بسم الله الرحمن الرحيم

كيفية الدخول إلى موقع السنة التحضيرية لمقرر علم الأحياء العام 1 (Bio 110)

من الموقع الرئيسي للجامعة:

1. يتم اختيار كلية العلوم من قائمة الكليات
2. اختيار قسم علم الأحياء من قائمة الأقسام العلمية
3. اختيار السنة التحضيرية
4. اختيار المحاضرات النظرية
5. تحميل الملفات بصيغة pdf

http://bio.kau.edu.sa/Default.aspx?Site_ID=13010&Lng=AR

كيفية الدخول إلى الموقع التفاعلي للتدريب علي أسئلة مقرر علم الأحياء العام 1 (Bio 110)

http://sciences.kau.edu.sa/Pages-Biology110-homepag.aspx

هام جدا

أسئلة الاختبارات تأتي من الموقع التفاعلي ومن المحاضرات النظرية فقط والقسم غير مسئول عن أي نماذج أو مذكرات تباع في أي مكان

General Biology (1) علم الأحياء العام (1)

جـدول توزيع محاضرات مقرر الأحياء العامه (Bio 110)

الأسبوع	عنوان المحاضرات النظرية
الاسبوع الأول	Chapter 1: Exploring Life
الاسبوع الثاني	Chapter 2: The Chemical Basis of Life
الاسبوع الثالث	Chapter 3: The Molecules of Cells
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الاسبوع السادس	الاختبار الدوري الاول (30 درجة)
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GENERAL BIOLOGY 1

(Bio 110)

Chapter 1 Exploring Life

Introduction to Biology

What is Biology?

- **Biology is the study of all living things**
- **Living things are called organisms**
- **Organisms include bacteria, protists, fungi, plants, & animals**

Biology:

Is the scientific study of life in all its living forms, plants, animals and microorganisms, including man

The term "Biology" derived from

***bios* = life**

and

***logos* = science**

All Living Things Share Common Characteristics known as:

The Characteristics of Life

The Characteristics of Life

1. Order (organization):

Living organisms are organized in several levels of increasing complexity best described as a :

Hierarchy of life levels.

Atoms **Molecules** **Organelles**

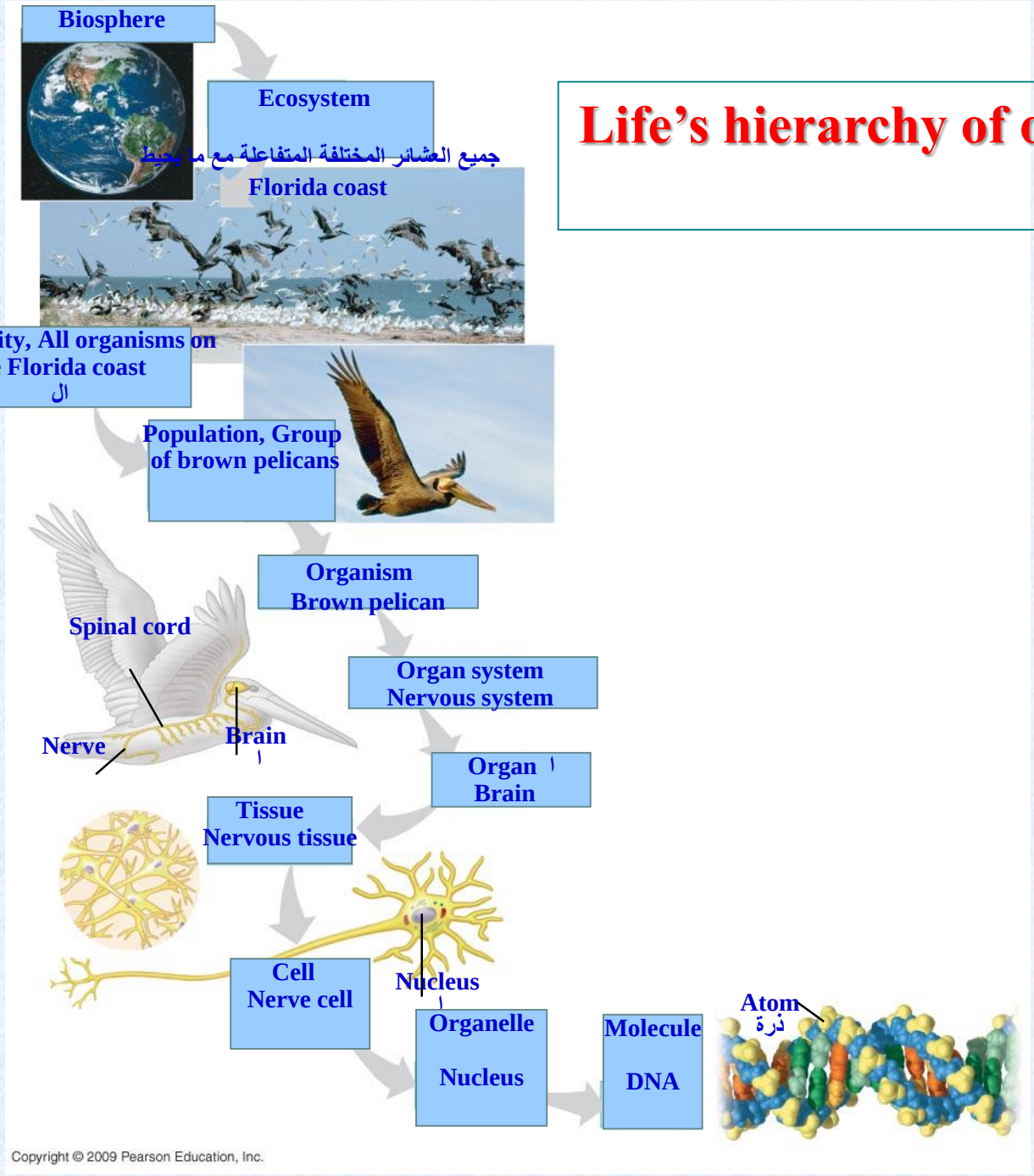
Cells – life starts here

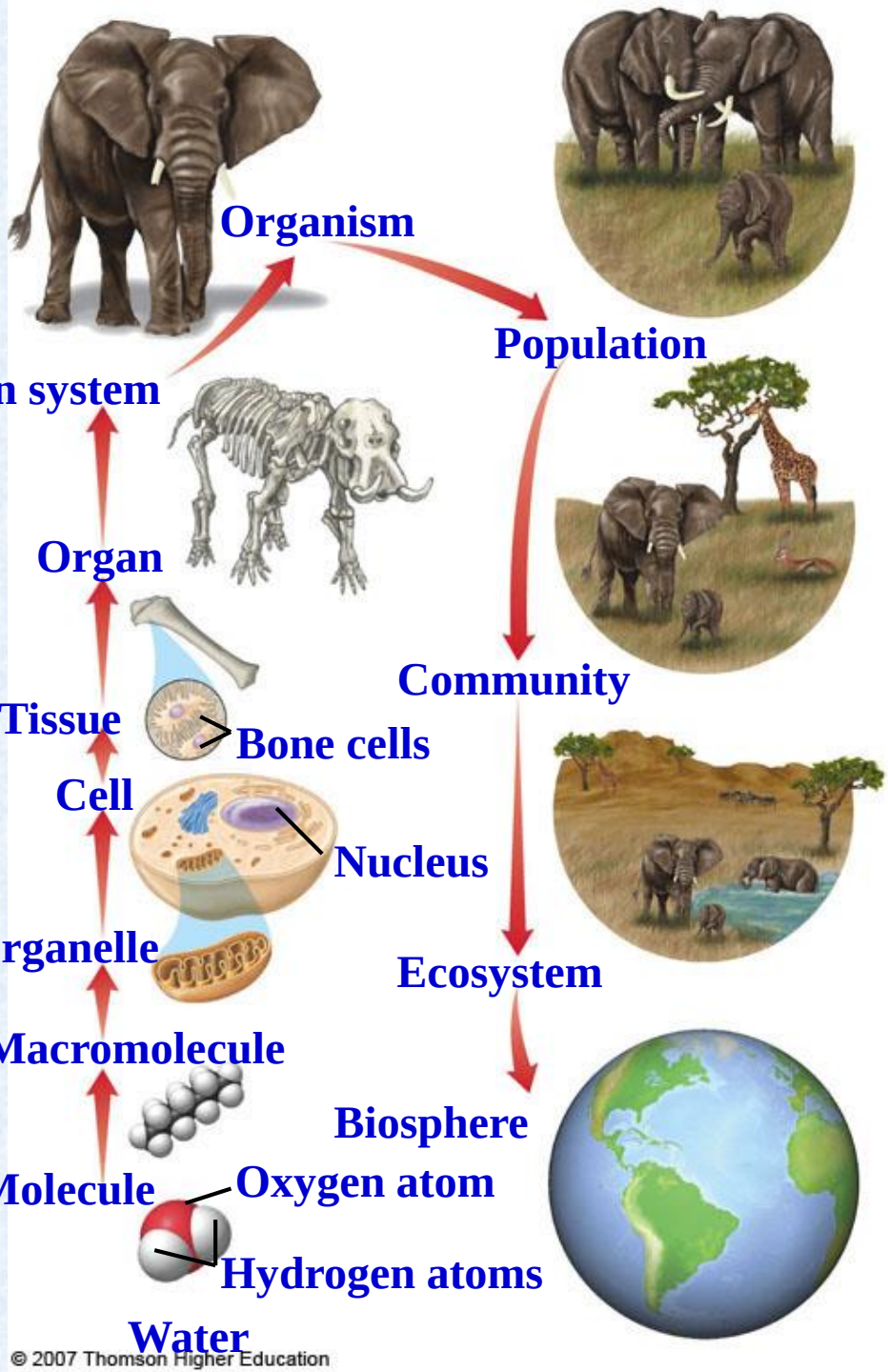
Tissues **Organs** **System**

Organism **Population** **Community**

Ecosystem **Biosphere**

Life's hierarchy of organization





Hierarchy of life levels.

- **Atom**
- **Molecules - clusters of atoms**
- **Organelles - membrane-bound structures with different jobs inside Cells**
- **Cells - life starts here. The simplest entity that has all the properties of life**
- **Tissues - made of groups of similar cells that carries out a particular function in an organism**
- **Organs - A structure consisting of two or more tissues that performs specialized functions within an organism**
- **Organ systems - have specific functions; are composed of organs that carries out a particular function in an organism**

Life's hierarchy of organization

- **Organism:** An individual living thing that can react to stimuli, reproduce, grow and maintain homeostasis
- **Population:** All the individuals of a species only interbreed with each other within a specific area
- **Community:** The array of organisms (different populations) living in a particular ecosystem
- **Ecosystem:** All the organisms (communities) living in a particular area
- **Biosphere:** All the environments (ecosystems) on Earth that support life

The Characteristics of Life

2. **Metabolism:**

   Sum of all the chemical reactions in an organism. Organized synthesis and break down of molecules; can produce energy to power life processes.

3. **Energy processing:**

   Acquiring energy and transforming it to a form useful for the organism through metabolism

4. **Motility:**

   Organisms can move themselves or their parts.

5. **Responsiveness:**

   An ability to respond to environmental stimuli

The Characteristics of Life

6. **Regulation:**

   An ability to maintain an internal environment consistent with life (Homeostasis) Within The Ranges Required For Life. Stable internal conditions of pH, temperature, water balance, etc

7. **Development:**

   Develop from simple to more complex organism.

8. **Reproduction:**

   The ability to perpetuate the species, genes are passed from parent to offspring; genes control an organism's phenotype

The Characteristics of Life

9. Evolution:

Evolution is the process of change that transforms life. Populations change over time as they adapt to their environment.

10. Adaptations:

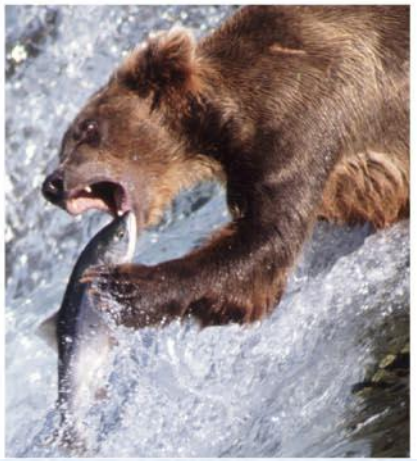
The innate fitness of an organism for its environmental condition. The environment selects organisms with traits that are best suited for an organisms environment (natural selection). The leopard is an excellent example of an organism adapted to its environment.

Adaptations are the result of evolution

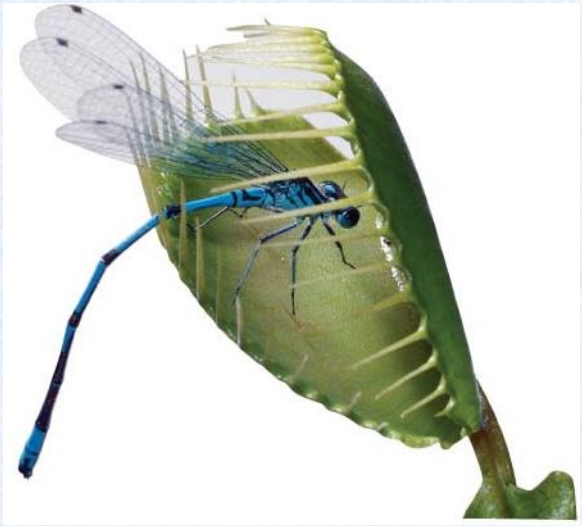
(1) Order

(2) Regulation

(3) Growth and development



(4) Energy processing



(5) Response to the environment

(6) Reproduction

(7) Evolutionary adaptation

Some important properties of life

Some important properties of life

All living things exhibit complex but ordered Organization, as seen in the highly ordered Structure of a sunflower

(1) Order

Some important properties of life

The environment outside an organism (a living thing) frequently changes, but mechanisms regulate the organism's internal environment, keeping it within limits that sustain life

(2) Regulation

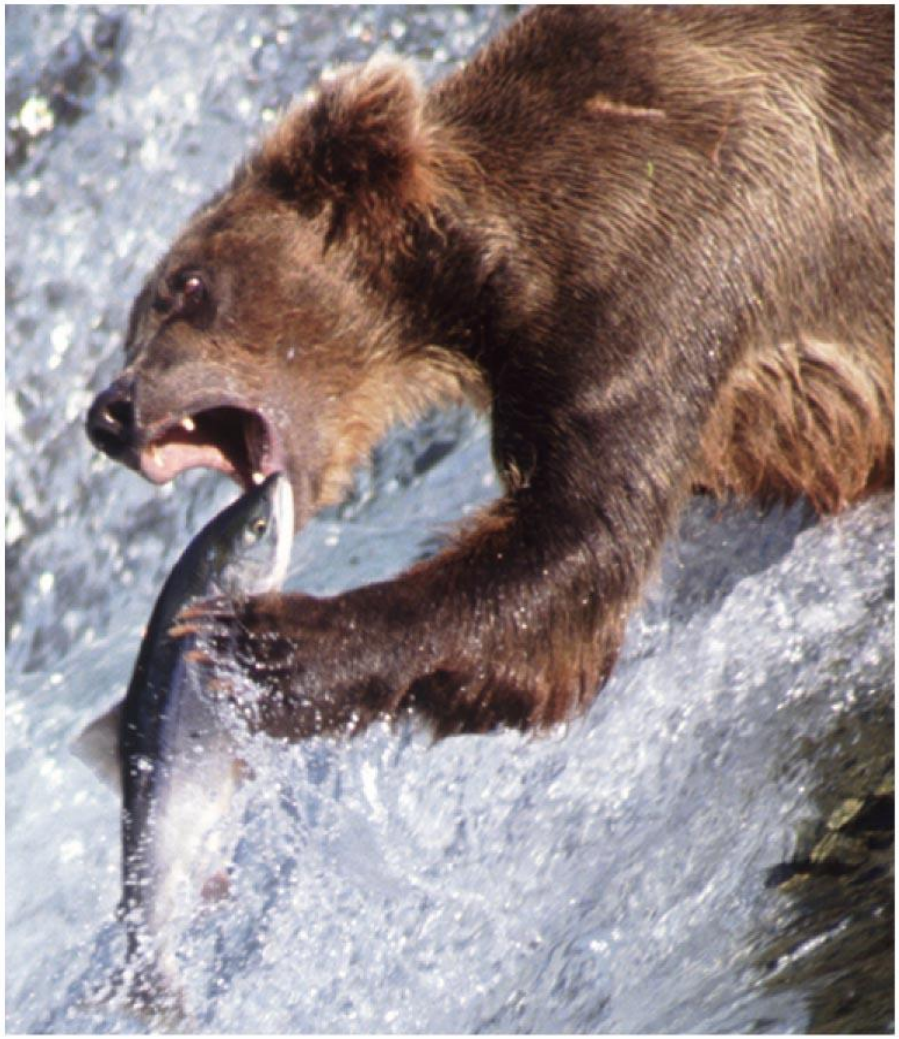
For example, a jackrabbit can adjust its body temperature by regulating The amount of blood flowing through its ears. When the rabbit's body temperature rises, more blood flows through the vessel in its ears, allowing excess heat to be released to the air.

Some important properties of life

(3) Growth and development

Information carried by genes the units of inheritance that transmit information from parents To offspring – controls the pattern of growth and development in all organisms, including the Nile crocodile

Some important properties of life



(4) Energy processing
Metabolism

Organisms take in energy and transform it in performing all of life's activities

For example, when this bear eats the fish, it will use the chemical energy stored in the fish to power its own activities and chemical reactions (metabolism)

Some important properties of life

All organisms respond to environmental stimuli

For example, a Venus flytrap closes its trap in response to the environmental stimulus of an insect landing on it

(5) Response to the environment

Some important properties of life

(6) Reproduction

Organisms reproduce their own kind, by producing offspring.

This Emperor Penguin is protecting its baby.

By reproduction survival of the specie, not extinction, is achieved

Some important properties of life

(7) Evolutionary adaptation

Reproduction underlies the capacity of populations to change (evolve) over time

For example, the appearance of the pygmy seahorses has evolved in the way that camouflage the animal in its environment

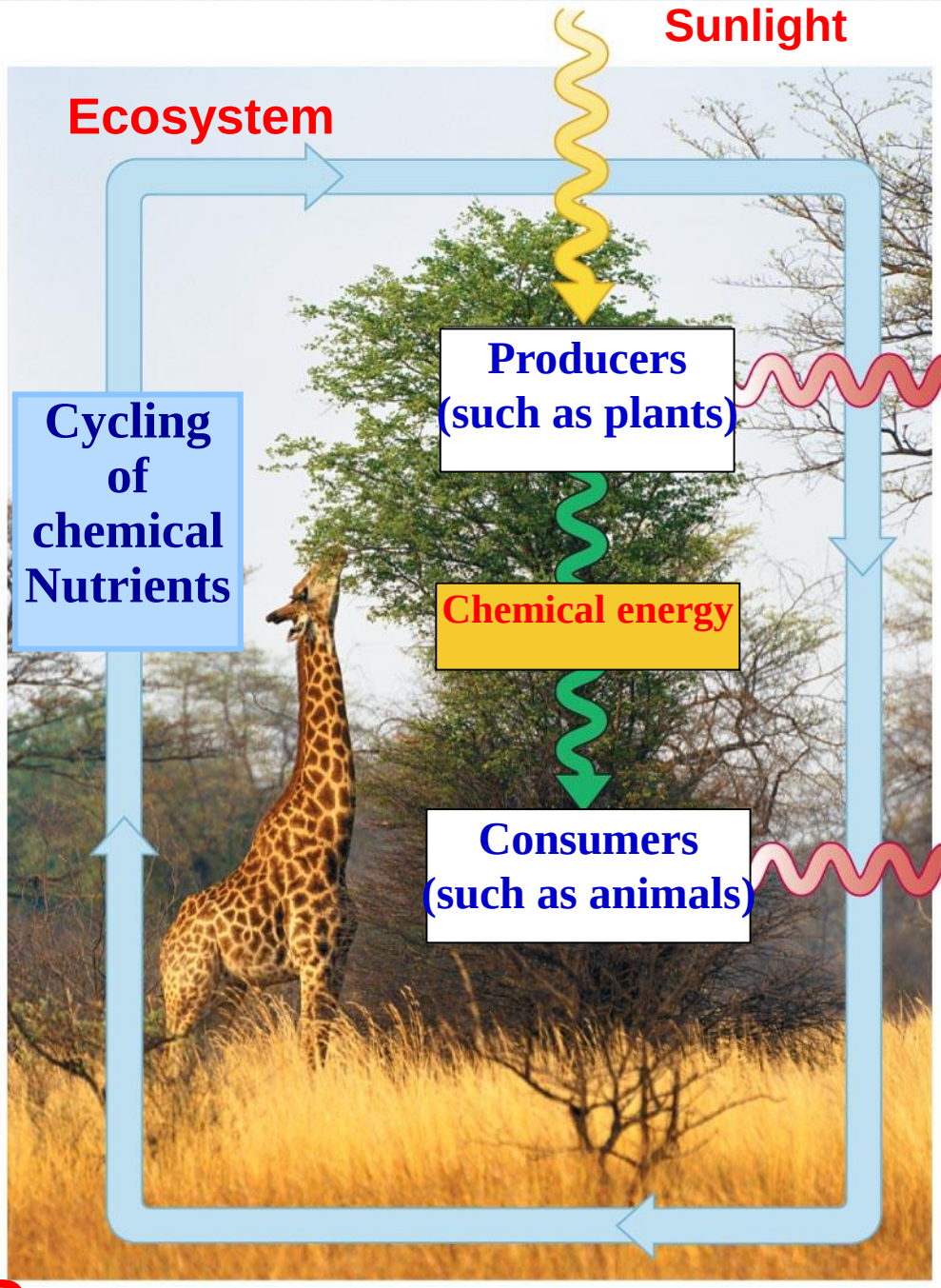
Living organisms interact with their environments, exchanging matter and energy

- **Life requires interactions between living and nonliving components**
  - **Photosynthetic organisms provide food and are called Producers**
  - **Others eat plants (or animals that profit from plants) and are called Consumers**
  - **Decomposers: Recycle all organic materials (Dead plants and animals)**
- **The nonliving components are chemical nutrients required for life**

Living organisms interact with their environments, exchanging matter and energy

- **To be successful, an ecosystem must accomplish two things:**
  - **Recycle chemicals necessary for life**
  - **Move energy through the ecosystem**

Energy enters as light and exits as heat



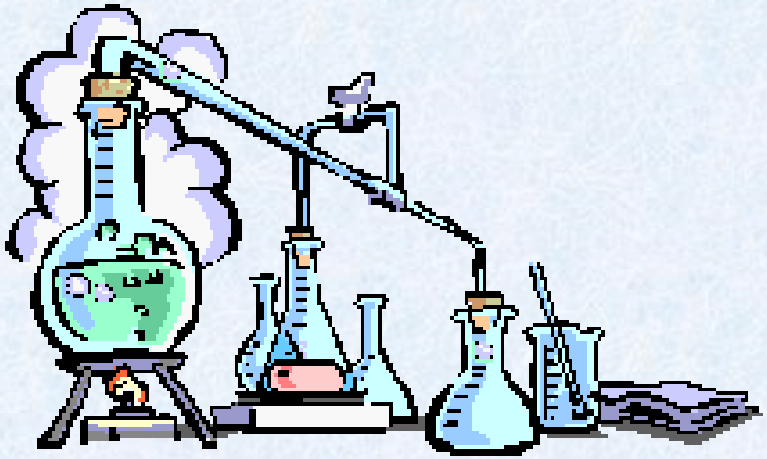
The cycling of nutrients and flow of energy in an ecosystem

THE PROCESS OF SCIENCE

Scientific Method

Steps in the Scientific Method

- Observation
- Hypothesis
- Experiment
- Data Collection
- Conclusion
- Retest



- **Two approaches are used to understand natural causes for natural phenomena**

1. **Discovery based science:**

- **Results that have been found from actually having carried out the experiment or investigation.**
- **Uses verifiable observations and measurements to describe science.**

2. **Hypothesis- based science:**

- **An educated guess by a scientist of what will happen during an experiment or investigation.**
- **Uses the data from discovery science to explain science. This requires proposing and testing of hypotheses.**

Scientists use two main approaches to learn about nature

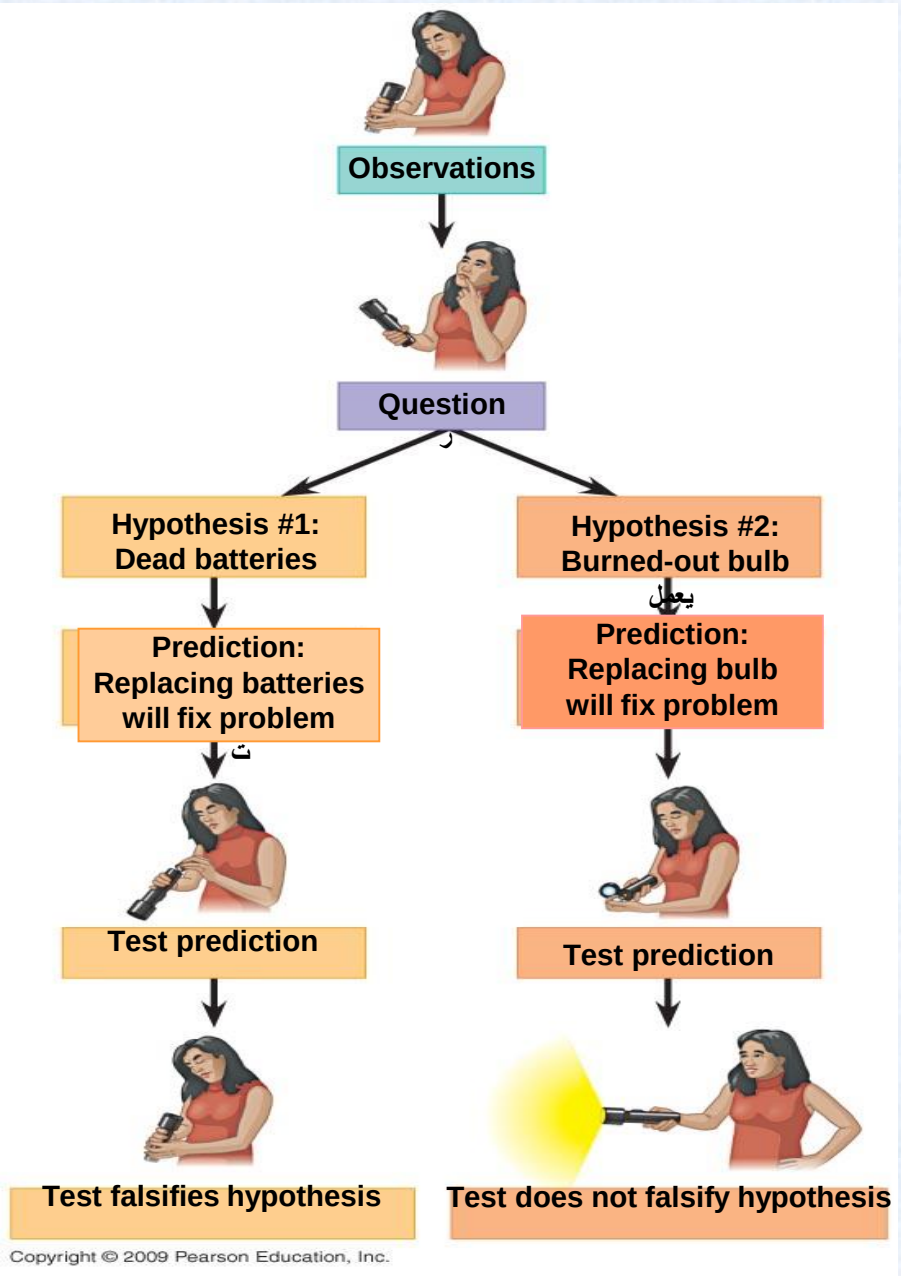
- There is a difference between a theory and a hypothesis
  - A hypothesis is a proposed explanation for a set of observations
  - A theory is supported by a large and usually growing body of evidence

With hypothesis-based science, we pose and test hypotheses

- **We solve everyday problems by using hypotheses**
  - An example would be the reasoning we use to answer the question, "Why doesn't the flashlight work?"
  - Using deductive reasoning we realize that the problem is either the:

(1) bulb or (2) batteries.

  - The hypothesis must be testable
  - The hypothesis must be falsifiable



The Process of Science

- **Deductive reasoning:**

  Draws specific conclusions based on information (facts)

- **Inductive reasoning:**

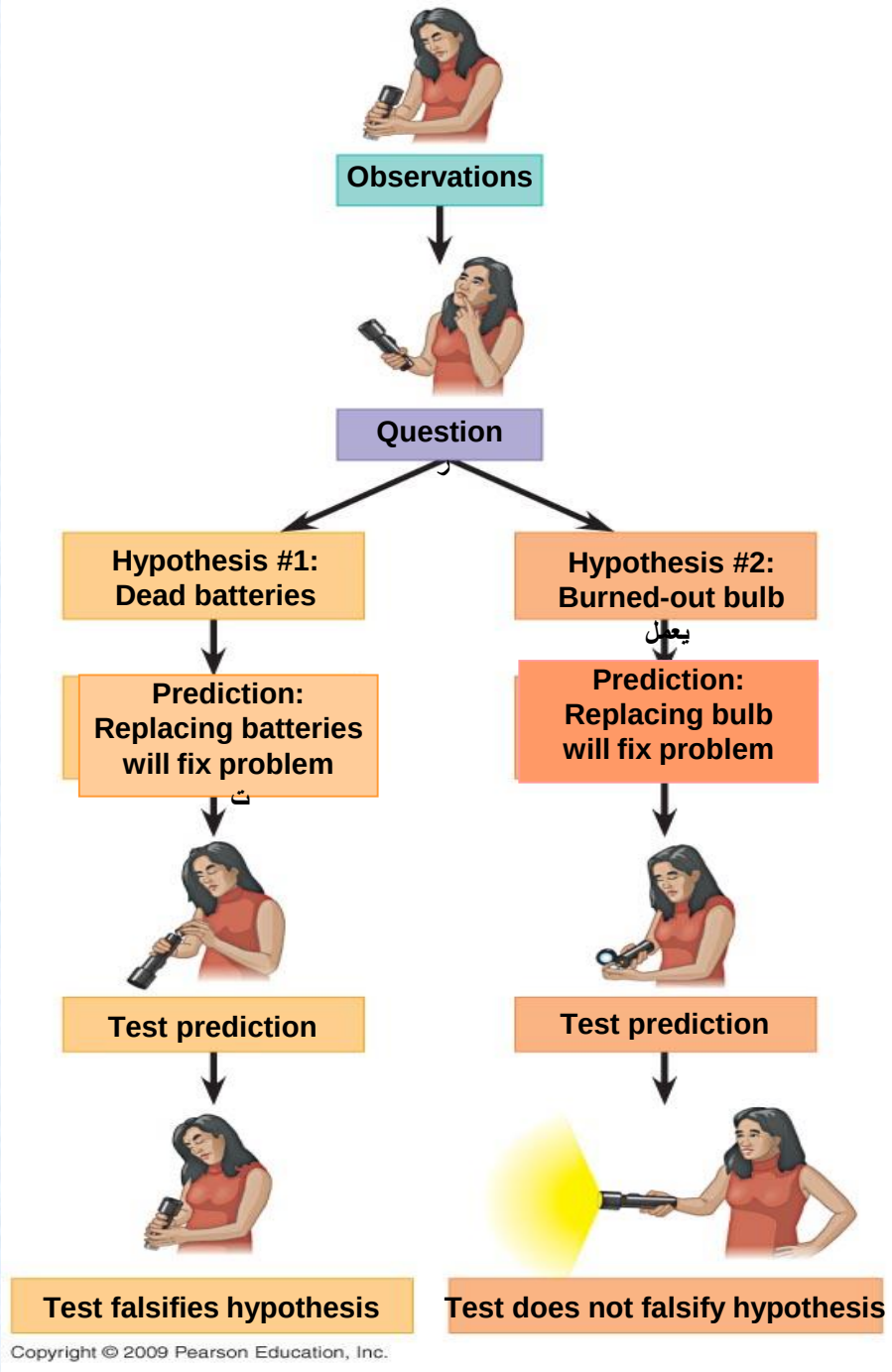
  Draws general conclusions based on specific (observations)

The Scientific Method

Steps in the Scientific Method

- Observation
- Question or problem
- Hypotheses
- Testable predictions
- Experiments
- Analyze data
- Conclusions

An example of hypothesis-based science



The Hypothesis

- A tentative (temporary) explanation for observations
- Consistent with facts
- Can be tested
- Tests can be repeated by others
- Can be rejected

Testing Predictions by Experiment

- **Prediction**
- **Deductive product of a hypothesis**
- **Control group**
- **Closely matches experimental group**
- **Experimental group**
- **Differs from control group in 1 variable**

With hypothesis-based science, we pose and test hypotheses

- **Another hypothesis:**

  Mimicry helps protect nonpoisonous king snakes from predators where poisonous coral snakes also live

- **The hypothesis predicts that predators learn to avoid the warning coloration of coral snakes**

With hypothesis-based science, we pose and test hypotheses

- **Experimentation supports the prediction of the mimicry hypothesis:**
- **Nonpoisonous snakes that mimic coloration of coral snakes are attacked less frequently**
  - **The experiment has a control group using brown artificial snakes for comparison**
  - **The experimental group is artificial snakes with the red, black, and yellow ring pattern of king snakes**

Eastern coral snake (poisonous)

Scarlet king snake (nonpoisonous)

Artificial king snake that was not attacked (left); artificial brown snake that was attacked by a bear (right)

Artificial king snake that was not attacked

Artificial brown snake that was attacked by a bear