Answer Key

1) Does meiosis occur during <u>asexual</u> reproduction? How about mitosis? Explain.

*Meiosis does **not** occur during asexual reproduction. Meiosis is the process of producing gametes (eggs and sperm). Mitosis, on the other hand, is simply the process of cell division. This is the process that animals are going through during regeneration.*

2) Is there ever any advantage of <u>asexual</u> reproduction over <u>sexual</u> reproduction? When and Why?

Yes. Two cases:

> *1) If only one organism is present in a population (think humans on deserted island), he/she can still reproduce and found a new population.*

> *2) If the environment is stable (unchanging), and a particular organism is very well adapted to it, asexual reproduction has an advantage over sexual reproduction. If however, the environment changes (as we know it usually does), then sexual reproduction is favored since it allows for new combinations of genes.*

3) Which evolved first- Sexual or Asexual reproduction? Provide evidence to support your hypothesis from the text and from the **phylogenetic tree** you were given as a handout on 7/23/04.

*In order to know which evolved first, we need to know the **ancestral state**. If we look at the phylogentic tree, it says that all animals evolved from an **ancestral protist**. Since we know that the ancestral protist reproduced asexually, we know that asexual reproduction evolved first.*

4) What is the advantage of sexual reproduction over asexual reproduction? (See pg 459 if you're having difficulty, but expand on the answer presented in the text.)

*The answer is alluded to in Question 2. Sexual reproduction is typically advantageous over asexual reproduction because the environment is constantly changing. Sexual reproduction allows new combinations of genes to form. This greater genetic diversity increases the **phenotypic variation:** that is, it increases the physical variety of the organisms. This increases the likelihood that the animal will adapt to the changing environment through a process called **evolution.***