

## Chapter 24: The Origin of Species

### Concept 24.1: The biological species concept emphasizes reproductive isolation

- Species: Latin for “kind” or “appearance”

#### Are these the same species?

- No, All eagles, not all same species

#### Are these the same species?

- Yes, All dogs, different kinds

#### The Biological Species Concept:

- Defines a species as a population or group of populations whose members have the potential to interbreed in nature and produce viable, fertile offspring
- **Cannot** be applied to
  - Asexual organisms
  - Fossils
  - Organisms about which little is known regarding their reproduction

#### Limitations of the BSC



#### Speciation

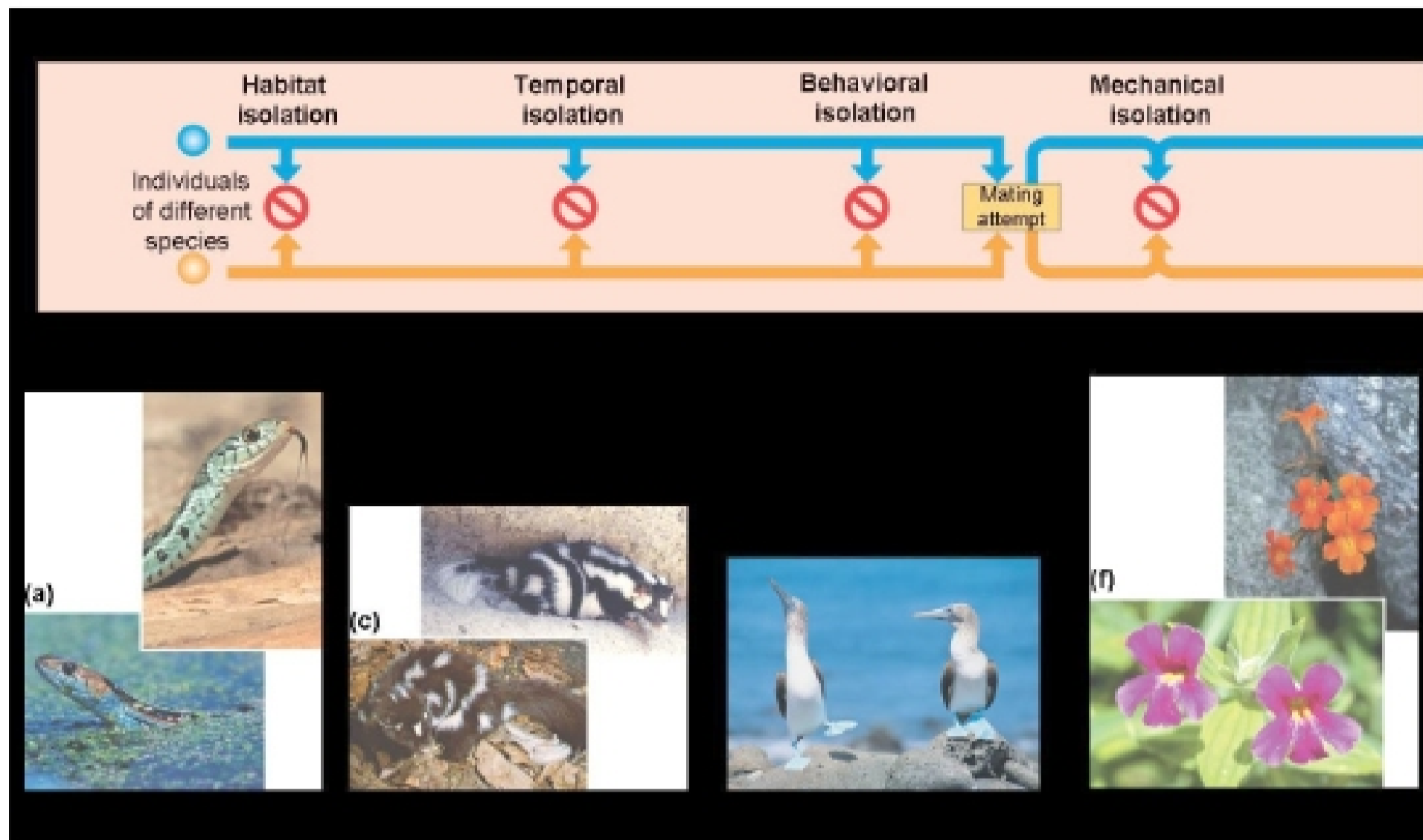
- Dependent on:
  - Reproductive isolation
  - Genetic divergence

#### Reproductive Isolation:

- The existence of biological factors that impede members of two species from producing viable, fertile offspring
- Pre-zygotic barriers
- Post-zygotic barriers

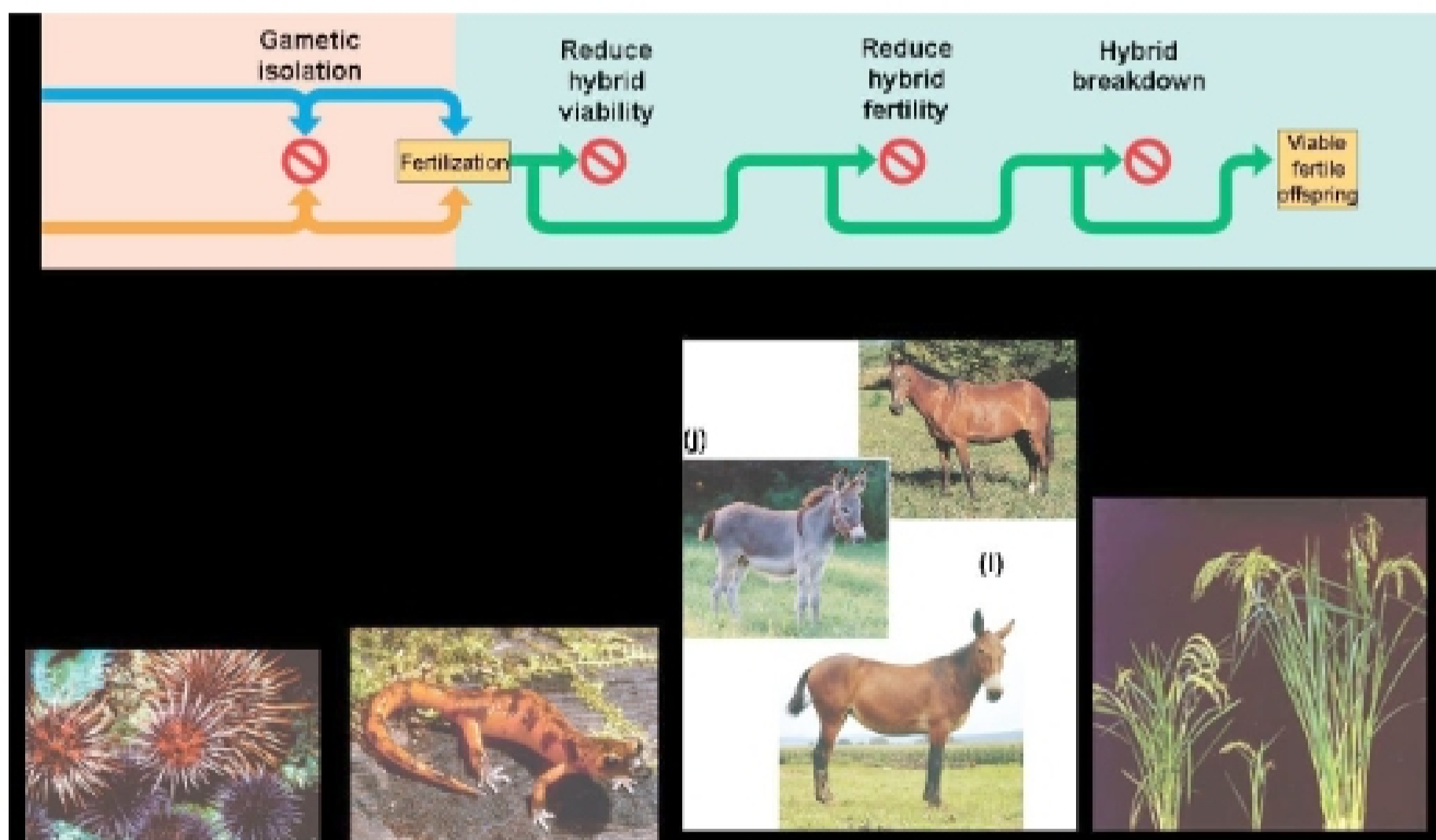
#### Pre-zygotic Barriers:

- Impede mating between species or hinder the fertilization of ova if members of different species attempt to mate



Post-zygotic Barriers:

- Often prevents the hybrid zygote from developing into a viable, fertile adult
  - o Example: Mule is sterile



Two species of pine are found in the same habitat, but release pollen at different times during the year. This is an example of \_\_\_\_\_ isolation.

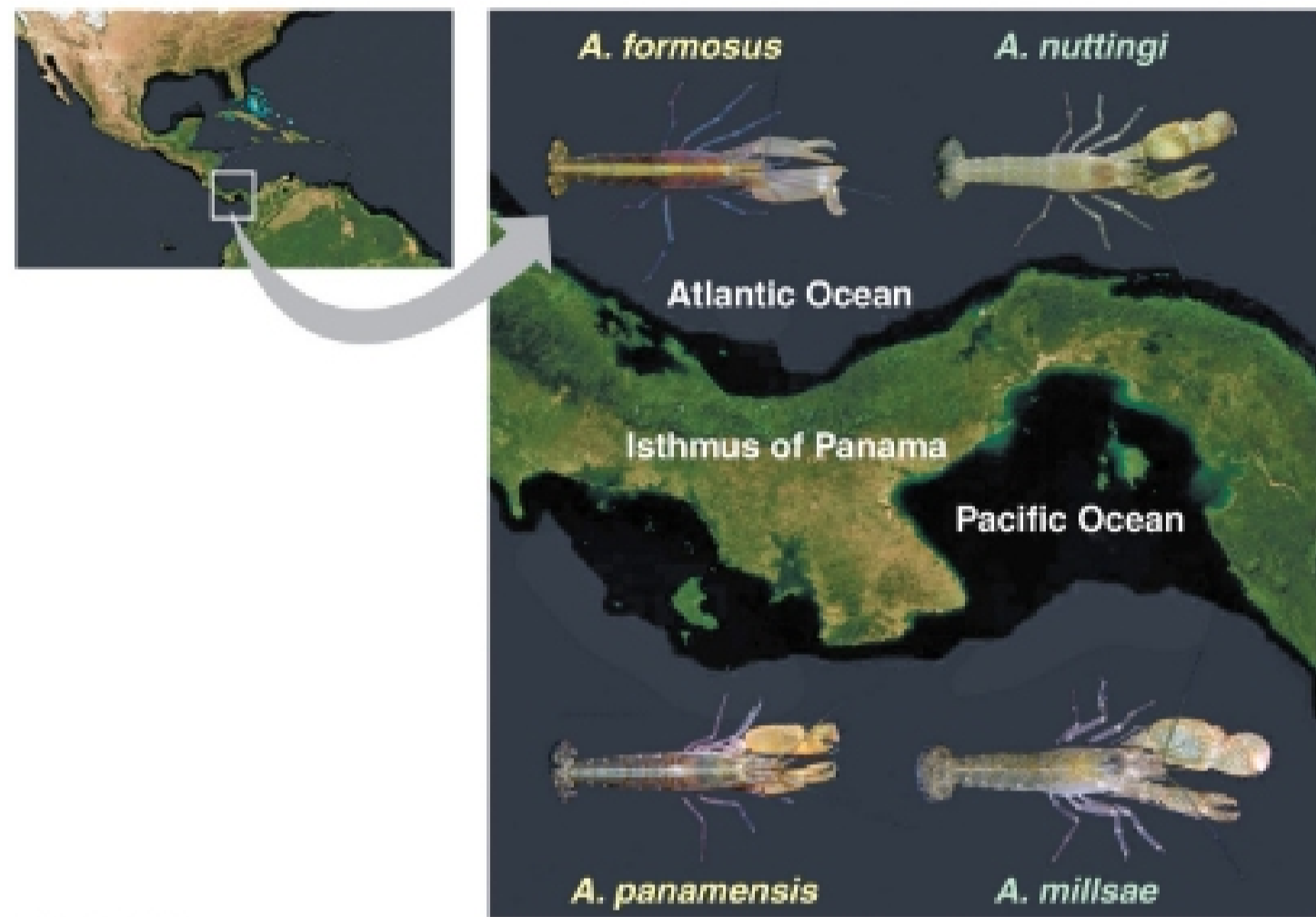
- Geographical
- Ecological
- **Temporal**
- Behavioral

Is gametic isolation a pre-zygotic or post-zygotic isolating mechanism?

1. **Pre-zygotic**
2. Post-zygotic
3. It depends on the species, or whether it acts pre- or post-zygotically
4. It can be either, depending on the time of year

Concept 24.2: Speciation can take place with or without geographic separation

- Speciation can occur in two ways
  - Allopatric speciation
  - Sympatric speciation



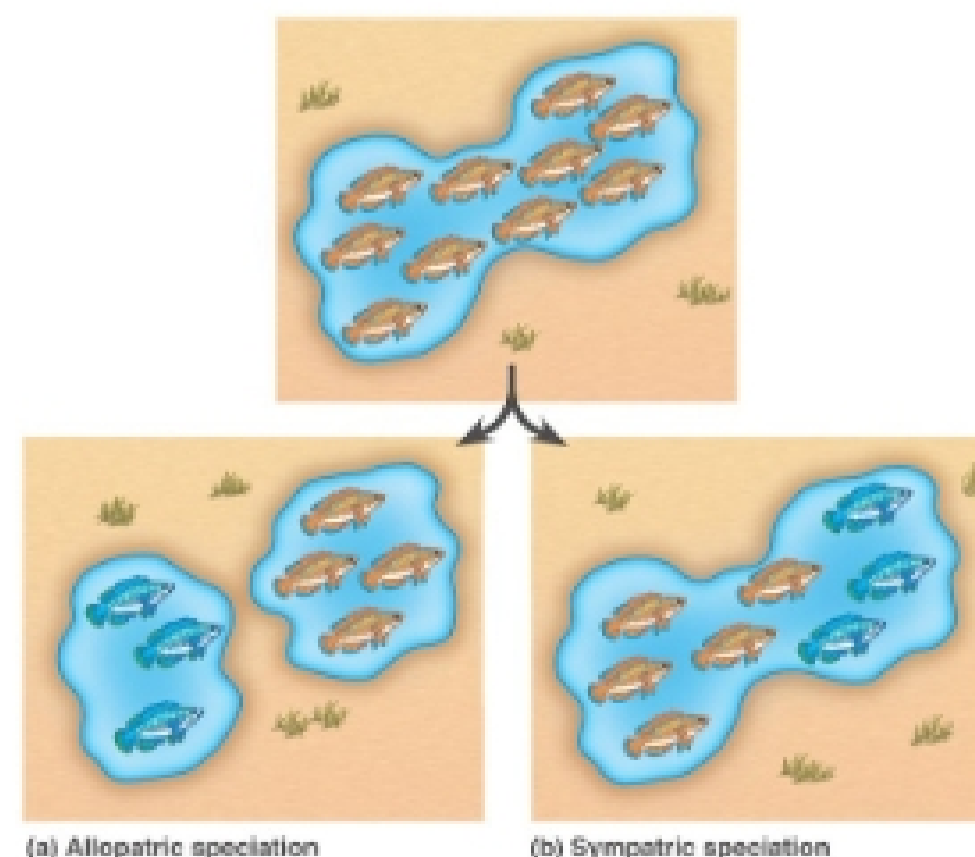
Which of the following is not considered a requirement for speciation to occur?

- Populations must be isolated (geographically or in some other manner) from one another
- Isolated populations must become genetically distinct from one another
- Exchanges of genetic information must be restricted between populations
- **High levels of gene flow among populations must occur**

Allopatric Speciation:

- "Other Country"
- Gene flow is interrupted or reduced when a population is divided into two or more geographically isolated subpopulations

Establishing Reproductive Isolation



(a) Allopatric speciation

(b) Sympatric speciation