Introduction to Biology

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Course: **General Biology I** (MA 101)

Fall Semester (2025)

Week 1

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✓ Class Rules for G. Biology:

- Punctuality and Attendance.
- Preparedness
- Respect for Others
- Use of Electronic Devices
- Academic Integrity
- Class Participation
- Respect for Class Time
- Office Hours and Communication

Outline

- What is Biology
- Branches of Biology
- Scientific Method
- Characteristics of Life

Objectives

❖By the end of this lecture, students should be able to:

1. Define Biology.

2. Understand the Importance of Studying Biology.

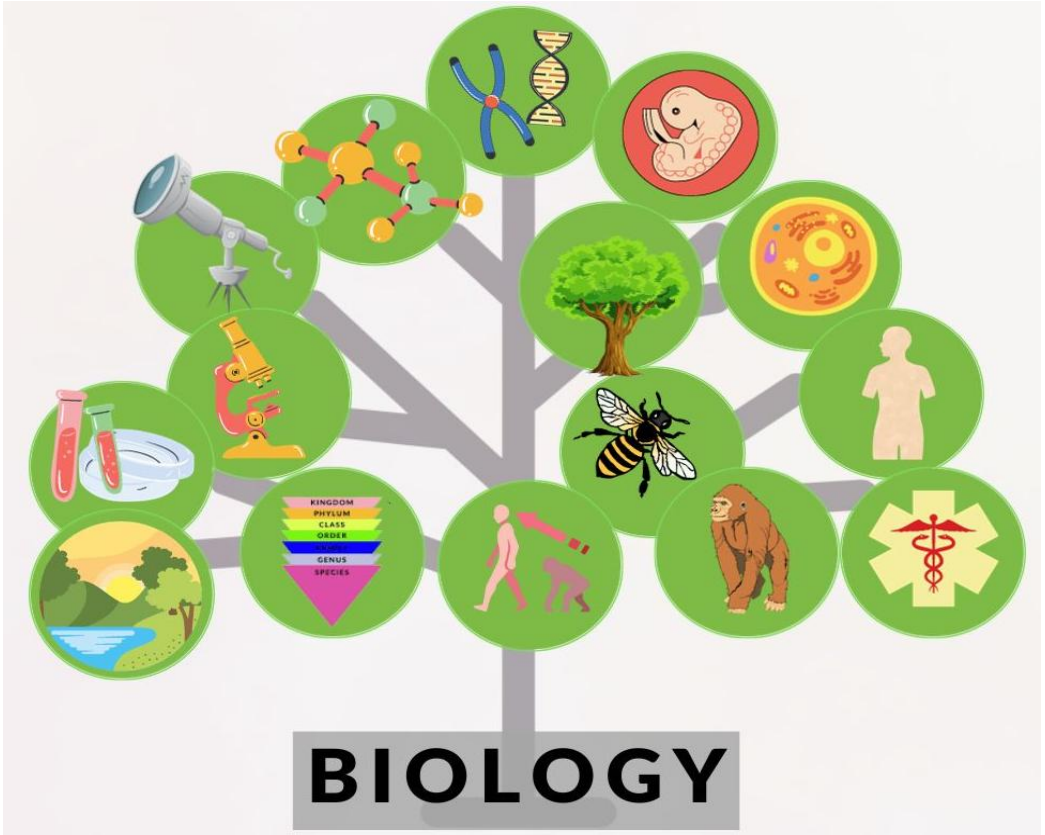
3. Distinguish between different Steps in the Scientific Method.

4. Recognize the fundamental characteristics that distinguish living organisms from non-living things

❑ What is Biology? The term Biology comes from two Greek words:

- **Bios** = Life
- **Logos** = Study/science

- Therefore, Biology = the study of life.



- Is the scientific study of **life** and **living organisms**, including their **structure**, **function**, **growth**, **origin**, **evolution**, and **distribution**.

❑ Importance of Studying Biology

❖ Biology is essential because it helps us understand life:

1) Understanding the **Human Body**
2) Understanding **Diseases and Their Causes**
3) Foundation for **Medical and Health Sciences**
4) Development of New **Treatments and Drugs**
5) Improving **Public Health**
6) Understanding **Genetics and Inheritance**
7) Enhancing **Environmental and Ecological** Awareness

❖ Branches of Biology:

- Biology is a **broad and diverse field**. It is divided into **main branches** and **specialized branches**.

✓ Main Branches of Biology:

- Botany, Zoology
- Microbiology, Genetics
- Anatomy, Physiology
- Ecology, Evolutionary Biology
- Cytology, Molecular Biology

❖ Applied (Specialized) Branches of Biology:

- Biotechnology
- Immunology
- Parasitology
- Entomology
- Virology
- Marine Biology
- Environmental Biology
- Biochemistry
- Mycology

❑ Scientific Method in Biology:

- Biology, like all sciences, relies on the scientific method, a systematic way to ask questions and solve problems.

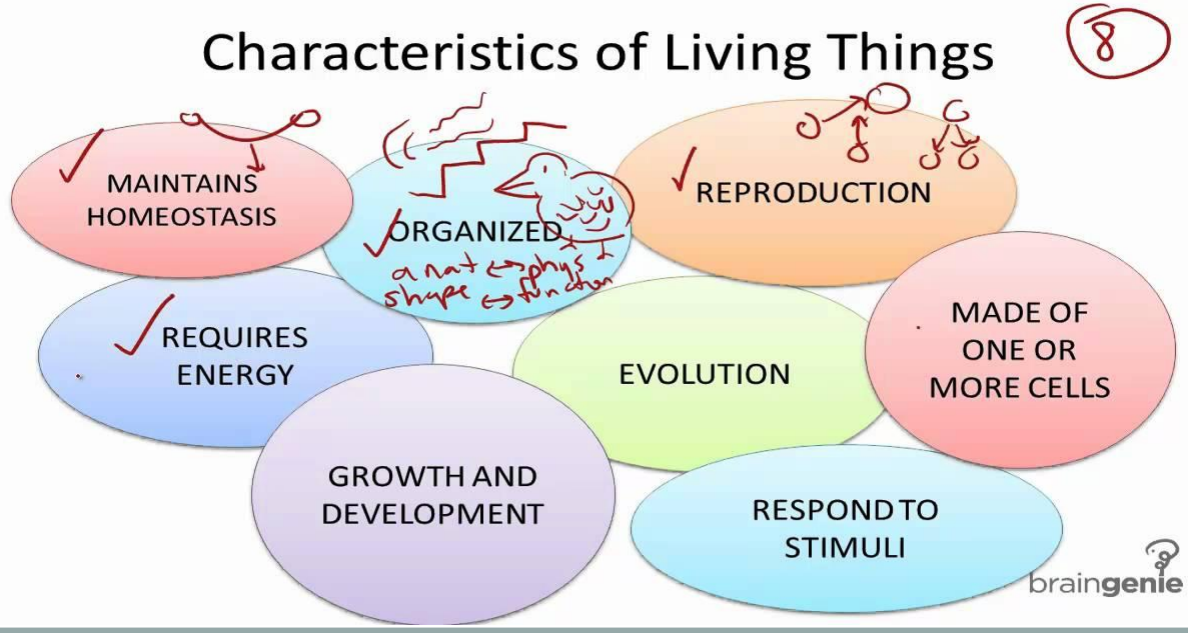
✓ Steps in the Scientific Method:

1. Observation
2. Question
3. Hypothesis
4. Experimentation
5. Data Collection and Analysis, Conclusion, Communication

❖ Characteristics of Life:

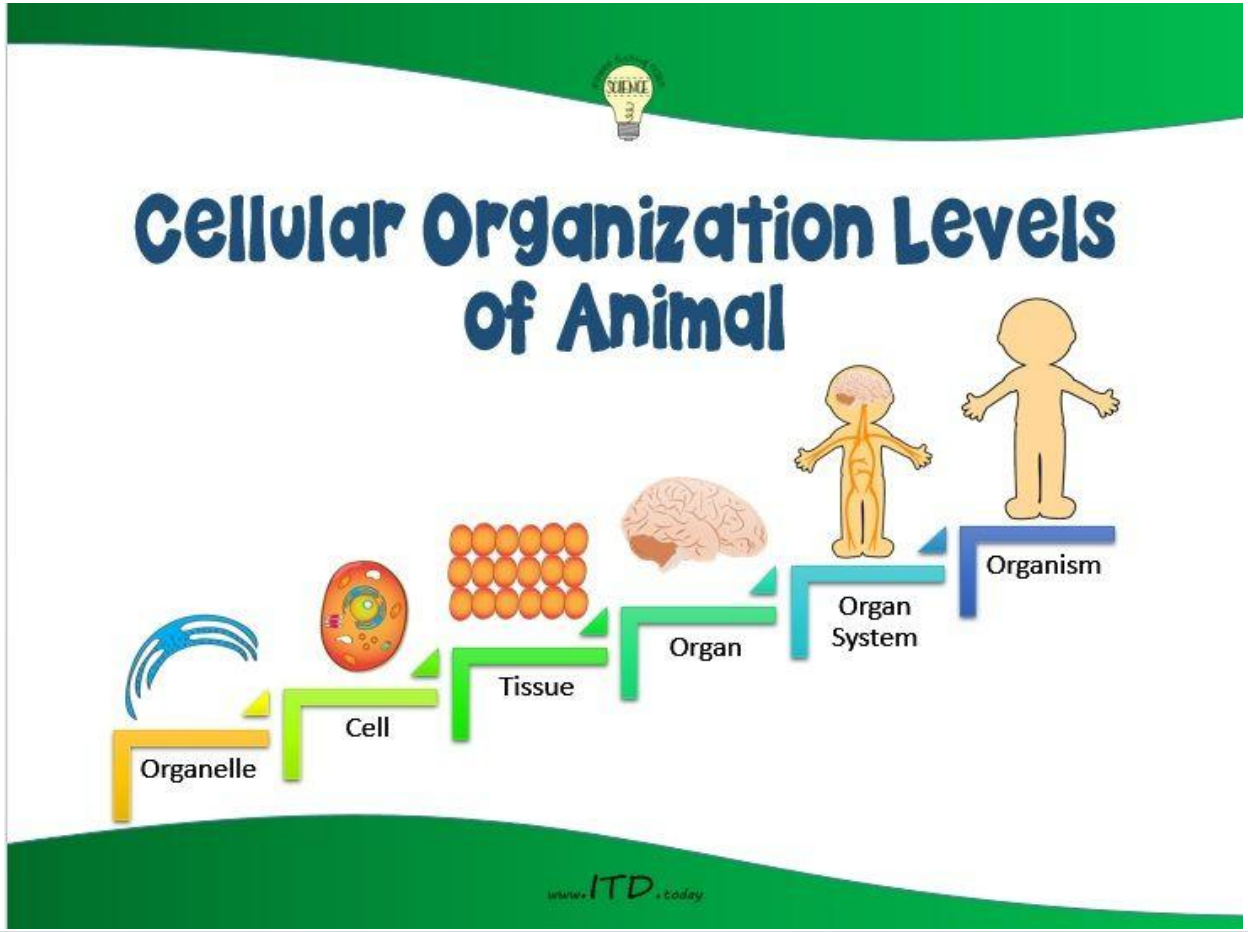
- Living organisms share a set of **fundamental characteristics** that distinguish them from **non-living things**.

- How organisms **function**, **survive**, and **interact with the environment**.



1. Cellular Organization:

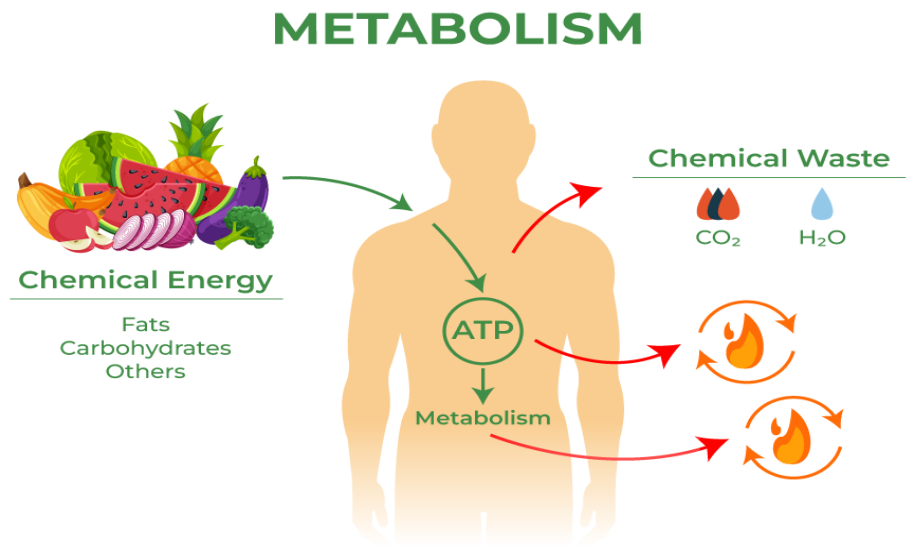
- All living things are composed of one or more cells, which are the basic units of life.



2. Metabolism:

- Living organisms carry out chemical reactions to obtain and use energy.

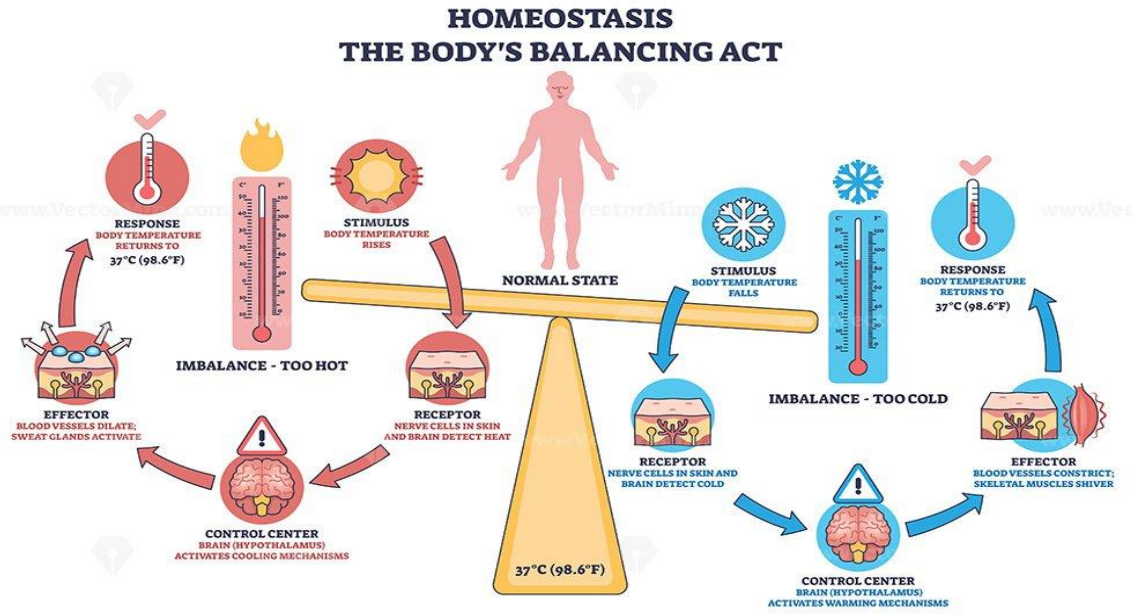
- Example: Human cells break down glucose to release energy (ATP). Liver metabolism of drugs influences medical treatment.



3. Homeostasis:

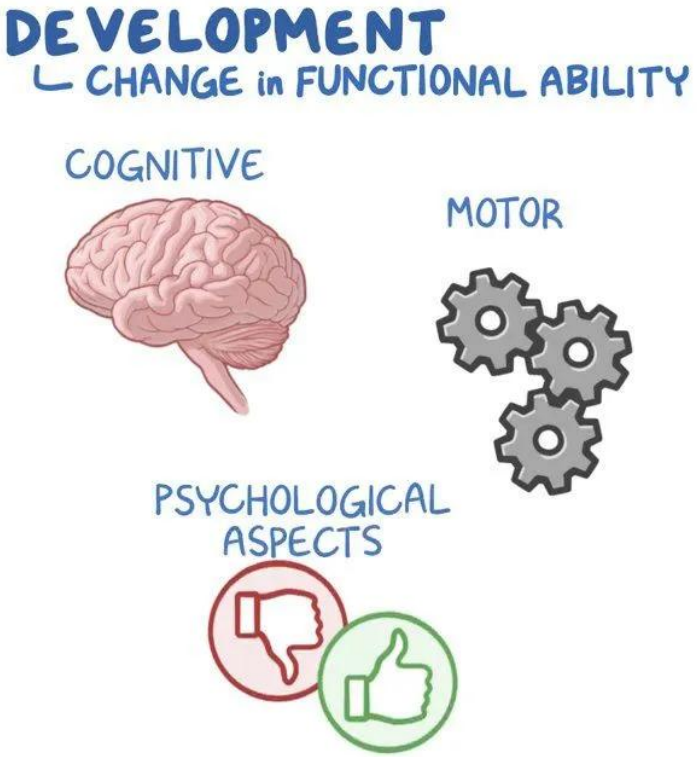
- Living organisms **maintain a stable internal environment** despite **changes outside**.

➢ Example: **Body temperature regulation**, **Blood glucose regulation**.



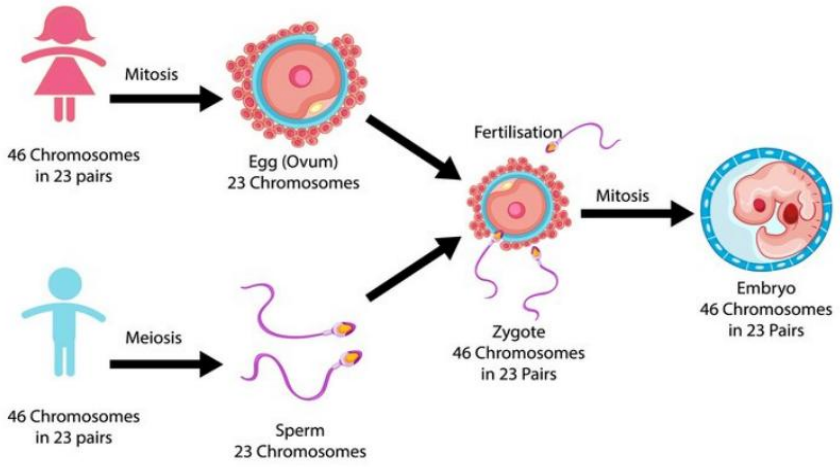
4. Growth and Development:

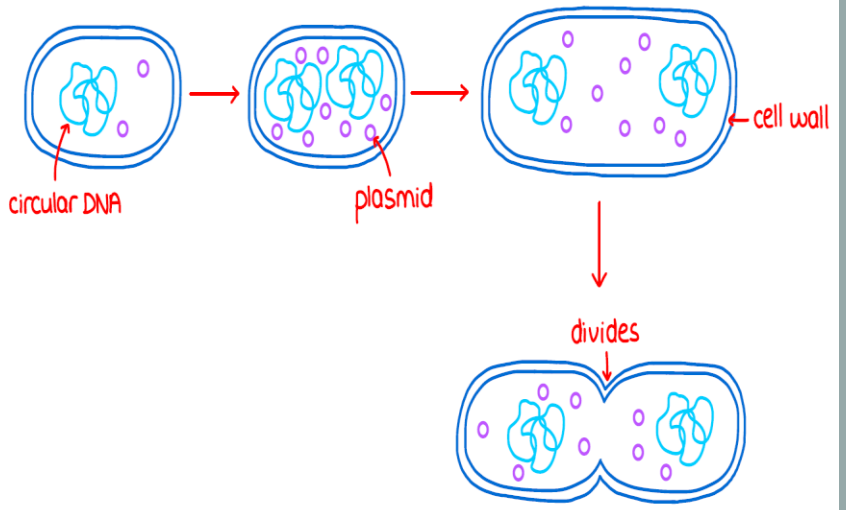
- Living organisms grow (increase in size/number of cells) and develop (mature or change in function).



5. Reproduction:

- All living organisms can reproduce to produce new individuals.
- Reproduction can be **sexual** or **asexual**.
- Example: Human reproduction involves gametes, Bacteria reproduce by binary fission.

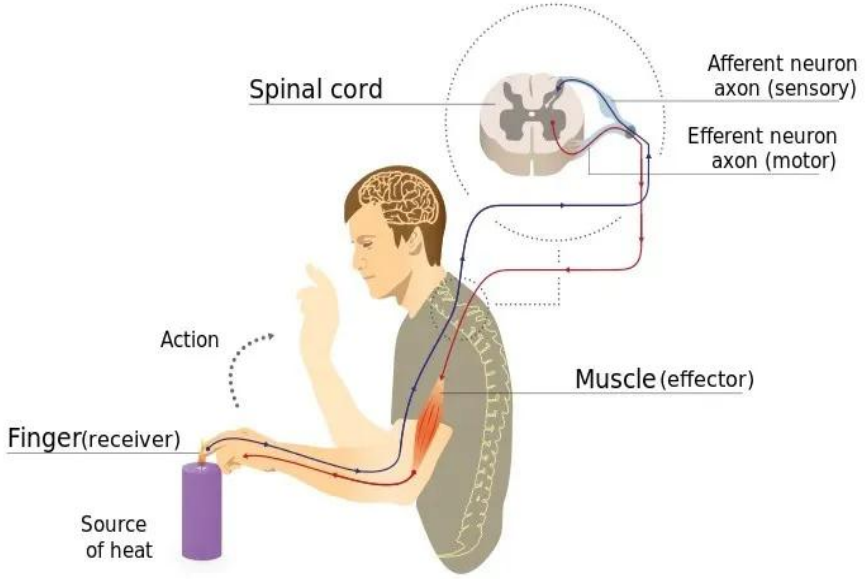




6. Response to Stimuli:

- Living things react to **physical** or **chemical changes** in their environment.

➢ Example: Pulling your hand away from a hot surface, Immune cells responding to invading pathogens.



7. Evolutionary Adaptation:

- Populations change over time to survive in their environment.

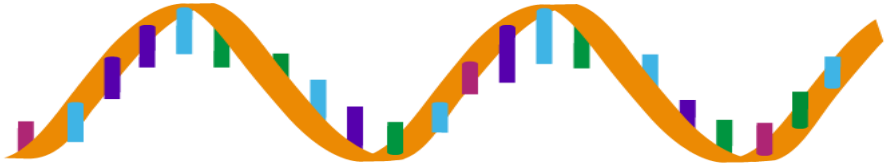
- Examples: Antibiotic resistance in bacteria, Genetic mutations influencing disease susceptibility.

8. Genetic Material (DNA or RNA):

- All living organisms store hereditary information in DNA, and some viruses use RNA.

❖ **Examples:** Human traits (blood group, eye color) are inherited through DNA.

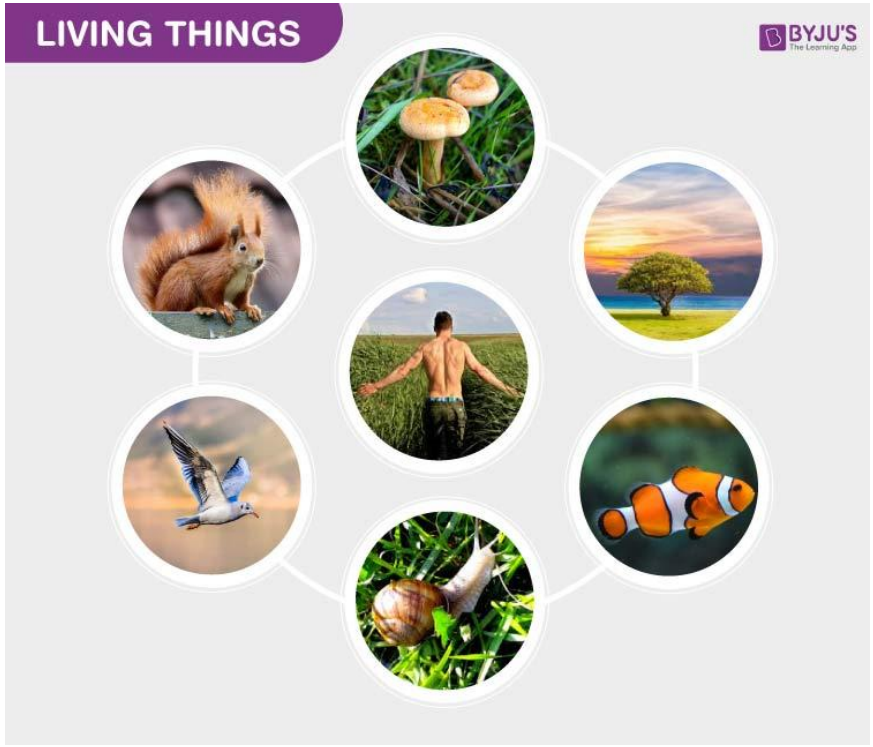
RNA
(Ribonucleic acid)



DNA
(Deoxyribonucleic acid)

10. Movement:

- All living things exhibit movement.



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1. Campbell, N.A. et al. (2020). Biology (12th ed.). Pearson Education.
2. Mader, S.S. (2022). Biology (14th ed.). McGraw-Hill Education.
3. Raven, P.H., Johnson, G.B. et al. (2021). Biology (12th ed.). McGraw-Hill
4. Principles of Biology

Thanks