

1. Using rules one and two of Strong Inference answer the following question: What is the physiological (biological) basis for human love? (10 pts)
Devise multiple hypotheses and then at least one experiment to disprove the hypotheses. Ex.: Hypo's- Oxytocin levels. Oxytocin receptor levels. There is no physiological basis. Pheromones. Expt- Look for a correlation between how much people are in love hormone levels. Genetically engineer people with increased and decreased oxytocin receptors and see if it changes their amorous behavior.
 2. Why would a deletion of **one** nucleotide in a gene be worse than the change (substitution) of **two** nucleotides? (10 pts)
3 nucleotides = 1 amino acid. So 2 substitution could change at most 2 amino acids, but a deletion of a 1 nucleotide would change all of the following amino acids because of the change in reading frame.
 3. If an organism has more DNA than humans, does that mean it can make more proteins than a human can? Why or why not? (10 pts)
No, they may have varying amounts of non-gene DNA.
 4. Your friend wants to make orange cauliflower, and they tell you that they will use artificial selection to combine cauliflower with carrots, which are two different species. Will their plan work? Why or why not? (10 pts)
No, if carrots and cauliflower are two different species, they cannot produce fertile offspring.
 5. A friend thinks she might be adopted. She has samples of mitochondrial DNA from her and her parents. The mitochondrial sequence of your friend is the same sequence as her father, but a different sequence from her mother. Is she adopted? Why or why not? (10 pts)
Yes, mtDNA is inherited from mom. The difference in mt DNA indicates that her mom is not her biological mom.
 6. You find a species of plant in the Sahara desert, in Africa, and it looks similar to another species of plant from the Gobi desert, in Asia. They are not the same species. What can explain their similar appearance? (10 pts)
The environment shapes which traits will be passed on more and less. In these similar environments, desert, the evolutionarily advantageous traits are similar.
 7. Could some individuals with poor fertility evolve via natural selection? Why or why not? (10 pts)
No, the selection in natural selection is based on enhanced or diminished ability to pass on genes. Poor fertility will be selected against, and the genes causing poor fertility will disappear rapidly.
 8. Could evolution occur in a species that had perfect, error free DNA replication? Why or why not? (10 pts)
No, genetic diversity is required for natural selection to take place, and the source of the genetic diversity is mutations.
 9. If you induced fear in people by shocking them when they saw people who had purple skin, would they maintain their fear after the shocks had stopped? Why or why not? (10 pts)
No, there is no reason people would have a learned negative association with purple colored people.
 10. If fraternal twins that grew up together had a 90% chance of having the same favorite color, and identical twins that grew up in different families had a 50% chance of having the same favorite color, would this indicate a stronger environmental or genetic influence on color preference. Why? (10 pts)
Environmental, the correlation is closer with those that shared an environment and not genes.
- Bonus:** Do the non-monogamous voles live in an environment of plentiful resources or of scarce resources? Explain. (3 pts) *Plentiful. There are enough resources for the females to support the offspring without help.*