas is lighter than water so it floats to the top, bringing some color with it from the food coloring. When the air releases from the colored water blob, the water gets heavy again and sinks.

2. Static electricity

Overview:

Static electricity is an imbalance of electric charges within or on the surface of a material or between materials. The charge remains until it is able to move away by means of an electric current or electrical discharge. Static electricity is named in contrast with current electricity, where the electric charge flows through an electrical conductor or space, and transmits energy.

A static electric charge can be created whenever two surfaces contact and or slide against each other and then separate. The effects of static electricity are familiar to most people because people can feel, hear, and even see the spark as the excess charge is neutralized when brought close to an electrical conductor

What You need:

an inflated balloon

a piece of cloth

Steps:

Rub the surface of the balloon with the cloth for at least40 seconds. Then, hold the balloon a short distance above your head and watch your hair stick to it!

What's Happening:

The balloon gains electrons from the cloth and becomes negatively-charged when you rub it together. Then, when the balloon touches you hair, it attracts your hair, which is positively charged.

3. Sugar Water Rainbows

Overview:

This is a colourful experiment to investigate density and buoyancy.

What You Need:

food colorings (preferably in rainbow colors including red, orange, yellow, green, blue, purple)

water

a clear straw

salt or sugar

6 cups

tablespoon

Steps:

First, fill each of the cups with the same amount of water.

Next, add the food coloring, one color in each cup, preferably in rainbow order.

Line the cups up next to each other.

In the first cup, do not add any sugar at all.

In the second cup, add one tablespoon of sugar.

In the third cup, add two tablespoon of sugar.

In the fourth cup, add three tablepoons of sugar, and so on.

Stir each mixture until all the sugar is dissolved in each glass.

The next step is to make a sugar rainbow by placing the end of the straw in the first cup (the cup with no sugar), only about a half of an inch.

Cover the top of the straw with your thumb before lifting it out of the water so that the water does not fall out of the straw.

Now dip the straw into the second cup (1 tablespoon sugar). This time, insert it deeper so that the end is one inch below the water level. In one quick move, release the thumb and recap again. Now you should have two layers of color.

Keep dipping the straw into each solution from the one with the least sugar to the one with five tablespoons of sugar. Each time, the straw is inserted half an inch deeper.

What's happening?

Density is the amount of substance (mass) within the volume occupied by the object. If two cups have the same amount of water (i.e. same volume), the one with more sugar is denser than the one with less sugar.

Buoyancy is determined by relative density. The solution with less density floats above the solution with higher density. That is why the color don't mix.

Sugary water has higher density than plain water. The solution with more sugar has higher density than the one with less sugar. If you have inserted the straw in the solutions from the least sugar to the most sugar, then the color don't mix and you have a sugar water rainbow.

3. DIY Parachute

Overview:

You can learn about gravity by making a DIY parachute for a light-weight toy.

Materials:

Plastic Bag (i.e. grocery bag)

String

Paper Cup

Scissors

Steps:

First, use the scissors to remove the handles from the plastic bag. Next, poke four holes around the plastic bag so that they are the same distance apart and on opposite sides of the bags.

Then, cut four holes into the rim of the paper cut.

You'll also need to cut four pieces of yarn, 10-12 inches long. Thread one piece of yarn through the hole in the plastic cup and tie the yarn to the cup with a knot. Repeat with all four strands of yarn in the remaining holes.

Next, thread the other end of the pieces of yarn through the hole in the plastic bag and tie a knot.

Finally, personalize and decorate your cup with stickers, paint, crayons or markers.

Now it's time to find a toy that is going to take a ride in your parachute. Launch your parachute into the air and see what happens!

Experiment with putting different objects into the paper cup and see how it affects the parachute's effectiveness. Does the parachute flight time increase or decrease?

You can also try creating the parachute with different materials to replace the paper bag, such as a paper towel or napkin, and see how that affects the performance.

4. Magic Milk Experiment

Materials:

-Full Fall Milk

-Food Coloring

-Dish washing liquid

-Cotton Swabs

Steps:

First, pour the milk in a small baking dish until the bottom is covered. Next, fill the milk with drops of food coloring. Glitter is optional!

Then, pour some dishwashing soap into a bowl, and dip your cotton swap tip into the dish soap to coat it. Then, gently touch your cotton swab to the milk and watch what happens!

Milk is composed of minerals, proteins, and fats, which are easy to change. When you add the dish soap to the milk, the soap molecules try to attach to the fat molecules in the milk.

When everything stops moving, you can see where all the fat molecules are.

Unit 2: Investigating

An **observation** is something that you notice using any of your senses. Being observant means using all your senses to notice things around you. It is important to be accurate in your observations. Some observations are:

• Smelling onions in the kitchen

• Finding that a fabric feels like satin

• Seeing a man running down a street

• Hearing an electronic alarm

• Finding that lemon juice tastes sour.

An **inference** is a likely explanation of what you observed. It is how you explain the observation. The explanation may or may not be true. Here are some inferences you might have made about the observations above:

• You will have onions with your dinner

• Mum bought the fabric for the concert

• The man is scared of dogs

• A cat caused the alarm to sound

• Lemons contain acid

A **hypothesis** is a guess at an answer, which you can test by doing an experiment. Some things cannot be tested by experiment such as personal likes and dislikes. Some hypotheses you might make about the observations above:

• Onions smell more on a hot day than on a cold day.

• The fabric feels smooth because the fibres are close together

• The man running from the dog was bitten last year.

• Cats climb onto cars, and the movement activates the car alarm.

• Lemons are sour because they contain citric acids.

A **control** is the part of a science experiment that acts as a standard by which to compare experimental observations.

Test

1. What is the difference between investigative and historical science?
2. When performing a science experiment, what is:
   a) An observation
   b) An inference
   c) A hypothesis
   d) A controlled experiment

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God is Pure and Holy
Chapter 4: Energy
Introduction

Light is the most important form of all energy. We see that God created light FIRST, on day 1 of Creation. Light represents purity and holiness.
Make a study of these Scriptures about walking in the Light:

Genesis 1:1-31
In the beginning, God created the heavens and the earth. The earth was without form and void, and darkness was over the face of the deep. And the Spirit of God was hovering over the face of the waters. And God said, “Let there be light,” and there was light. And God saw that the light was good. And God separated the light from the darkness. God called the light Day, and the darkness he called Night. And there was evening and there was morning, the first day. ...

John 1:7 But if we walk in the light, as he is in the light, we have fellowship with one another, and the blood of Jesus his Son cleanses us from all sin.

John 8:12 Again Jesus spoke to them, saying, “I am the light of the world. Whoever follows me will not walk in darkness, but will have the light of life.”

1 John 1:5 This is the message we have heard from him and proclaim to you, that God is light, and in him is no darkness at all.

Psalm 119:105 Your word is a lamp to my feet and a light to my path.

Ephesians 5:8 For at one time you were darkness, but now you are light in the Lord. Walk as children of light

Matthew 5:14 “You are the light of the world. A city set on a hill cannot be hidden.

1 Peter 2:9 But you are a chosen race, a royal priesthood, a holy nation, a people for his own possession, that you may proclaim the excellencies of him who called you out of darkness into his marvelous light.

2 Corinthians 4:6 For God, who said, “Let light shine out of darkness,” has shone in our hearts to give the light of the knowledge of the glory of God in the face of Jesus Christ.

Questions and answers

Unit 1

1. What is energy?

Energy is the power to change things. It is the ability to do work. Energy lights our towns and cities, powers our vehicles and runs machinery in factories. It warms and cools our homes, cooks our food and gives us the ability to operate technology.

2. What is the principal source of energy?

The sun

3. What are some other sources of energy?

Other sources of energy are Fossil fuels, Hydro power, plant Biomass, Wind Energy, Solar energy, Geothermal energy, Ocean thermal energy, Tidal energy, Wave energy, Nuclear energy.

4. What is renewable energy?

Sources such as wind, solar and hydro (water). Renewable energy produces little or no waste products such as carbon dioxide or other chemical pollutants, so has minimum impact on the environment. However it can be argued that disposal of batteries long term, will have an impact on the environment, and wind farm can kill birds in flight.

5. What are non-renewable energy sources?

Coal, oil and gas are called “fossil fuels” because they have been formed from the organic remains (plants and animals) from the Great Flood. Crude oil (called “petroleum”) is easier to get out of the ground than coal, as it can flow along pipes. Natural gas provides around 20% of the world’s consumption of energy, and as well as being burnt in power stations, is used by many people to heat their homes in countries that have very cold winters It is easy to transport along pipes, and gas power stations produce comparatively little pollution.

6. Explain the differences between peat, brown coal and black coal.

Black coal is the oldest, rarest but most efficient fuel. Brown coal is younger, and contains more moisture so less efficient, peat is the youngest and has the most moisture in the organic matter.

7. How is oil formed?

Oil was formed in a similar way to coal. Many people think that it was formed millions of years ago, but this is not the case. It was formed about 6000 years ago as a product of the Great Flood, when plants and animals in the sea bed were crushed under layers of mud , and gradually turned into oil. As oil formed it gave off natural gas. The oil and gas flowed upwards until they reached layers of hard rock and became trapped under the rock.

8. What is the difference between transparent, translucent and opaque light?

A *transparent* material transmits light, which means it allows almost all the light that strikes it to pass through it. This property of light allows us to see through transparent objects. No shadow is formed when light is shown through a transparent object. For example, the water where the fish and coral live is transparent.

A *translucent* material allows some light to pass through it and scatters the rest. If you can see through a material, but the objects you see through it do not look clear or distinct, then the material is translucent.
An *opaque* object does not allow any light to pass through it. Most materials around us are opaque Wood and metal are examples of opaque materials. An opaque material either absorbs or reflects all of the light that strikes it. When light is shone on an opaque object/material, a shadow is formed behind it.

9. What is regular reflection of light?

Regular reflection occurs when parallel light waves strike a surface and reflect all in the same direction.

10. What is diffused light?

Diffused (scattered) reflection occurs when parallel light rays of light strike a rough, uneven surface and reflect in many different directions. An image is a copy of an object formed by reflected (or refracted) waves of light. In scattering, light is redirected as it passes through a medium such as the atmosphere.

Unit 2

11. What are the 2 types of energy?

There are two types of movement energy: kinetic energy and potential energy.

KE (kinetic energy)

Kinetic energy is energy in use. Anything that is moving or changing has kinetic energy. Examples: Blowing wind has kinetic energy. Flowing water has kinetic energy. A boy on roller blades has kinetic energy.

•PE (potential energy)

Potential energy is stored energy. Something has potential energy when it is not moving, but is in a position to move. If you hold a marble in the air, it has potential energy. If you drop the marble, it has kinetic energy as it falls.

12. Name the different forms of energy and give examples.

Mechanical Energy; Electrical Energy; Thermal Energy; Chemical Energy; Electromagnetic Energy; Nuclear Energy

13. Explain some ways we can conserve energy.

Use efficient cooking methods; When buying electrical appliances, look for the energy rating label;

Turn off computers and TVs from the power source when not in use; Use lights, fans and air conditioning efficiently; Recycle bottles and aluminium cans

Unit 3

14. Give examples of the following type of forces.

Frictional force - Friction is the force acting on an object when it moves against the surface of another object, e.g. a bicycle on a road

Magnetic force – e.g. a compass

Gravitational force – e.g. dropping an object from a high building

Test

1. What is energy?
2. What is the principal source of energy?
3. What are some other sources of energy?
4. What is renewable energy?
5. What are non-renewable energy sources?
6. Explain the differences between peat, brown coal and black coal.
7. How is oil formed?
8. What is the difference between transparent, translucent and opaque light?
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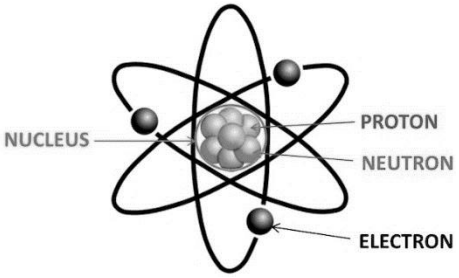
God is Creator

Chapter 2 – Matter p.30

Introduction



What is 'matter'?

Matter is the material substance that makes up the universe.

At the most fundamental level, matter is composed of tiny particles called atoms. Atoms can combine with other atoms to form molecules.

Most of the atom is empty space. The rest consists of three basic subatomic particles: protons, neutrons, and electrons.

The first thing the Bible tells us is that God is a creator. "In the beginning God created the heavens and the earth" (Gen. 1:1). God spoke and things came into being that were not there before, beginning with the universe itself. Creation is solely an act of God. It is not an accident or a mistake.

Genesis continues by emphasizing the material substance of the world. "The earth was a formless void and darkness covered the face of the deep, while a wind from God swept over the face of the waters" (Gen. 1:2). The creation, though still "formless," had the material dimensions of space ("the deep") and matter ("waters"). Later, in chapter 2, we even see God working the dirt of his creation. "The Lord God formed man from the dust of the ground" (Gen. 2:7). Throughout chapters 1 and 2, we see that God is working with the physical elements of his creation, 'matter'.

Basic Assumptions of Biblical Creation

Biblical creation is based on the Bible being the absolute authority.

- The Creator God of the Bible exists.
- The entire universe, heaven, created spiritual beings, and all life on earth originated at creation.
- God created all things in six normal-length days of approximately 24 hours.
- God began creating without the use of any previously existing matter.
- God's creative activities cannot be explained merely in terms of natural laws; neither are they subject to the above limits.
- The Bible indicates that life has a purpose.
- The Bible reveals that the God of the Bible is the Designer of all things.
- There is a definite beginning point of time, (See Genesis 1:1).
- The past is the key to the present.
- Death is the result of the sin of the first human couple.
- Creation was adversely affected by man's sin.
- The present geological structures of the earth's crust cannot be properly explained without reference to Noah's flood.
- Life does not come from nonlife.

- The creation of living organisms (original kinds) was completed during creation week. Speciation and variations within created kinds have been ongoing since creation.

Questions and Answer

Unit 1: Atoms

1. **Draw the structure of an atom, showing the nucleus, protons, neutrons and electrons.**
2. **What charges do protons, neutrons and electrons have?**

Protons are positively charged.

Neutrons have no electrical charge.

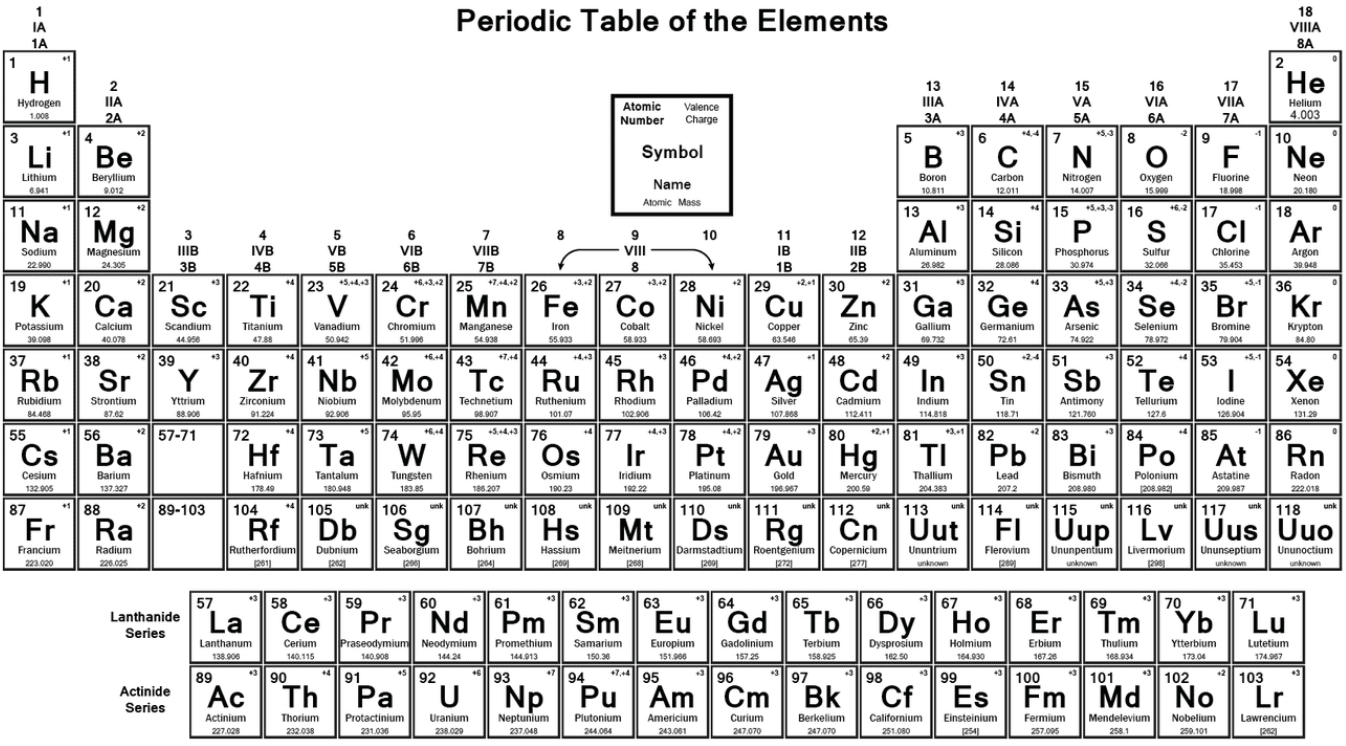
Electrons, have a negative charge and are arranged in shells (orbits) of different energy levels around the nucleus.

3. **True or false: The number of protons in an atom is equal to its number of electrons.**

True

4. **What is an element in science?**

A chemical element is a substance that cannot be broken down by chemical means. There are 118 known elements and these are shown on the periodic table.



5. **What is the atomic number of an element?**

The atomic number (Z) of an element gives the number of protons in the atom and determines which element the atom is. For example, atoms of hydrogen always have one

proton, those of helium always have two, those of carbon have six and those of oxygen have eight.

List of elements on the periodic table:

actinium (89)	oxygen (8)
aluminum (13)	neon (10)
americium (95)	neptunium (93)
antimony (51)	nickel (28)
argon (18)	niobium (41)
arsenic (33)	indium (49)
astatine (85)	iodine (53)
barium (56)	iridium (77)
berkelium (97)	iron (26)
beryllium (4)	krypton (36)
bismuth (83)	lanthanum (57)
bohrium (107)	lawrencium (103)
boron (5)	lead (82)
bromine (35)	lithium (3)
cadmium (48)	livermorium (116)
calcium (20)	lutetium (71)
californium (98)	palladium (46)
carbon (6)	phosphorus (15)
cerium (58)	platinum (78)
cesium (55)	plutonium (94)
chlorine (17)	polonium (84)
chromium (24)	potassium (19)
cobalt (27)	praseodymium (59)
copernicium (112)	promethium (61)
copper (29)	protactinium (91)
curium (96)	radium (88)
darmstadtium (110)	radon (86)
dubnium (105)	rhenium (75)
dysprosium (66)	rhodium (45)
einsteinium (99)	roentgenium (111)
element 113 (113)	rubidium (37)
element 115 (115)	ruthenium (44)
element 117 (117)	rutherfordium (104)
element 118 (118)	samarium (62)
erbium (68)	scandium (21)
europium (63)	seaborgium (106)
fermium (100)	selenium (34)
flerovium (114)	silicon (14)
fluorine (9)	silver (47)
francium (87)	sodium (11)
gadolinium (64)	strontium (38)
gallium (31)	sulfur (16)
germanium (32)	tantalum (73)
gold (79)	technetium (43)
hafnium (72)	tellurium (52)
hassium (108)	terbium (65)
helium (2)	thallium (81)
holmium (67)	thorium (90)
hydrogen (1)	thulium (69)
magnesium (12)	tin (50)
manganese (25)	titanium (22)
meitnerium (109)	tungsten (74)

mendelevium (101) mercury (80) molybdenum (42) neodymium (60) nitrogen (7) nobelium (102) osmium (76)	uranium (92) vanadium (23) xenon (54) ytterbium (70) yttrium (39) zinc (30) zirconium (40)

6. **From the list, find 3 metals and 3 gases**
7. **What is the mass number of an element?**

The mass number of an element is the number of protons plus the number of neutrons in an atom of that element. For example: Magnesium has 12 protons and 12 neutrons in the nucleus of its atoms. It would have a mass
number of 12 + 12 = 24. (Since the electrons have insignificant mass, they are never counted but must always be equal in number to the protons)

8. **Explain the differences in the way that solids, liquids and gases are structured.**

Solids: The particles in a solid are arranged in a fixed pattern and held very closely together.
Liquids: The particles in a liquid possess more energy than the particles of solids.
Gases: The particles in gases are very loosely held together.

9. **Explain the Physical Properties of Matter**

Elasticity: The ability of a material to return to its original shape and size after being stretched or compressed.
Strength: The ability of a material to support a mass or heavy load without breaking or collapsing.
Hardness: The ability of a material to withstand scratches and wear.
Solubility: Is the maximum quantity of a substance that can dissolve in a given quantity of the solvent (e.g 10g/100g water).
Melting point: The temperature at which a substance changes from solid to liquid.
Electrical conductivity: A measure of how readily electric current flows through a substance. Substances that allow electricity to pass through them are called conductors. Those that do not allow electric current to pass through them are called insulators.
Heat conductivity: A measure of how readily heat flows through a substance.

Test Unit 1

1. Draw the structure of an atom, showing the nucleus, protons, neutrons and electrons.
2. What charges do protons, neutrons and electrons have?
3. True or false: The number of protons in an atom is equal to its number of electrons.
4. What is an element in science?
5. What is the atomic number of an element?
6. Name an element that is a) a metal, b) a gas
7. What is the mass number of an element?
8. Explain the differences in the way that solids, liquids and gases are structured.
9. List and explain 3 physical properties of matter

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Unit 2: Materials

1. **What are materials? Give 2 examples.**
   A material is a substance that is used for making objects, e.g. cotton for making clothes; wood for making furniture

2. **List some living and some non-living sources.**
   Non-living: Building materials from rocks, such as slate, marble, stone, gravel; metals from ores, e.g. iron, copper
   Living: wood from trees for buildings and furniture; and for making paper and cardboard; canvas and ropes from plants; silk, wool and cotton fibers for clothing from silk worms , sheep and cotton plants; rubber from latex of rubber trees; leather from animal skins

3. **List some properties of materials**
   Glass: Transparent, brittle, unreactive, high melting point, non-conductor of heat and electricity
   Metals and Alloys: Usually hard, strong, dense, malleable, ductile, have high melting point, conduct heat and electricity
   Plastics: Flexible, low density, moulded when warm, many melt easily and some burn on heating, good insulator of heat and electricity
   Ceramics: Brittle, hard, high melting point, unreactive, non-conductors of heat and electricity
   Fibres: Flexible, low density, many burn on heating, long strands
   Composites: Have the properties of the materials making them

4. **Explain the meaning of these words:**
   Transparent
   Brittle
   Dense
   Flexible
   Malleable
   Ductile
   Conductor of heat (or electricity)
   Non- conductor (insulator of heat (or electricity)
5. **What are plastics made from?**
   They are made from chemical compounds obtained from plants, coal and petroleum.
6. **What is hard water and what is soft water?**
   Hard water: This type of water contains mineral salts of calcium and magnesium.
   Soft water: This type of water contains very few or absolutely no traces of minerals such as calcium and magnesium.
7. **How does soap have a different reaction on hard water to soft water?**
   Hard water: Soap does not lather well
   Soft water: Soap lathers well

- Do an experiment – make hard water by adding crushed chalk, which is a form of calcium. See how well the soap lathers compared to normal water.

8. **What are some of the negative effects that materials can have on the environment?**
    - Chemicals added to plastics are absorbed by human bodies. Some of these compounds have been found to alter hormones or have other potential human health effects.

    • Plastic debris, laced with chemicals and often ingested by marine animals, can injure or poison wildlife.

    • Floating plastic waste, which can survive for thousands of years in water, serves as mini transportation devices for invasive species, disrupting habitats.

    • Plastic buried deep in landfills can leach harmful chemicals that spread into groundwater.

Test Unit 2

1. What are materials? Give 2 examples.
2. List some living and some non-living sources.
3. List some properties of materials
4. Explain the meaning of these words: transparent; malleable; conductor
5. What are plastics made from?
6. What is hard water and what is soft water?
7. What happens when you use soap with hard water?
8. What are some of the negative effects that materials can have on the environment?

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