

Introduction to the Study of Life  
BIO 42  
Human Biology

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# Learning Objectives

- List the characteristics of life
- Define Homeostasis
- Contrast positive and negative feedback
- Describe the organizational pattern of life
- Relate taxonomy to human biology
- List steps in the scientific method
- Describe the characteristics of primates
- Compare producers and consumers
- List the functions of the 11 body systems

# Nine characteristics of life

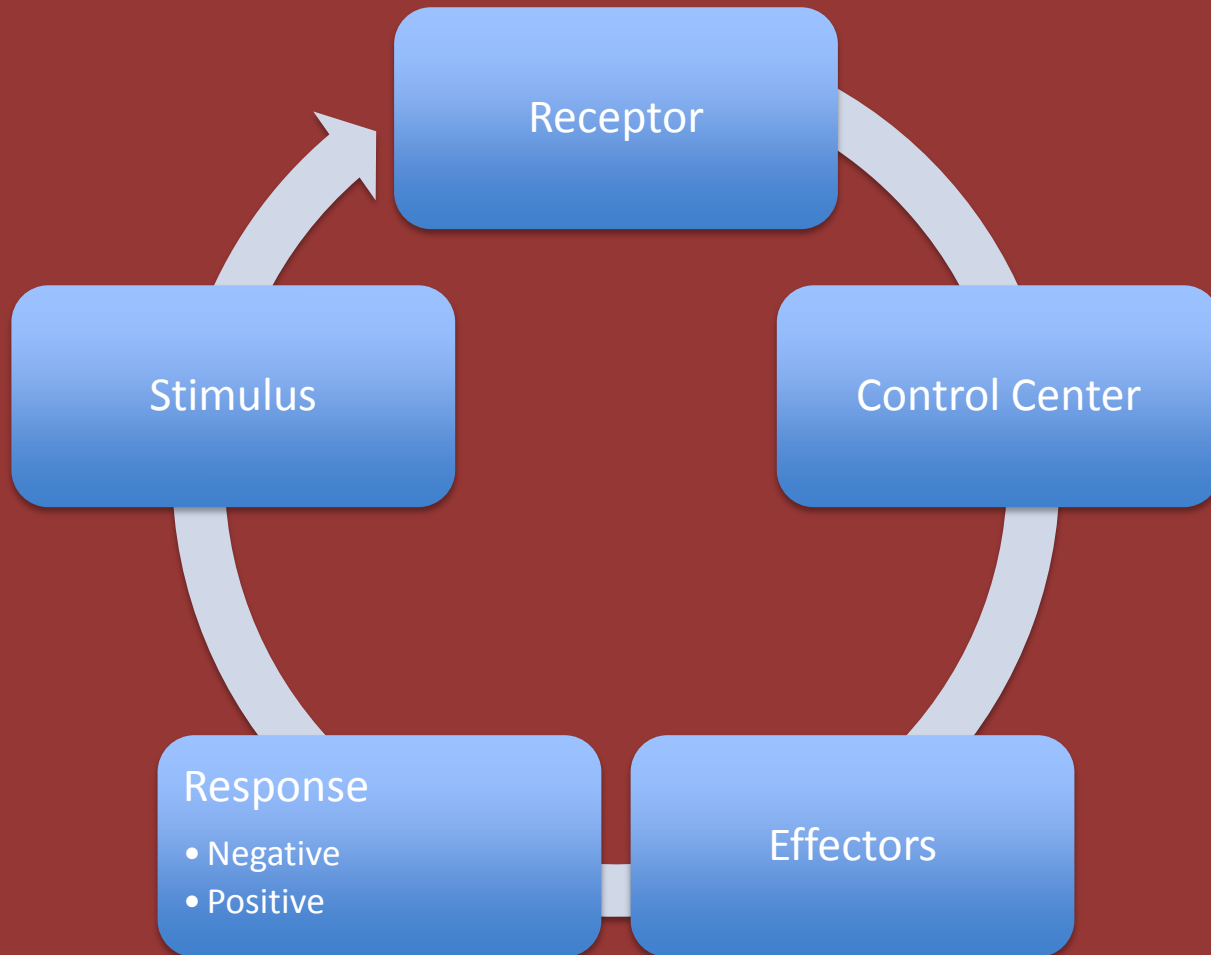
1. Responds to external stimuli
2. Adapts to the environment
3. Contain materials found only in living organisms
4. Alter the environment
5. Use energy
6. Maintain a constant internal environment (Homeostasis)
7. Sense the environment
8. Reproduce
9. Have a high degree of organization

# HOMEOSTASIS

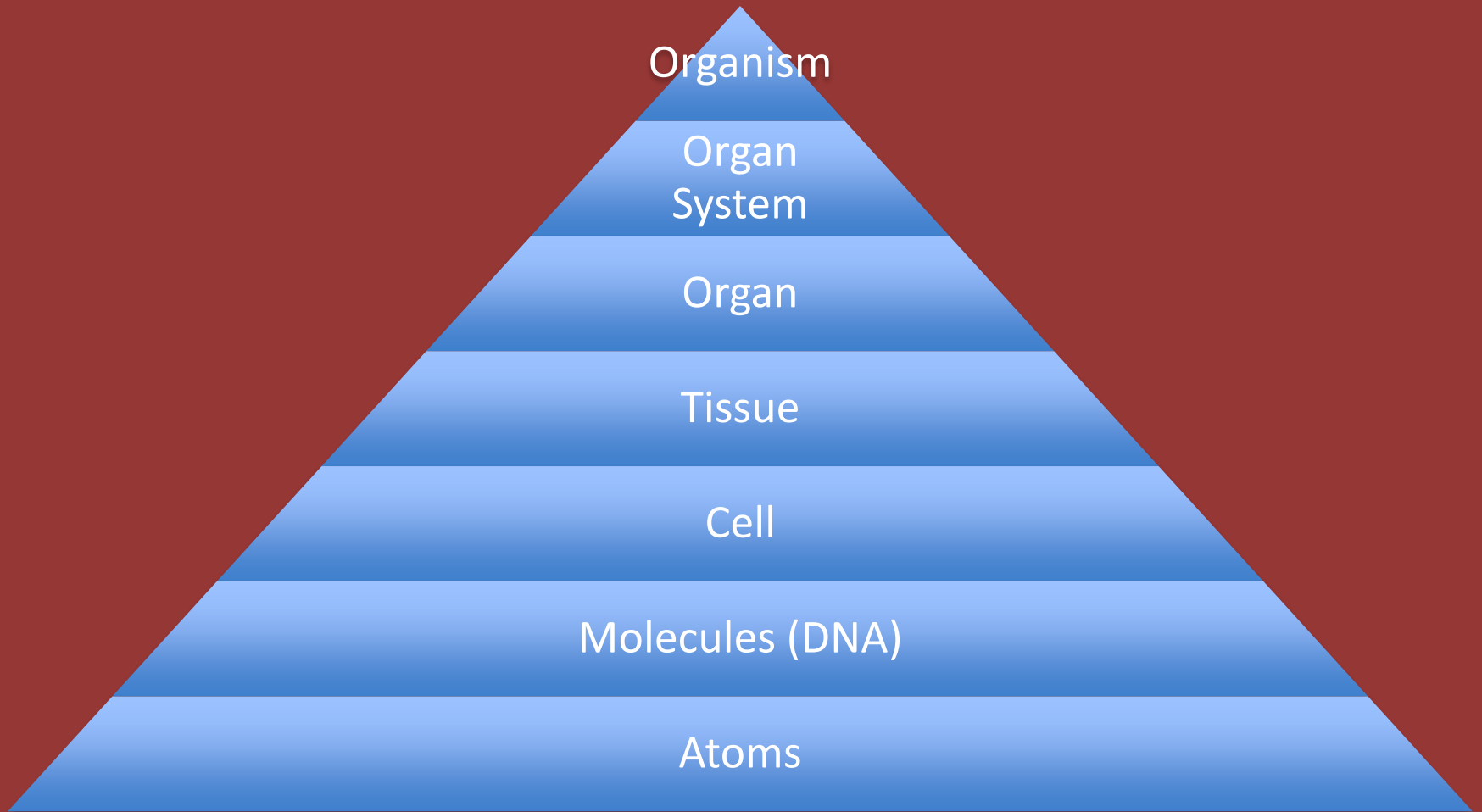
Homeo – unchanging

Stasis – standing

# Feedback loop



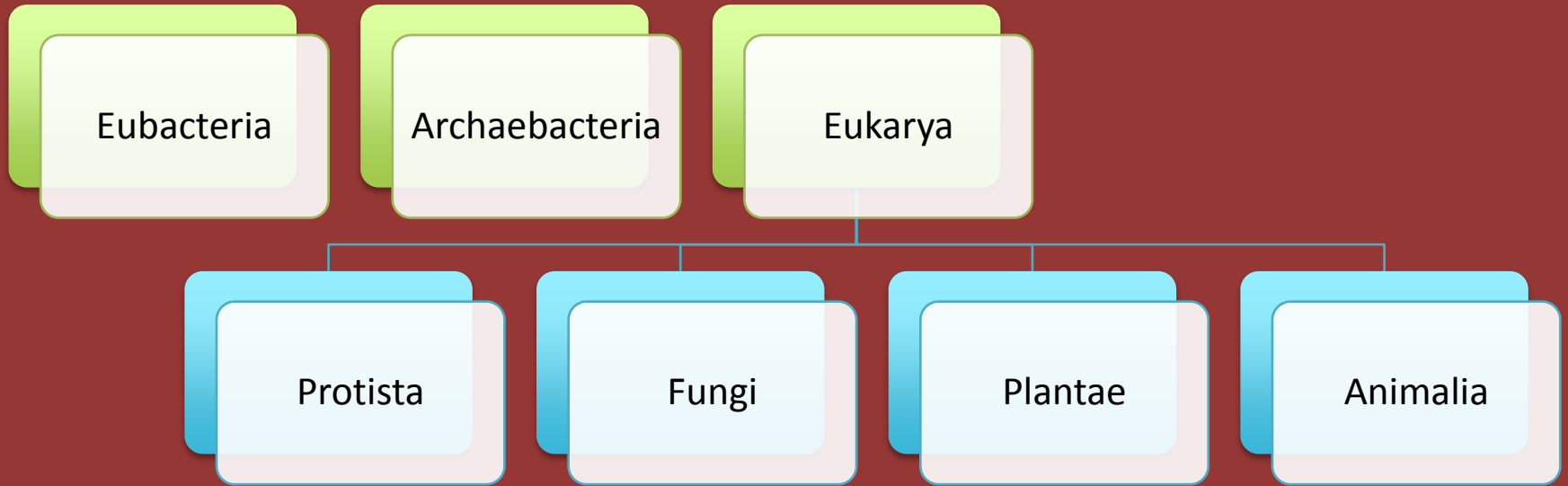
# Hierarchy of organization of life



# Biological Classification

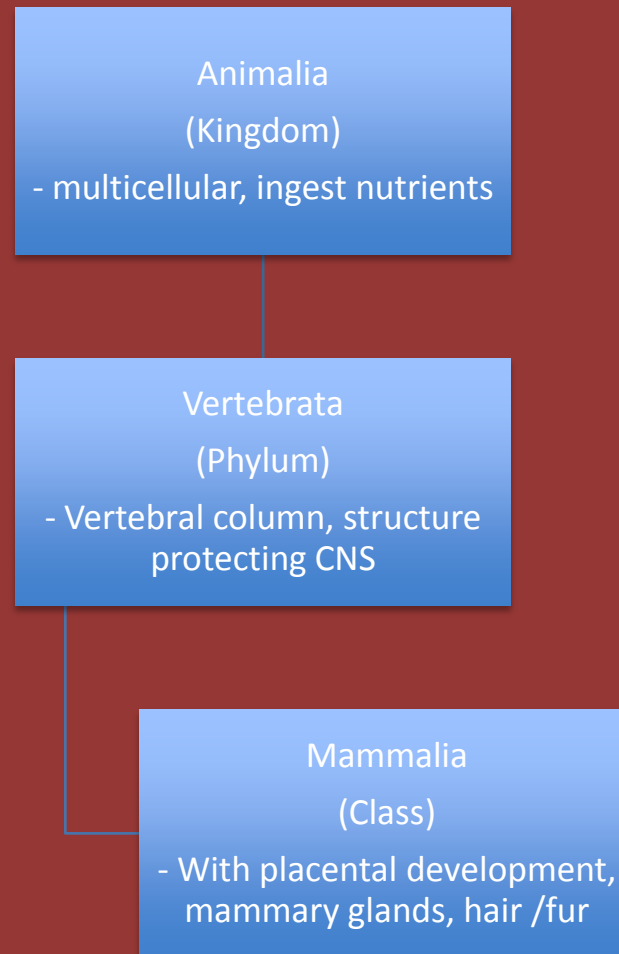
- Taxonomy – branch of science that deals with organizational scheme

# 3 Domains and 4 Kingdoms

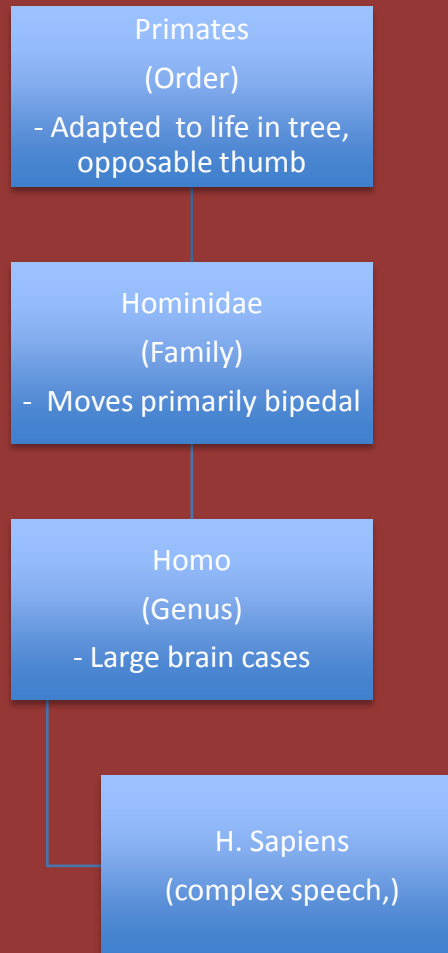




# Human Taxonomy



# Human Taxonomy



# Scientific Method steps



• OBSERVE



• HYPOTHESIZE



• EXPERIMENT



• COLLECT AND ANALYZE DATA



• COMMUNICATE

# Scientific Method steps

## 1. OBSERVE

- Recognize problem
- Unanswered question

## 2. HYPOTHESIZE

- Develop hypothesis to explain problem

# Scientific Method steps

## 3. EXPERIMENT

- Design and perform experiment to test hypothesis

## 4. COLLECT AND ANALYZE

- Analyze and interpret data to reach conclusion

# Scientific Method steps

## 5. COMMUNICATE

- Share knowledge with other

# Example

- Drug A is more potent than Drug B
- Drug B is more potent than Drug C
- Drug A is more potent than Drug C???
- Experimentation of Drug A and Drug C
- Drug A proves more effective than Drug C
- Relay results of Drug A and Drug C

# Characteristics of primates

- ORDER – Primates
- CHARACTERISTICS
  - ✓ 5 digits hands with opposable thumb
  - ✓ fingernails and toenails rather than claws
  - ✓ Stereoscopic vision

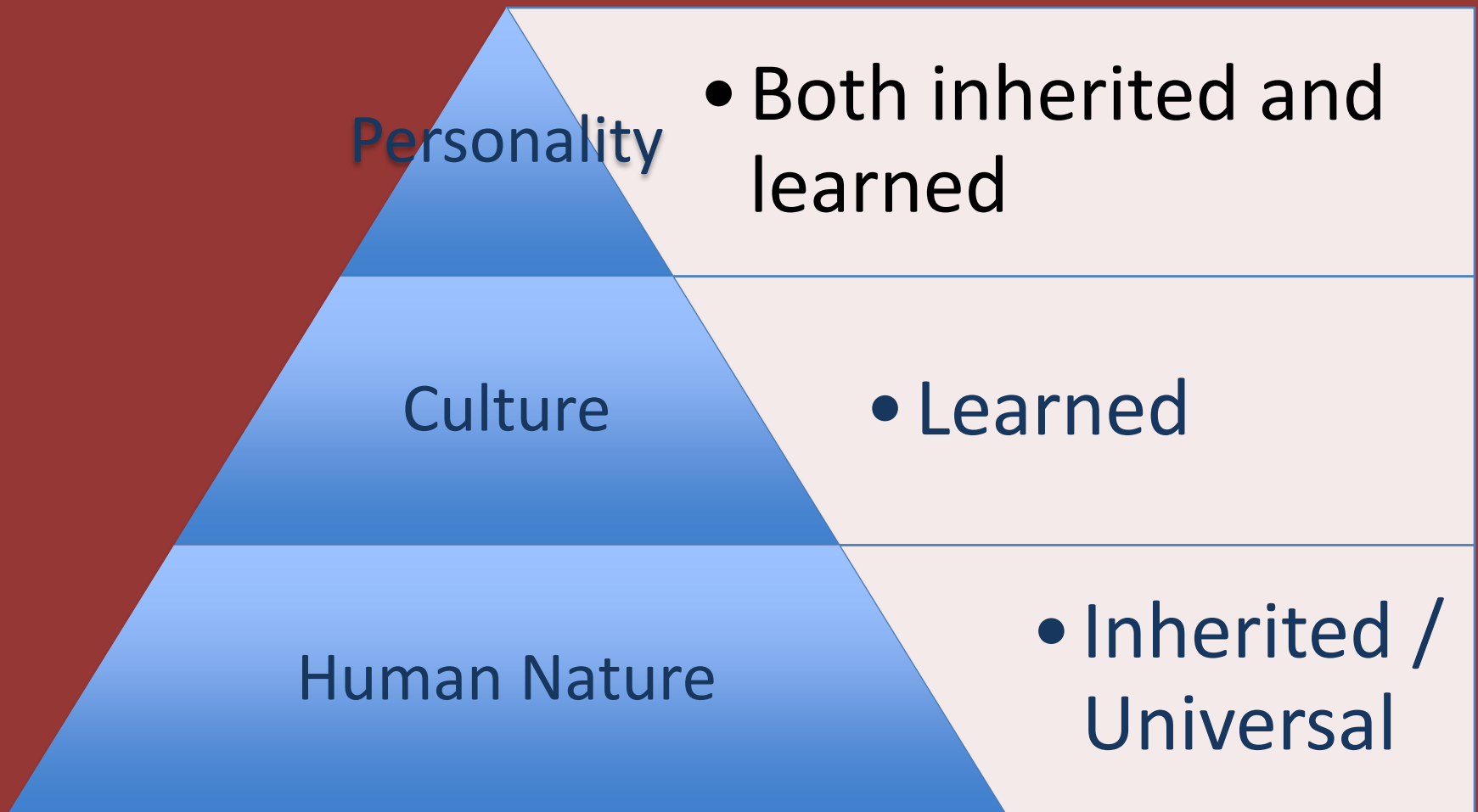


# Human Variation

Brought about by the ff:

- Natural selection
- Sexual selection
- Favored different genetic traits

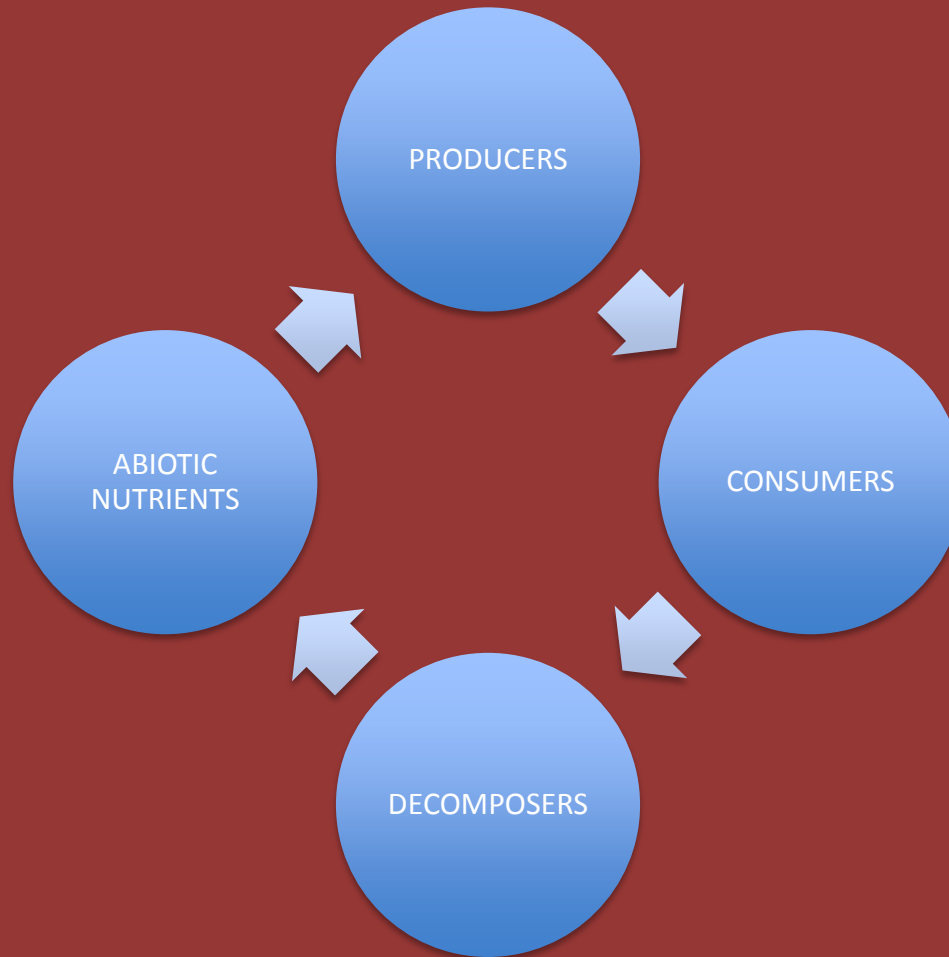
# Nature vs. Nurture



# Nature vs. Nurture

- Blank Slate / “ tabula rasa “ (no innate human traits) by Steve Pinker
- The Noble Savage (people are born good and corrupted by society) by John Dryden
- The Ghost in the Machine (each of us has a soul that makes choices free from biology) by Gilbert Ryle

# Energy Flow and Resource cycling



# Producers vs. Consumers

- Producers – assemble usable food molecules through photosynthesis or chemosynthesis

## Photosynthesis vs. Chemosynthesis

- Consumers – obtain food molecules from other organism

# Four categories of consumers

- HERBIVORE

- ✓ eat green plants / direct
- ✓ primary consumers

- CARNIVORE

- ✓ eat other animals
- ✓ “complete” nutrition source
- ✓ secondary consumers

- OMNIVORE

- ✓ eat either plants or animals
- ✓ Efficient in obtaining food

- DECOMPOSER / DETRITIVORES

- ✓ obtain nutrient from detritus

# Eleven Organ Systems (based on BIO 42 textbook)

- Skeleto-muscular system
- Nervous system
- Sensory system
- Cutaneous system
- Lymphatic system
- Cardiovascular system
- Respiratory system

# Eleven Organ Systems (based on BIO 42 textbook)

- Respiratory system
- Digestive system
- Urinary system
- Endocrine system
- Reproductive system



# Skeleto-muscular System

- Provides support and movement
- Stores calcium

# Nervous System

- Receive and process information
- Formulates a response

# Sensory System

- Receive visual, auditory, temperature, and tactile information

# Cutaneous System

- Provide barrier between self and environment
- Regulate temperature

# Lymphatic System

- Protect against specific diseases

# Cardiovascular System

- Pump nutrients, oxygen, carbon dioxide, and chemical messengers throughout the body

# Respiratory System

- Cycle gases into and out of the body

# Digestive System

- Cycle nutrients through the body



# Urinary System

- Provide fluid balance and purification

# Endocrine System

- Regulate long term changes

# Reproductive System

- Perpetuate the species

# References

- Ireland, K.A. (2011). *Visualizing Human Biology (3rd ed.)*. Danvers, MA: Wiley & Sons Inc.
- Retrieved from [http://oceansjsu.com/105d/exped\\_dive/19.html](http://oceansjsu.com/105d/exped_dive/19.html)