Suggested Answers for Journal Article #1
“Call duration as an indicator of genetic quality in male gray tree frogs”

The following example answers are only models. In many cases, there are many good answers to these questions.

1. Briefly define each of the following terms.
   - evolutionary fitness  The relative capacity of an organism to pass its alleles to the next generation through natural selection.
   - gravid  A frog carrying eggs that are ready to be fertilized by a male
   - half-sibship  Organisms that share one parent. In this case, they have the same mother but a different father
   - sire  The genetic father, or the act of fathering a child
   - the “good genes” model  The idea that traits that a female looks for in a mate are correlated with higher fitness

2. What does the “good genes” model predict about the role of male courtship displays?
   Male courtship displays exist to inform a female of the overall health of the male. Females choose to mate with males that have good courtship displays because they have generally superior alleles to pass along to the female’s offspring. If this model is true, then we expect males with better courtship displays to sire fitter offspring.

3. In testing this model, why was it important to use a species in which females themselves do not directly benefit from the choice of a good mate?
   The idea behind the “good genes” model is that the offspring will benefit, not the female. If the female benefits from mating with a specific males (by being protected from predators, for example) then she may not be selecting males specifically for the good of the offspring. Any direct benefit to the female would likely be a bigger effect than the indirect benefit to the offspring.

4. Would you classify this work as Discovery Science or Hypothesis-Based Science? Why?
   I would call this hypothesis-based science. The scientists had a clear idea (the “good genes” model) in mind. They set up their experiment to explicitly support or refute the “good genes” model.

5. The authors conclude that gray tree frog females choose males based on their call duration. Explain how this preference could have evolved by the process of natural selection.
   The evidence presented in the paper is clear that the offspring of long-calling males tend to be more evolutionarily fit, in that they were generally larger and survived better. We can presume that there is variation in the population for what kinds of calls females prefer and we presume that this variation is heritable. For the females the prefer long-calling males, their offspring have tended to survive and thrive a bit more due to the father’s superior genetic contribution. Thus, over time, the population has evolved so that females prefer to mate with long-calling males.