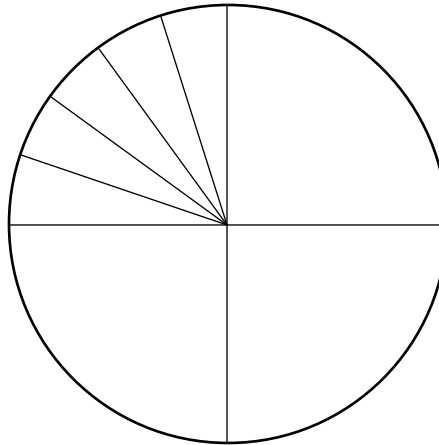


Test 5 Study Guide – Enzymes (BIO.2c) and Cell Division (BIO.5a-b)

Cell Cycle

Draw a model of the cell cycle. Include and label the following phases in the correct order: interphase, gap 1, synthesis, gap 2, mitosis (with all phases included), and cytokinesis.



Complete the following chart to describe what is happening in each part of the cell cycle. Make sure the phases are in the correct order

| Phase Name | | Phase Description |
|------------|--|-------------------|
| Interphase | | |
| | | |
| | | |
| M-phase | | |
| | | |

Explain the difference between normal cells and cancer cells. In other words, what causes cancer?

Explain what happens when a cell enters “gap 0” phase.

Mitosis

Describe the product of mitosis (how many cells, how do they compare, and are they diploid or haploid).

Describe the 3 functions of mitosis. Why do organisms perform mitosis?

- 1.
- 2.
- 3.

Draw the 4 phases of mitosis. Label each picture with the phase name.

| | | | | |
|------------|--|--|--|--|
| Picture | | | | |
| Phase name | | | | |

Chromosomes

Describe the function of chromosomes.

Explain human chromosomes:

- How many do we have total? _____
- How are they organized? _____
- Where do they come from? _____

Explain the difference between a haploid cell and a diploid cell.

Describe what a “homologous pair of chromosomes” is. How are they related, and where do they come from?

Meiosis

Describe the product of meiosis (how many cells, how do they compare, and are they diploid or haploid).

Describe the only function of meiosis. Why do organisms perform meiosis?

Complete the chart below by listing each stage of meiosis, drawing a picture, and summarizing what is happening at each stage.

| | Stage | Picture | Description |
|-----------|-------|---------|-------------|
| Meiosis I | | | |
| | | | |
| | | | |
| | | | |

| | | | |
|------------|--|--|--|
| Meiosis II | | | |
| | | | |
| | | | |
| | | | |

Meiosis vs. Mitosis

Write each of the following terms in the correct part of the Box-and-T chart below

| | | | | |
|-----------------------------------|-----------------------|------------------------|--------------------------------|--------------------------------------|
| diploid daughter cell | haploid daughter cell | one cell division | two cell divisions | making sex cells (gametes) |
| growth | cell replacement | asexual reproduction | sexual reproduction | division of the nucleus |
| DNA replicated beforehand | crossing over | independent assortment | homologous chromosomes pair up | daughter cells genetically identical |
| daughter cells genetically unique | 2 daughter cells | 4 daughter cells | diploid at the beginning | increases genetic diversity |

Both mitosis and meiosis...

| | |
|-----------------|--------------|
| Only mitosis... | Only meiosis |
| | |

Describe what happens during crossing over and when it occurs.

Describe independent assortment and when it occurs.

Explain why crossing over and independent assortment are important. What do they increase?

Explain why genetic diversity is important in a group of organisms.

Explain the difference between sexual and asexual reproduction.

List 2 examples of gametes.

- 1.
- 2.

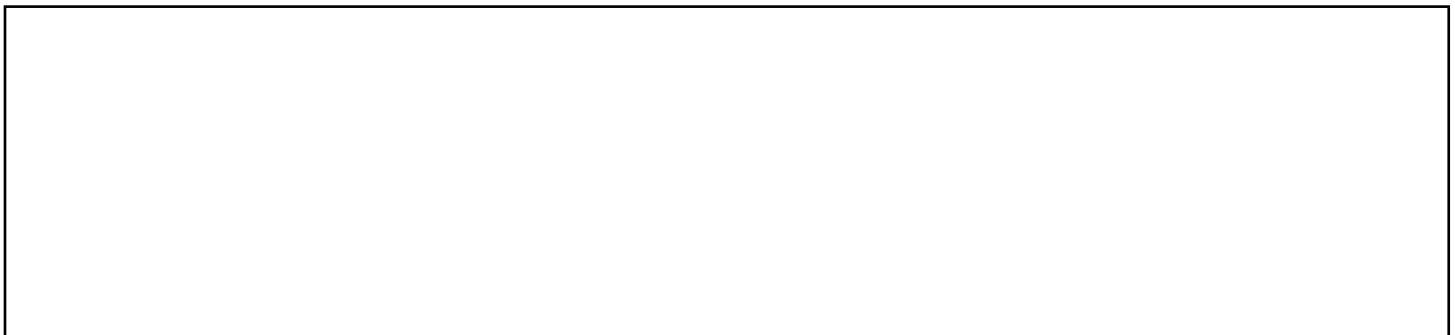
Describe the function of gametes. (Hint: fertilization)

Enzymes

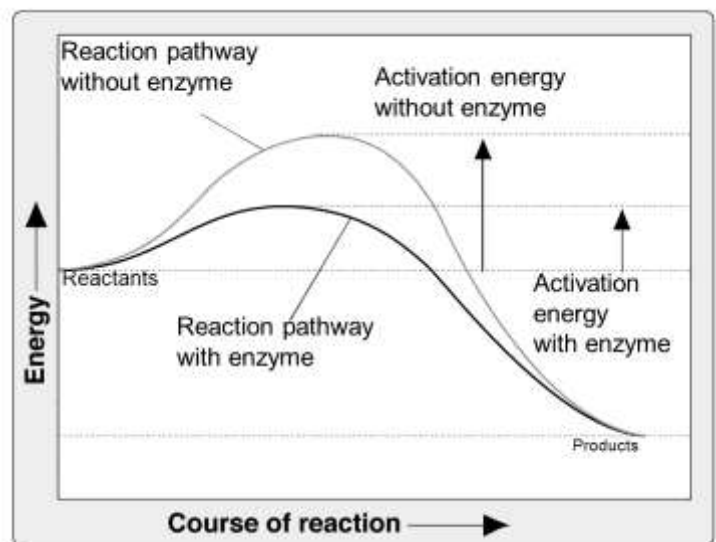
Describe the function of enzymes.

Describe the relationship between a substrate and the active site of the enzyme.

Draw a diagram of the action of an enzyme, from just before it binds to the substrate to when it releases the product. Label the active site, enzyme, enzyme-substrate complex, product, and substrate.



Based on the graph at right, what does adding an enzyme do to the activation energy required to make a chemical reaction occur? How does this affect the rate of the reaction?



Describe what happens to an enzyme when temperature or pH changes and moves away from the enzyme's optimal conditions.
