

GLG 430 Paleontology
(Prof. Jack Farmer, Arizona State University, School of Earth and Space Exploration)

In-class Exercise: Sources of Variation in Natural Populations

Student Name: _____

Variation in butterflies, snails and corals

Directions: Divide into three groups. Each group should spend time examining each of the collections provided (snail, butterfly and a colonial coral), answering the questions for each given under the numbered sections below.

For the shells, first arrange individuals by body size (ontogeny) and then by morphology within each of the general size categories. For the butterfly population, compare differences in color and wing shape. For the corals, examine the types of variation present within the colonies provided. (Note: Each coral colony is a clone formed by asexual budding. However, different colonies originate from single, sexually produced founding individual that differs genetically from other founding individuals).

Make representative sketches of each of the end member morphotypes comprising each collection and answer the following questions.

Collection 1 - *Thais lamellosa* (predatory snail)
Sketches and notes:

Collection 2 - Tropical butterfly species
Sketches and notes:

Collection 3 - *Favosites* sp. (fossil coral)

Sketches and notes:

- 1) For each of the example species, note the most variable aspects of form in the population sampled. Can you think of any advantages that such intra population variation might convey to individuals of each species?

- a) *Thais* (snail)

- b) Butterfly

- c) *Favosites* (coral)

- 2) Now assign the observed variation to the following potential sources: Genetic, sexual, ontogenetic and ecophenotypic. Explain your reasoning for each case.

- a) *Thais* (snail)

- b) Butterfly species

c) *Favosites* (coral)

3) For the colonial coral *Favosites*, what is the origin of the variation you see between the individuals of a colony? How about between colonies?

4) What do you conclude about the nature and extent of variability in each of the example populations you have studied? Do you think the collections represent single, interbreeding population (i.e., the same species), or is the variation great enough to warrant assigning individuals to different species? How could you test your ideas?

a) *Thais* (snail)

b) Butterfly

c) *Favosites* (coral)

5) For each of the cases above, discuss the value of polymorphism (variation in aspects of form or behavior) among the members of a population, as it relates to adaptation and evolution.