Name: _____ Teacher: _____ Pd. ___ Date: _____

STAAR Science Tutorial 49
TEK 7.14B: Sexual & Asexual Reproduction

TEK 7.14B: Compare the results of uniform or diverse offspring from sexual reproduction or asexual reproduction.

- **Asexual Reproduction** is the process by which an organism creates a new organism by making an exact copy of its DNA (broken into chromosomes and genes) and placing it in the new organism. There are five different processes used in asexual reproduction:
    - (1) binary fission, one cell dividing into two cells, each with an identical copy of the DNA;
    - (2) vegetative propagation, multi-celled plants growing whole plants from divided parts;
    - (3) spores, seed-like capsules of DNA and tissue capable of growth when placed in proper conditions;
    - (4) budding, growth of a child organism from the body of the parent that automatically breaks off when developed enough to survive on its own, found in yeast, hydras, coral and sponges; and
    - (5) regeneration, re-growth of whole organism from a severed part of an animal, such as a worm or starfish.
- The advantages of asexual reproduction are: (1) no reproduction mate is required, so asexual reproduction works well when there is a low population or the population of a species is widely dispersed (spread-out); (2) the division process is fast, so that quick population growth is possible when conditions are right; and (3) the division process is simple, so that single-cell organisms can reproduce without special reproduction organs or organelles.
- The big disadvantage of asexual reproduction is that all of the offspring are exact copies of the original parent, so there is no variation in the organisms, making them all equally sensitive to diseases or environmental changes.
- **Sexual Reproduction** is the process by which two parent organisms combine a part of each organism's DNA to create a unique new organism which is slightly different genetically than either parent, because it is a blend of both parent's genes.
- The sexual reproduction process requires the use of specialized reproductive organs to create sex cells (gametes – eggs and sperm in animals, eggs and pollen in plants) that carry a random half of the DNA from each parent. The sex cells are created by the process of meiosis. In the process of meiosis, a random selection of half of the parent's genes forms a sex cell with half of the chromosomes of the parent (23 in humans).
- The male and female sex cells are combined into a new organism in a process called fertilization. In fertilization, two sex cells, one from each parent, combine to

form a fertilized egg with the same number of chromosomes as either parent (46 in humans).

- The new cell with combined DNA then divides and grows through the process of mitosis, which is similar to the asexual binary fission process. In mitosis, all of the chromosomes of the cell are first copied (in humans 46 chromosomes are copied to become 92 chromosomes), and then the cell splits in two, with each half containing the same number of chromosomes as the original parent cell (46 chromosomes in humans).
- The big advantage of sexual reproduction is that it creates a genetically diverse (different) population, which is better able to survive as a species when the environment or predator population changes. It is highly unlikely that all members of a diverse population would be killed by a single disease outbreak, for example.
- The disadvantages of sexual reproduction are: (1) it is a slow process, making for slow population growth; (2) it requires that males and females of a population (or their sex cells) be able to find one another, which may be difficult when the species has a low population, or the population is spread over a wide area; (3) it only works in complex, multi-cellular organisms which have the specialized organs and behaviors necessary to complete the process.

Practice Questions

1. _____ _____ is the process by which an organism creates a new organism by making an exact copy of its DNA and placing it in the new organism.

2. The five different processes of asexual reproduction are:
   (1) _____;
   (2) _____;
   (3) _____;
   (4) _____; and
   (5) _____.

3. The advantages of asexual reproduction are: (1) _____ _____, so it works well with low _____;
   (2) _____; and
   (3) _____
   _____.

4. The main disadvantage of asexual reproduction is _____
   _____
   _____.

5. _____ _____ is the process by which two parent organisms combine a part of each organism's DNA to create a unique new organism which is slightly different genetically than either parent.

6. The main advantage of sexual reproduction is _____ _____ _____.

7. The three disadvantages of sexual reproduction are: (1) _____ _____; (2) _____ _____; and (3) _____ _____.