Douglas Hofstadter (1985), "The genetic code: Arbitrary?", from "Mathematical Temas"

Guided reading questions.

1. What does the term "arbitrary" mean in the context of a coding system? Why do Hofstadter and his student disagree about the arbitrary nature of the genetic code, and with which one do you agree?

2. Hofstadter describes genes as "static". What does he mean by this? Can genes be considered both static and active?

3. There is a point at which the author declares that he wanted to prove something to his class. In what way does his use of this term reveal that his background is not in biology?

4. What is the relationship between the primary sequence and the tertiary sequence of a protein? How are each related to the specificity of action of an enzyme?

5. There are several biological molecules introduced in this chapter: enzymes, DNA, ribosomes, mRNA, tRNA. They are all part of the story of expression of phenotype from genotype. What role does each play in the translation of a gene? Does any one entity "hold" the genetic code?

6. Hofstadter draws a parallel between the queen bee and the DNA in a cell. Note that biologists now know that the queen bee is subtly and constantly manipulated by her daughters, the worker bees – they determine, for instance, whether a queen will lay eggs that produce reproductive offspring (drones and virgin queens) or more workers. Does this increased knowledge strengthen or weaken the analogy of the DNA and the queen bee?