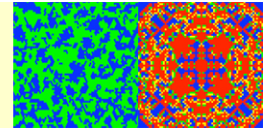


THE EVOLUTION OF COOPERATION



Group Activity: Evolutionary Trivia Prisoner's Dilemma



Name: _____

Objective: Working with partners, try to maximize the number of points that you can earn on an evolutionary quiz.

How the Activity Works:

1. You and your partners have each been given a quiz on the principles of evolutionary biology (see the opposite side of this page). The quizzes you have are identical. In addition, each of you have been given a list of "Principles of Evolutionary Biology". These lists are different, and contain different information on how evolution works.
2. Working simultaneously, you will have the opportunity to exchange information relevant to each question before separately and privately recording your own answer. After everyone has completed the quiz, we will grade it. If all three players get the correct answer, they each earn four (4) points; if two players get the correct answer, they each earn eight (8) points; if only one player gets the correct answer, that player earns twelve (12) points. Wrong answers for either partner receive zero (0) points.

Instructions:

1. Before working with your partner, review the list of information that you have below under "Principles of Evolutionary Biology". **DO NOT SHOW THIS INFORMATION TO YOUR PARTNER.**
2. Once you and your partner have reviewed the information contained on your list, begin by reading the first quiz question together. Feel free to discuss each question and offer each other help, but work out your own means of discussion and information-sharing. Although you should read over the question together, you are not obligated to help each other in any particular way, nor do you need to record the same answer.
3. After you have discussed each question, each person should record an answer under the "My Answer" column on the opposite side of this page. **DO NOT SHARE YOUR ANSWER WITH YOUR PARTNER.**
4. Continue discussing each question until you have both completed the quiz. Notify your instructor when you are done.

Principles of Evolutionary Biology:

- ★ Adaptations are traits (physical, physiological, behavioral) possessed by individual organisms which increase their probability of survival and reproduction. We can think of adaptations as the "product" of natural selection because those traits that survive the selection process are adaptive for the particular environment in which selection is occurring.
- ★ Historically, the process of evolution has been misrepresented for social and political purposes. For instance, the Nazis employed an idea called "eugenics", which was incorrectly portrayed as consistent with Darwin's theories. Evolutionary biology is about discovering natural processes, not ethical truths.
- ★ Genes are a critical component of the evolutionary process. Genes (the genotype) allow traits (the phenotype) to be passed on to offspring. Contrary to popular misconceptions, genes rarely encode for individual traits. Generally, multiple genes contribute to a particular trait, and interact with environmental factors to produce the actual trait possessed by an individual organism.
- ★ Evolutionary change occurs via reproduction. Those organisms with the traits that are best suited to survive and reproduce in their current environment will leave the most offspring, passing their favorable traits on to the next generation.
- ★ Speciation is a critical concept in evolution because it explains how inter-breeding populations can become distinct from each other. Some form of isolation is critical to the speciation process, for in order for one population to become two separate species, gene flow must be interrupted between these populations. Once isolated, separate populations can evolve independently, producing greater diversity of traits.

Quiz:

Principles of Evolutionary Biology

1. The theory of evolution is best described as:
 - a. the survival of the fittest.
 - b. one of many plausible hypotheses explaining how organisms change.
 - c. a collection of mechanisms explaining why populations change through time.
 - d. a means of explaining the origin of life.
2. Throughout time, evolution has allowed organisms to:
 - a. gain traits that will help them survive in future environments.
 - b. possess the best possible genes.
 - c. gradually become better than their predecessors.
 - d. pass on favorable traits to their offspring.
3. Adaptations are best described as:
 - a. favorable traits that allow for survival and reproduction in a given environment.
 - b. favorable traits provided to organisms by natural selection.
 - c. favorable traits which developed as the result of random chance.
 - d. favorable traits which individual organisms develop in order to survive.
4. Which of the following definitions best describes "evolutionary fitness"?
 - a. Fitness is defined as the stamina and physical condition of the individual.
 - b. Fitness is a measure of how successful a species is through time.
 - c. Fitness is the ability to survive for longer periods of time than others.
 - d. Fitness is proportional to the reproductive success of an individual.
5. Which of the following *does not* potentially act as a force of natural selection?
 - a. Interactions between predators and their prey.
 - b. Random mutations (i.e. errors) in the genetic code.
 - c. Climate, weather, and geography.
 - d. Interactions between organisms competing for the same resource.
6. Which statement best describes the relationship between genes and traits?
 - a. Genes determine which traits an organism possesses.
 - b. Most traits are influenced by multiple genes.
 - c. Natural selection on genes changes the traits that organisms possess.
 - d. Organisms who possess different genes will have different traits.
7. Speciation is a prominent evolutionary process because it:
 - a. allows a single population to divide into two isolated populations.
 - b. favors beneficial mutations and purges deleterious mutations.
 - c. allows individual organisms to adapt to changes in their environment.
 - d. prevents organisms from becoming too different from others.
8. Evolution cannot occur if there is *not*:
 - a. A more complex biological solution to environmental problems.
 - b. Heritable variation present in a given population of organisms.
 - c. Natural selection favoring one trait over another.
 - d. Sexual reproduction occurring in a given population of organisms.
9. Which of the following statements best describe controversies over evolution?
 - a. Scientists are still debating the role of intelligent design in evolution.
 - b. Scientists are still working to fill in all the gaps in evolutionary theory.
 - c. Scientists are still debating how evolution took place.
 - d. Scientists are still debating whether or not evolution took place.
10. Evolution has potentially dangerous social implications because:
 - a. it suggests that humans are like other animals and therefore without morals.
 - b. it can be misrepresented for political purposes.
 - c. it provides scientific justification for oppression and discrimination.
 - d. it demands that we choose between religion and science.

My Answer	Correct Answer	My Points	Partner Points
Totals:			