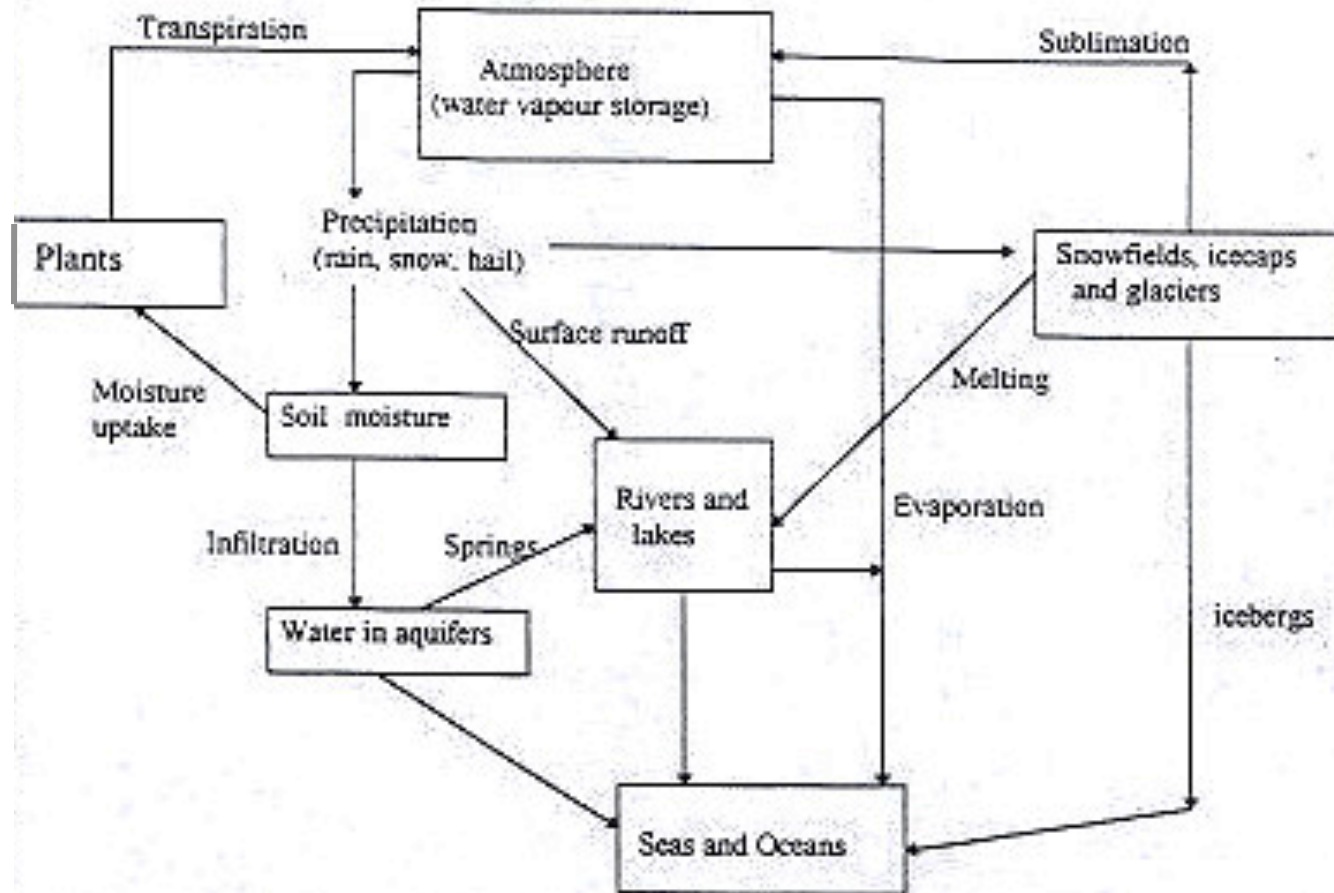


**1.1.2 Apply the systems concept at  
a range of scales**

**1.1.3 Define the terms  
open system, closed system  
and isolated system.**

CC p.71 - 73

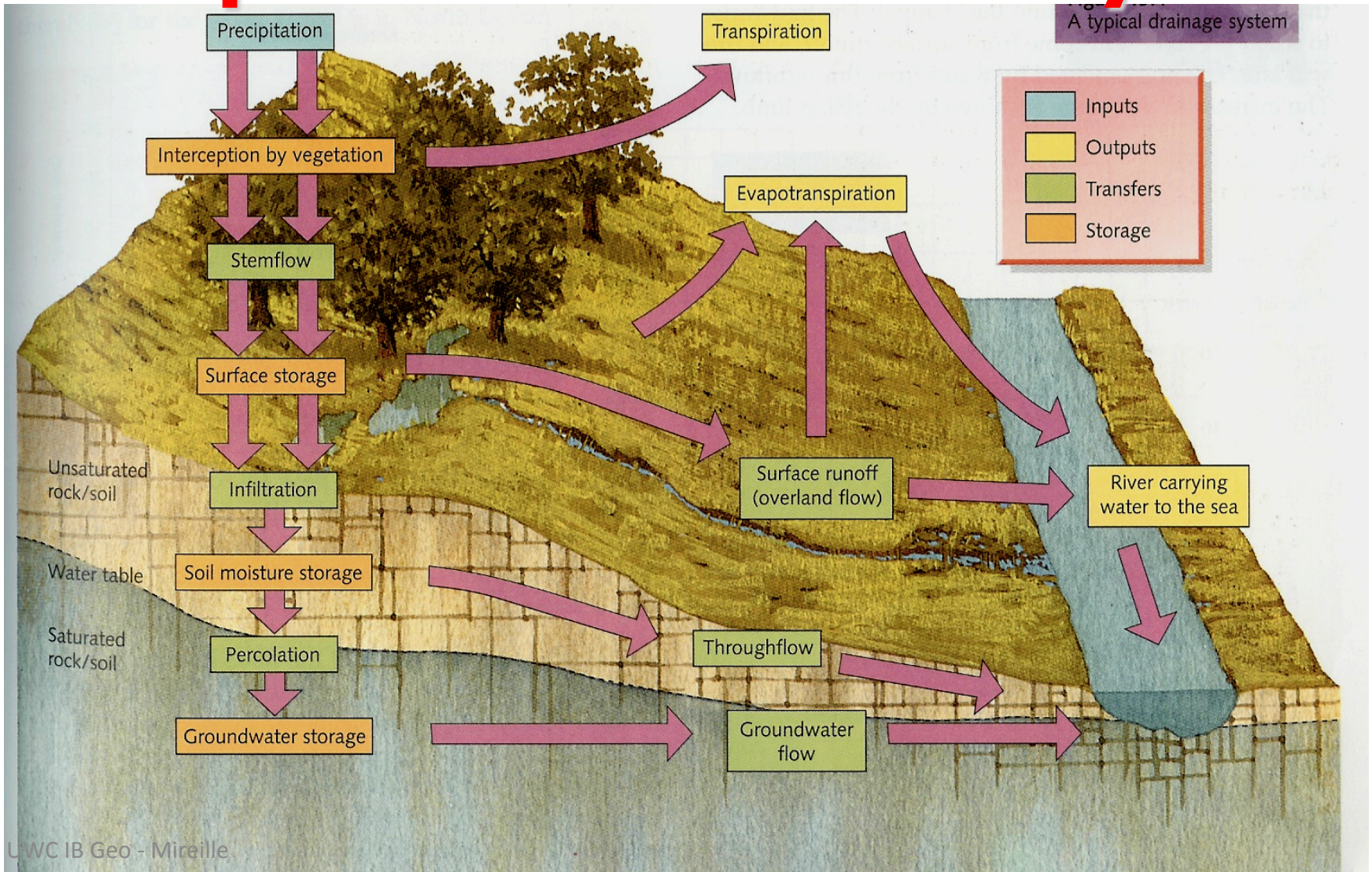
# ...Global Water System Open or Closed? Why?



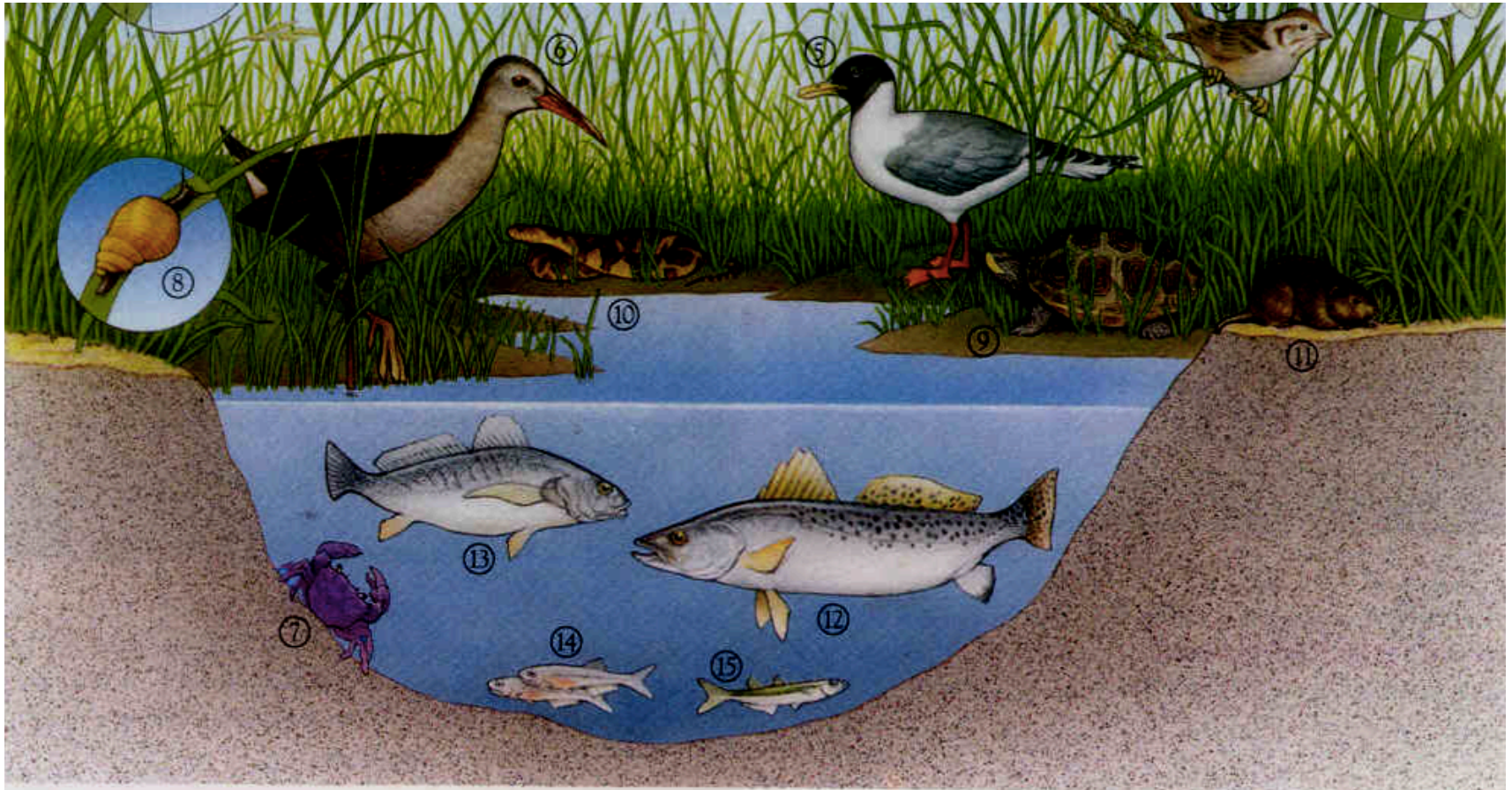
# CLOSED SYSTEMS:

- exchange **energy** but **NOT matter** with its surroundings
- do not occur naturally on Earth, HOWEVER the global cycles of matter are closed systems
- Examples:
  - the water cycle and the nitrogen cycle (*global cycles*)
  - “Biosphere II” was an attempt (*see CC p.73*)
  - a spaceship
  - Earth (*for the most part*)

# River System... Open or Closed? Why?



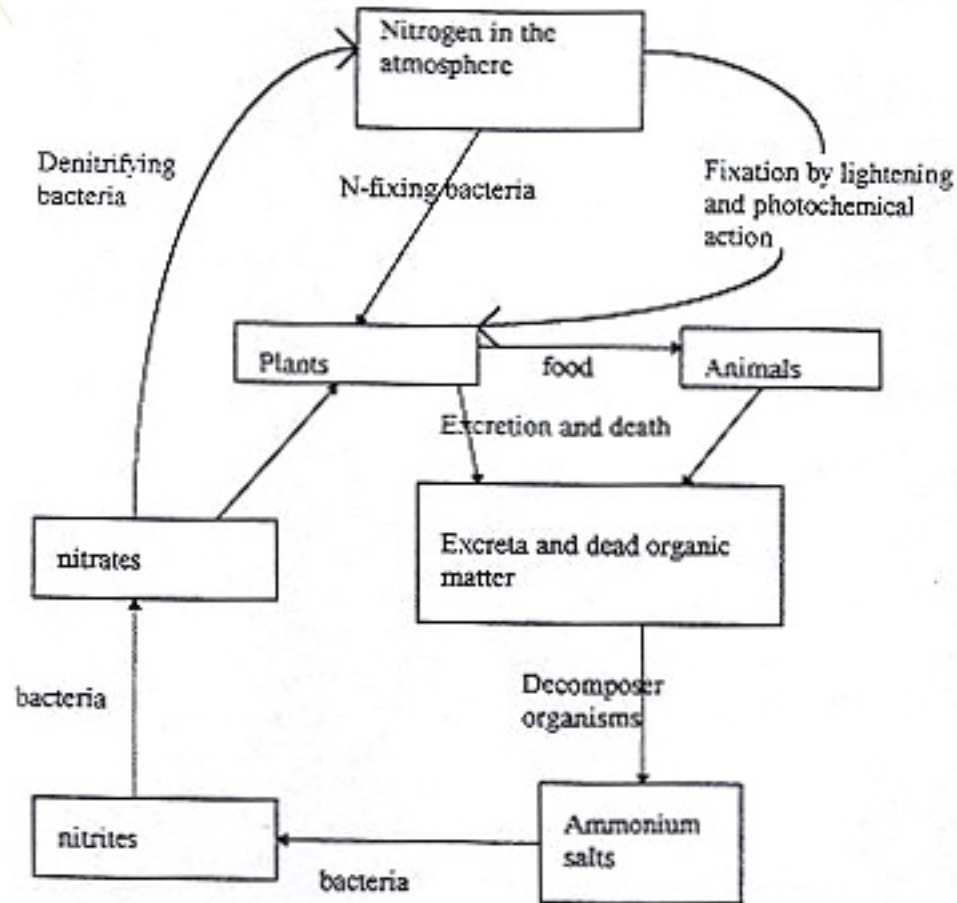
# Salt marsh System... Open or Closed? Why?



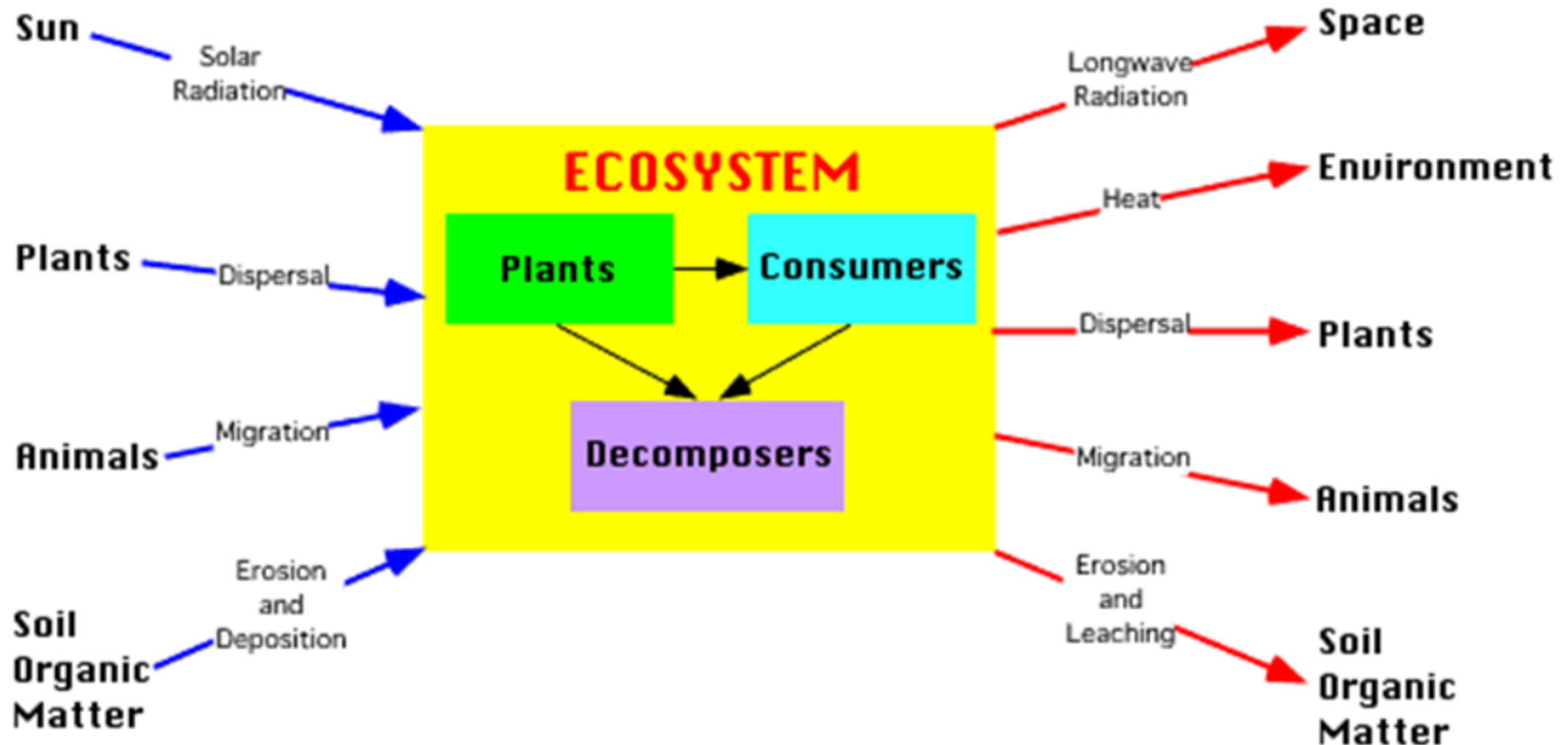
# OPEN SYSTEMS:

- exchange matter AND energy with its surroundings – inputs are added in from outside its boundaries
- Examples:
  - a river system and a forest ecosystem
  - Can you name a few others?

# Nitrogen System... Open or Closed?



# An ecosystem... Open or Closed?





# GAIA... Open or Closed?

- The Gaia hypothesis proposes that living and non-living parts of the earth form *one complex interacting system* that can be compared to one single LIVING organism. Life would continue despite human life. (Deep Ecologist & Ecocentrics believe in Gaia)
- So, it also suggests that Earth is a self-regulating system with feedback mechanisms that maintain equilibrium.

# ISOLATED SYSTEMS:

- Exchange nothing, **neither matter** nor **energy**
- No such systems exist (with the possible exception of the entire **cosmos/the universe**).