SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19GET277-BIOLOGY FOR ENGINEERS

IV B.E. ECE / VII SEMESTER

UNIT 1 – INTRODUCTION TO LIFE

TOPIC 1-CHARACTERISTICS OF LIVING ORGANISMS

Characteristics of Living Things?

Alive or not alive?

Characteristics of Living Things?

All living things exhibit several characteristics in combination.

The Building Blocks of Life

All living things are made of the same ***ELEMENTS***:

- Carbon
- Hydrogen
- Nitrogen
- Oxygen

Organization

All life is organized the same way!

Organization

MULTICELLULAR ORGANISM

ORGAN SYSTEM

ORGAN

TISSUE

CELL

ORGANELLE

MOLECULE

ATOM ***(smallest)***

Biome "the world's major communities, classified according to the predominant vegetation and characterized by adaptations of organisms to that particular environment" (Campbell 1996)

Biosphere
Parts of the planet and its atmosphere where life is possible.

Ecosystem
The living and nonliving environment. (The community of life, plus soil, rocks, water, air, etc.)

Community
All organisms in a given place and time.

Population
A group of the same type of organism living in the same place and time.

Multicellular organism
A living individual.

Organ system
Organs connected physically or chemically that function together.

CHARACTERISTICS OF LIVING THINGS

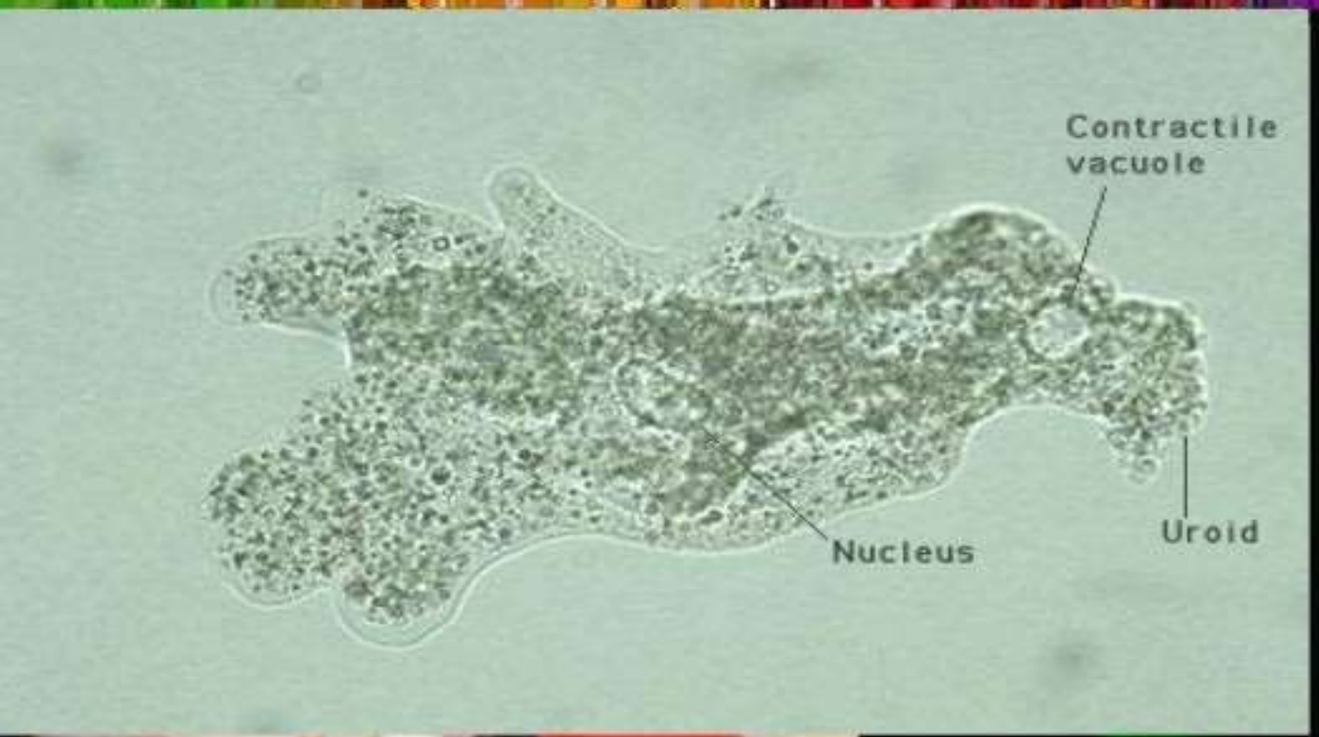
(Organisms)

CHARACTERISTICS OF LIVING THINGS

1. Are made up of cells

Unicellular – organisms that are made of only one cell

Multicellular – organisms that are made of more than one cell


Contractile
vacuole
Nucleus
Uroid


David Webb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2. Reproduce to produce new organisms

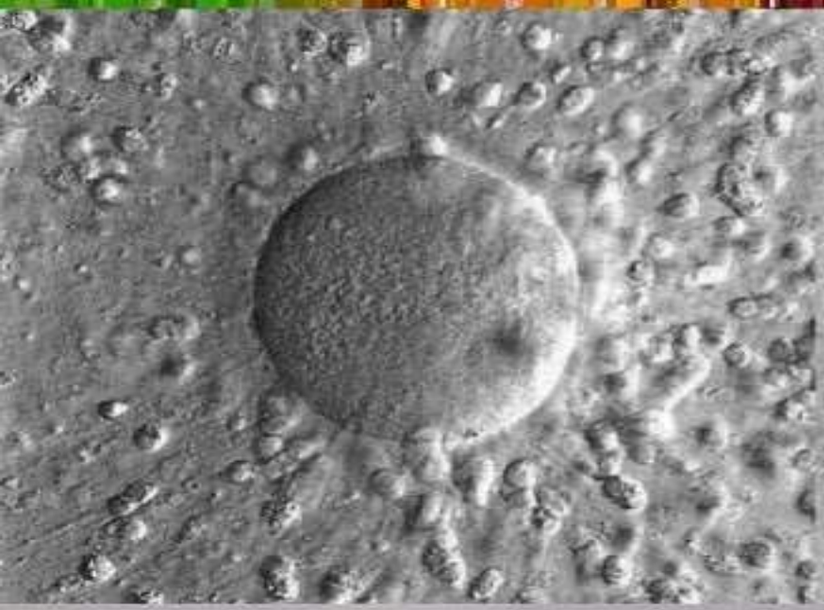
Asexual reproduction - involves a single parent; progeny are genetically identical to the parent.

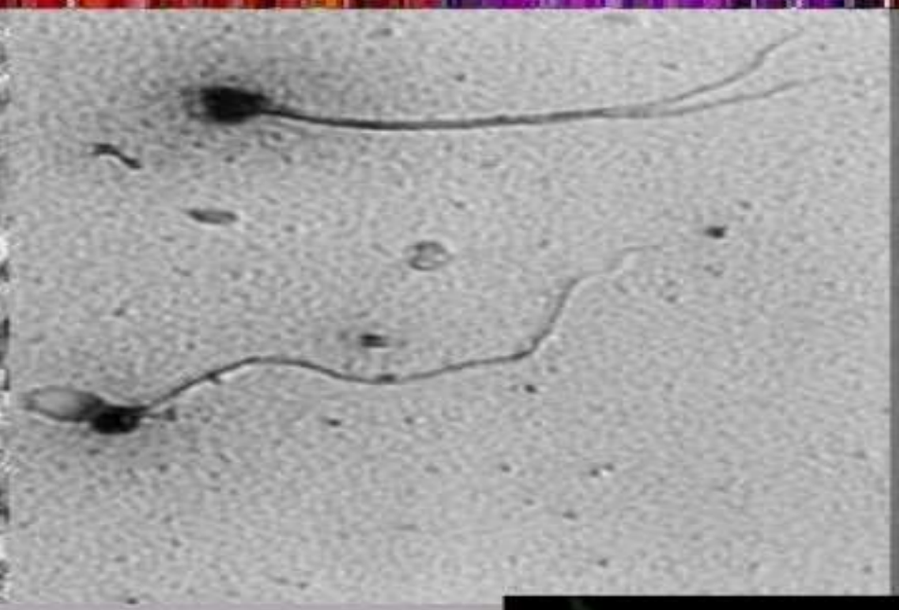
Sexual reproduction - involves 2 parents; progeny are genetically diverse.

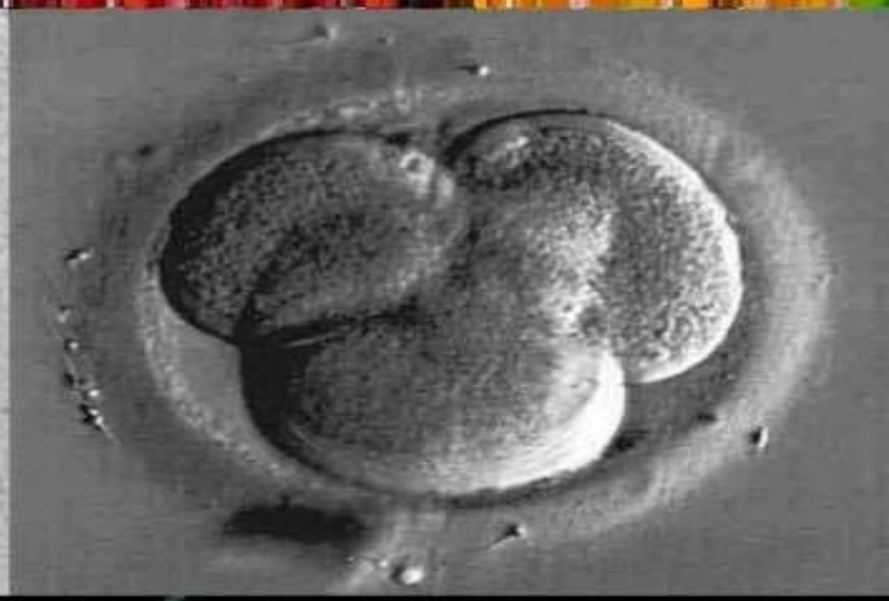
3.Common Genetic Code

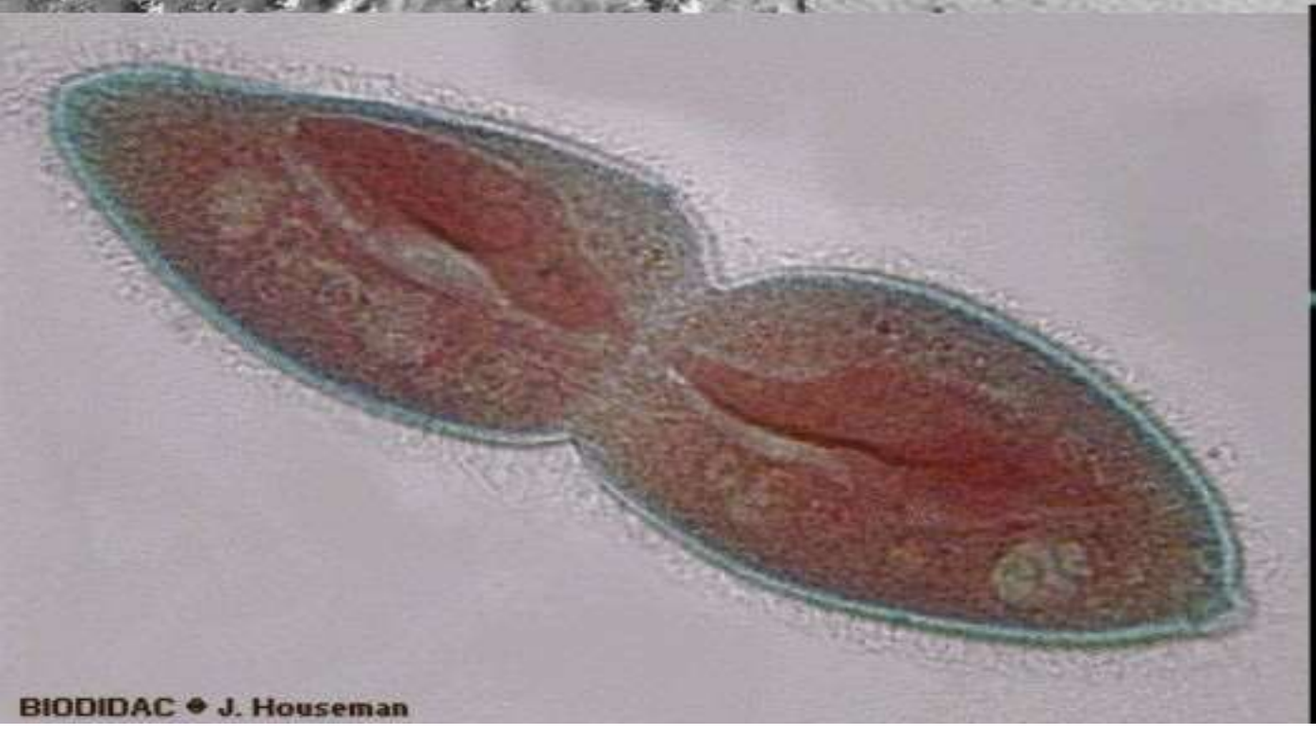
- All living organisms use the same language to pass genetic info on to offspring.

- DNA & RNA contain the code.







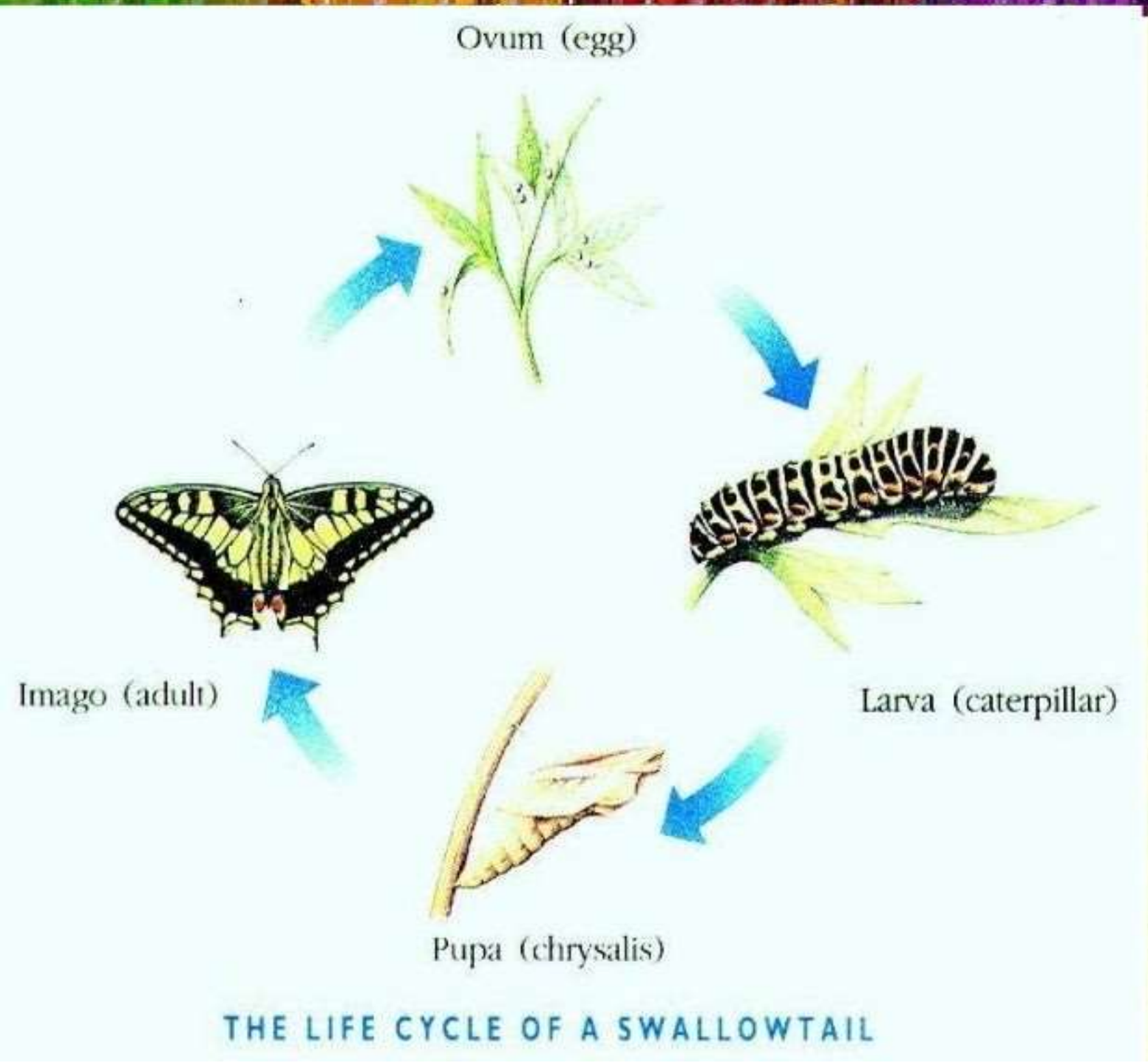

BIODIDAC • J. Houseman

4. Growth, Development and Aging

Growth – some cells get larger and other new cells are added

Development – cells and body parts become specialized for certain jobs

Aging – cells and body parts become damaged and cannot be repaired


Ovum (egg)
Larva (caterpillar)
Pupa (chrysalis)
Imago (adult)
THE LIFE CYCLE OF A SWALLOWTAIL

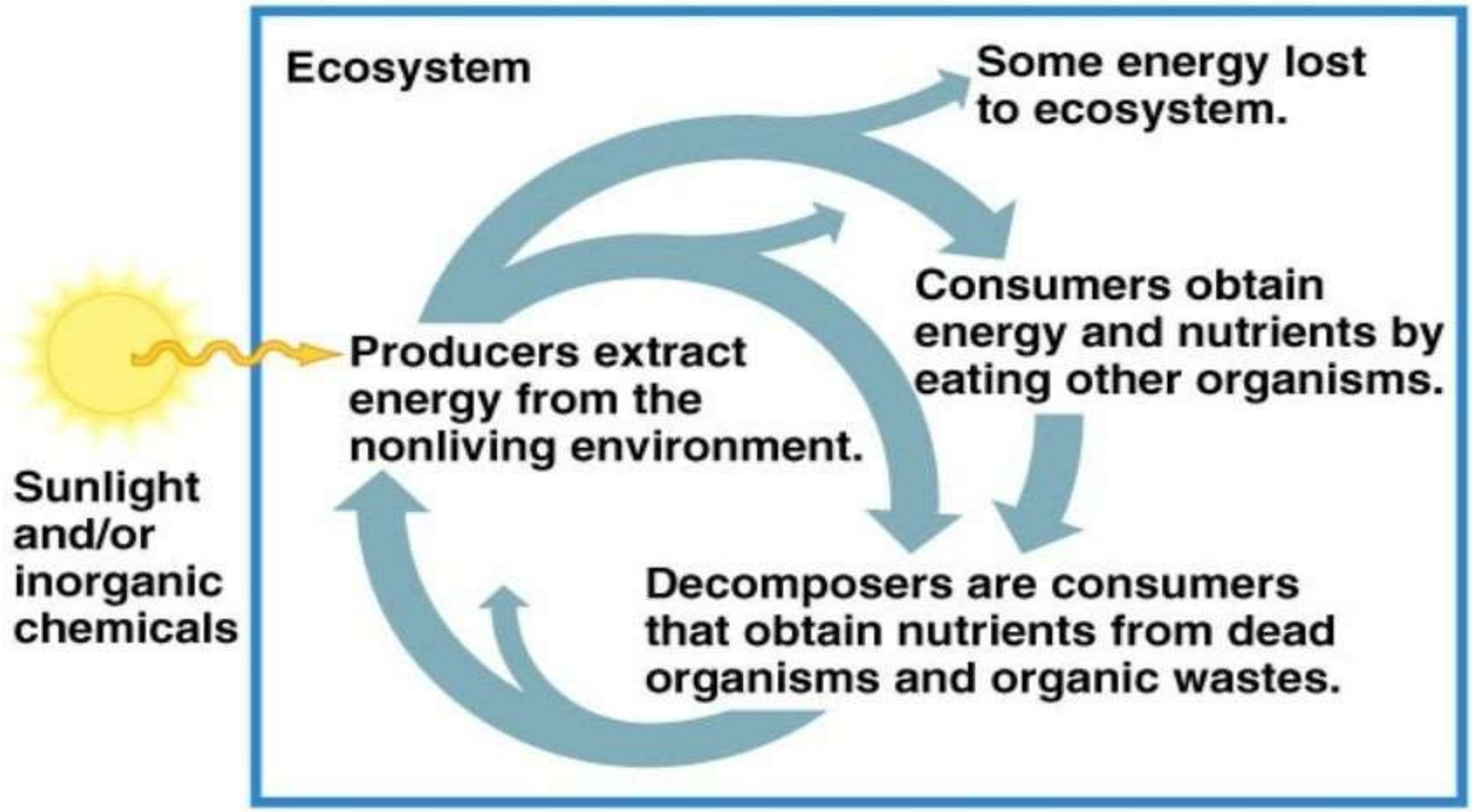
Energy Use & Metabolism

Metabolism - biochemical reactions that acquire & use energy.

Why do organisms need energy?

How do organisms obtain energy?

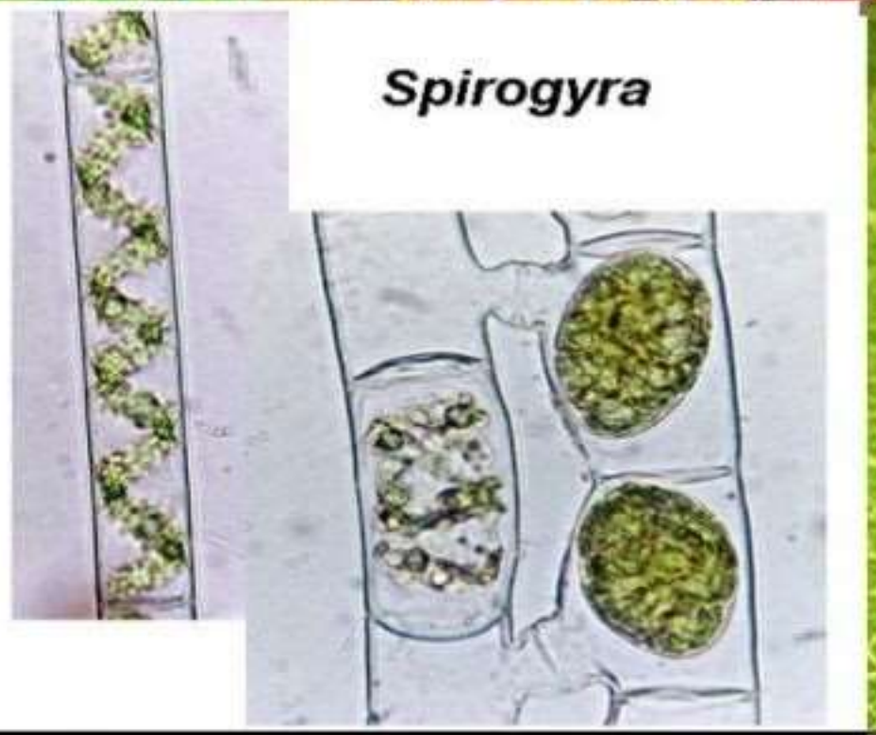
Energy Flow is Connected



5. Obtain and Use Energy from Environment

Autotroph – organism that can make its own food from it's environment

Heterotroph – organism that has to obtain its energy from another organism


Spirogyra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6. Respond to the Environment

Stimulus – anything in the environment that causes a reaction from an organism

Response – automatic reaction to a stimulus

Behavior – learned or inherited response to a stimulus

CHARACTERISTICS OF LIVING THINGS

Irritability - *immediate* response to a stimulus.

7. Maintain a stable internal environment (homeostasis)

Homeostasis - **the ability of an organism to maintain its internal environment despite conditions in the external environment.**

Human body temperature is……..

- **if body temperature rises, you sweat.**
- **if body temperature lowers, you shiver.**


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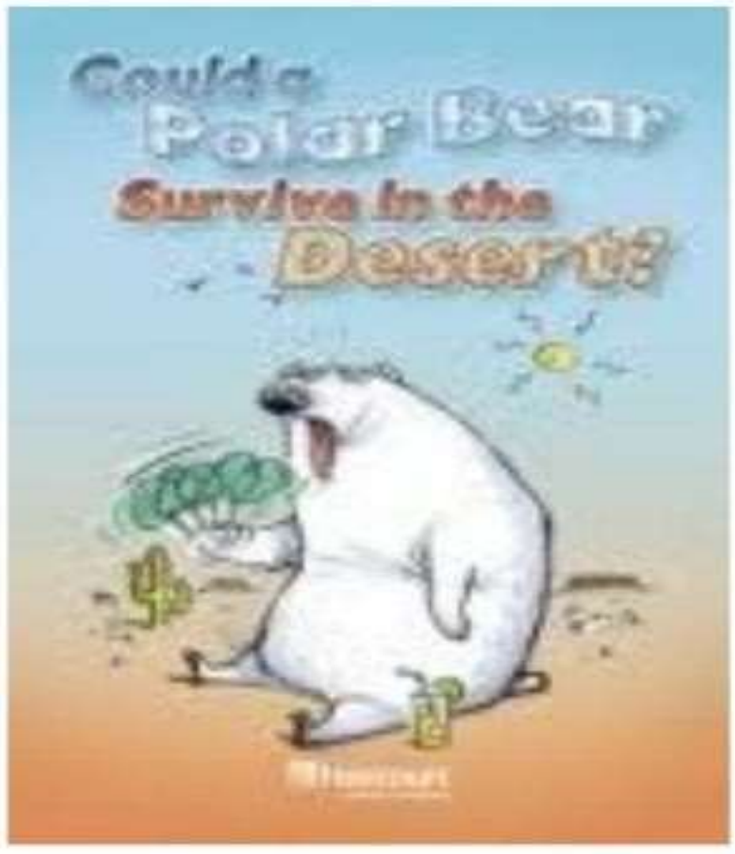
When your body gets too warm due to activity or stress, you will sweat to cool it down.

8. As a group, living things change over time.

- Organisms adapt to their environment in order to survive!

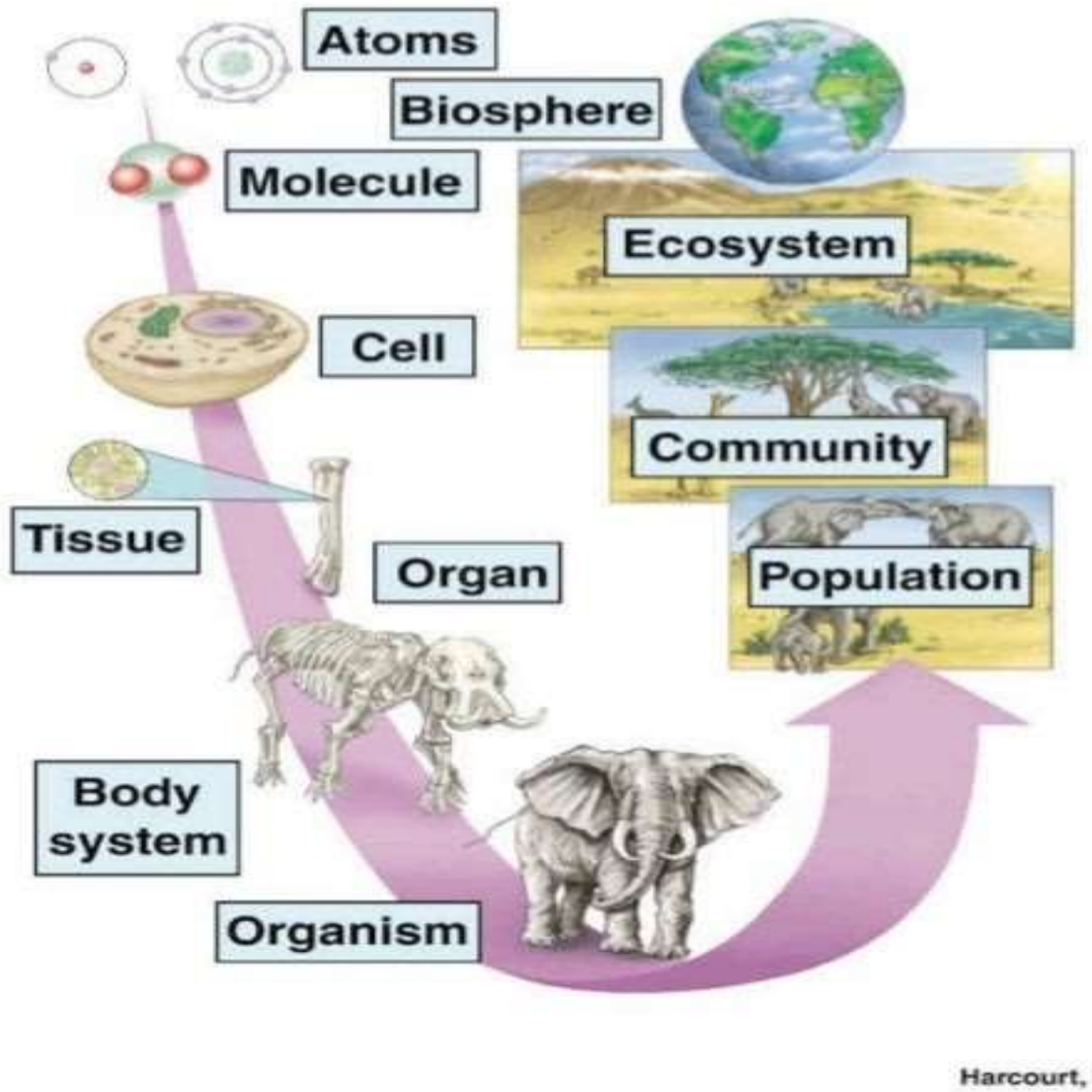


Living things are VERY organized!

Can you guess the smallest part of a living organism?

Hint: It's so tiny that you can't see it!!

Raven/Berg, Environment, 3/e
Figure 4.1



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Levels of Organization of Biological Study

- Atoms/Molecules
- Cells
- Groups of cells (tissues, organs, organ systems)
- Organism
- Population
- Community
- Ecosystem
- Biosphere