THE SHELL EXERCISE BOOK

NAME M. Parry

FORM
GRADE 2B

SCHOOL W.H.T.S.

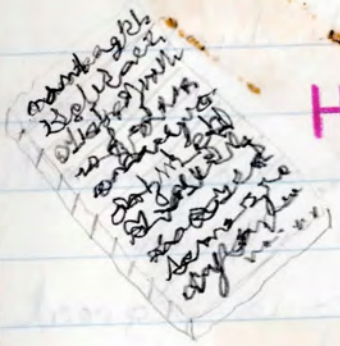
SUBJECT Science Notebook

96 PAGES FEINT

APPROVED BY THE EDUCATION DEPARTMENT

SHELL · DISTINCTIVE · STATIONERY ·


ALL
AUSTRALIAN
©ET 66



H^2O = WATER

SCIENCE

68

Topic No.1 19.2.68.

What is Science? Michael Parry.

Science is the systematic study of knowledge.

People who carry out these studies are called Scientists.

Our knowledge has become so great that Science has had to be broken into many BRANCHES, each of which deals with a small area of knowledge.

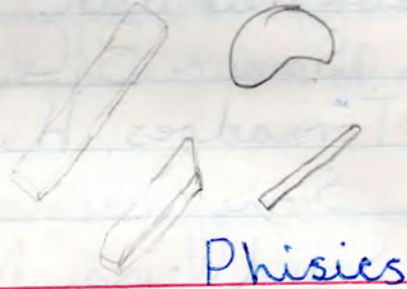
Some branches of Science are –

Branch of Science	Scientist	Area of Study
Metaturgy	Metalurgist	The Study of metal
Astronomy	Astronomer	The Study of Space
Geometry	Geometrist	The Study of the Earths Crust
Physics	Physisist	Study of the properties
Geography	Geographer	The Study of Earth Form
Zoology	Zoologist	The Study of the history of animals
Botany	Botanist	The Study of plants.
Meteorology	Meteorologist	The Study of weather
Biology	Biologist	The study of animals and plants

Metalurgy

Astronomy

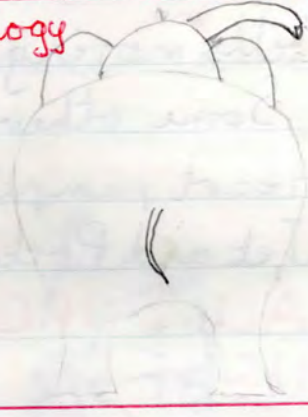
Geometry

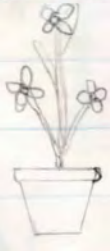


Phisics

Geography

Zoology





Topic No. 2

Force.

22.2.68
Michael Parry

Every day we use FORCE.
When we ride a bicycle we have to push on the pedals. A carpenter hits a nail with a hammer to push or force it into the wood.
A Dentist uses pliers to pull out decayed teeth of boys who eat sweet lollies and don't clean their teeth.

Some "BIG FORCES" are:
Tornadoes, Hurricanes, Atom Bombs.

Some "very small forces" are:
Sound Waves, Microscopic animals moving, Cells moving, Molecules moving,

Some other forces are:
Heart pumping blood, Magnets, Gravity, Jet and Rocket motors.

ALL FORCES ARE EITHER PUSHES OR PULLS

Michael Parry 1-3-68.

Topic No 2

In general, forces change the state of motion of bodies.

example:

(1.) A force applied to the pedal of a bicycle makes the bicycle move. ✓

(2.) A force applied to the handle bar of a bicycle makes the bicycle change its direction of movement. ✓

(3.) A force applied to a door makes it open or close ✓

(4.) A force applied to the brake on a bicycle makes it slow down. ✓

A force Can:

1. A force can make a stationary body move

Michael Parry. 4. 2. 68.

Force

2. Make a moving body move faster.
3. " " " " slow down.
4. " " " " stop.
5. " " " " change direction.

Michael Parry 4. 3. 68.

When forces do Work.

Forces can act and may or may not do work.

Example.

1. A man sits on a chair – he applies a force (his weight) to the chair. But the chair does not move. NO WORK IS DONE.

2. A man lifts a log of wood. He applies a force to the wood and it MOVES.

WORK IS DONE

Work is done when a Force makes a Body move

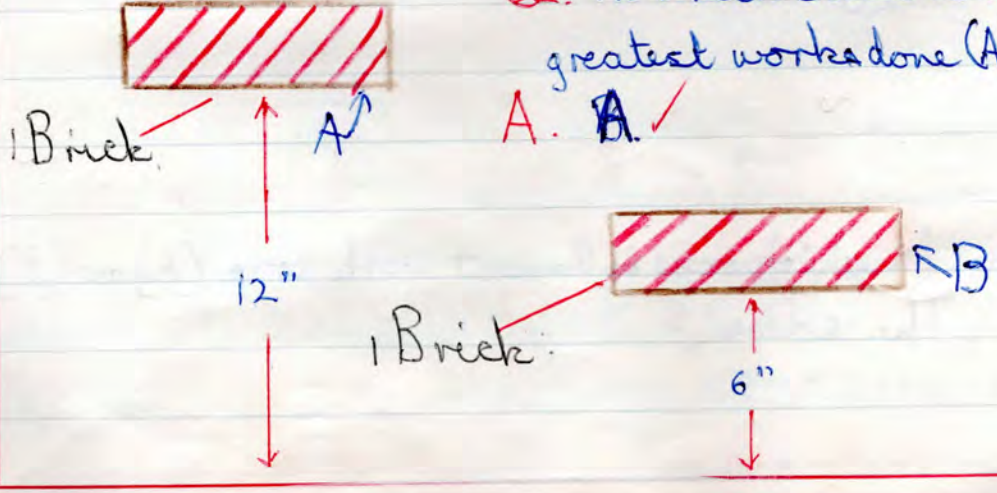
There ~~are~~ must ALWAYS be the 2 factors.

1. force.
2. movement. (distance).

How much work?

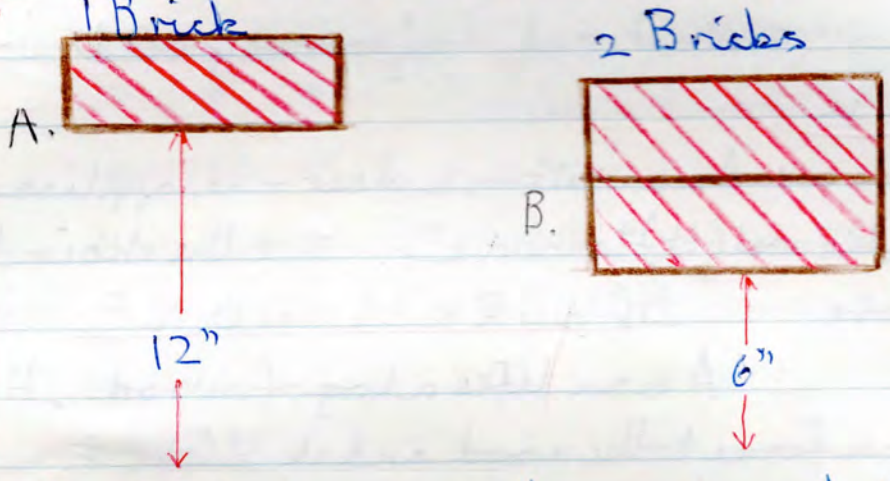
Q. In which case is the greatest work done (A) or (B)

A. ~~B~~ A ✓



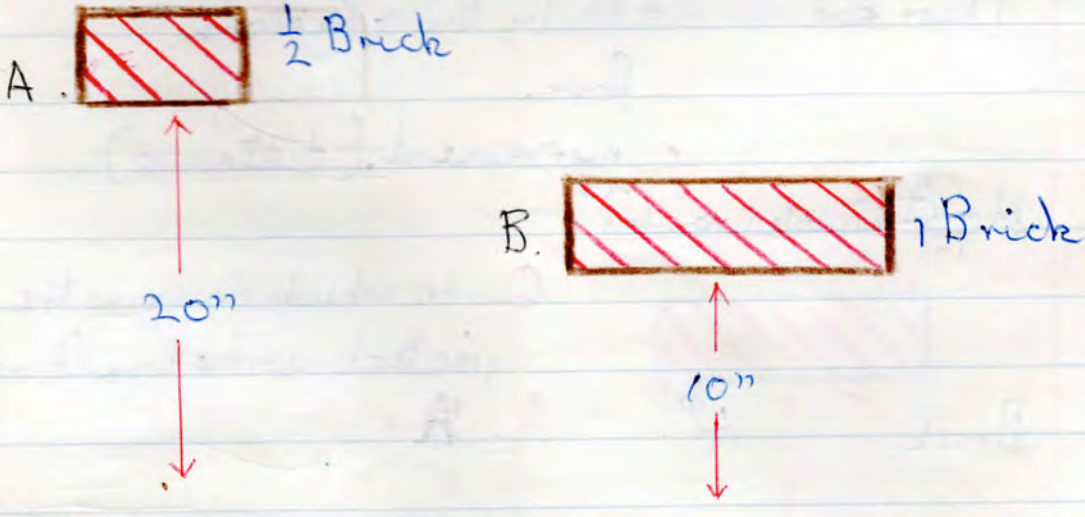
Michael Parry 4.3.68

When Forces do work.



Q. In which case is the most work done (A) or (B)

A. The Same. ✓



Q. In which case is the most work done (A) or (B).

A. The same. ✓

Michael Parry 15. 3. 68.

When Forces do work.

In calculating the amount of work done by a force we say:

Work Done = Force x Distance.

Example. 1. A force of 9 lbf moves a distance of 3 ft. How much work is done?

Work Done = Force x Distance

OR

Work Done = F x D.

F = 9 lb-f

D = 3 ft

∴ Work done = 9 x 3 ft lb-f.

= 27 ft lb-f.

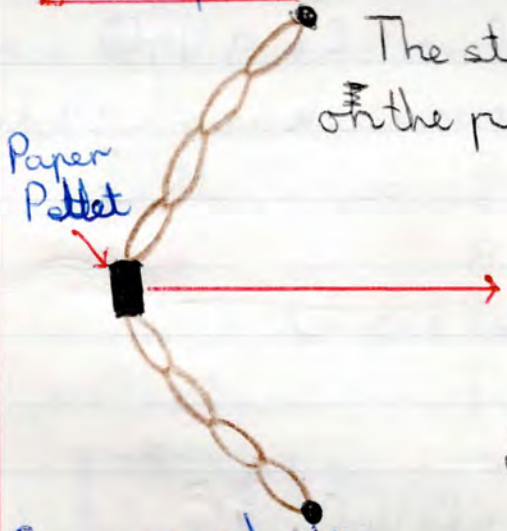
2. A force of 8 lb-f. moves an object 4 ft. How much work is done.

Michael Parry 15. 3. 68

Topic No 4. Bodies which can do work.

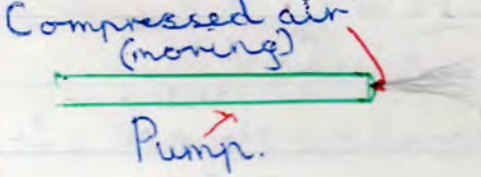
There are many bodies which are able to do work

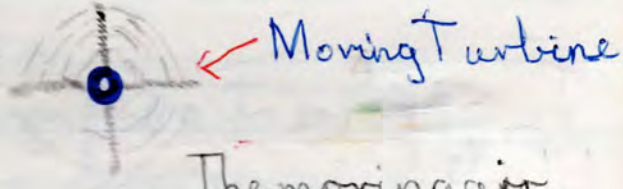
Examples.



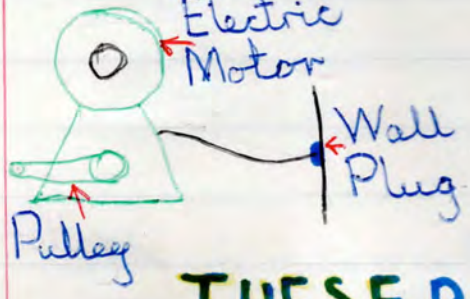
The stretched elastic did work on the paper pellet.

The falling hammer did work of the nail





The moving air does work on the Turbine.



The motor did work on the Pulley wheel.

THESE BODIES COULD DO WORK BECAUSE THEY POSSESSED ENERGY

Michael Parry 18. 3. 68

Topic No 5 Forms of Energy

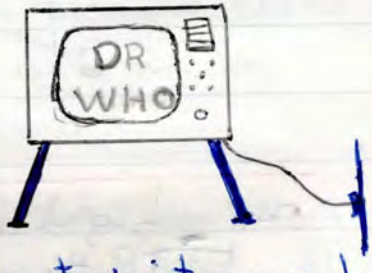
There are many different forms of energy:

1. **Electric Energy** - Electricity
2. **Stored Energy** - (raised objects, strained ,,)
3. **Heat Energy** - Hot objects.
4. **Moving Energy** (Kinetic) moving energy
5. **Chemical Energy** (torch batteries, matches)
6. **Light Energy** (Luminous objects)
7. **Sound Energy** (Vibrating objects)
8. **Nuclear Energy** (Splitting of the atom)

1A.

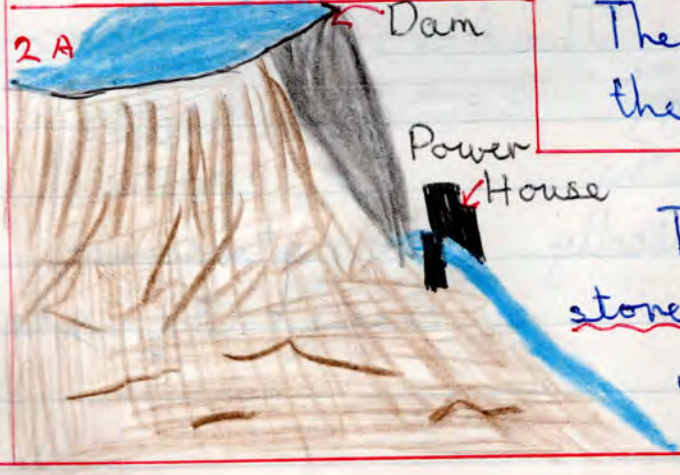
The light was powered by electricity.

1B.



The electricity made the television come on.

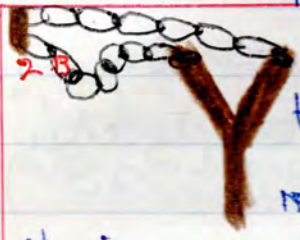
2A



The water was stored in the dam to make Hydro-electricity

Michael Parry 19.3.68.

Forms of Energy

2B 

When stretched the rubber bands ~~rubbers~~ released their energy.

3A.  ← Flame

The Bunsen Burner flame had heat energy.

3B.  Match

The match possessed heat energy.

4A Golf Ball ●←

The golf ball was moving.

4B. 

The Aeroplane was moving

5A.  Light Battery

The energy that came from the battery was chemically made.

5B.  ← Matches

The matches are chemically made.

Michael Parry 19.3.68.

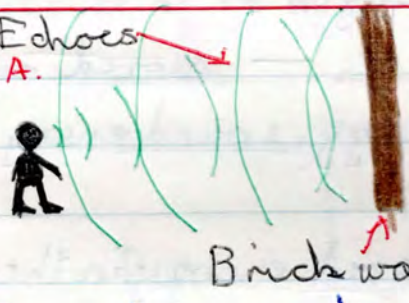
Forms of energy

6.A 

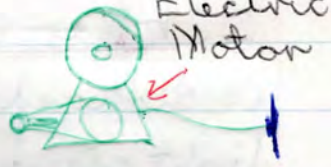
The Sun is a form of light energy.

6B. Torch

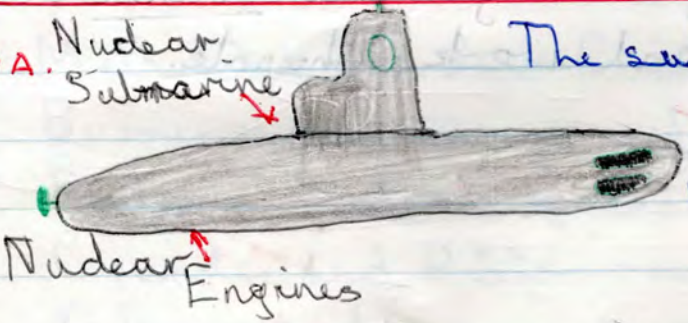
The torch was able to give light energy.

7A. 

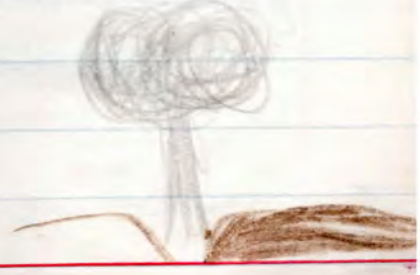
The echo was also sound energy

7B. 

The vibrating motor had sound energy.

8A. 

The submarine was powered by the nucleus of the Atom



Michael Parry 23. 3. 68. M

Topic No 6. Changing one form of energy into another. T

(1). Shanghi — Stored energy in the stretch elastic is changed into moving energy.

(2). Electric Motor. — Electrical energy is turned into moving energy.

(3). Electric Radiator. — Electrical energy is changed into heat energy.

(4). Hydrogen bomb blast. — Stored energy is changed into heat energy, sound energy and light energy.

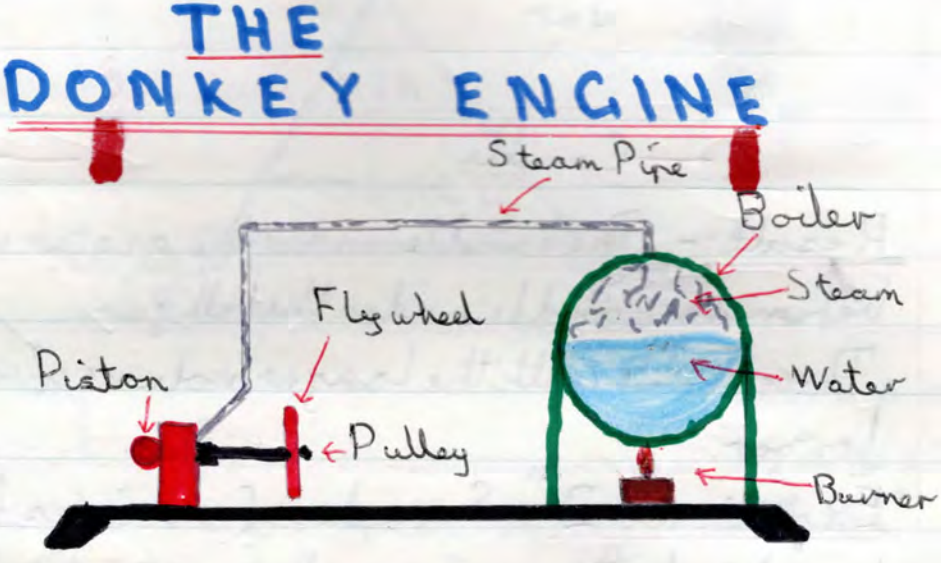
5 Pile Driver — Stored energy in the raised monkey is changed into moving energy. As the monkey strikes the top of the pile the moving energy of the monkey is changed into sound energy, heat energy and work on the pole.

4

Michael Parry 4.4.68

Topic No 7 The Donkey Engine

The Donkey Engine is an excellent example of energy changing from one form to another

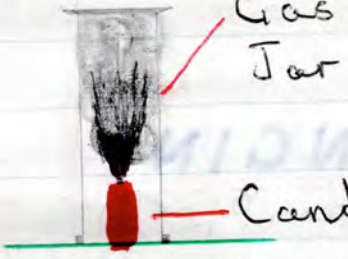


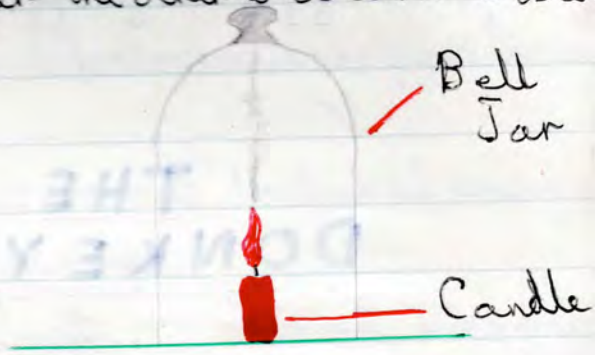
1. Methylated Spirits - Chemical Energy.
2. Burner - heat energy and light energy.
3. Boiler - heat energy and compressed energy.
4. Cylinder and Piston - moving energy.
5. Pulley wheel - moving energy.

Michael Parry 11. 4. 68.

Topic No 7. Fires

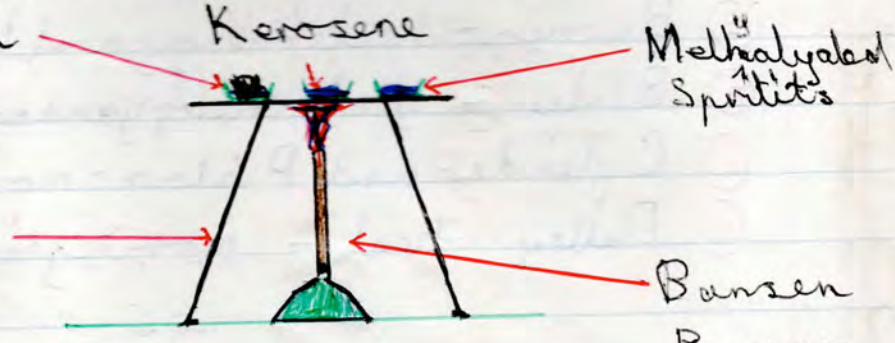
Experiment 1. Two candles were lit. One was covered with a gas jar the other was covered with a bell jar.





Result:- The candle under the gas jar went out before the candle under the bell jar.
The candle with the longer volume of air burnt longer.

Experiment 2. Samples of various fuels were placed in bottle caps and an even heat applied to all from a bunsen-burner.



Result.

Michael Perry 18-4-68 M.

Topic No 8. Extinguishing Of fires

1. Removing the fuel. (i) A wood shed may catch on fire. The Fire-men always remove as much wood as possible.

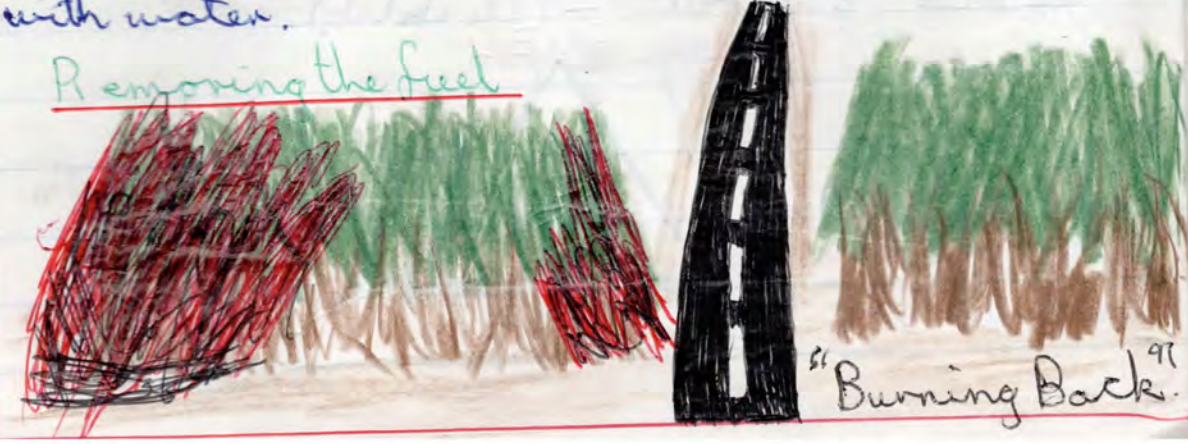
(ii) If a bush-fire is out of control it may be put out by "burning back" to remove the fuel.

(iii) Inflammable liquids may be put out when burning by removing the supply of fuel.

2. Lowering the temperature (i) Water spread over a fire has the effect of lowering the temperature of the fuel to below ignition temperature.

3. Removing the air. (i) Smothering of fires by covering with bags, carpet, soil, water or foam. Petrol, Oil etc. are usually put out with foam. Inflammable solids are usually to put out with water.

Removing the fuel



"Burning Back"

Michael Parry

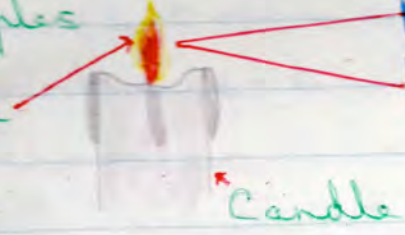
26.4.68

Topic No 9. Burning Releases Energy.

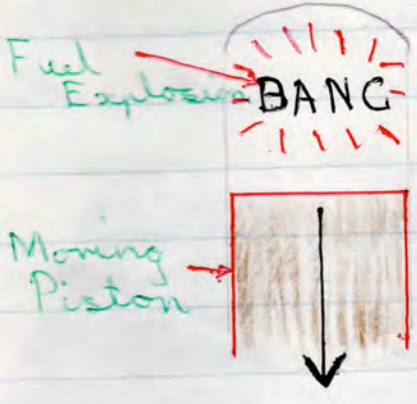
When a fuel burns the Chemical energy in the fuel is changed into other forms of energy. Some of these are Heat energy, Light energy and sometimes Sound energy. (eg. during an explosion)

We can see and feel these forms of energy being given off or released when an inflamable material burns.

① Examples



② Car Engine



Fuel burns very rapidly giving an explosion in the cylinder

Energy in the fuel is released as

(i) Heat energy
(ii) Sound energy
(iii) Moving energy which drives the car

Michael Parry 2:5.68.

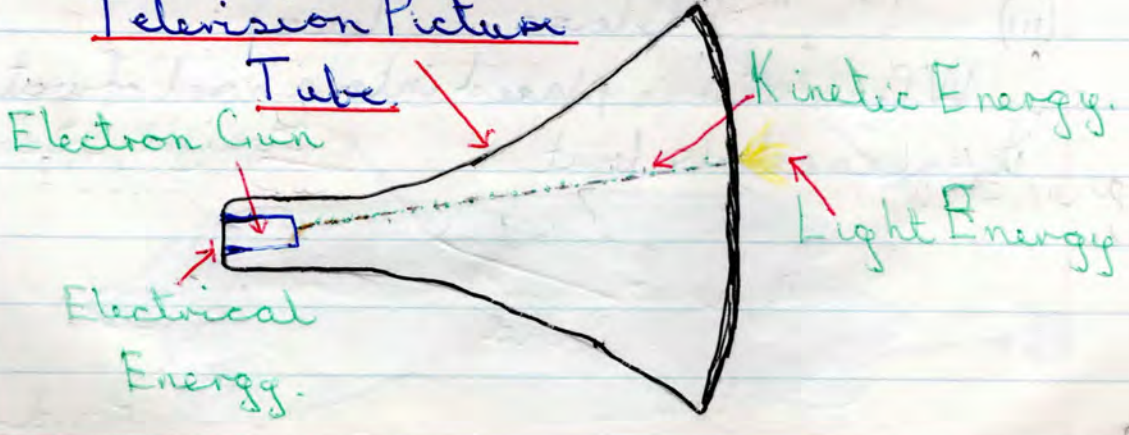
Topic No 10. Light Energy.

Light is provided by various means but always involved a change of one form of energy to light energy.

Examples:

1. Sun — Nuclear Energy to Light Energy.
2. Match — Chemical " " " "
3. Electric light globe — Electrical Energy to Light Energy.
4. Kerosene Lamp — Chemical Energy to Light energy.
5. Flourescent lamp — Electrical Energy to Kinetic energy to Light energy.
6. Television — Electrical Energy to Kinetic energy to Light Energy

Television Picture Tube.



Michael Parry 3.5.68.

Topic No 11 The Speed of Light.

Galileo was the first man to attempt to measure the speed of Light. However due to the poor timing devices that he used and the tremdous speed of light he was not successful.

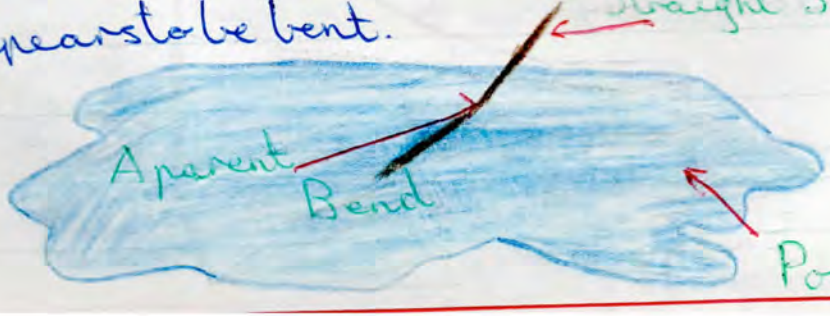
A man named Michelson (1852 - 1932) was the first man who successfully did this.

He declared that the speed of light in air was 186,000 miles per second. Since then other methods have shown that its speed through other materials is similar but slightly more or less than this

Examples.

(i) Speed in a Vacuum is greater
(ii) " " " Water " less
(iii) " " " Glass " less.

When a stick is placed into a pool of water it appears to be bent.



Michael Parry
Topic No 11 The speed of light

Calculate the time light takes to travel to Earth from the Sun. Light travels at 186,000 miles per second, and the sun is 93,000,000 miles from the earth.

186,000 | 93,000,000

500 seconds.

=. 500 seconds or

8 mins 20 seconds.

The Sun

93,000,000 miles

Earth

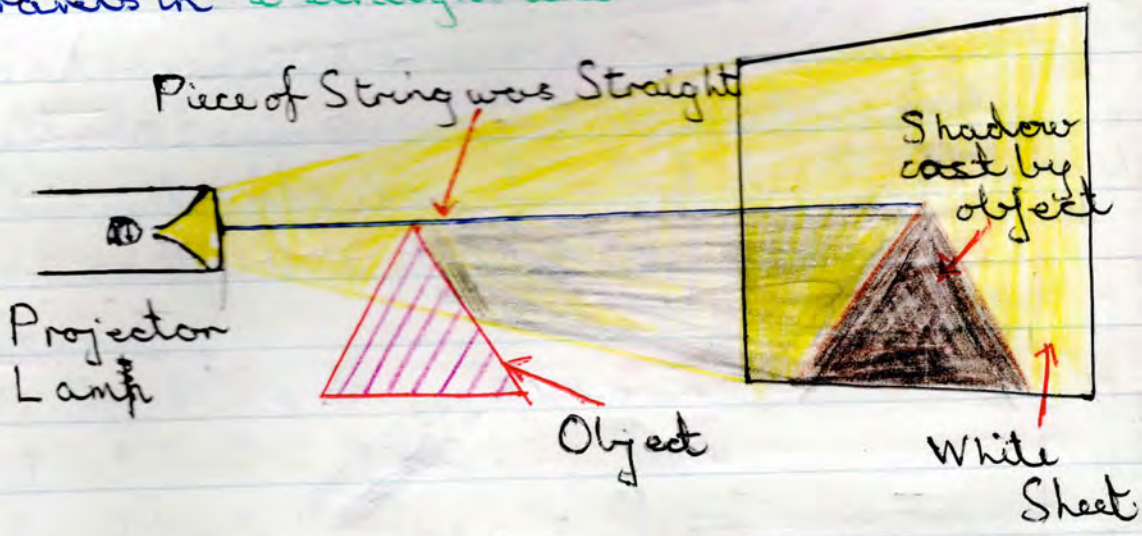
Michael Parry 9.5.68.

Topic No 11. How Light Travels.

A piece of rubber tubing would not allow light to pass through it unless it was straight.

A shadow cast by an object placed in the beam of a light from a projector was directly in line with the object and the light source.

These simple experiments show that lights travels in a straight line.



Light travels in rays which do not need any particles of matter to help them travel.

→

A Light Ray

Michael Parry 10.5.68

Topic No 11 How Light Travels.

Q. How long does light take to travel from the Sun to Pluto.

$$\frac{3,670,000,000}{186,000} = \frac{3,670,000}{186}$$

= 19,731 seconds.

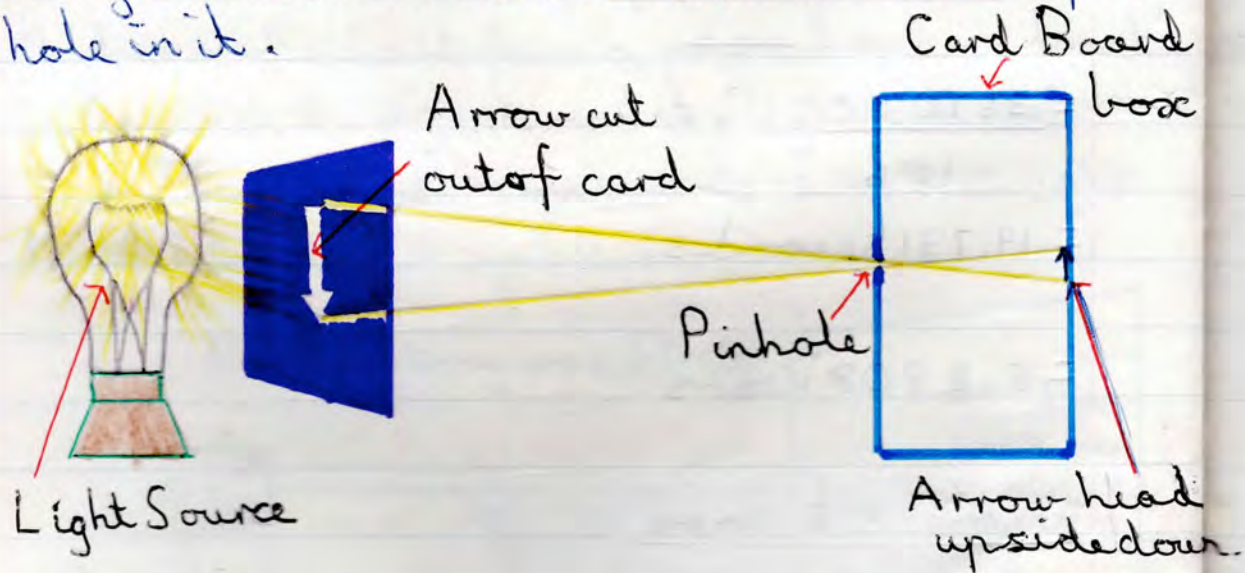
= 5.4808 hours.

approx. 5 $\frac{1}{2}$ hours

End of Term one

Topic No 12. The Pin-Hole Camera

Because light travels in straight lines it is possible to take a photo or make an image with a cardboard box with a pin-hole in it.



To make the pin-hole camera take a photograph

(i) In a dark place put a piece of unexposed film on the side of the box opposite the pin-hole. Cellotape will hold film.

(ii) Place lid back on box and cover pin-hole.

(iii) Set "Camera" on a solid surface with pin hole pointing at object.

(iv) Remove finger from pinhole for 3 to 4 seconds.

Michael Parry 23.5.68.

Topic No 12 The Pin Hole Camera

(v) Cover pin-hole again. Remove and develop film in a dark place.

Michael Parry 30.5.68.

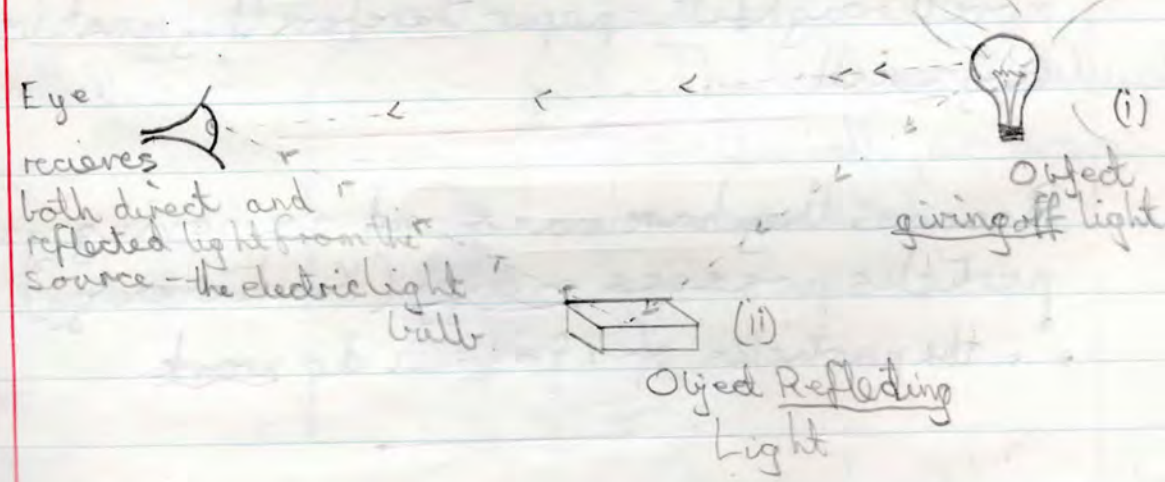
Why do we see?

We see the objects about because they either

(i) Give off light - television recievers, electric light globes, the Sun etc

OR

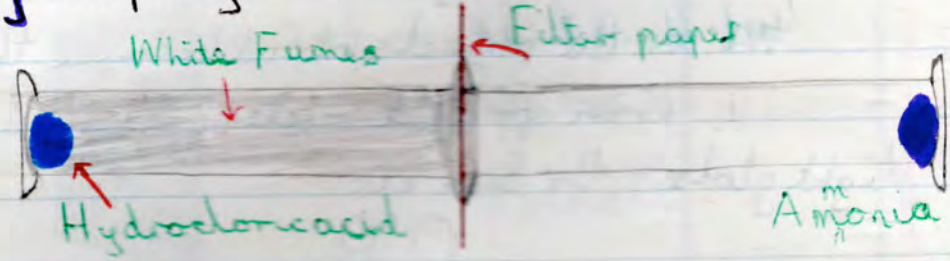
(ii) They reflect light which strikes them.



Michael Parry 6.6.68.

Topic No 13 Some facts about Gases

Some ammonia solution was place on cotton wool on a watch glass. It **evaporated** and was soon noticed in various places around the room. The particles of **Ammonia Gas** must have been **moving** rapidly



This experiment shows that gas particles can move through filter paper therefore they must be very small.

Because they have mass and are moving gas particles possess energy (Kinetic energy)

∴ the particles of a gas can do work.

Michael Parry 20.6.68

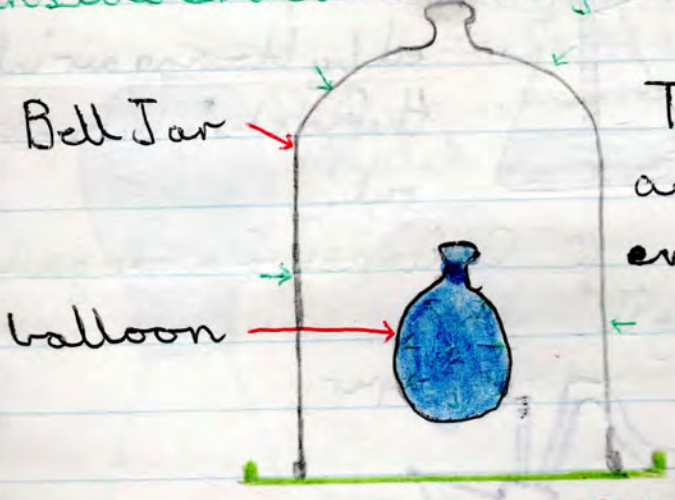
Topic No 13 Some facts about Gases.

Gases that Work

① Inflated balloon.

The balloon is inflated because the air particles are trying to get out and they push out the sides.

② Partly inflated balloon inside evacuated bell jar.



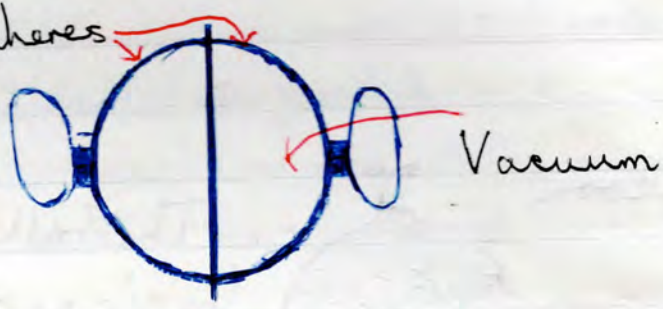
The balloon "went up" as the bell jar was evacuated.

③ Magdamburg hemispheres

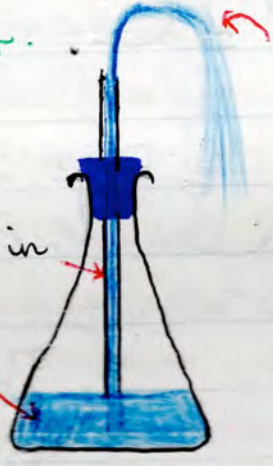
The hemispheres would not come apart because a vacuum had been made. P.T.O.

Michael Parry 20.6.68

Topic No 13



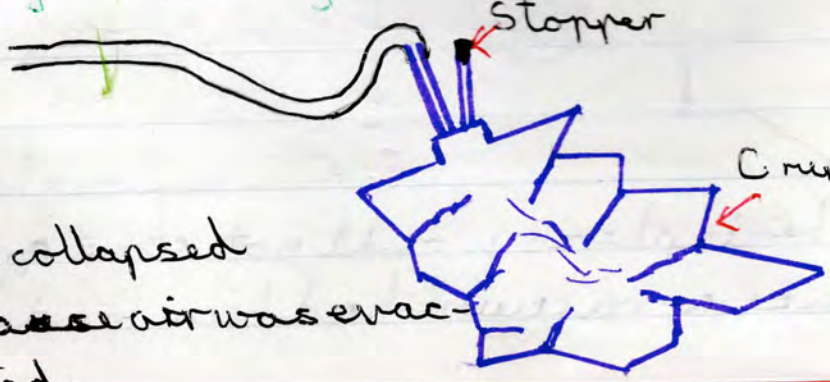
④ Flask with boiled stopper, tube and water.



Fountain of water from flask

Air pressure increased by blowing air into the flask. ∴ Water came out.

⑤ Collapse of a one gallon tin by evacuating it.



Tin collapsed because air was evacuated

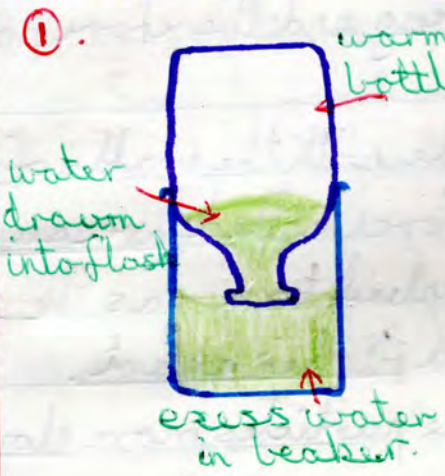
Michael Parry

21. 6. 68.

Topic No 33 ~~Temperature~~ Some facts about Gases

Temperature changes in Gases.

① .



A warmed bottle was placed in a beaker of cold water. As the air in the bottle cooled the water from the beaker was drawn up into the bottle to replace the air which left when the bottle was heated.

② Partly inflated balloon

Flask

balloon was inflated more.

Heated Flask

Michael Parry 27.6.68.

Topic No. 13. Some facts about Gases

General rules about gases.

1. Gas particles are moving and therefore posses energy.
2. When gas patides collide with the walls of a container they create a force called pressure.
3. When heat energy is supplied to a gas the particles move faster and further apart.
4. When a gas is cooled the particles move slower and closer together.

In a closed space:

a. Increasing temperature, increased speed of particles and number of collisions; therefore the pressure increases.

b. Lowering the temperature, decreases the speed of the particles and numbers of collisions; therefor the pressure decreases.

c. Reducing the volume increases the number of collis ns; therefore the pressure increases.

d. Increasing the volume decreases the numbe of collisions; therefore the pressure decrease

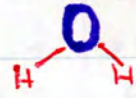
8. Michael Parry 28.6.68.

Topic No. 13 Atoms and Molecules

All matter is made up of different combinations of Atoms of the 92 naturally occuring elements.

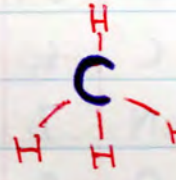
Sometimes these atoms are joined together to make larger particles called molecules

e.g. Water – H_2O



1 atom of oxygen
2 atoms of hydrogen
= 1 molecule of water

Methane – CH_4
(in coal gas)



1 atom carbon
4 atoms hydrogen
= 1 molecule of Methane

Michael Parry 4.7.68.

Topic No. 13 Atoms and Molecules

Atomic No.	Element.	Symbol	Protons	Neutrons	Atomic Weight	Electrons	Electron Arrangement
1	Hydrogen	H	1	0	1	1	1,
2	Helium	HE	2	2	4	2	2,
3	Lithium	Li	3	4	7	3	2, 1,
4	Beryllium	Be	4	5	9	4	2, 2,
5	Boron	B	5	6	11	5	2, 3,
6	Carbon	C	6	6	12	6	2, 4,
7	Nitrogen	N	7	7	14	7	2, 5,
8	Oxygen	O	8	8	16	8	2, 6,
9	Fluorine	F	9	10	19	9	2, 7,
10	Neon	Ne	10	10	20	10	2, 8,
11	Sodium	Na	11	12	23	11	2, 8, 1
12	Magnesium	Mg	12	12	24	12	2, 8, 2
13	Aluminium	Al	13	14	27	13	2, 8, 3
14	Silicon	Si	14	14	28	14	2, 8, 4
15	Phosphorus	P	15	16	31	15	2, 8, 5,
16	Sulphur	S	16	16	32	16	2, 8, 6,
17	Chlorine	Cl	17	18	35	17	2, 8, 7,
18	Argon	Ar	18	22	40	18	2, 8, 8,
19	Potassium	K	19	20	39	19	2, 8, 8, 1,
20	Calcium	Ca	20	20	40	20	2, 8, 8, 2,

Michael Parry 5.7.68.

Topic No 13 Atoms and Molecules

examples:

Name	P.	N.	E
Helium	2	2	2
Boron	5	6	5
Beryllium	4	5	4
Fluorine	9	10	9
Nitrogen	7	7	7
Carbon	6	6	6
Lithium	3	4	3
Oxygen	8	8	8
Neon	10	10	10
Hydrogen	1	0	1

Different combinations of the three sub-atomic particles are called atoms of different elements.

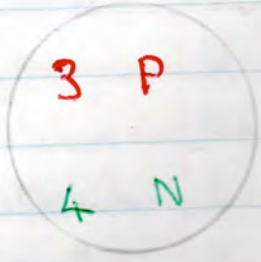
The three particles that make up atoms are:

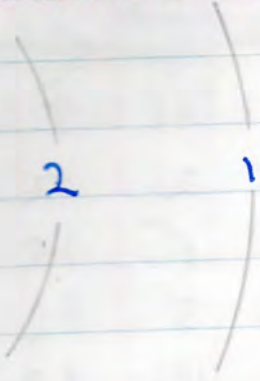
1. Protons +ve charge small Heavy
2. Nuetrons no charge small Heavy
3. Electrons -ve charge large Light.

Michael Parry

11.7.68.

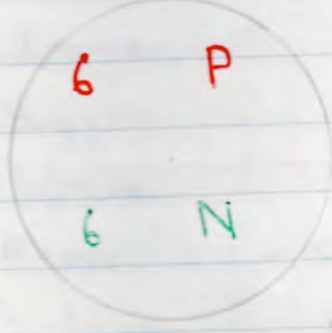
Atomic Structure

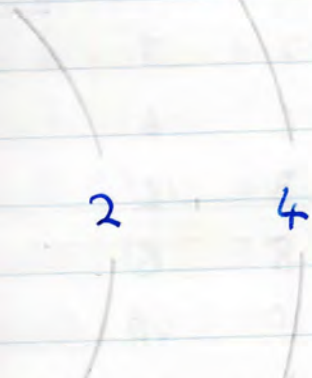




3 P
4 N
3 E

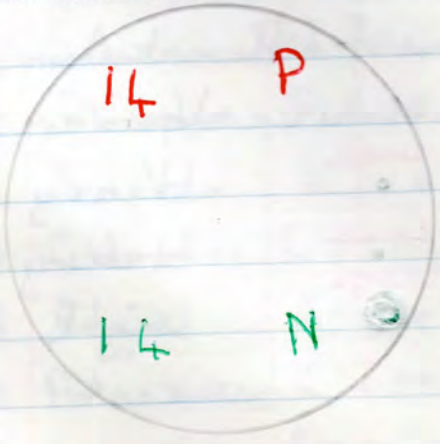
1. Lithium

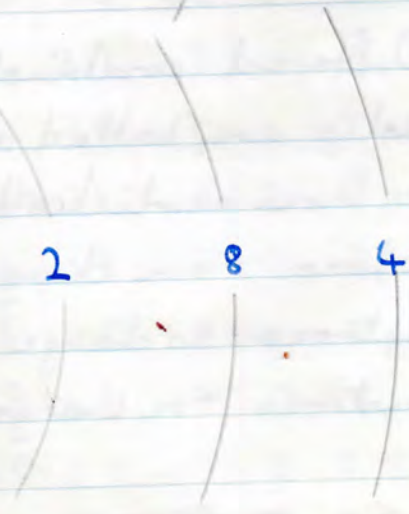




~~6~~ 6 P
~~6~~ 6 N
6 E

2. Carbon
3. Silicon

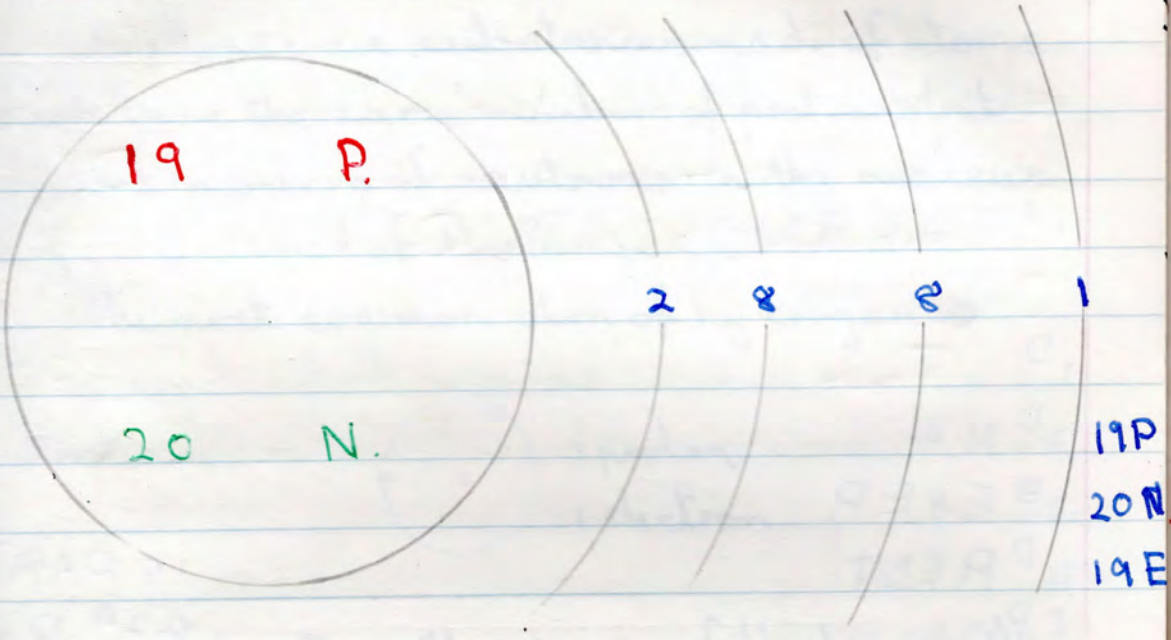




14 P.
14 N.
14 E

Michael Parry 11. 7. 68.

Atomic Structure



1A THERMOSTATIC

1D

2D HA

3D EVER

4D REST

5D ON

6D

7D

8D

9

16D

17D IGNITION

18D COIR

23DY

25D TENT 29A AT

27D GAS 33 ARTS 37D S 38

32D HEAT 35D HOME 39D

15 PARTICL

22A RAY

32A H

33A

34A ASH

36A

38A INTER

40A O

41A TAME

42A

EXTINGUISHER

Michael Parry 19. 7. 68.

Isotopes

Isotopes are substances made of atoms which have the same number of protons but different numbers of neutrons in the nucleus

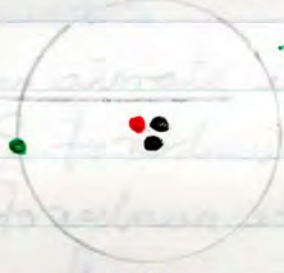
e.g. Isotopes of Hydrogen.

The most common aton of hydrogen is

Protium  1 proton
1 electron

There are also two other types of Hydrogen Atoms.

Deuterium



Tritium

1 protron
1 electron
1 extra neutron

1 protron
1 electron
2 extra neutrons

	Protium	Deuterium	Tritium
At. No.	1	1	1
At. Wt.	1	2	3

Michael Parry 19.7.68.

Isotopes

Most elements as they occur naturally, are a mixture of the Isotopes of that element.

Oxygen. — in the air is chiefly O. (At Wt. 16) but with about 0.04% O (At. Wt. 17) and 0.2% O (At. Wt. 18)

There are 2 isotopes of Chlorine, Potassium and 10 isotopes of tin. There are also many others.

Michael Parry 25.7.68.

Summery of work on Atoms

1. The atomic number of an element tells us the number of Protrons in the nucleus. ✓
2. The number of Protrons (positively charged) is the same as the number of Electrons (negatively charged) in an atom of any element ✓
3. The atomic weight of an atom is the sum of the number of protrons and the number of nuetrons. ✓
4. Protrons and Nuetrons are always in the Nucleus of an atom. ✓
5. Electrons orbit the Nucleus like planets

Isotopes

around the Sun.

6. Electrons are large and light like table tennis balls; Protrons and Neutrons are small and heavy like ball bearings.

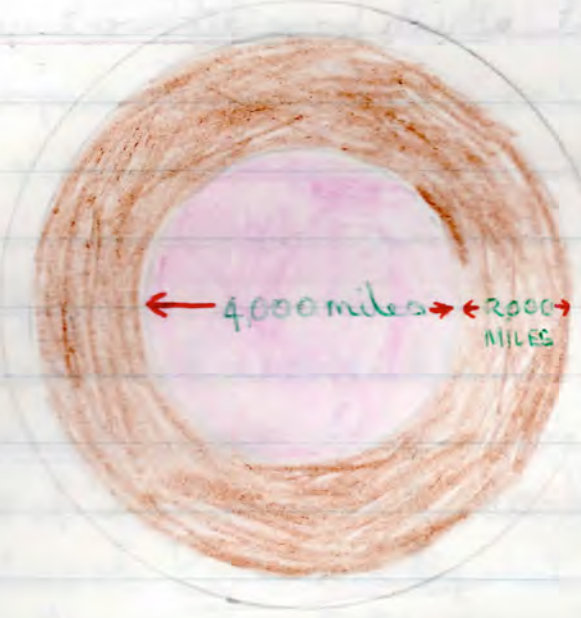
7. Isotopes of an element are made of atoms of that element which have different numbers of Neutrons

Michael Parry 1. 8. 68.

Topic No. 14 Geology

Geology is the science which studies the earth's crust.

The Earth is a slightly flattened sphere (Flattened at the Poles) About 8,000 miles in diameter.



The surface of the Earth is divided into two parts:

(i) Land – about $\frac{1}{3}$ of the total area.

(ii) Water – about $\frac{2}{3}$ of the total area – there is so much water that its volume may be measured in thousands of cubic miles.

Michael Parry 2.8.68.

Topic No. 14 Changes in the Earths Crust.

As the Earth cooled the most normal thing to happen would be for it to slowly contract.

The rocks of the crust of the earth would probably have been the first to become solid

Once solid the amount of contraction would not be so great. As the inner layers continued to cool the crust began to warp and buckle like the wrinkled skin of a dried out lemon

The changes which do take place occur over tremendous periods of time.

Very few sudden changes take place in the earth's crust.

Some of the changes which occur are:

1. Folding

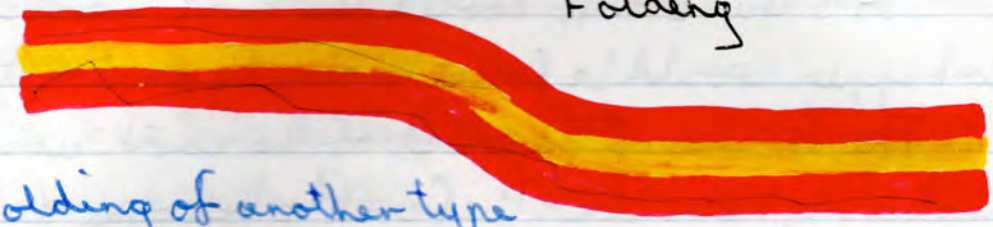
Level beds of rock on the Ocean Bed

Folded rocks of a similar type.

Michael Parry 2.8.68.

Topic No 14. Changes in the Earth's Crust

Folding

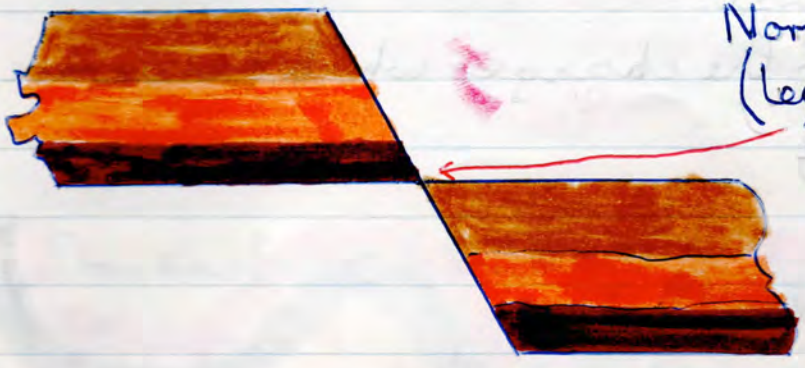


Folding of another type which can occur.

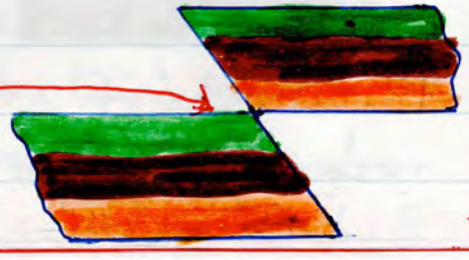
8.8.68.

Faults

Large blocks of rock may move relative to one another to produce either legenthing or shortening of a huge land mass.



Normal Fault (legnthening)



Reverse Fault (Shortening

Michael Parry 22.8.68.

Geology sht 1.

1. What is the shape of the earth?

1. The shape of the earth is a sphere. ✓

2. One theory of the formation of the earth was that is began as a ball of burning gases. What othe stages has the earth passed through?

2 ✗ After this the earth slowly cooled and turned to a mass of red hot rocks. Then it was covered with cloud from which rain fell for centuries. Polar ice spread several times receding and coming back again. The plants and animals began to appear and about 300,0 years ago man appeared. ✓

3. How old is the Earth?

3 The earth is about 5,000,000,000 years old! ✓

4. A section cut through the earth's surface show four major regions. What are these four major regions.

4. The four major regions of the earth are the inner core, outer core; mantle and crust. ✓

5. To find out what the earth looks like under the surface the scientists are going to drill through the earths crust under the oce Why did they choose to drill under the ocean instead of land?

Michael Parry 22.8.68.

Geology sheet No 1.

5 They ~~do~~ are drilling under the ocean instead of on land because there is less crust under the ocean than what there is on the land. ✓

6. What is the mohole project?

6. The Mohole project is to find out how old the earth is and the mantle inside. ✓

7. Why is the Mohole project being carried out?

7. The Mohole project is being carried out to give us better clues to the earths age. ✓

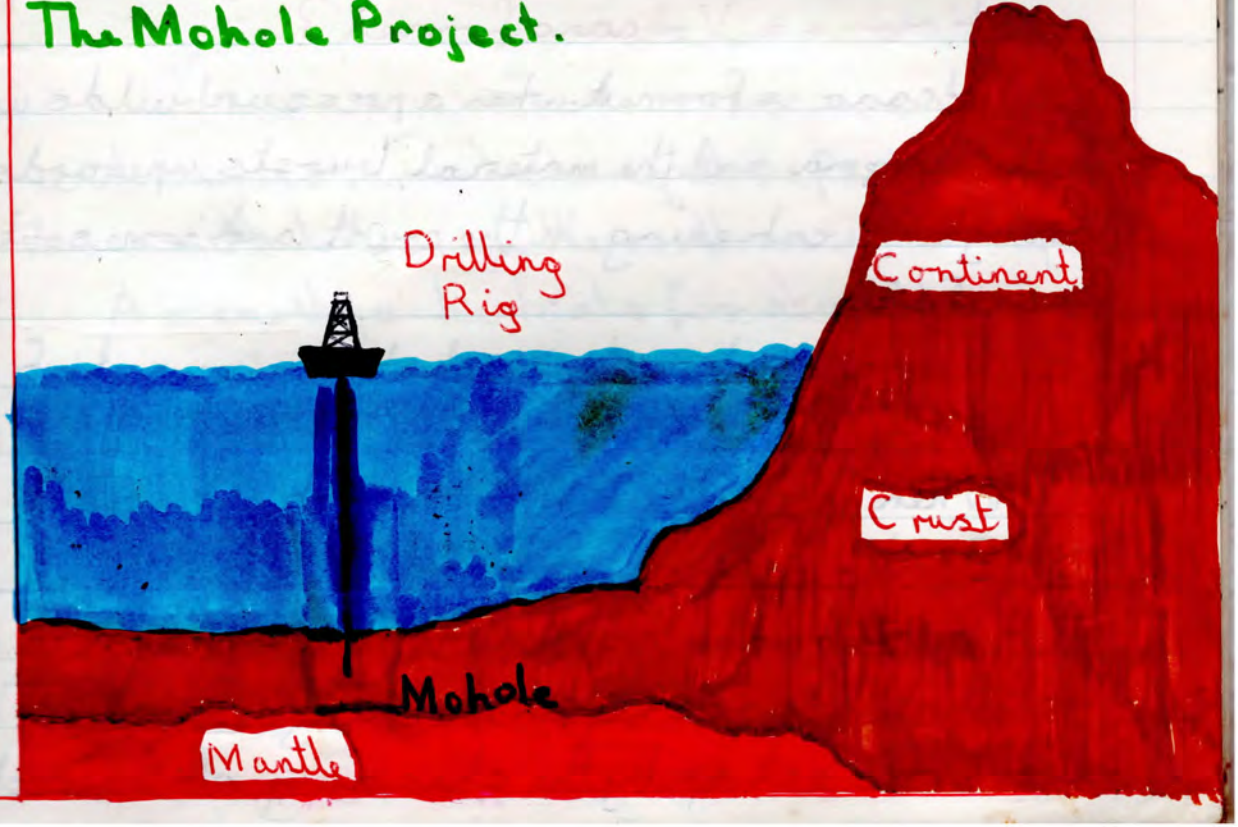
Stages of the Earths Formation

Michael Parry 12. 9. 68.

Geology sheet No 1.

2.

The Mohole Project.



Michael Parry 13.9.68.

Geology Sheet No 2.

Ever since the earth was formed it has been undergoing changes. These changes are due to the many forces which shape the earth. These changes take place over a long time and are still going on now. Some of the actions which change the crust are: Volcanoes, earthquakes, glaciers, weathering, Erosion, Deposition, Folding, Faulting and Landslides.

1. Volcanoes.

a. How is a Volcano formed?

A Volcano is formed when a pressure builds up in the magma and the material bursts upwards through a weakening in the crust and comes out on the surface. ✓

b. Lava and ash is what comes out of a Volcano. ✓

c. When it cools it forms rock. ✓

2. a. Earthquakes.

a. An earthquake happens when tension is so great that the rocks split, forming a fault. The vibrations set up by the shearing of the rocks

and any movements along the fault plane are transmitted through the earth as an earthquake.
b. An earthquake lasts for a matter of seconds to a minute.
c. An earthquake can destroy everything that that is standing.
d. The epicentre is the first point to be effected and it suffers the most damage.
e. The instrument that scientists use to detect earthquakes seismograph.

Michael Perry 20. 9. 68.

Geology No 2

Roof of underground cavern collapsing.

3. Weathering, Erosion and Deposition

1 What causes weathering of rocks?

1. Wind, water, rain and glaciers causes weathering of rocks. ✓

2. How is the soil formed?

2 Soil is formed by weathered rocks in very small particles. ✓

3. How are mountains worn down?

3 Mountains are worn down by the wind and rain. ✓

4. How is a hilly region turned into a plain?

4. Hilly country is turned into a plain by erosion of the soil. ✓

5. What happens to all the small particles of

rocks which are worn away?

5. The pieces of rock which are worn away are formed to soil. ✓

4. Folding and Faulting.

1. What is a fold?

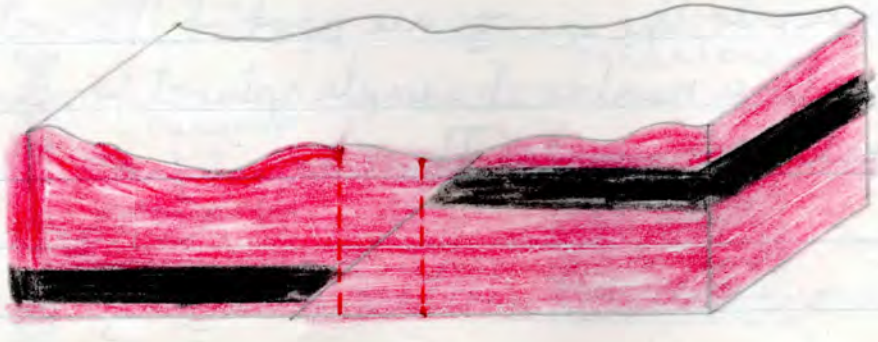
1. A fold is when the rocks have contracted and buckled

2. How is a fold formed?

2 A fold is formed when the contracting of the earth forses a layer of rocks to fold.

3. What is a fault?

3 A fault is when a piece of land drops below the level of the other. This takes an enormous amount of time. ✓



Michael Parry 30.9.68.

Geology Sheet No 3

About $\frac{2}{3}$ of the earth's surface is covered by water, and on the remainder, the land, there are mountainous areas and large deserts which cannot produce food plants. We are left with a limited area whose top few inches of soil must provide all of us - in fact, all living animals with food. The soil is a vital link in the food chains of all living things. Soil Normally contains: humus, air, water and mineral matter.

1. What is the mineral matter in the soil?

1. Mineral Matter in the soil is the pieces of rock which break down and form clay.

2. What is the Humus in the soil?

2. Humus is the decaying matter in the Soil.

3. What is Weathering?

3 Weathering is the gradual conversion of soled rock into the inorganic part of the soil and is due to a number of simple natural forces called weathering agents. These are:

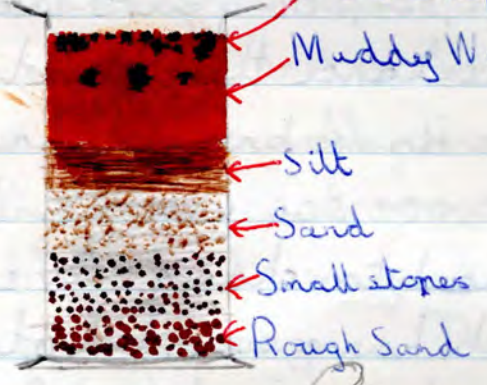
Changes in Temperature, water freezing, running water, Breeze, Carbon Dioxide and [illegible]

Michael Parry 3. 10. 68.

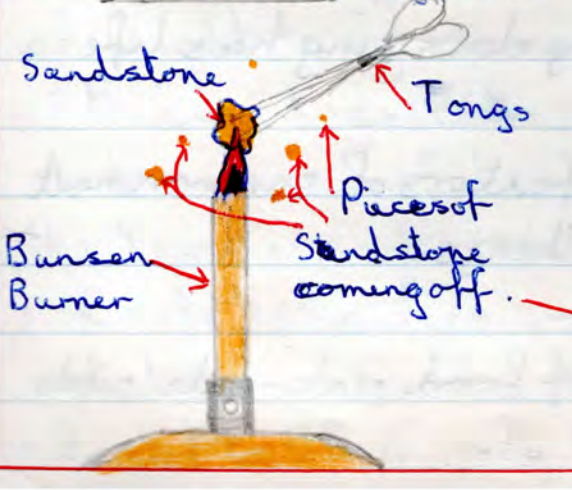
Geology No. 3.

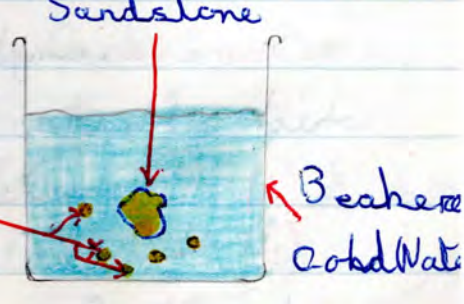
5 The soil near Daylesford is a rich red soil, while towards Swan Hill the soil is light red and sandy and in the Bendigo area soil has a lot of clay. How can we account for these different soil types?

5. Climate and the different types of rocks can account for this.



The sandstone broke into small pieces as it was heated and cooled.





Michael Parry 19.9.68.

Biology

This is the study of living things
This Big branch of science is divided into several smaller fields of study.

examples:

Botany - Plants
Zoology - Animals
Entamology - Insects
Parasitology - Parasite

During the 4 - 5,000,000,000 years that the earth has been in existance there have been many changes. Life as we know it has existed for over 600,000,000 years and during this time has had to change to suit the conditions which have existed at various times. Only by changing has life survived.

Some examples of factors of environment which influence living things:

(i) Climate
(ii) Availability of food materials and materials for nests etc.

Michael Parry 20.9.68

Biology

(iii) Other individuals of the same species.
(iv) Living things of other species.
(v) Type of Terrain.

1. Climate:

1 A snake placed in a refrigerator for 24 hours was less active but otherwise unharmed when removed. Snakes have adapted to a changeable climate. They hibernate in Winter if necessary 2. Slaters have adapted to a moist environment and were killed by exposure to dry air. They normally live under stones and logs sitting on moist ground. ~~Many birds~~

3. Many birds migrate to new places when the season changes. These birds use the power of flight to overcome seasonal changes

4. Bears, dogs, cats, fowls and many other animals lose much of their coat or feathers during the Summer and grow a new one/s

5. Cacti conserve water after rain and do not lose water like other plants. They have adapted to life in very hot dry climates.

Michael Parry 21. 9. 68.

Biology

6. **Otters** have adapted themselves to the climate by storing up as much food as possible before all the water freezes over. By doing this it can sleep for most of the winter and when it gets hungry it does not have to go hunting for its food.

2. Other individuals of the same species.

(a.) Groups instinct – many animals of the same species tend to collect in groups called: herds, mobs, flocks etc as the case may be.

Examples.

Horses, cattle, deer, galahs, zebras, wolves, ants, bees.

(b.) Individual instinct – Some animals spend most of their life on their own. Sometimes two mates will live and hunt together but stay on their own.

Examples

Dingoes, eagles, mountain-lions snakes wombats

Michael Parry 26. 9. 68.

Biology

(c) Cannibalism – a number of species will attack and kill any injured or weak member of their species. It appears that Nature ensures that only the fittest of a species survive.

Examples.

Sharks, barracouta, poultry ferrets, spiders, aligators and crocadiles.

3. Members of other Species

(a.) Co-operation – Several examples of co-operation between species of animals exist.

Examples:

(i) Human and the dog.

(ii) Rhinoceros and tick bird.

(iii) Birds often give the alarm ~~Be~~ of approaching danger to animals.

(iv) Pilot fish and the shark

(v.) Lichen – an alga and a fungus living in co-operation.

~~Enemies~~

Michael Parry 4.10.68.

Biology

II Animals of the same species

Co-operation

b. Enemies

(Eg.) Dingoes, Cats, Eagles, Falcons, Snakes and Tasmanian Devil

There are some species of animal which are individualistic and live almost entirely alone.

Dealt with Previously.

IV Material Resources

All living things require certain materials for:

(i) Food
Shelter.
Nest building.

These may only be available in certain areas and animals have adopted to life where they are available.

Example. (i) Swallows need mud for there

Biology

nests and therefore build them near water. Insects, also found near water form their food.

(ii) Water birds that eat fish and water life are only found near water particularly and nesting time when they must have food for their young.

(iii) All living plants must be able to obtain certain elements from the soil. If these are lacking they cannot grow. On the Coonalpyn Downs of S. A. trace elements, not naturally present in the soil, were supplied artificially. The area was then able to support plant growth and a desert was transformed into rich grazing land.

(iv) Pigeons in their natural surroundings make their roosts on cliff ledges. They have adapted to life in the city where food is plentiful and now roost on buildings

(v) Birds such as cranes, crows and magpies will often use wire for their nests.

These are all examples of either adaption of the animal to the resources or provision of resources and their use by living things

Michael Parry 18.10.68.

Biology

5. Terrain

A number of living things have adapted to the particular type of country they are found in

Examples: 1 Koala – has strong sharp claws – tree climbing, obtains moisture from gum leaves – does not need to drink and can remain in the tree for long periods

2. Camel – has large spreading feet for walking on loose sand, can survive for long periods in waterless areas – humps

3. Climbing Plants – use other plants for support and therefore put their energy into growth mainly in length. By doing this they reach the light.

4. Fungi – are saprophytes (live on dead bodies of other living things) they can live in dark places as they do not have to manufacture food.

5. Rabbits and Scorpions – found in country where it is easy to burrow

Biology

into the soil. Ants also like this type of terrain.

These living things have adapted to the type of country in which they are now commonly found. Some have reached the point in their adaption where they would find it difficult to survive in other areas.

General Summary.

1. Animals which have adapted to their environment are more likely to survive than animals which have not been able to adapt. The modifications which enabled some to survive are likely to be passed on to their offspring. D.D.T resistance of some flies is passed on to their offspring.

2. Changes due to the environment affecting a particular animal or group of animals cannot be passed on to other generations. A parrot which learns to talk cannot produce young parrots which will talk

Michael Parry 17.10.68

Living things depend on each other for survival.

Living things have adapted to an environment in which there are other living things.

There are many cases of dependence of one living thing on other living things.

Without the living things on which they depend many plants and animals would be unable to survive.

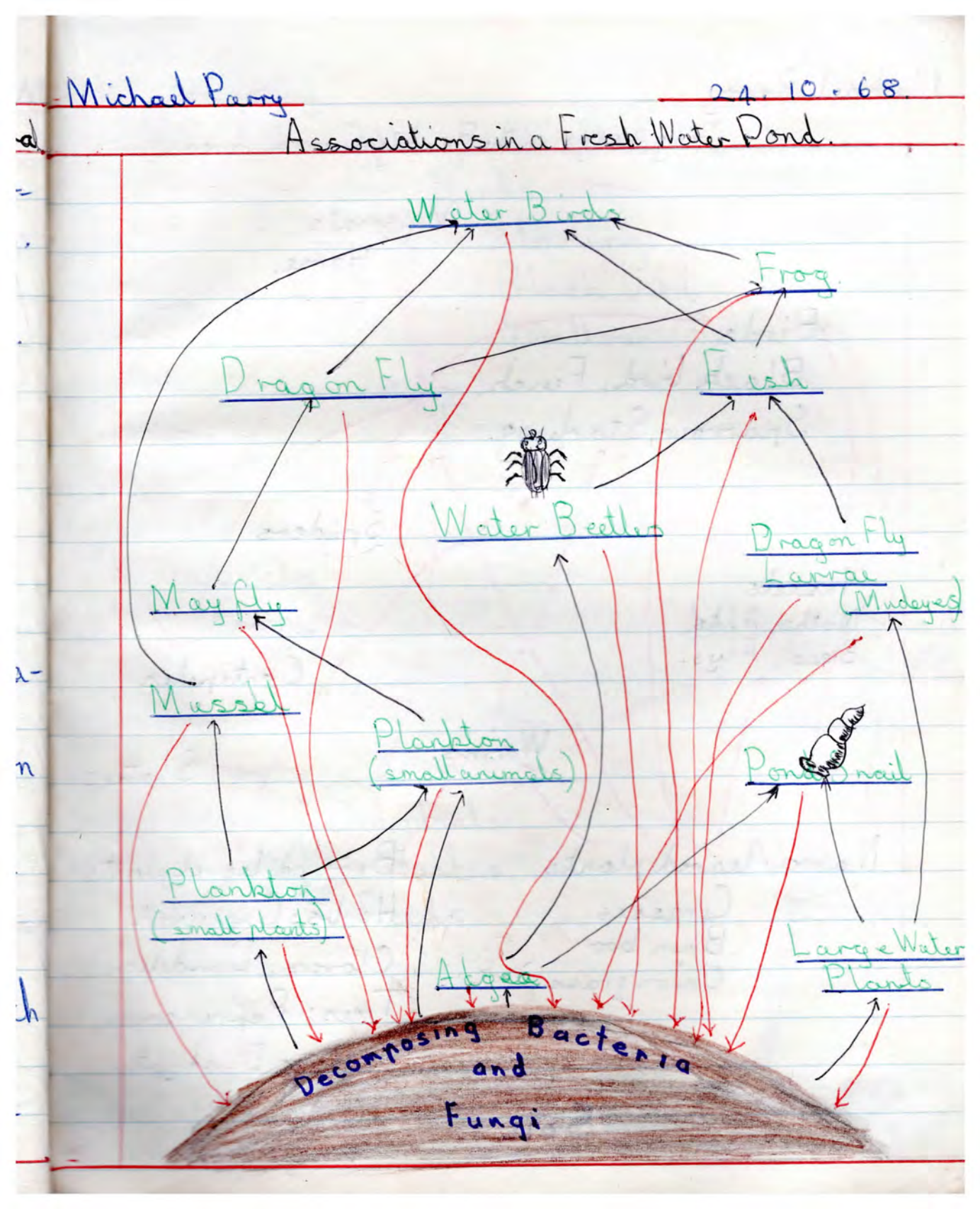
Examples.

1. Grazing animals depend on plants for food.
2. Carnivorous animals depend of the flesh of other animals.
3. Many birds depend on insects and plants for their food.
4. Plants often depend on insects for pollination hence seed production.
5. Associations, such as the Hermit Crab and sea anemone depend on each other for both food and shelter.

Michael Parry

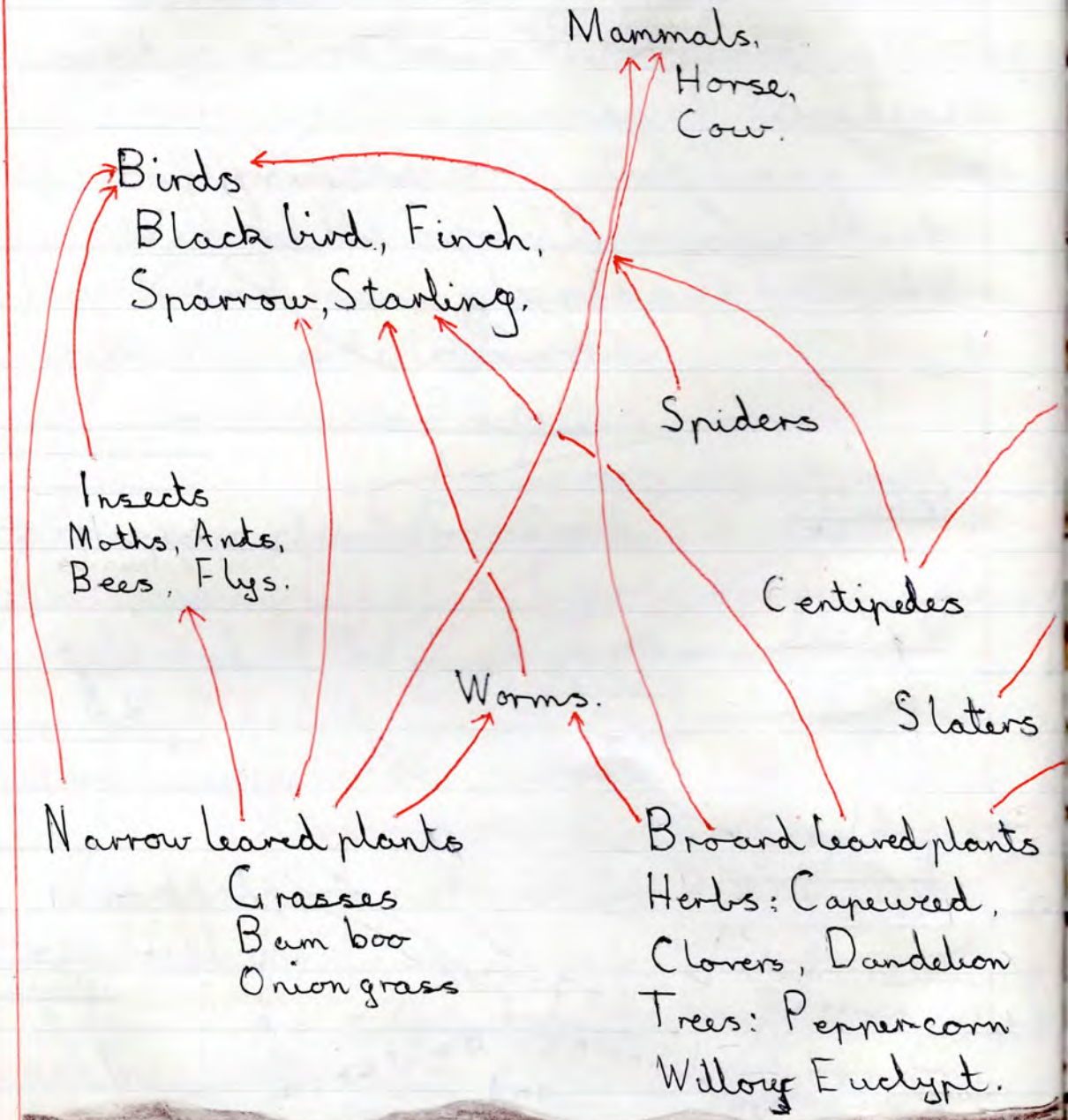
24.10.68.

Associations in a Fresh Water Pond.



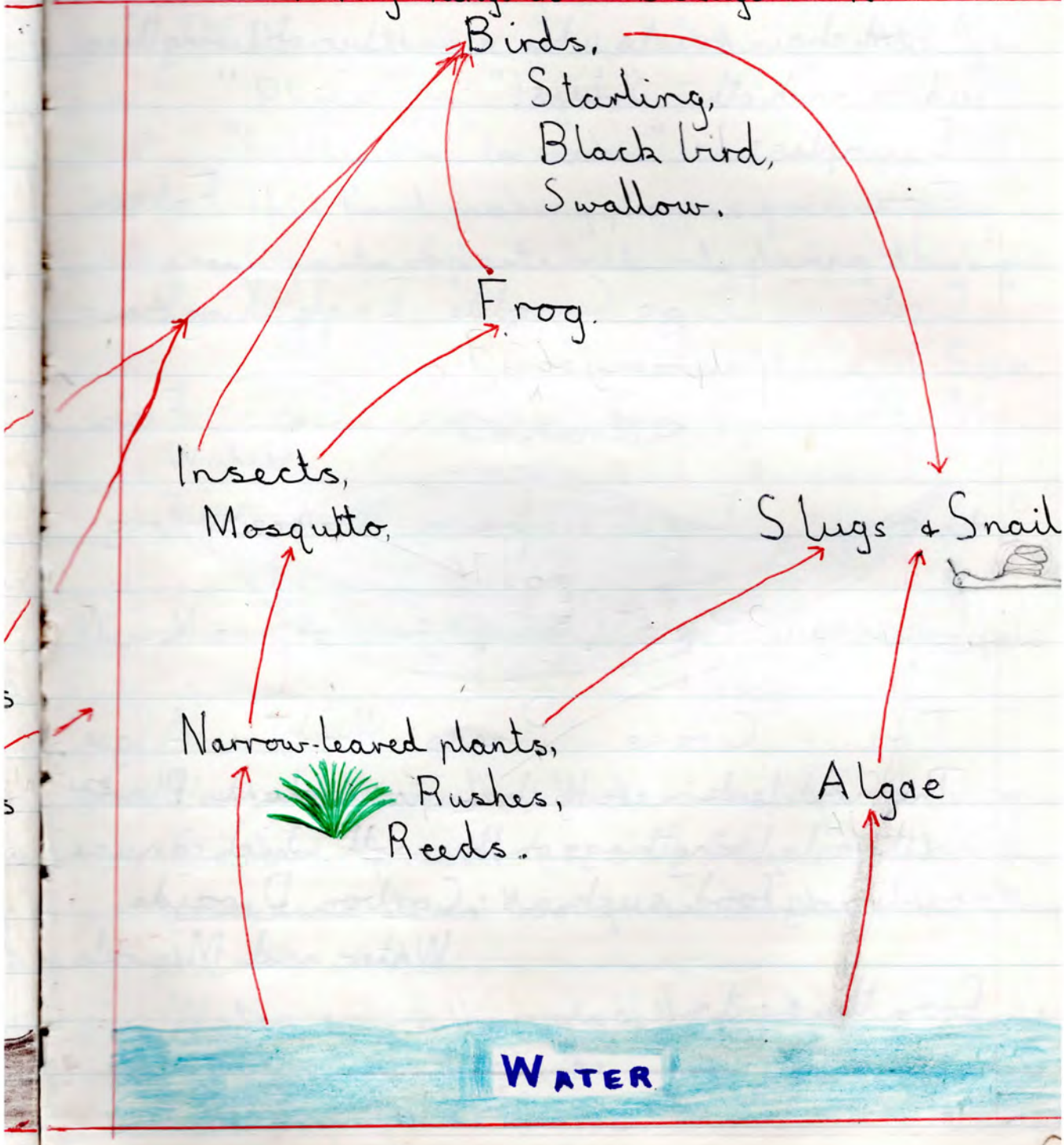
Michael Parry 31.10.68

Living things in the Bendigo Creek Area.



Michael Parry 31.10.68.

Living things in the Bendigo Creek area.

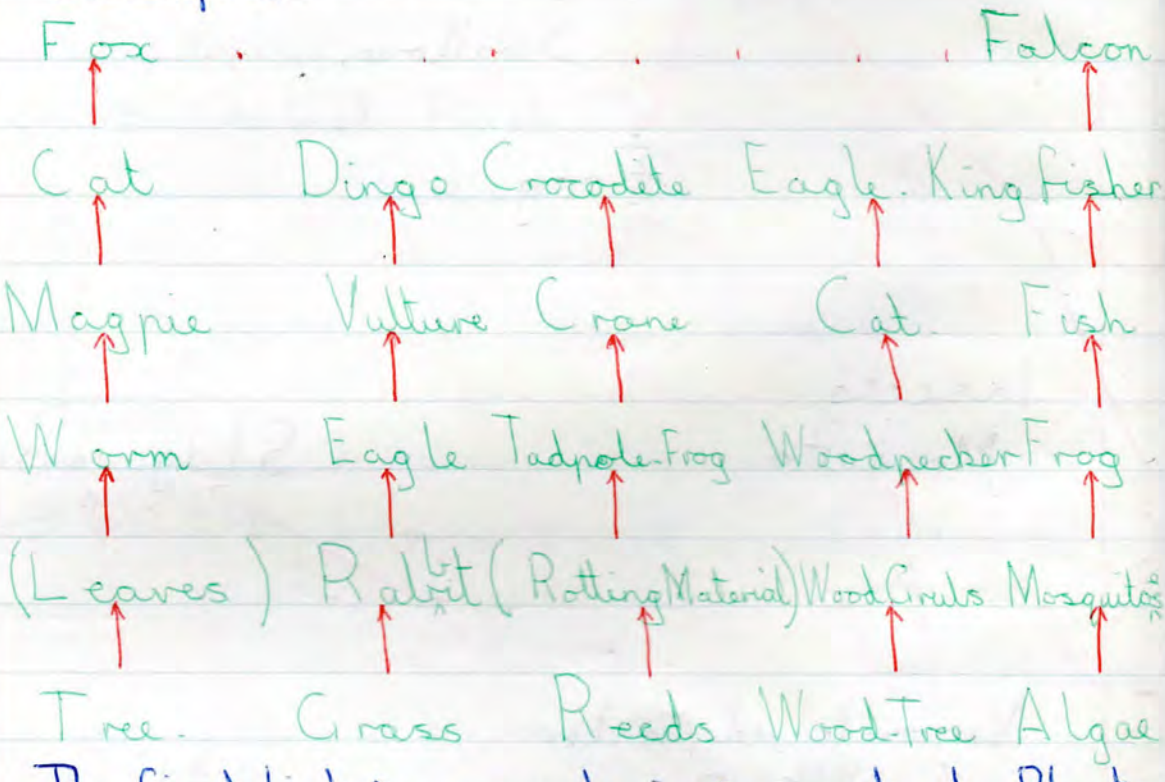


Michael Parry 1. 11. 68.

Food Chains

A food chain exists when a number of living things feed on each other in turn.

Examples:



The first link in every chain is a plant. Plants are the only living things on the earth which can use non-living food such as: Carbon Dioxide, Water, and Minerals from the soils.

Michael Parry 7. 11. 68.

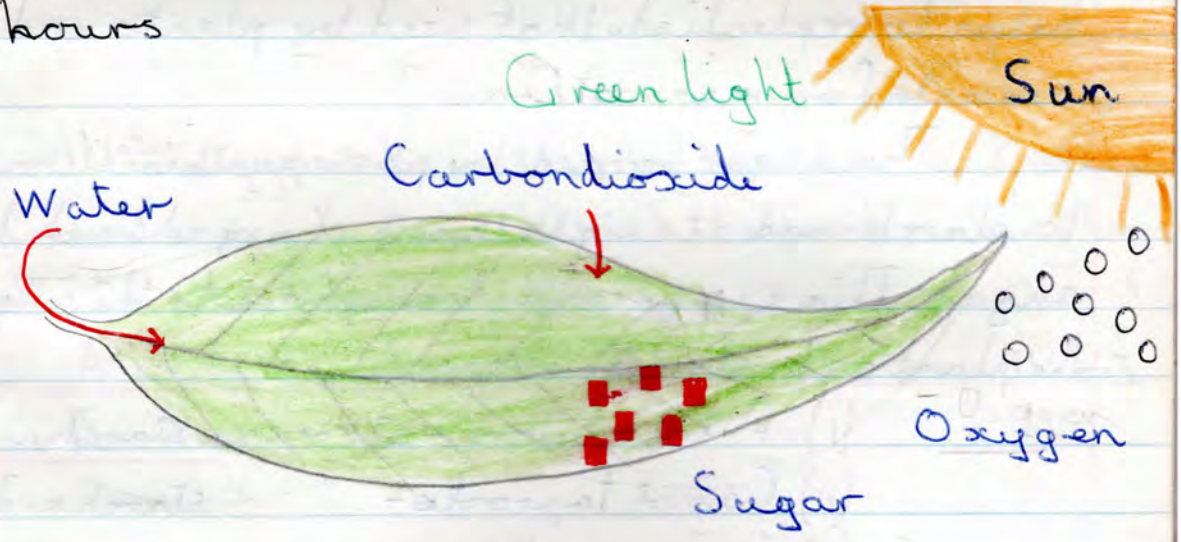
Photosynthesis.

Photosynthesis means making with light.

"Photo" - "light"

"Synthesis" - "to make"

This food making process goes on only in green parts of plants and only during daylight hours



Carbon dioxide + Water → sugar + oxygen.

Carbon dioxide (0.03% of the air) enters the leaves and stems through small holes called stomata or lenticels.

Water enters the roots of the plants and travels to the leaves of the plants via veins in the plants.

Chlorophyll - the green material - in the plants

Photosynthesis

captures some of the energy of the light which strikes it during daylight hours.

Sugar is the main product and is used by the plant as food.

Oxygen is released as a by-product and helps to replenish that used by plants and animals for respiration.

The sugar formed by photosynthesis changes to starch and at night this is changed back to sugar. This sugar is then transported to the cells of the plant or to storage organs.

E.g. (i) Potato tubers - stored as starch.
(ii) Carrot taproots - " " starch and sugar.
(iii) Sugar cane pith - " " Sugar.
(iv) Seeds of plants - usually contain starch food stores.

Breakfast.

Maize → Cornflakes
Sugar Cane → Sugar
Grass → Cow → Milk
Banana Tree → Banana

Michael Parry 8.11.68.

Photosynthesis

Breakfast.

Cereal → Pig → Bacon
Cereal → Fowl → Eggs
Mineral - no energy → Salt
Cereal → Pig → Sausage
Wheat → Toast
Tea Tree. → Tea.

All energy foods eaten by humans and other animals can be traced back to food making by plants i.e. Photosynthesis.

All life depends ultimately on photosynthesis for food.

Michael Parry 14. 11. 68.

Balance of Nature

A Balance exists between the many living things which live in any particular area.

All food chains commence with plants of some kind and these must be the determining factor on which the whole community will depend.

A Lake in the U.S.A was completely drained and a survey of the life present tapered. The result showed a balance between: Algea, Water fleas, Minnows and Bass

Bass ——— 10 Kg.
↑
Minnows ——— 100 Kg.
↑
Water Fleas ——— 1,000 Kg.
↑
Plankton ——— 10,000 Kg.

Similar balanced communities exist in any place where conditions have been constant for some time.

Examples:

Paddocks on farms.

Michael parry 14. 11. 68.

Balance of Nature

Isolated forest areas, swamps, etc.

Sometimes however such communities may be disturbed which effect all or some of the inhabitants.

Some of the changes which may take place are caused by mans interference

Examples:

1. Land clearing – disturbes both animal and plant life.

2. Drainage of swamps – directly effects aquatic life; indirectly affects higher links in food chains.

3. Bushfires – affect all life in areas affected

4. Introduction of other living thing – a preditor may quickly change the balance of life in a community.

5. Removal of living things – Parasites which help to keep pests in check are important members of living communities. Pests increase if these are removed.

6. Pollution of air and streams

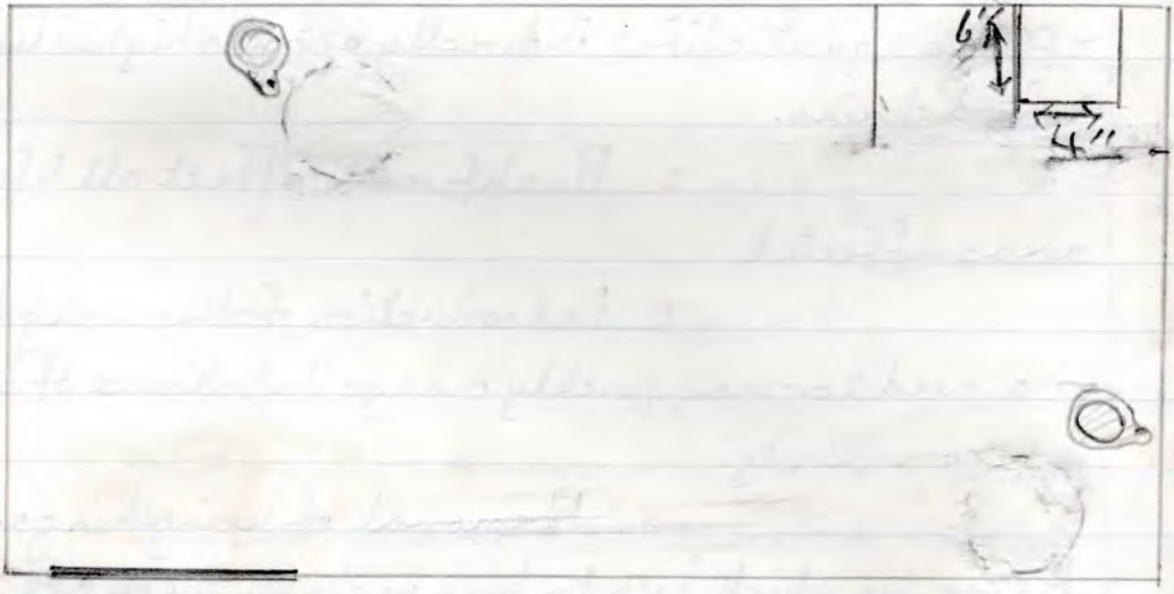
Michael Parry 14.11.68.

Balance of Nature

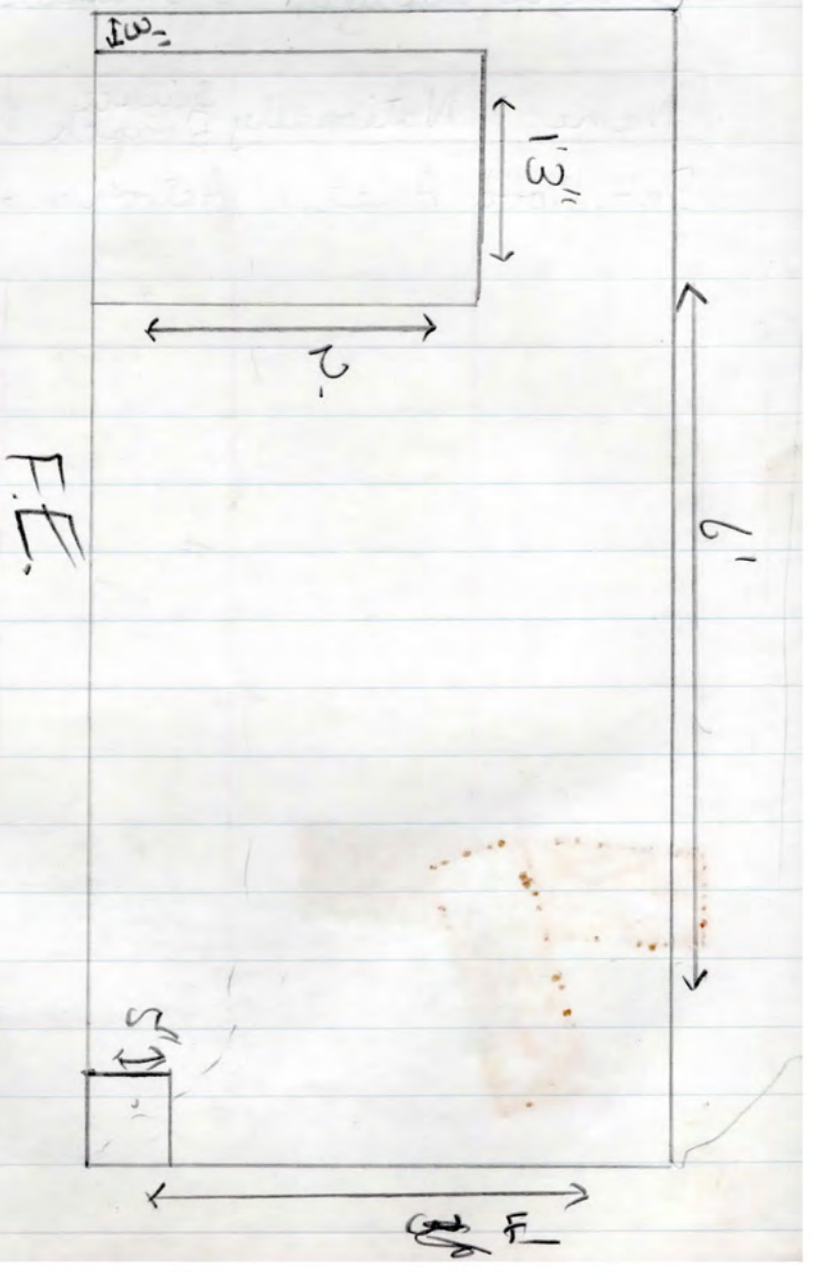
— dangerous poisons if released into the air or rivers and streams can upset living communities which have become well balanced and stable.

These are just some of the ways that animals and plants can be disturbed in hither to balanced communities. Man must always consider the consequences of his practices when working with nature.

PLAN



8/6' of 3"x2"
4/3' " "
2/3 " "



Homework No. 1

22.2.68
26.2.66

Michael Parr

Names of Scientists

Read Newspapers, or Scientific articles and find out the names, nationality, and area of scientific study of 10 Scientists.

Name	Nationality	Science Branch	other information
Dr. H. Wood	Aust.	Astronomer	government Astronomer for N.S.W.