**SC.912.L.16.17 – Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.**

**Mitosis Meiosis**

*Asexual Reproduction Sexual Reproduction*

*Identical to parent Genetically unique*

*2 Daughter Cells 4 Daughter Cells*

*Diploid Cells Haploid Cells*

*2N - Diploid N – Haploid*

*Takes place in Body Cell Germ cells*

*Somatic Cells (Body) Gametes (Sex cells)*

*Used for Growth and repair Reproduction*

*Happens all of lifetime Happens only at certain times*

*Nuclear division only 1 time Nuclear division 2 times*

*4 Stages – PMAT 8 Stages – PMAT I and PMAT II*

*Prokaryotes reproduce using a type of asexual reproduction called binary fission.*

*Many Eukaryotes can reproduce asexually using several different ways including:*

* ***budding*** *– a new individual splits off from the parent (ex. Hydra)*
* *f****ragmentation*** *– parts of a whole organism can develop into a complete adult when missing parts are regrown (ex. Starfish)*
* ***vegetative propagation*** *– runners from the parent plant send up new plants that are identical to the parent (ex. Strawberries)*

***REVIEW FILL IN THE BLANK: MITOSIS vs MEIOSIS***

*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a form of asexual reproduction where a single parents passes copies of its\_\_\_\_\_\_\_\_\_\_ to each of its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The offspring produced by asexual reproduction are genetically \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to its parent. This process produces only \_\_\_\_\_\_\_\_\_ daughter cells and normally takes place in a body cell. A \_\_\_\_\_\_\_\_\_\_\_cell is the scientific name for a body cell. Since the offspring has all of the DNA from the parent and is identical to its parent, it is called a \_\_\_\_\_\_\_\_\_\_\_\_\_cell which is represented by \_\_\_\_N. This process occurs during the entire \_\_\_\_\_\_\_\_\_\_\_ of the organism. The nuclear division only happens \_\_\_\_\_\_\_\_\_time and involves the following steps: Prophase, \_\_\_\_\_\_\_\_\_\_\_\_\_\_, Anaphase and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Don’t get confused a add Cytokinesis to Mitosis, since this is dividing the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ not the nucleus.*

*Meiosis is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reproduction where two \_\_\_\_\_\_\_\_\_\_\_\_\_ each form reproductive cells that have \_\_\_\_\_\_\_\_\_ of the number of chromosomes. This type of cell is called \_\_\_\_\_\_\_\_\_\_\_ and can be represented as \_\_\_\_\_. The diploid mother and father would give rise to haploid \_\_\_\_\_\_\_\_\_\_, which may also be called sex cells. When the sex cells join, they will produce an \_\_\_\_\_\_\_\_\_\_\_\_\_\_ that is genetically \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and different than the parents. It is a combination of each \_\_\_\_\_\_\_\_\_\_\_\_\_. This process will produce more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cells than mitosis and we know this number to be \_\_\_\_\_. Nuclear division in meiosis happens \_\_\_\_times and goes through PMAT I and \_\_\_\_\_\_II. Crossing – over in Prophase I can lead to the exchange of segments of \_\_\_\_\_\_ between homologous chromosomes. This helps provide genetic \_\_\_\_\_\_\_\_\_\_\_\_ in organisms.*

1. Which of the following phases of mitosis is represented by the diagram below?



* 1. prophase
  2. metaphase
  3. anaphase
  4. telophase

1. A scientist wants to change the DNA of a sexually reproducing organism and have the new DNA present in every cell of the organism. In order to do this after fertilization, she would change the DNA in which of the following?
   1. zygote
   2. placenta
   3. testes of the father
   4. ovaries of the mother
2. Which row in the chart below indicates the correct process for each event indicated?



* 1. row 1
  2. row 2
  3. row 3
  4. row 4

1. The diagram below shows a cellular process that occurs in organisms.



What is the name of this process?

* 1. meiosis
  2. mitosis
  3. endocytosis
  4. phagocytosis