Biology 1-2 lesson

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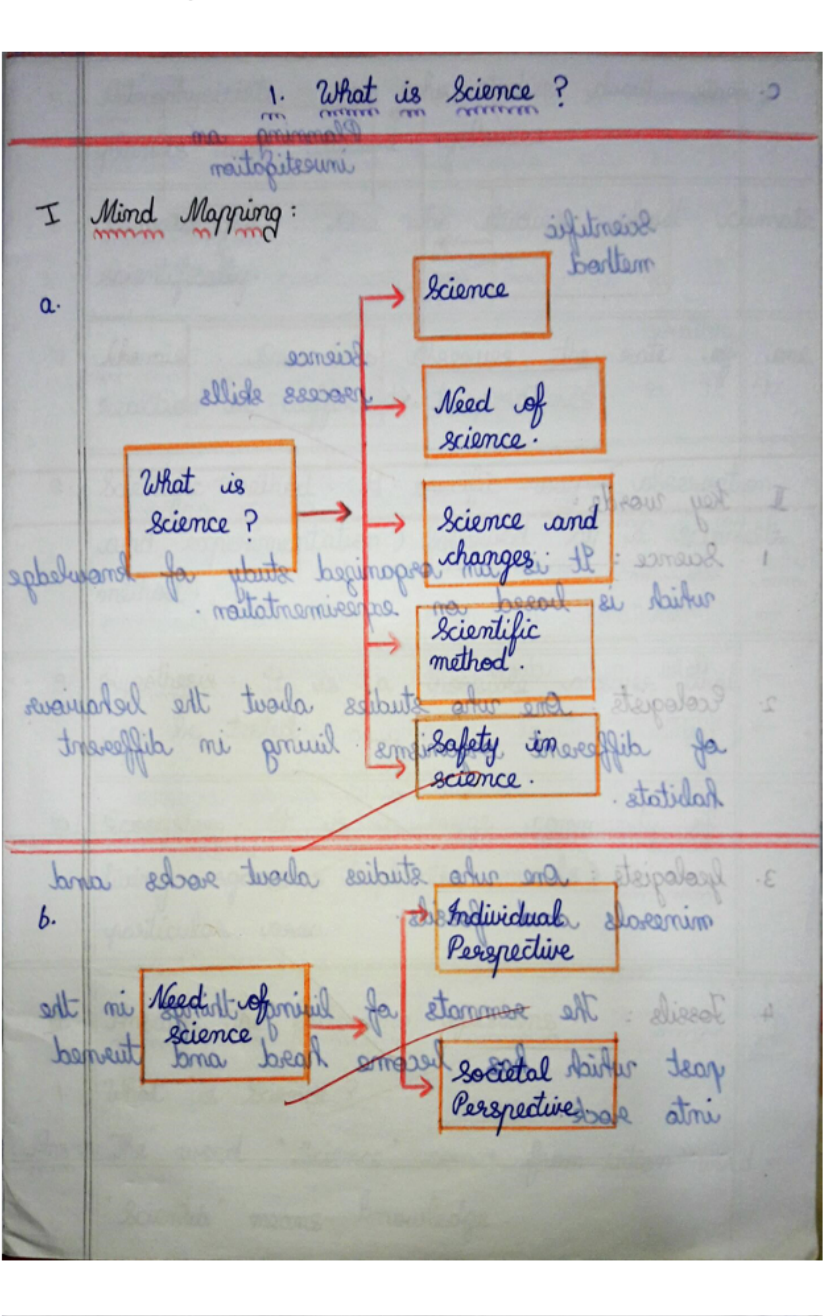
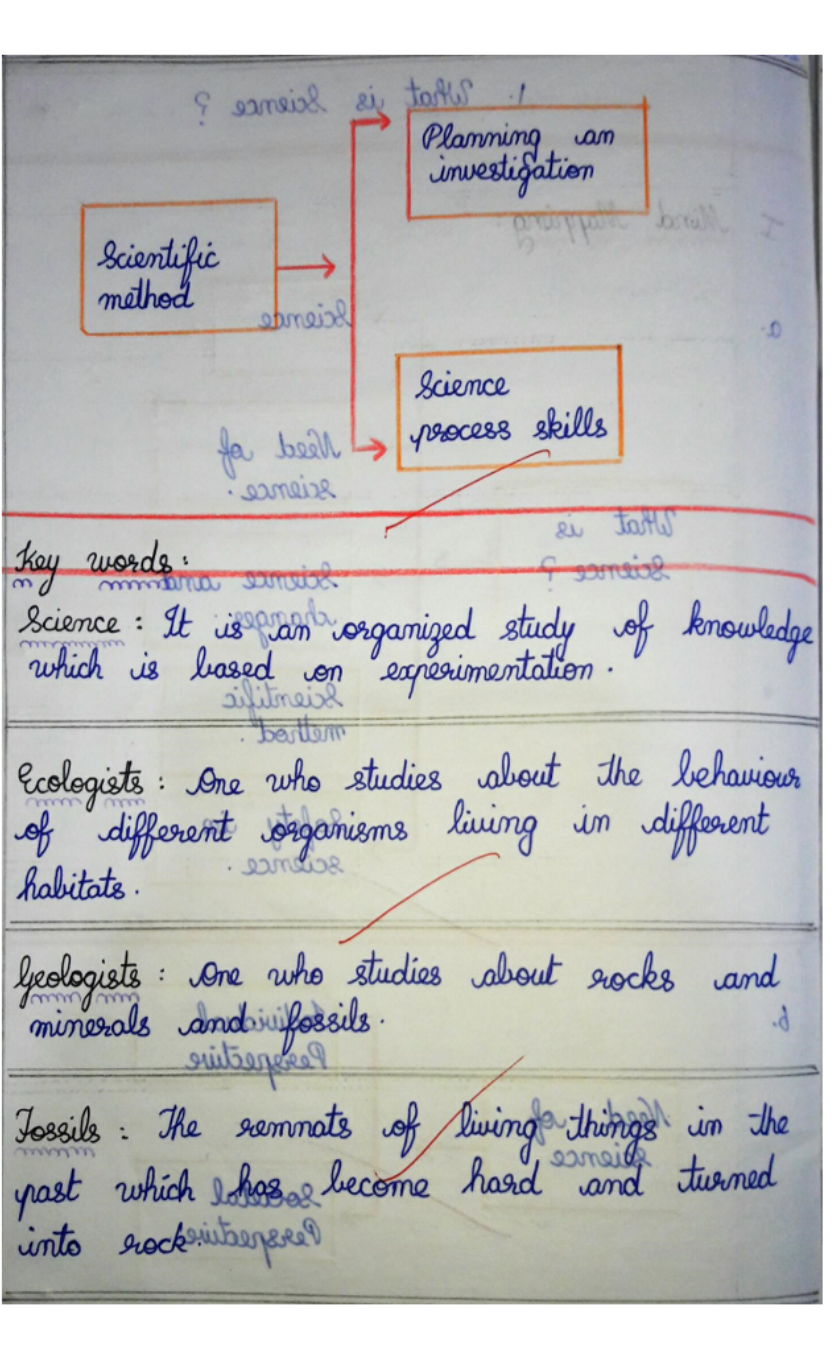

1. What is Science?

I Mind Mapping:

a.

b.


Scientific method
Planning an investigation
Science process skills

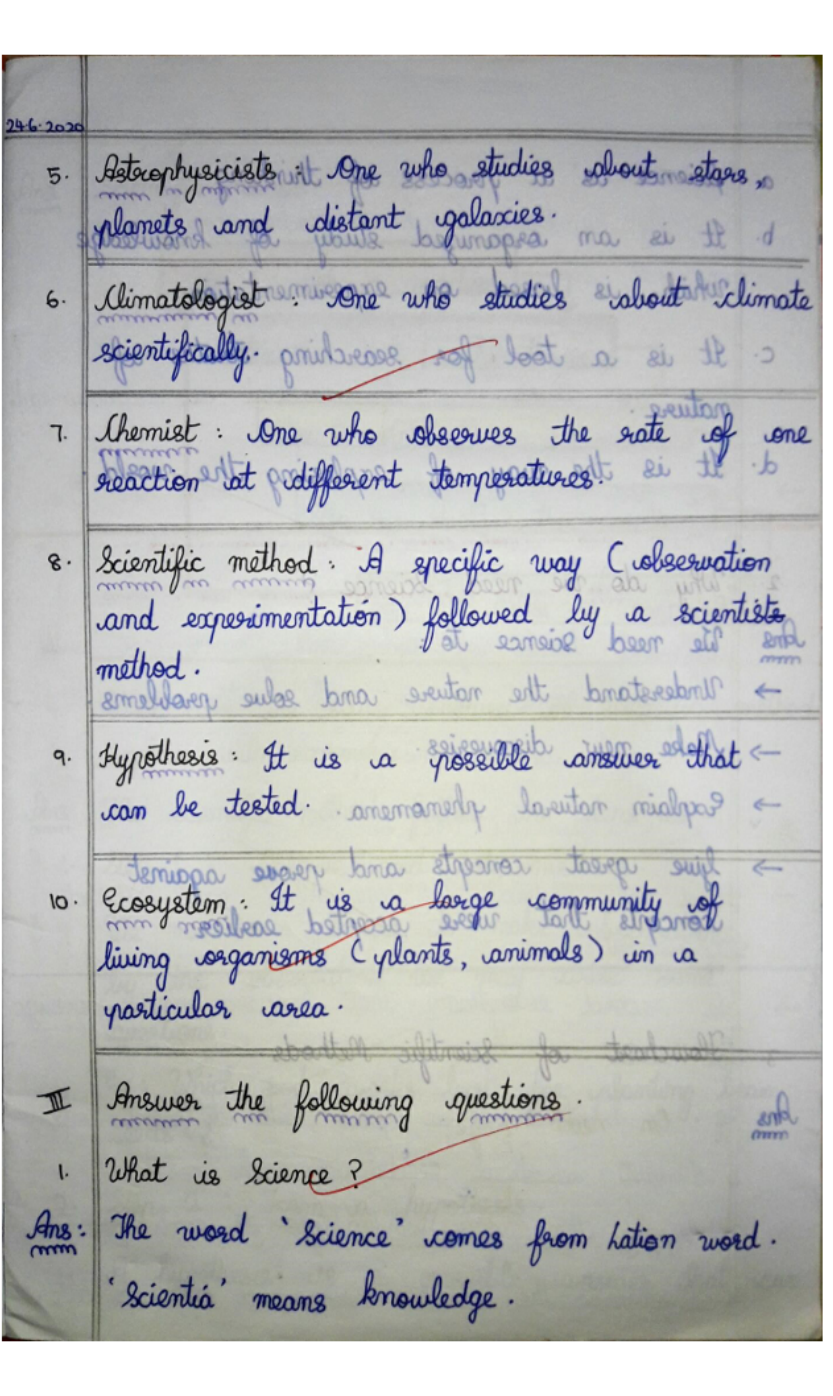
Key words:

Science: It is an organized study of knowledge which is based on experimentation.

Ecologists: One who studies about the behaviour of different organisms living in different habitats.

Geologists: One who studies about rocks and minerals and fossils.

Fossils: The remnats of living things in the past which has become hard and turned into rock.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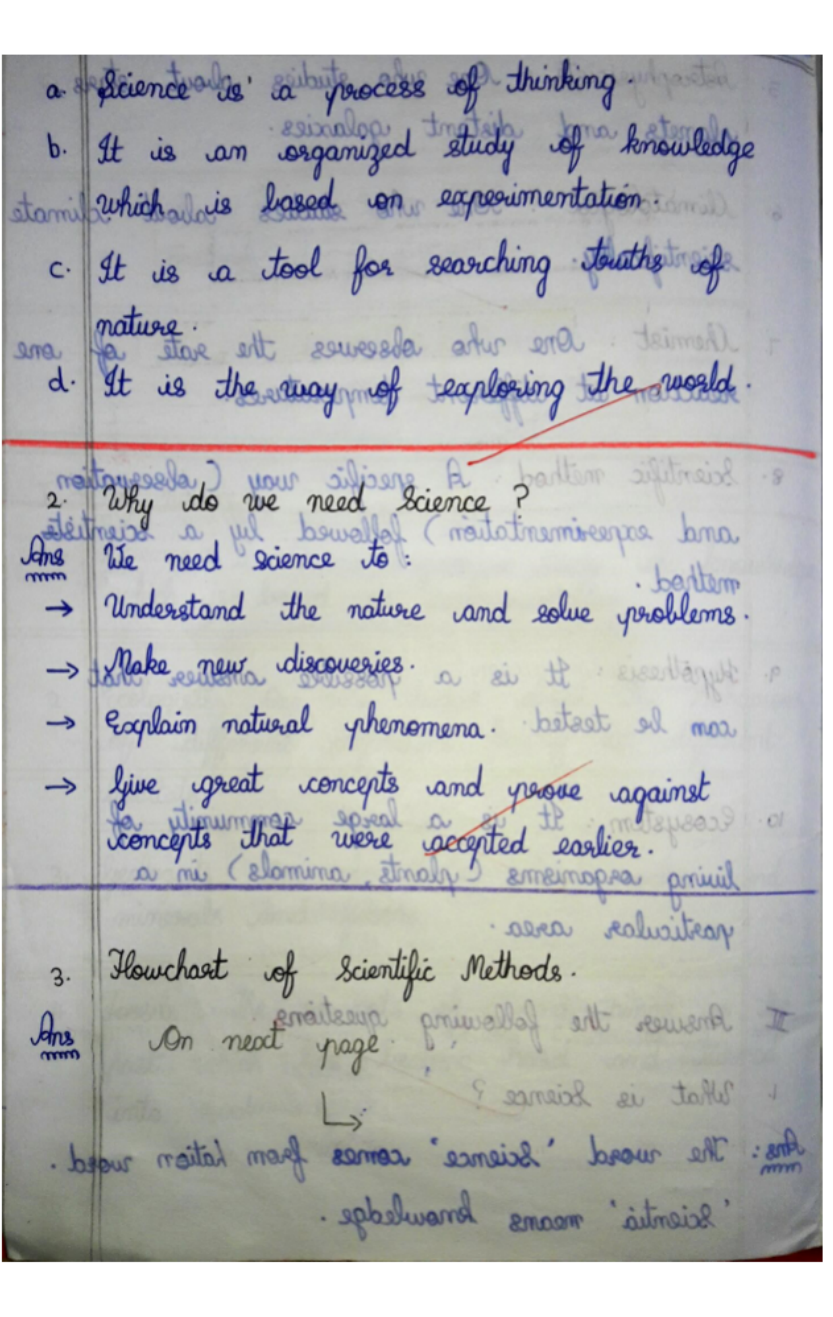
5. Astrophysicists: One who studies about stars, planets and distant galaxies.
6. Climatologist: One who studies about climate scientifically.
7. Chemist: One who observes the rate of one reaction at different temperatures.
8. Scientific method: A specific way (observation and experimentation) followed by a scientists method.
9. Hypothesis: It is a possible answer that can be tested.
10. Ecosystem: It is a large community of living organisms (plants, animals) in a particular area.

III Answer the following questions.

1. What is Science?

Ans: The word 'Science' comes from latin word 'Scientia' means knowledge.

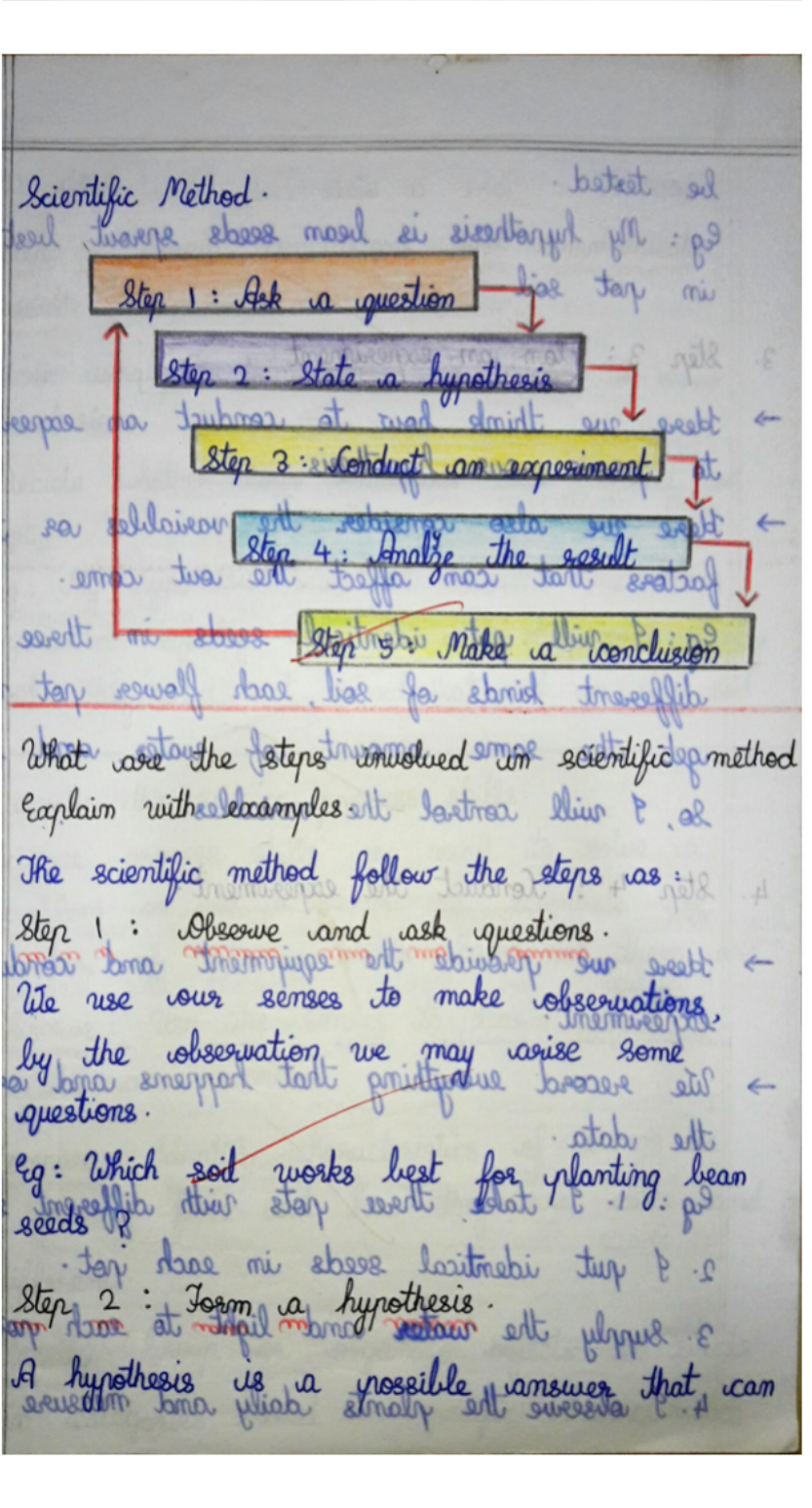

a. Science is a process of thinking.
b. It is an organized study of knowledge which is based on experimentation.
c. It is a tool for searching truths of nature.
d. It is the way of exploring the world.

2. Why do we need Science?

Ans We need science to:
→ Understand the nature and solve problems.
→ Make new discoveries.
→ Explain natural phenomena.
→ Give great concepts and prove against concepts that were accepted earlier.

3. Flowchart of Scientific Methods.

Ans On next page

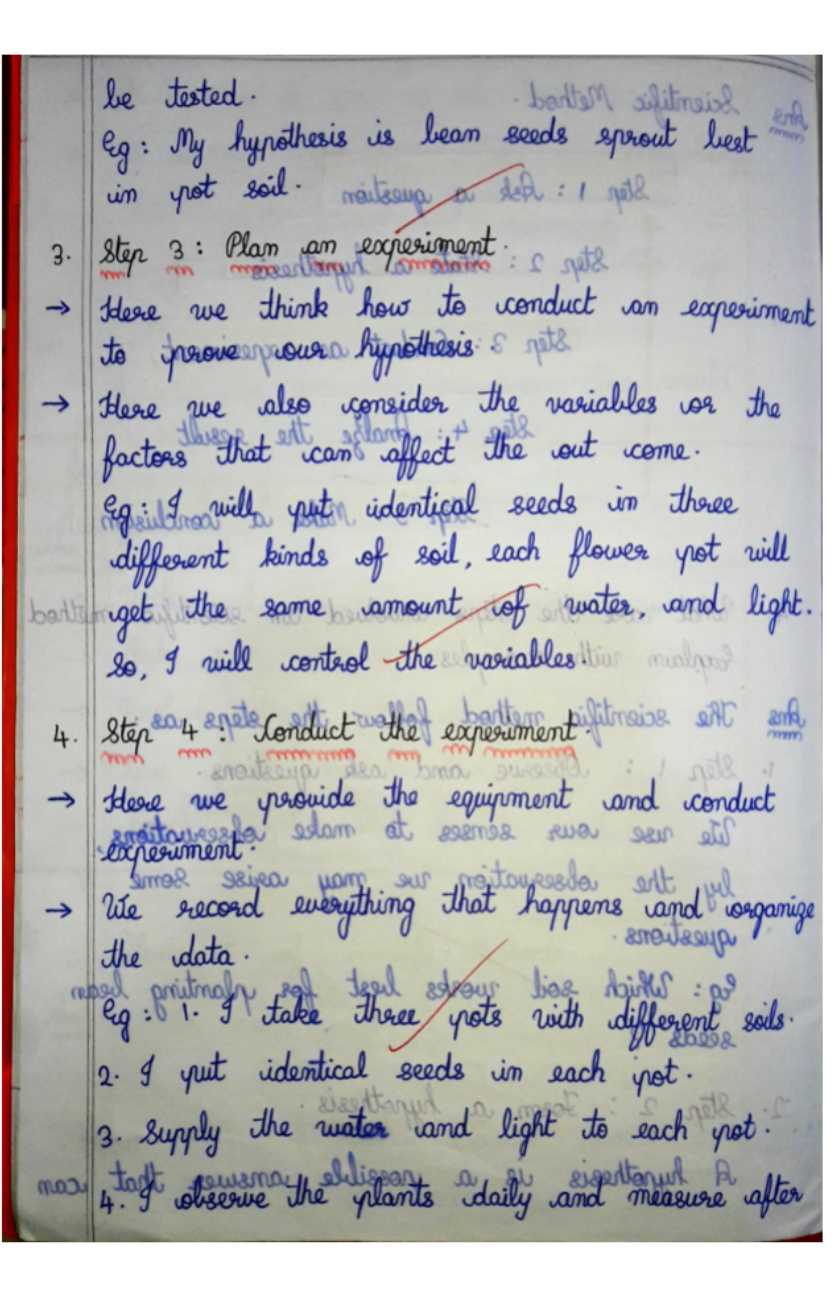

Scientific Method.
Step 1: Ask a question
Step 2: State a hypothesis
Step 3: Conduct an experiment
Step 4: Analze the result
Step 5: Make a conclusion

What are the steps involved in scientific method Explain with examples.

The scientific method follow the steps as:

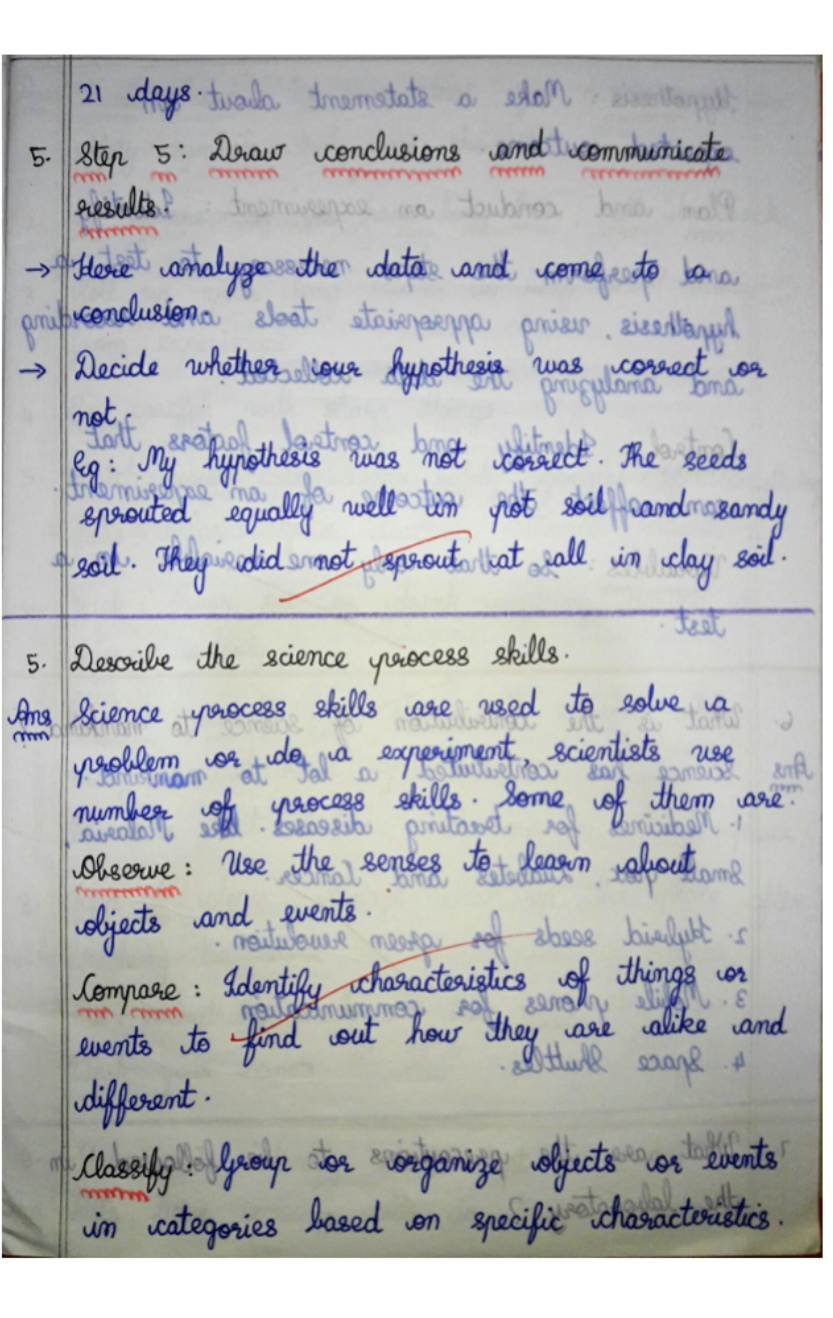
Step 1: Observe and ask questions.
We use our senses to make observations, by the observation we may arise some questions.
Eg: Which soil works best for planting bean seeds?

Step 2: Form a hypothesis.
A hypothesis is a possible answer that can


be tested.
Eg: My hypothesis is bean seeds sprout best in pot soil.

3. Step 3: Plan an experiment.
→ Here we think how to conduct an experiment to prove our hypothesis.
→ Here we also consider the variables or the factors that can affect the out come.
Eg: I will put identical seeds in three different kinds of soil, each flower pot will get the same amount of water, and light. So, I will control the variables.

4. Step 4: Conduct the experiment
→ Here we provide the equipment and conduct experiment.
→ We record everything that happens and organize the data.
Eg: 1. I take three pots with different soils.
2. I put identical seeds in each pot.
3. Supply the water and light to each pot.
4. I observe the plants daily and measure after


21 days.

5. Step 5: Draw conclusions and communicate results.
→ Here analyze the data and come to a conclusion.
→ Decide whether our hypothesis was correct or not.
Eg: My hypothesis was not correct. The seeds sprouted equally well in pot soil and sandy soil. They did not sprout at all in clay soil.

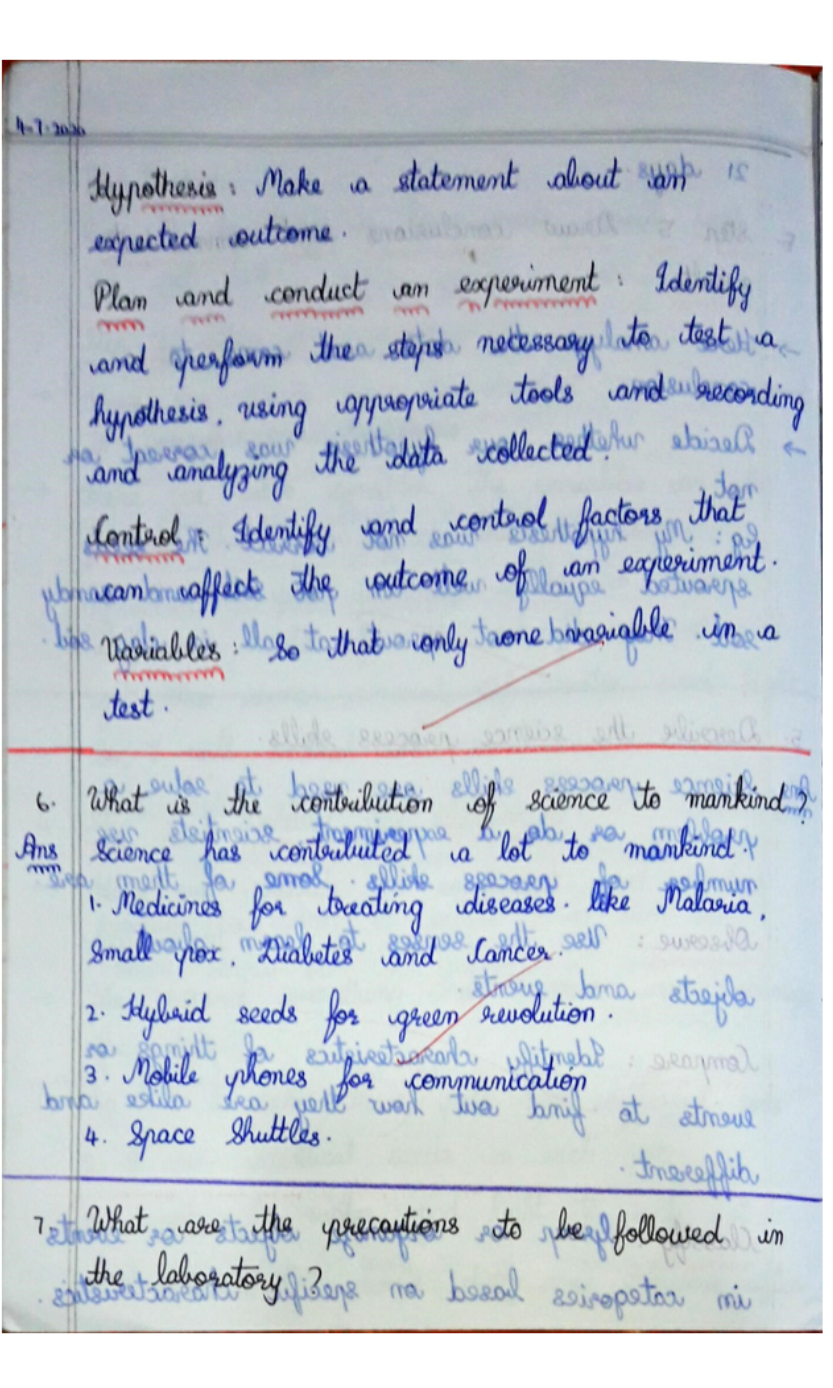
5. Describe the science process skills.

Ans Science process skills are used to solve a problem or do a experiment scientists use number of process skills. Some of them are:

Observe: Use the senses to learn about objects and events.

Compare: Identify characteristics of things or events to find out how they are alike and different.

Classify: Group or organize objects or events in categories based on specific characteristics.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Hypothesis: Make a statement about an expected outcome.

Plan and conduct an experiment: Identify and perform the steps necessary to test a hypothesis, using appropriate tools and recording and analyzing the data collected.

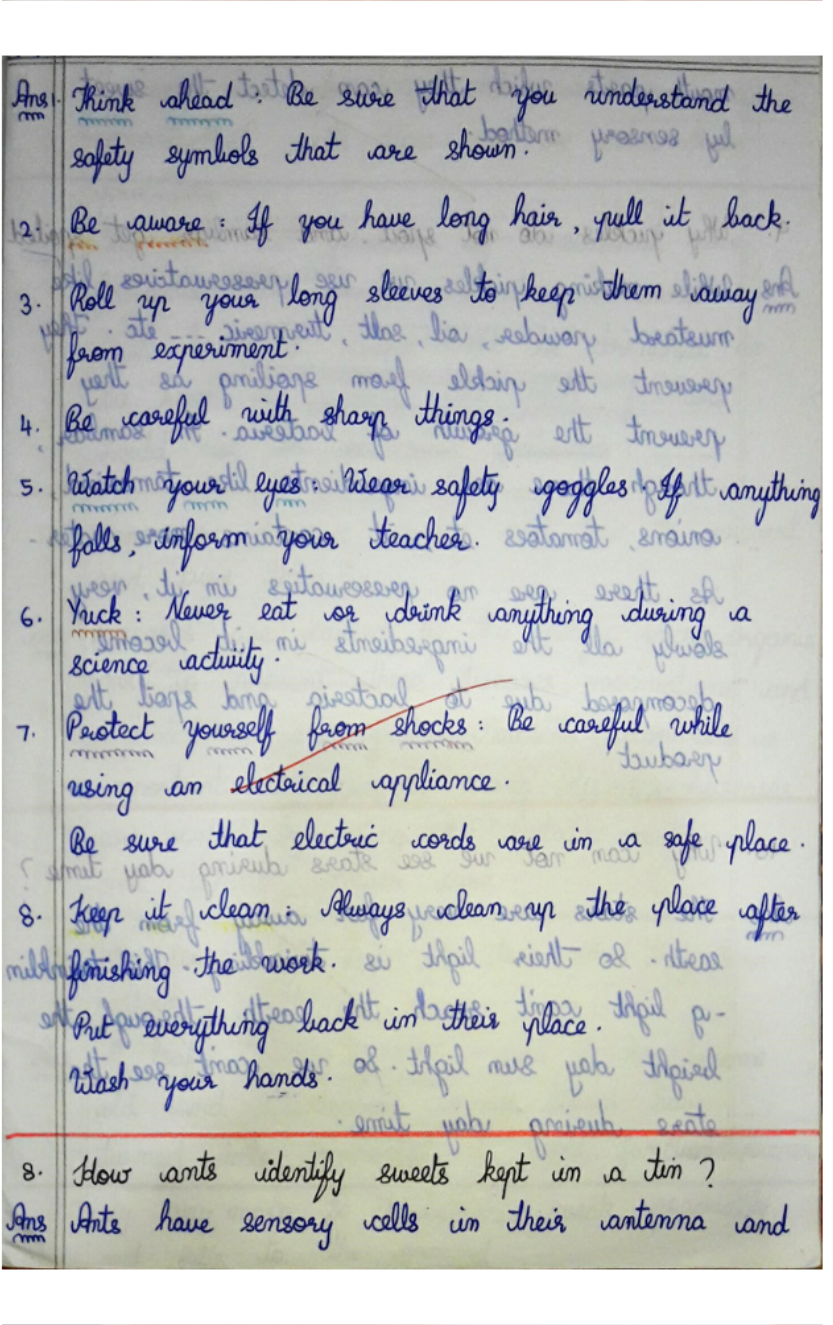
Control: Identify and control factors that can affect the outcome of an experiment.

Variables: So that only one variable in a test.

6. What is the contribution of science to mankind?

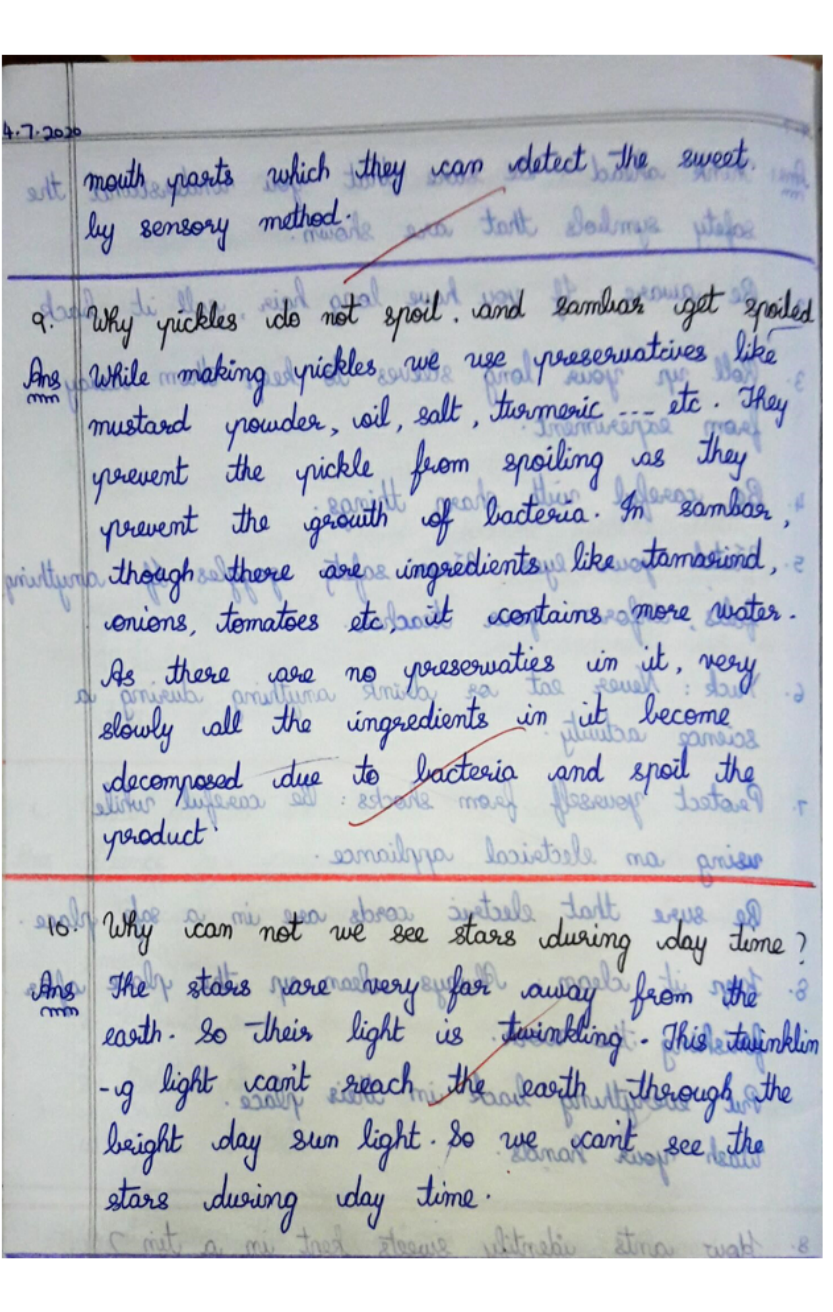
Ans Science has contributed a lot to mankind.
1. Medicines for treating diseases like Malaria, Small pox, Diabetes and Cancer.
2. Hybrid seeds for green revolution.
3. Mobile phones for communication
4. Space Shuttles.

7. What are the precautions to be followed in the laboratory?


Ans Think ahead: Be sure that you understand the safety symbols that are shown.
2. Be aware: If you have long hair, pull it back.
3. Roll up your long sleeves to keep them away from experiment.
4. Be careful with sharp things.
5. Watch your eyes: Wear safety goggles if anything falls, inform your teacher.
6. Yuck: Never eat or drink anything during a science activity.
7. Protect yourself from shocks: Be careful while using an electrical appliance. Be sure that electric cords are in a safe place.
8. Keep it clean: Always clean up the place after finishing the work. Put everything back in their place. Wash your hands.

8. How ants identify sweets kept in a tin?

Ans Ants have sensory cells in their antenna and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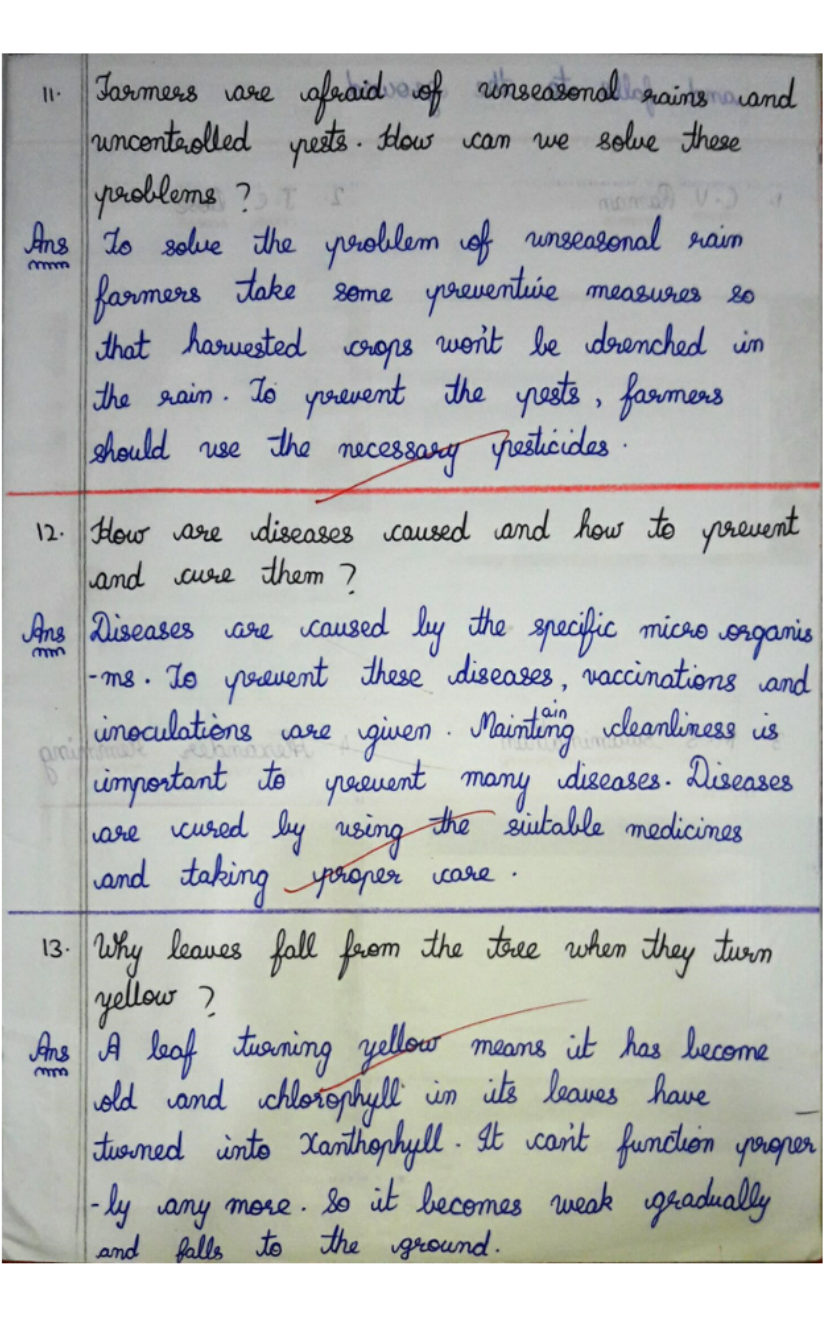
mouth parts which they can detect the sweet by sensory method.

9. Why pickles do not spoil, and sambar get spoiled?

Ans While making pickles, we use preservatives like mustard powder, oil, salt, turmeric ... etc. They prevent the pickle from spoiling as they prevent the growth of bacteria. In sambar, though there are ingredients like tamarind, onions, tomatoes etc but contains more water. As there are no preservaties in it, very slowly all the ingredients in it become decomposed due to bacteria and spoil the product.

10. Why can not we see stars during day time?

Ans The stars are very far away from the earth. So their light is twinkling. This twinkling light can't reach the earth through the bright day sun light. So we can't see the stars during day time.


11. Farmers are afraid of unseasonal rains and uncontrolled pests. How can we solve these problems?

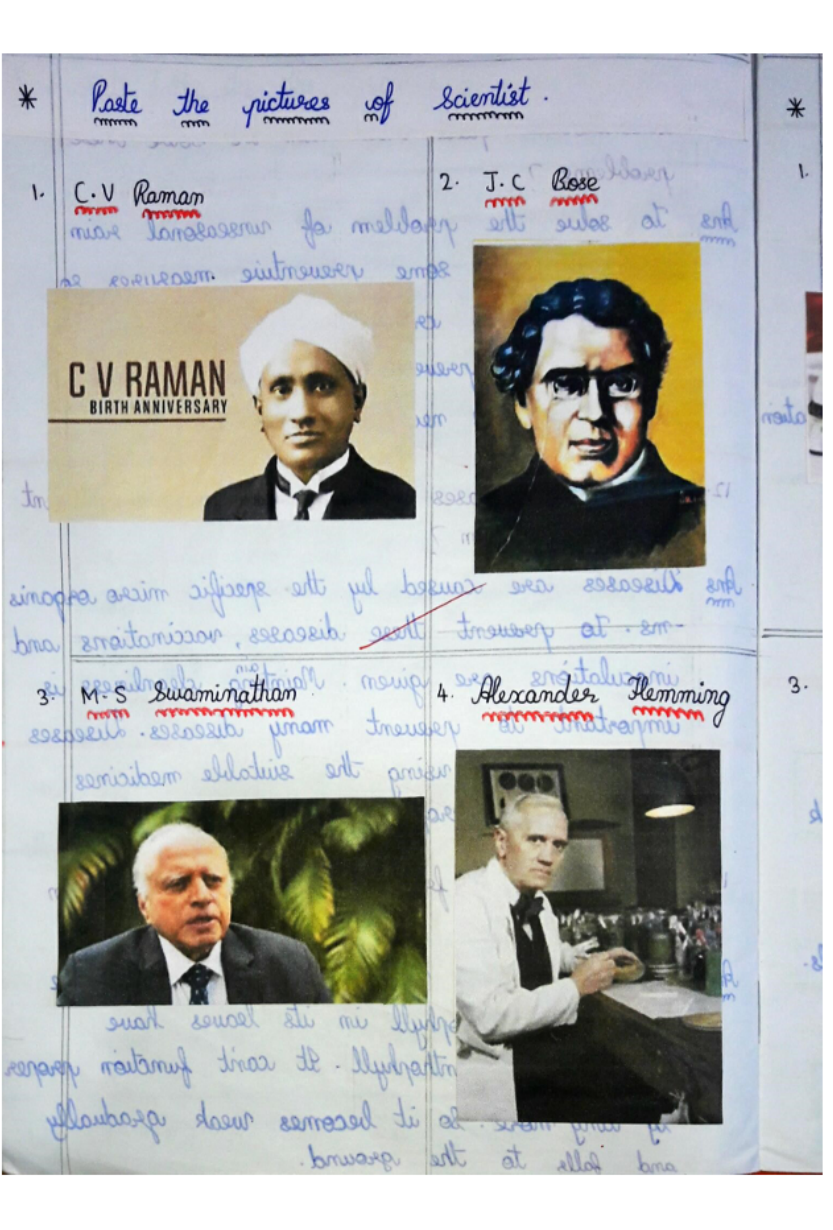
Ans To solve the problem of unseasonal rain farmers take some preventive measures so that harvested crops won't be drenched in the rain. To prevent the pests, farmers should use the necessary pesticides.

12. How are diseases caused and how to prevent and cure them?

Ans Diseases are caused by the specific micro organisms. To prevent these diseases, vaccinations and inoculations are given. Maintaining cleanliness is important to prevent many diseases. Diseases are cured by using the suitable medicines and taking proper care.

13. Why leaves fall from the tree when they turn yellow?

Ans A leaf turning yellow means it has become old and chlorophyll in its leaves have turned into Xanthophyll. It can't function properly any more. So it becomes weak gradually and falls to the ground.


* Paste the pictures of Scientist.

1. C.V Raman
2. J.C Bose
3. M.S Swaminathan
4. Alexander Flemming

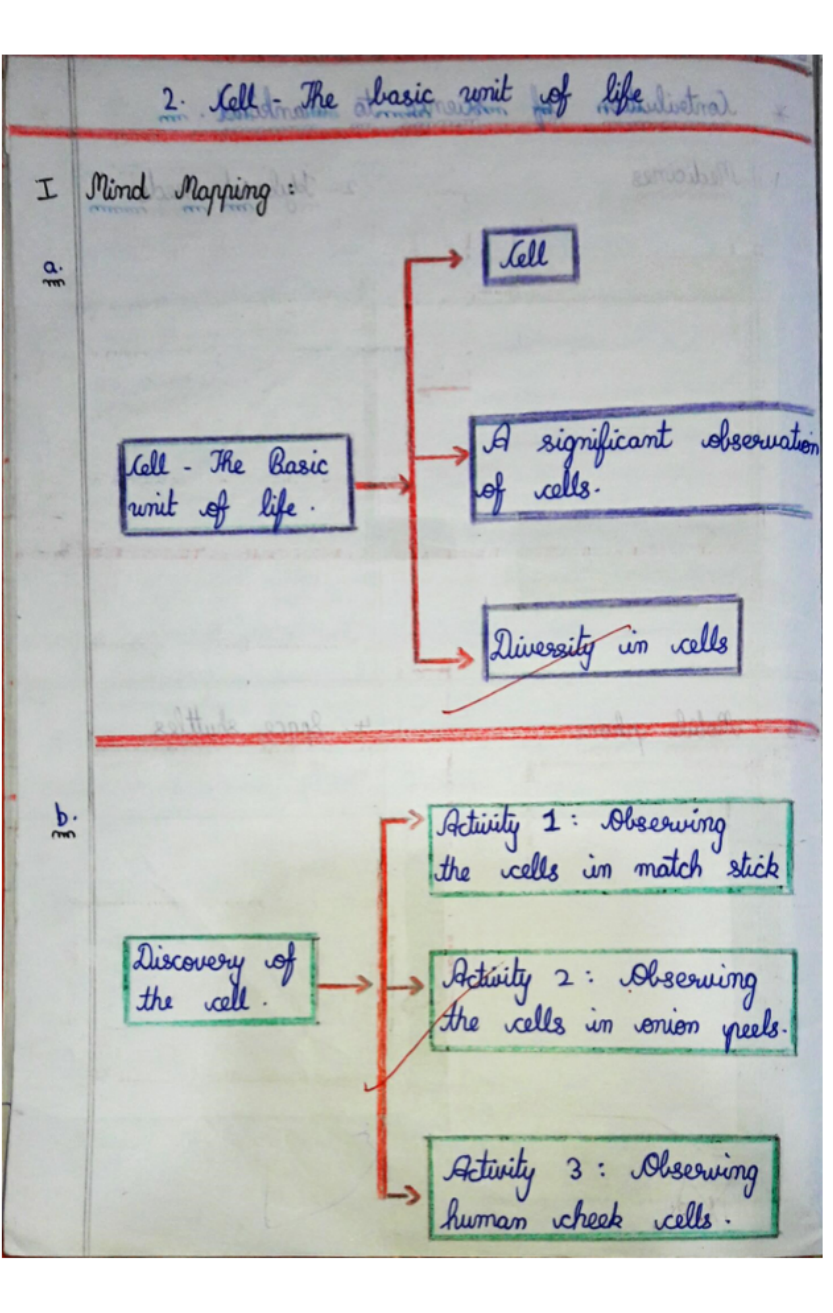
Contribution of Science to mankind.

Medicines

2. Hybrid seeds

Mobile phone

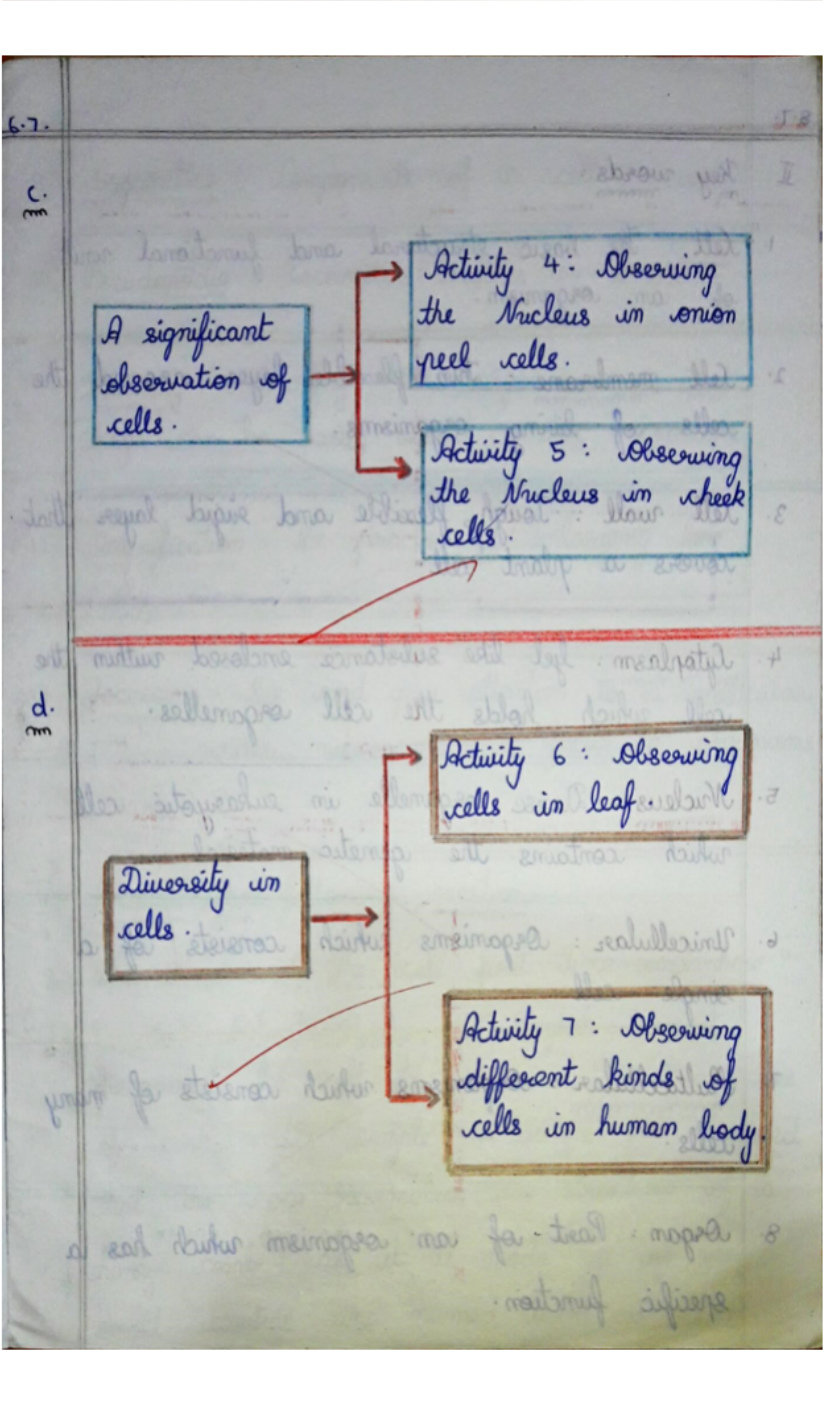
4. Space shuttles


2. Cell - The basic unit of life

I Mind Mapping:

a.
Cell - The Basic unit of life.
Cell
A significant observation of cells.
Diversity in cells

b.
Discovery of the cell.
Activity 1: Observing the cells in match stick
Activity 2: Observing the cells in onion peels.
Activity 3: Observing human cheek cells.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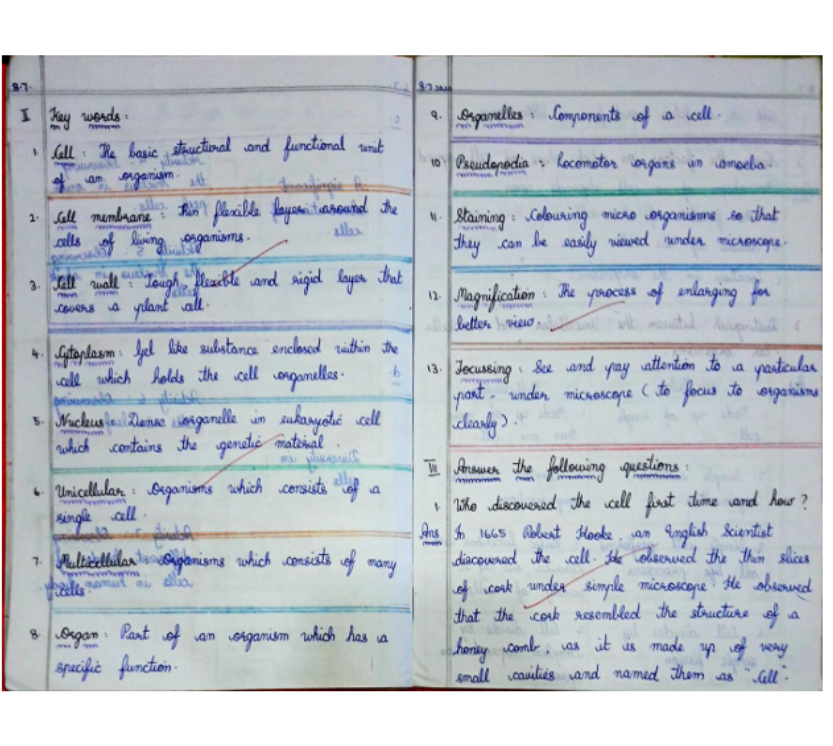
c.
A significant observation of cells.
Activity 4: Observing the Nucleus in onion peel cells.
Activity 5: Observing the Nucleus in cheek cells.

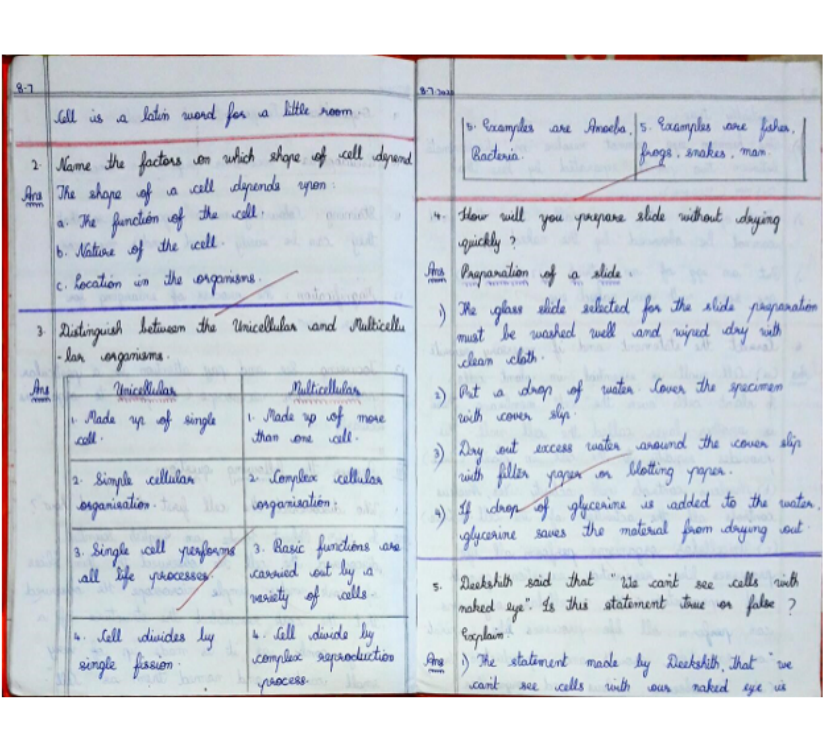
d.
Diversity in cells.
Activity 6: Observing cells in leaf.
Activity 7: Observing different kinds of cells in human body.


II Key words:
1. Cell: The basic structural and functional unit of an organism.
2. Cell membrane: Thin flexible layer around the cells of living organisms.
3. Cell wall: Tough, flexible and rigid layer that covers a plant cell.
4. Cytoplasm: Jel like substance enclosed within the cell which holds the cell organelles.
5. Nucleus: Dense organelle in eukaryotic cell which contains the genetic material.
6. Unicellular: Organisms which consists of a single cell.
7. Multicellular: Organisms which consists of many cells.
8. Organ: Part of an organism which has a specific function.
9. Organelles: Components of a cell.
10. Pseudopodia: Locomotor organs in amoeba.
11. Staining: Colouring micro organisms so that they can be easily viewed under microscope.
12. Magnification: The process of enlarging for better view.
13. Focusing: See and pay attention to a particular part under microscope (to focus to organisms clearly).

III Answer the following questions.

1. Who discovered the cell first time and how?

Ans In 1665 Robert Hooke, an English Scientist discovered the cell. He observed the thin slices of cork under simple microscope. He observed that the cork resembled the structure of a honey comb, as it is made up of very small cavities and named them as 'Cell'.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Cell is a latin word for a little room.

2. Name the factors on which shape of cell depend.

Ans The shape of a cell depends upon
a. The function of the cell.
b. Nature of the cell.
c. Location in the organisms.

3. Distinguish between the Unicellular and Multicellular organisms.

Ans

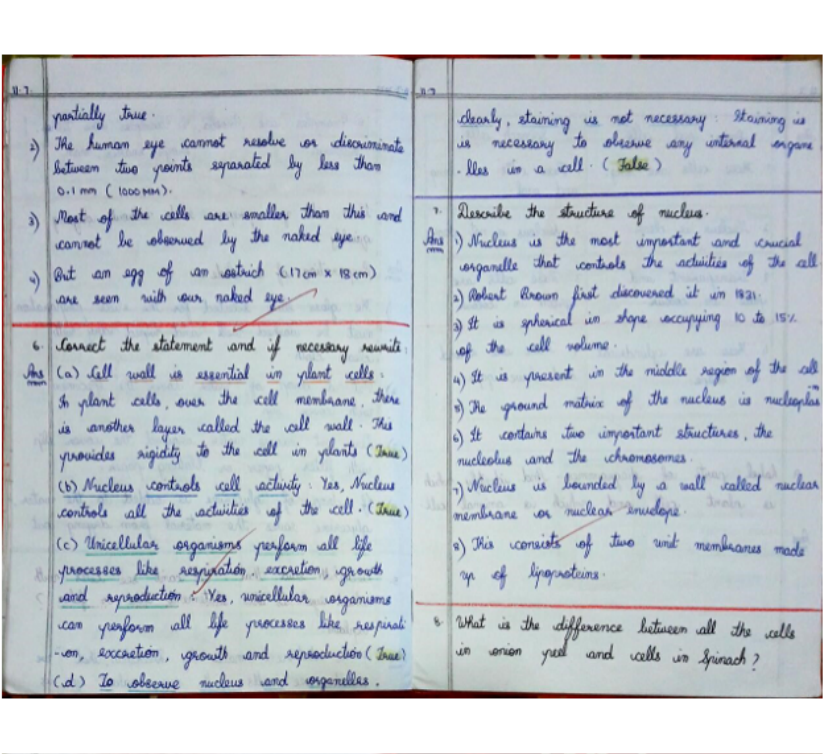
Unicellular	Multicellular
1. Made up of single cell.	1. Made up of more than one cell.
2. Simple cellular organisation.	2. Complex cellular organisation.
3. Single cell performs all life processes	3. Basic functions are carried out by a variety of cells.
4. Cell divides by single fission.	4. Cell divide by complex reproduction process.
5. Examples are Amoeba, Bacteria	5. Examples are fishes, frogs, snakes, man

4. How will you prepare slide without drying quickly?

Ans Preparation of a slide.
1) The glass slide selected for the slide preparation must be washed well and wiped dry with clean cloth.
2) Put a drop of water. Cover the specimen with cover slip.
3) Dry out excess water around the cover slip with filter paper or blotting paper.
4) If drop of glycerine is added to the water, glycerine saves the material from drying out.

5. Deekshith said that "We can't see cells with naked eye". Is this statement true or false? Explain.

Ans 1) The statement made by Deekshith that "we can't see cells with our naked eye is


partially true.
2) The human eye cannot resolve or discriminate between two points separated by less than 0.1 mm (100 μm).
3) Most of the cells are smaller than this and cannot be observed by the naked eye.
4) But an egg of an ostrich (17 cm × 18 cm) are seen with our naked eye.

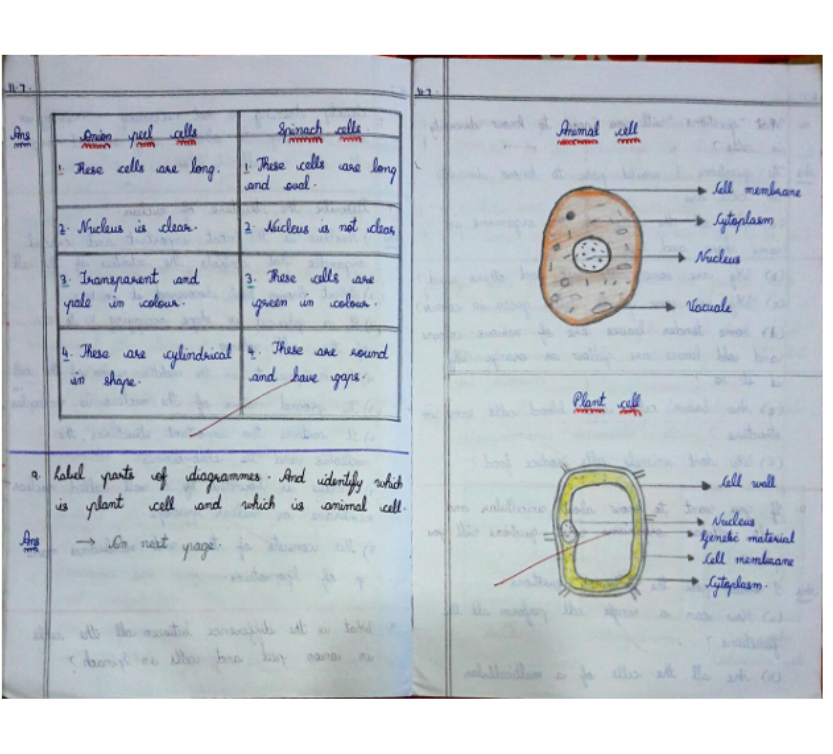
6. Correct the statement and if necessary rewrite.

Ans (a) Cell wall is essential in plant cells.
In plant cells, over the cell membrane there is another layer called the cell wall. This provides rigidity to the cell in plants (True)
(b) Nucleus controls cell activity. Yes, Nucleus controls all the activities of the cell. (True)
(c) Unicellular organisms perform all life processes like respiration, excretion, growth and reproduction. Yes, unicellular organisms can perform all life processes like respiration, excretion, growth and reproduction (True)
(d) To observe nucleus and organelles, clearly, staining is not necessary. Staining is necessary to observe any internal organelles in a cell. (False)

7. Describe the structure of nucleus.

Ans 1) Nucleus is the most important and crucial organelle that controls the activities of the cell.
2) Robert Brown first discovered it in 1831.
3) It is spherical in shape occupying 10 to 15% of the cell volume.
4) It is present in the middle region of the cell.
5) The ground matrix of the nucleus is nucleoplasm.
6) It contains two important structures, the nucleolus and the chromosomes.
7) Nucleus is bounded by a wall called nuclear membrane or nuclear envelope.
8) This consists of two unit membranes made up of lipoproteins.

8. What is the difference between all the cells in onion peel and cells in spinach?


Ans

Onion peel cells	Spinach cells
1. These cells are long.	1. These cells are long and oval.
2. Nucleus is clear.	2. Nucleus is not clear.
3. Transparent and pale in colour.	3. These cells are green in colour.
4. These are cylindrical in shape.	4. These are round and have gaps.

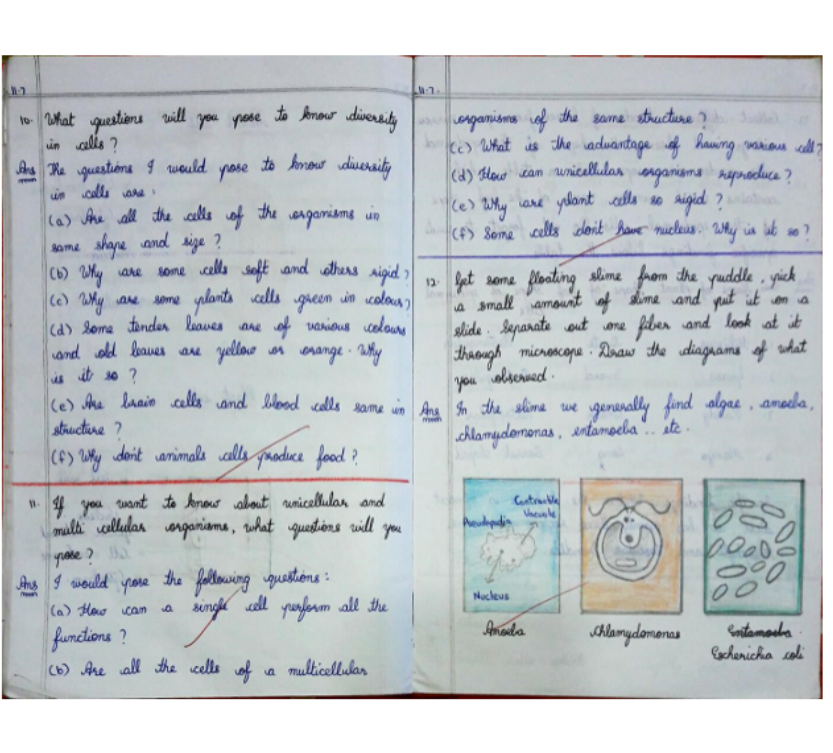
9. Label parts of diagrammes. And identify which is plant cell and which is animal cell.

Ans → On next page

Animal cell

Plant cell

Cell wall
Nucleus
Genetic material
Cell membrane
Cytoplasm


10. What questions will you pose to know diversity in cells?

Ans The questions I would pose to know diversity in cells are:
(a) Are all the cells of the organisms in same shape and size?
(b) Why are some cells soft and others rigid?
(c) Why are some plants cells green in colour?
(d) Some tender leaves are of various colours and old leaves are yellow or orange. Why is it so?
(e) Are brain cells and blood cells same in structure?
(f) Why dont animals cells produce food?

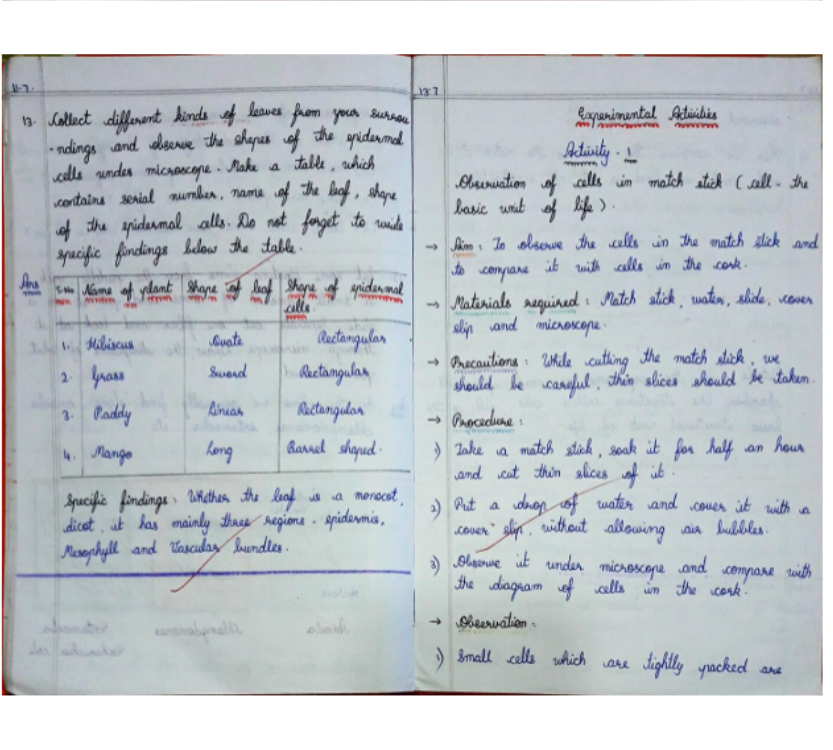
11. If you want to know about unicellular and multi cellular organisms, what questions will you pose?

Ans I would pose the following questions:
(a) How can a single cell perform all the functions?
(b) Are all the cells of a multicellular organisms of the same structure?
(c) What is the advantage of having various cells?
(d) How can unicellular organisms reproduce?
(e) Why are plant cells so rigid?
(f) Some cells dont have nucleus. Why is it so?

12. Get some floating slime from the puddle, pick a small amount of slime and put it on a slide. Separate out one fiber and look at it through microscope. Draw the diagrams of what you observed.

Ans In the slime we generally find algae, amoeba, chlamydomonas, entamoeba ... etc.

Pseudopodia
Contractile Vacuole
Nucleus
Amoeba
Chlamydomonas
Entamoeba
Escherichia coli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13. Collect different kinds of leaves from your surroundings and observe the shapes of the epidermal cells under microscope. Make a table, which contains serial number, name of the leaf, shape of the epidermal cells. Do not forget to write specific findings below the table.

Ans

S.no	Name of plant	Shape of leaf	Shape of epidermal cells
1.	Hibiscus	Ovate	Rectangular
2.	Grass	Sword	Rectangular
3.	Paddy	Linear	Rectangular
4.	Mango	Long	Barrel shaped.

Specific findings: Whether the leaf is a monocot, dicot, it has mainly three regions - epidermis, Mesophyll and Vascular bundles.

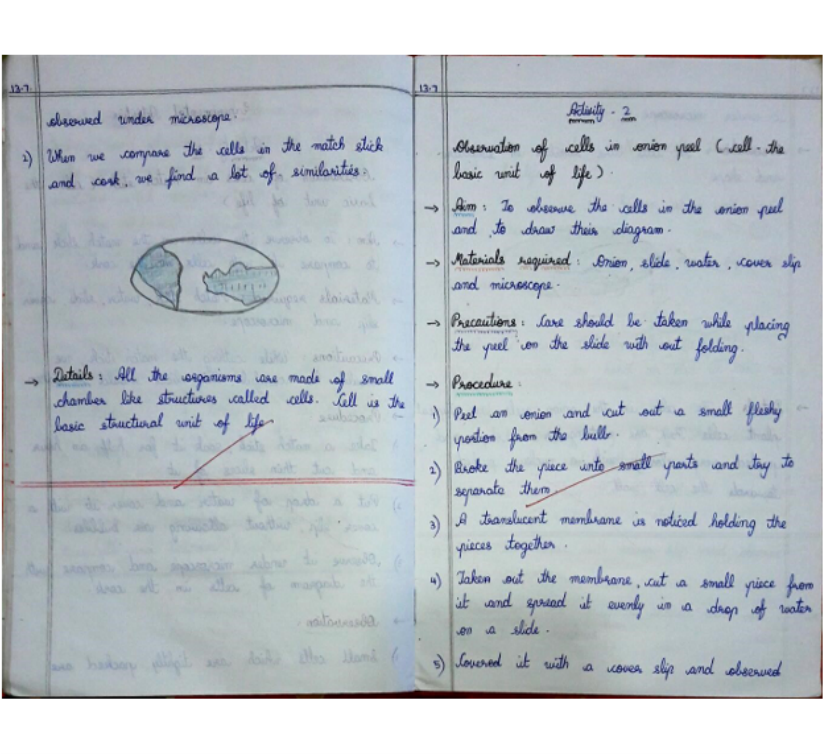
13-7

Experimental Activities

Activity - 1

Observation of cells in match stick (cell - the basic unit of life)

→ Aim: To observe the cells in the match stick and to compare it with cells in the cork.
→ Materials required: Match stick, water, slide, cover slip and microscope.
→ Precautions: While cutting the match stick, we should be careful, thin slices should be taken.
→ Procedure:
1) Take a match stick, soak it for half an hour and cut thin slices of it.
2) Put a drop of water and cover it with a cover slip without allowing air bubbles.
3) Observe it under microscope and compare with the diagram of cells in the cork.
→ Observation:
→ Small cells which are tightly packed are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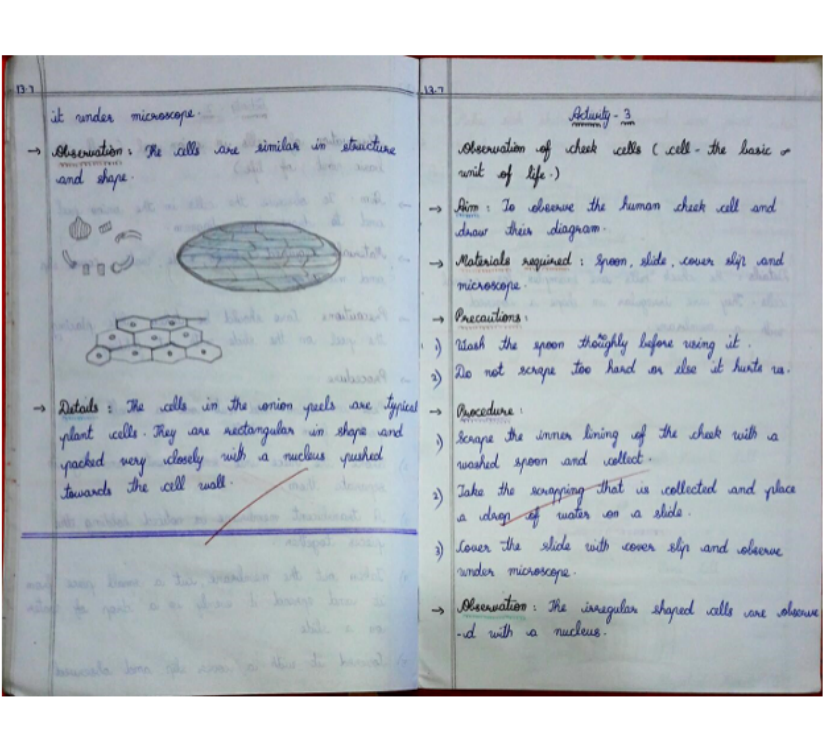
observed under microscope.
2) When we compare the cells in the match stick and cork, we find a lot of similarities.

→ Details: All the organisms are made of small chamber like structures called cells. Cell is the basic structural unit of life.

Activity - 2

Observation of cells in onion peel (cell - the basic unit of life)

→ Aim: To observe the cells in the onion peel and to draw their diagram.
→ Materials required: Onion, slide, water, cover slip and microscope.
→ Precautions: Care should be taken while placing the peel on the slide with out folding.
→ Procedure:
1) Peel an onion and cut out a small fleshy portion from the bulb.
2) Broke the piece into small parts and try to separate them.
3) A translucent membrane is noticed holding the pieces together.
4) Taken out the membrane, cut a small piece from it and spread it evenly in a drop of water on a slide.
5) Covered it with a cover slip and observed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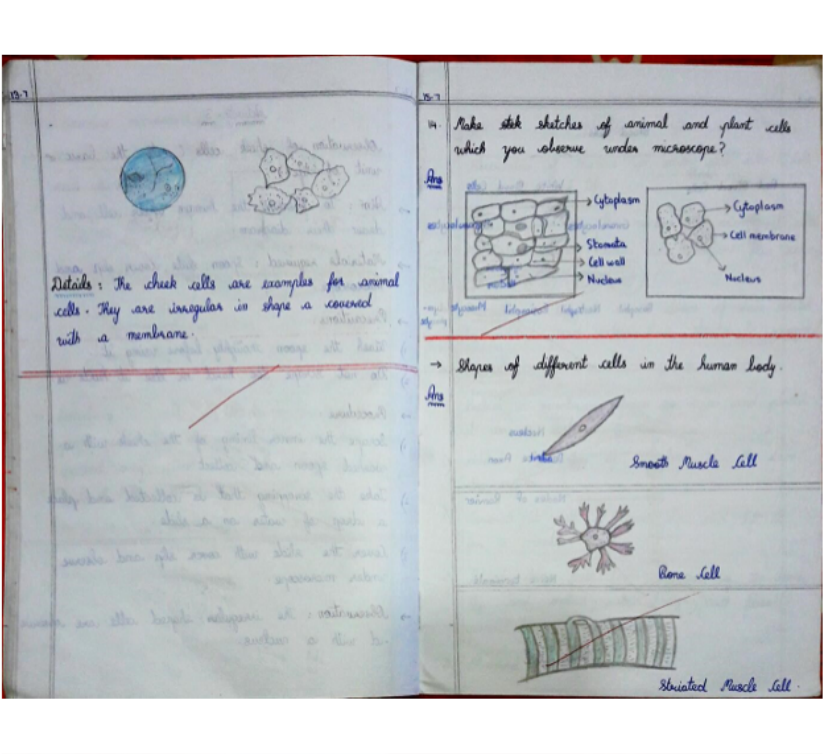
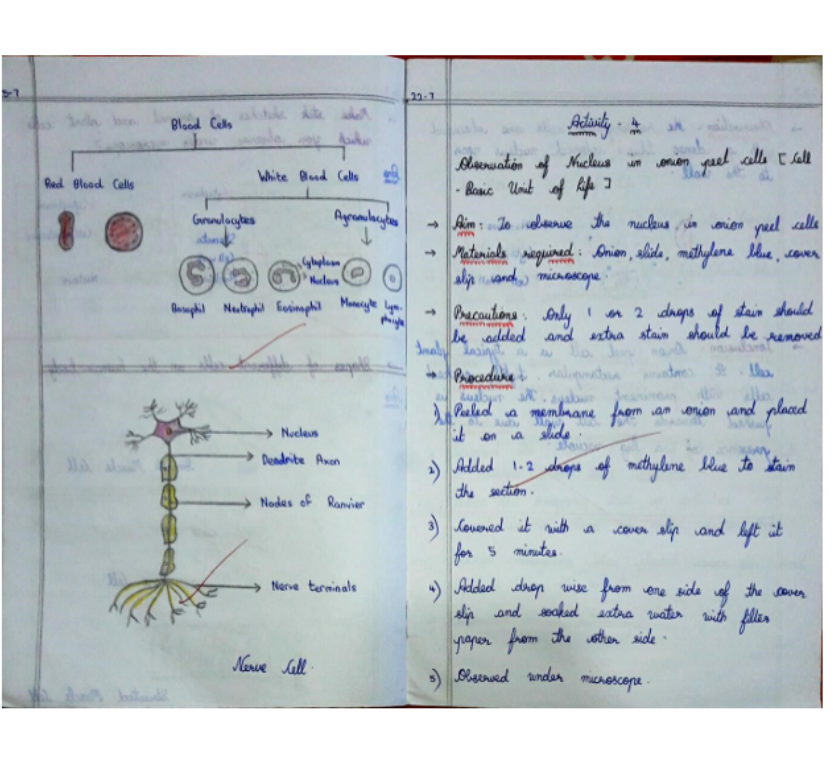
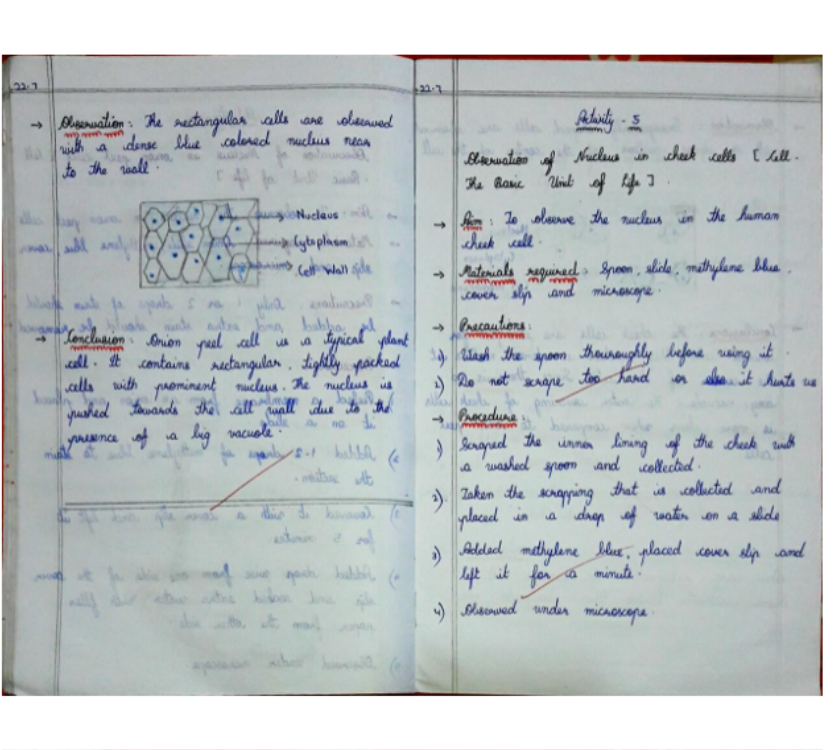
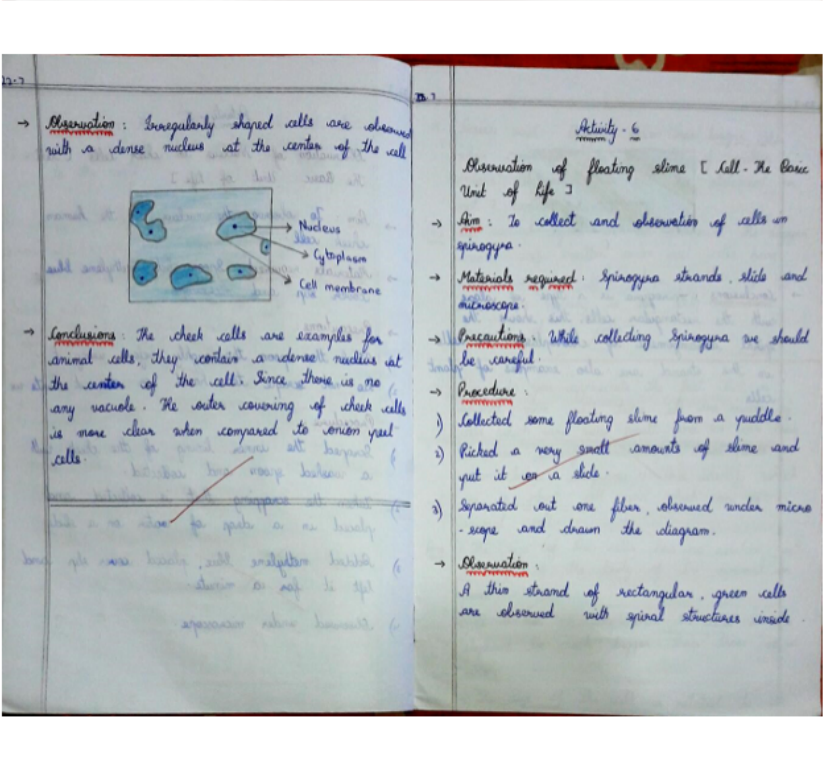
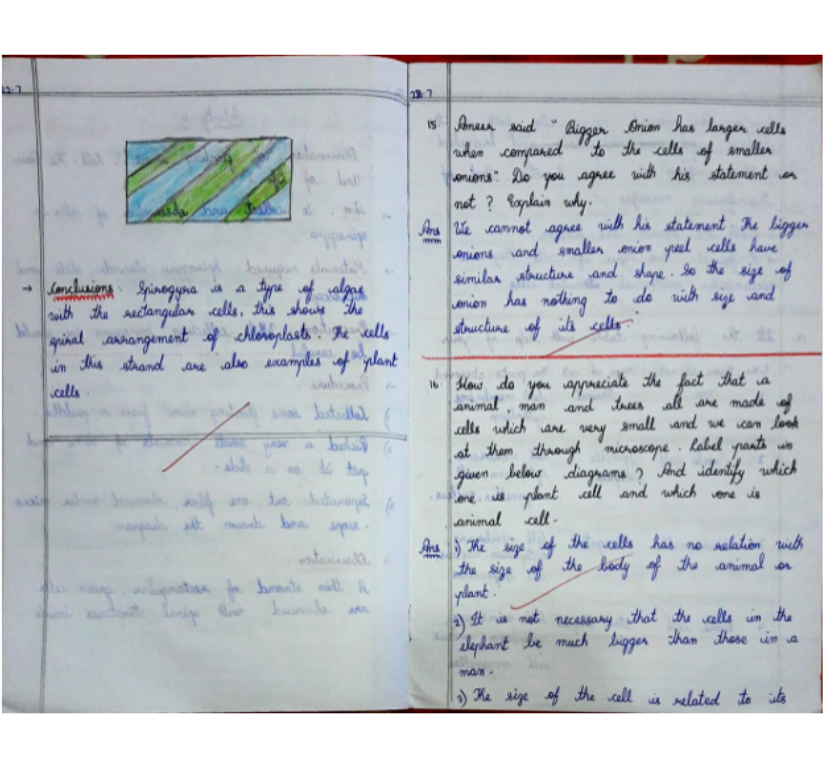
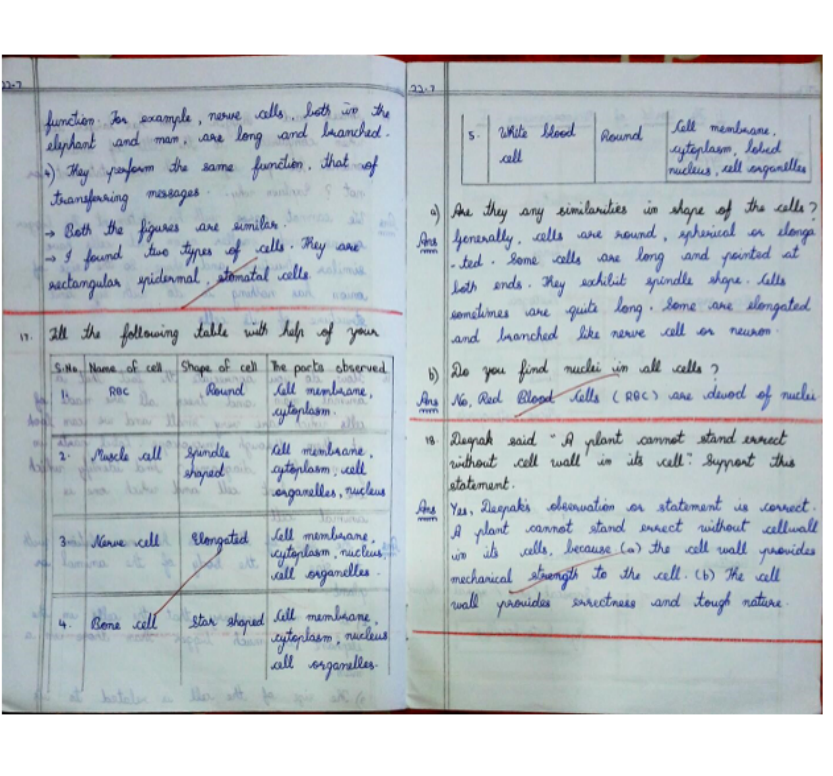
it under microscope.

→ Observation: The cells are similar in structure and shape.

→ Details: The cells in the onion peels are typical plant cells. They are rectangular in shape and packed very closely with a nucleus pushed towards the cell wall.

Activity - 3

Observation of cheek cells (cell - the basic unit of life.)

→ Aim: To observe the human cheek cell and draw their diagram.
→ Materials required: Spoon, slide, cover slip and microscope.
→ Precautions:
1) Wash the spoon throughly before using it.
2) Do not scrape too hard as else it hurts us.
→ Procedure:
1) Scrape the inner lining of the cheek with a washed spoon and collect.
2) Take the scrapping that is collected and place a drop of water on a slide
3) Cover the slide with cover slip and observe under microscope.