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Lesson 1

Introduction

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The study of life uncovers overarching themes that connect all living organisms.

Unifying Themes of Life

1.Organization

hierarchical structure in which life is arranged, from the smallest unit (atoms) to the most complex (biosphere).

2.Information

genetic information is fundamental to life's processes, guiding the development, functioning, and reproduction of organisms. It involves the expression of genes to produce proteins and the transmission of genetic material from one generation to the next.

3.Energy & matter

living organisms acquire, use, and transform energy and matter to sustain life processes

4. Interactions

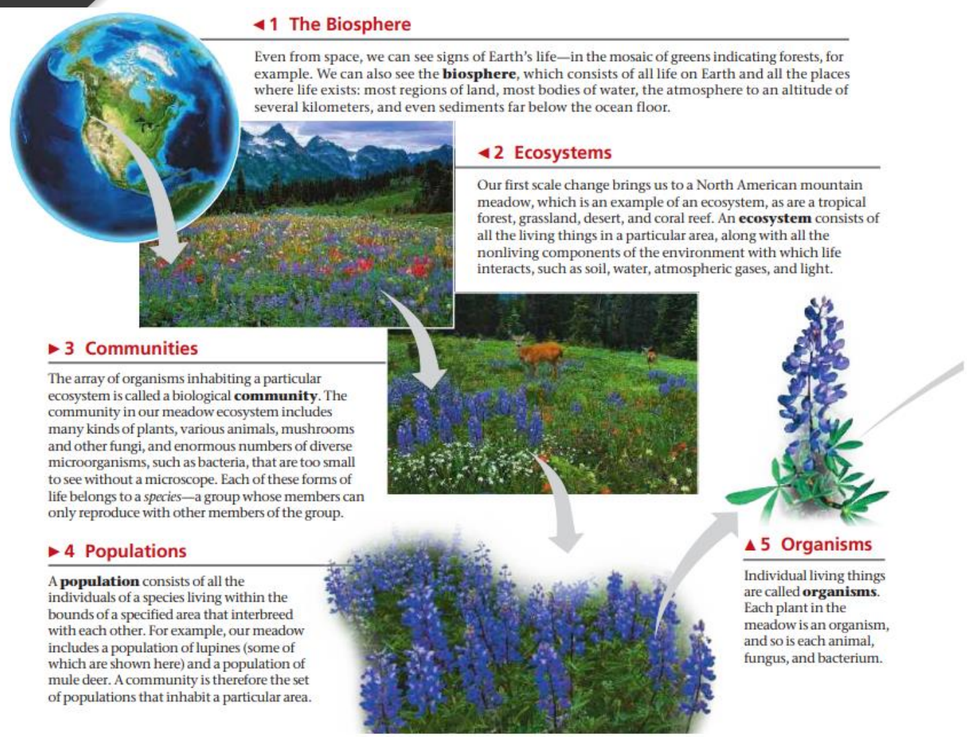
At any level of the biological hierarchy, interactions between the components of the system ensure smooth integration of all the parts, such that they function as a whole

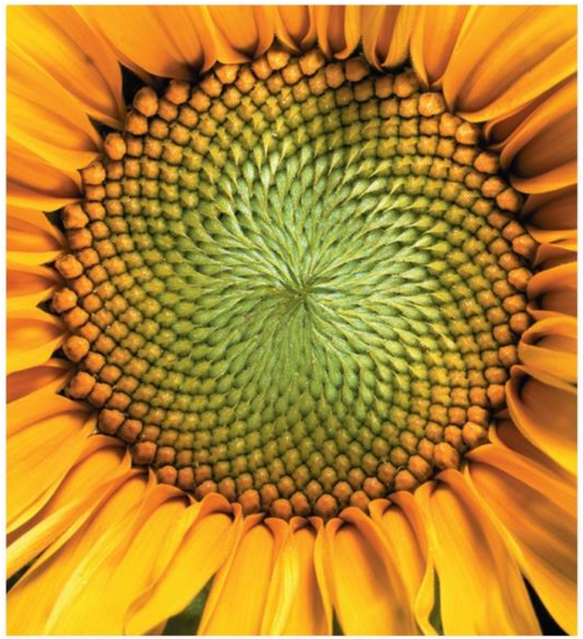
5.Evolution

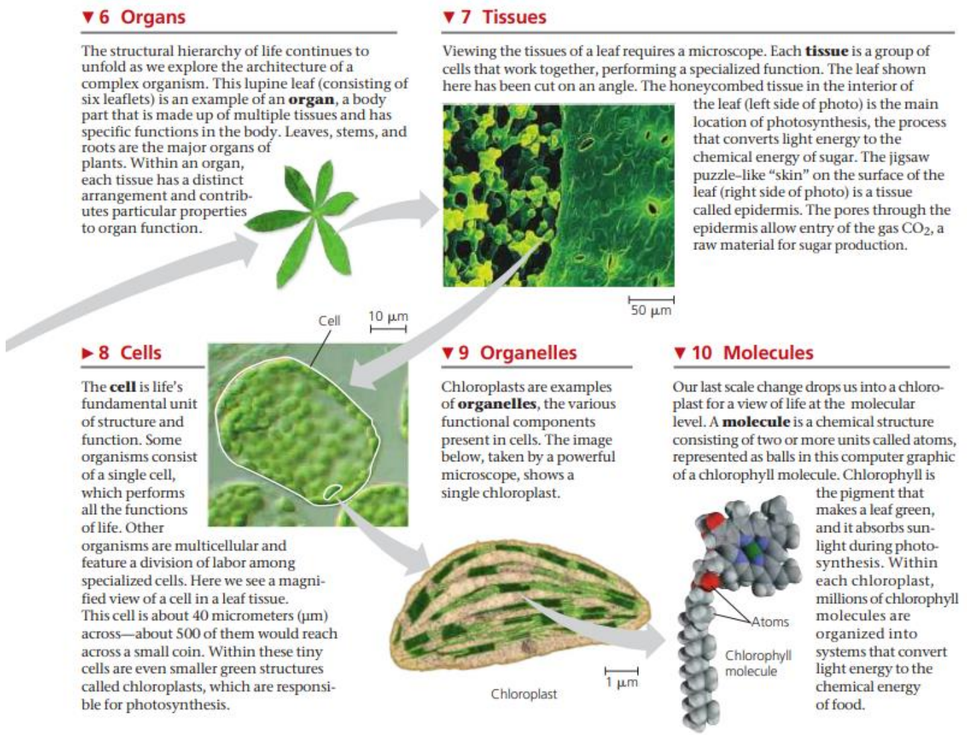
a process of biological change in which species accumulate differences from their ancestors as they adapt to different environments over time.

1.Organization

New properties emerge at different levels of biological organization.



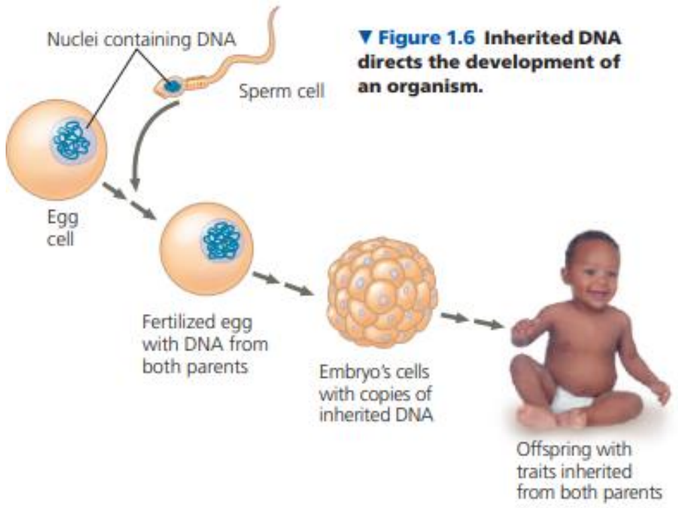




- **Emerging properties: c**haracteristics or behaviors that arise from the interactions of simpler components within a system, which cannot be predicted by examining the individual components alone.
- **Structure & function:** form or structure of a biological entity is closely related to its function.

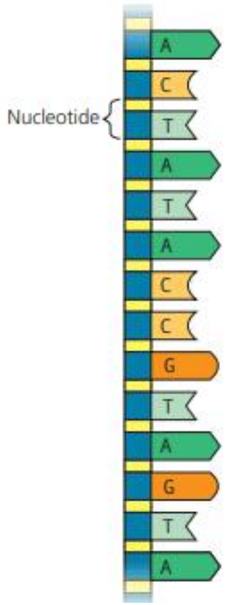
2.Information

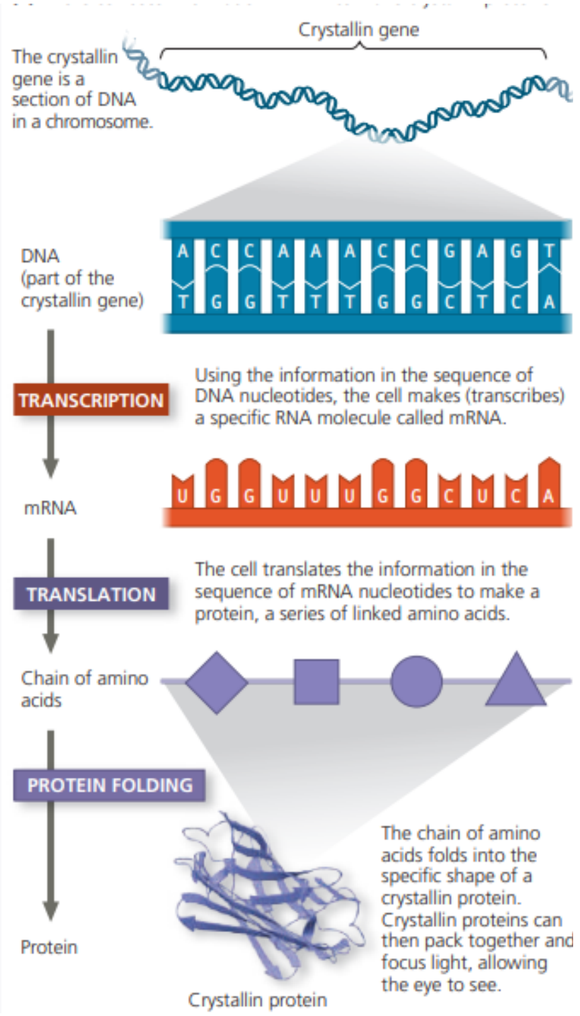
Life's processes involve the expression and transmission of genetic information.



▼ **Figure 1.6 Inherited DNA directs the development of an organism.**

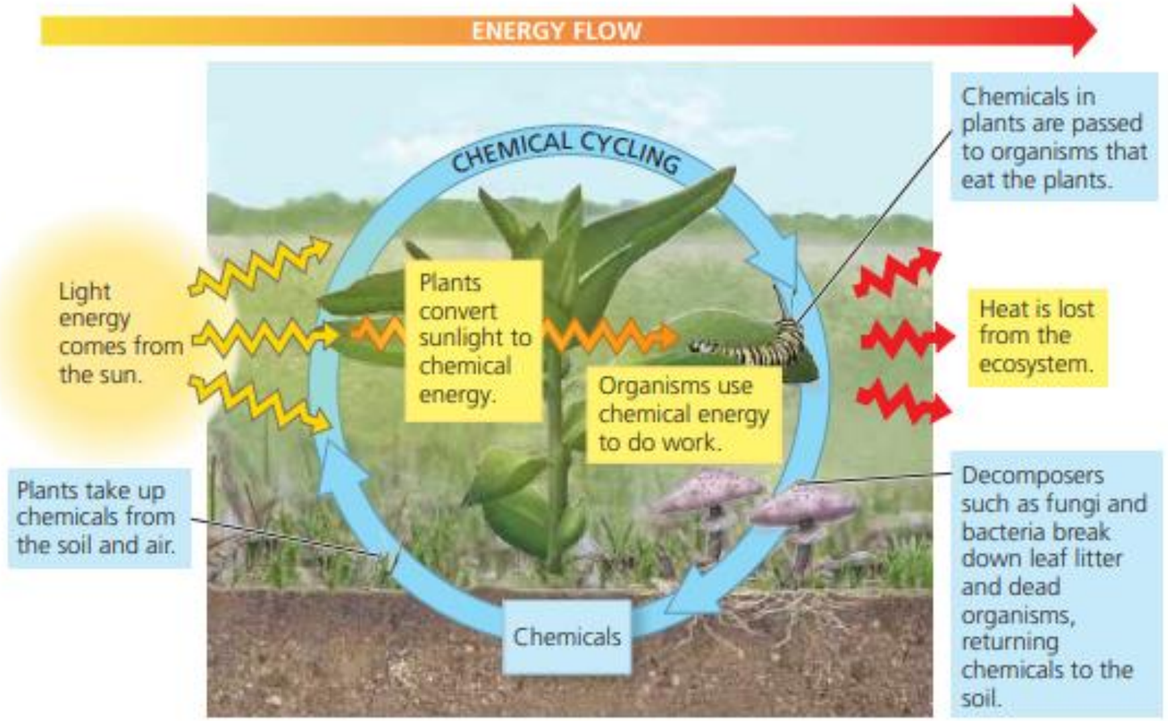
▼ **Figure 1.7 DNA: the genetic material.**





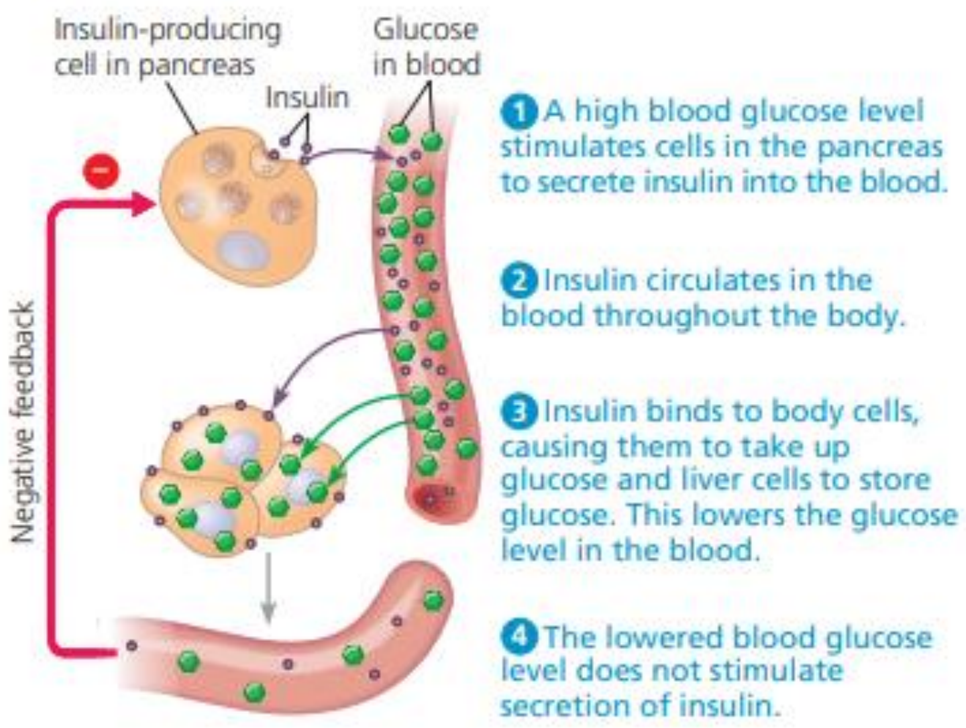
3.Energy and Matter

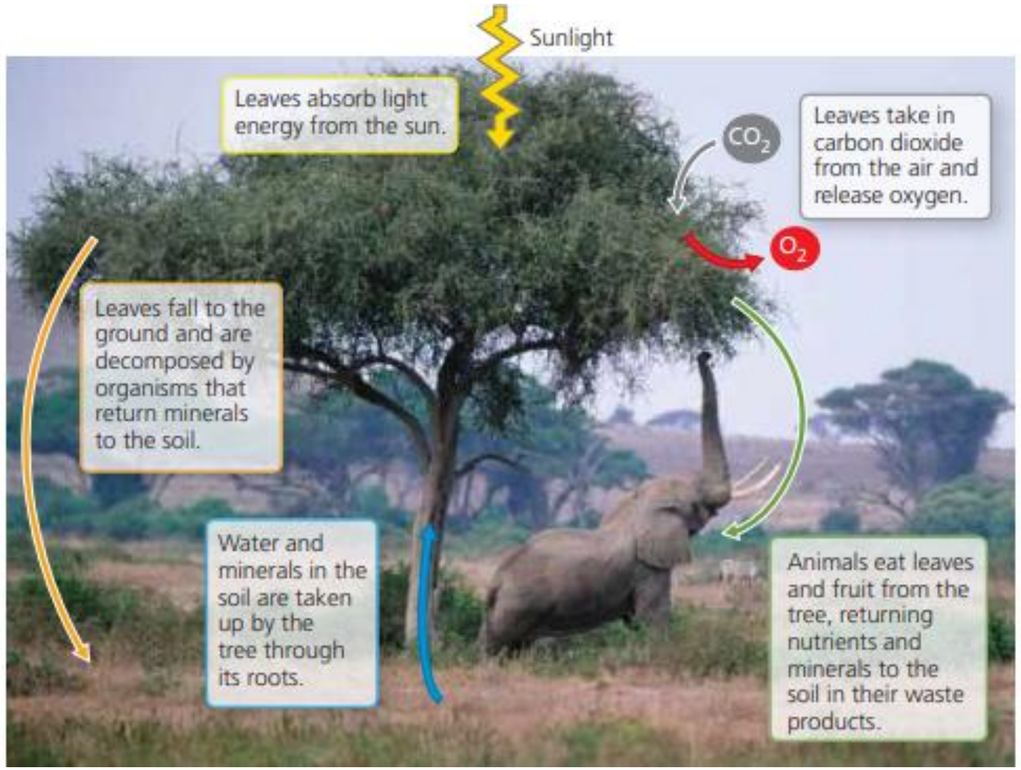
Life require the tranformation of energy and matter.



4. Interactions

Interactions helps to reveal the complexity and interdependence of biological systems





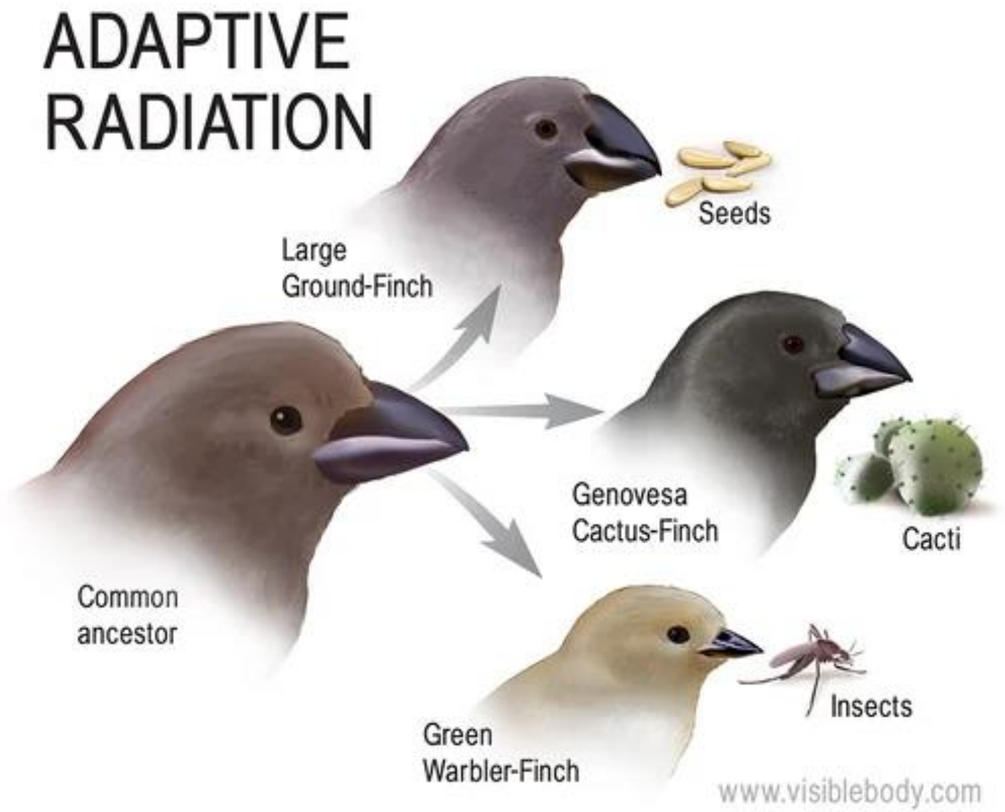
Feedback regulation: mechanisms that organisms use to maintain homeostasis and ensure that biological processes operate within optimal ranges.

1.N*egative-a loop in which the response reduces the initial stimulus*

2. Positive-an end product speeds up its own production

5. Evolution

provides a framework for understanding how species adapt to their environments, how new species arise, and how all life forms are interconnected through common ancestry.



Thank You

For Your Attention