

Selfish Gene Question Set 1

Chapter 2: The replicators.

1. In physical systems, what does "survival of the stable" mean? In physical systems, what sorts of things survive and what sorts of things don't? (Hint: Think of various biological molecules and ask what about them makes some more stable than others.)
2. How does a "replicator" change the nature of stability?
3. Why is imperfect replication a necessity for improving a replicator's ability? How is this paradoxical?
4. How does competition among replicators change what it takes to survive?
5. What characteristics might serve replicators well in their competition?

Chapter 3. Immortal coils.

6. What does Dawkins mean by "each new generation starts from scratch?" Why is this important from the point of view of a gene?
7. How do genes cooperate? Think of any structure in your own body and try to account for its morphology and functioning in terms of sets of two or more genes that interact.
8. What is a pleiotropic gene? (See p.202 in Futyma)
9. Give an example of a pleiotropic gene.
10. Describe two ways sexual reproduction results in a shuffling of genes? When and where does gene shuffling occur in your body?
11. What does "gene pool" mean?
12. Why is the lifespan of a chromosome one generation?
13. How (or why) is longevity of a genetic unit related to its size?
14. How does Dawkins define gene?
15. What about a gene is potentially immortal?
16. Why is selfishness a good quality for a gene's longevity? Why is altruism bad?
17. Why does the genetic background (or genetic environment) of a gene matter? (Think about cooperating genes.)
18. How does genetic background limit the evolutionary options for a set of genes?
19. How does Dawkins explain senescence and death? What solutions does he propose for extending human longevity?
20. What is "selfish DNA?" Does this differ from a "selfish gene?"
21. How do inversions preserve gene combinations? (See p. 209 in Futyma.) Use a diagram to illustrate.
22. Why is sexual reproduction better than asexual reproduction?

Chap 4. The gene machine

23. Dawkins says on p. 47. "It is usually convenient, as an approximation, to regard the individual body as an agent 'trying' to increase the numbers of its genes in future generations." Implicit in this statement is an admission of its inaccuracy. How could it be worded to make it more accurate?
24. How can something have behaviors suited to a purpose but be unconscious of the purpose? Give an example of a machine and an example of an organism that has a behavior that it is not conscious of.
25. Describe a behavior that a real organism has that has a purpose and describe how it could have evolved to benefit the organism even if it was unaware of the purpose.
26. Dawkins says that genes give general instructions (policy makers) and the brain implements them (executives). Why can't the genes give and more directly implement their instructions?
27. If all living things are gamblers, using odds and stakes to guide their behavior, how do they "know" what the odds and stakes are? Are the estimates necessarily accurate?
28. What types of organisms do you think run simulations to guide their behavior? What types use just trial and error to learn?
29. How does the hygienic behavior of bees illustrate the principle of cooperating genes?
30. How can communication between animals be considered manipulative?
31. Give an example of an organism that is a conservative gambler.
32. Give an example of an organism that is a risky gambler.
33. Give an example of an organism that has manipulated you other than a human or a pet.