BIG IDEA #3

What are the main differences between mitosis and meiosis?

What does a crossover ascus look like compared to a non-crossover ascus?

If 40% of the asci show crossover, what is the true crossover frequency?

How many map units is the gene from the centromere?

If you were doing crossover frequency to map gene distances in Drosophila, and 2 genes had a 32% crossover, how many map units apart would they be?

For a dihybrid cross, if there are 4 possible outcomes, you would have 4 sums to calculate to find the Chi square value. How many degrees of freedom would there be? What would the critical value for p=0.05 be?

BIG IDEA #2

Macromolecules

|  |  |  |  |
| --- | --- | --- | --- |
| Macromolecule | Elements | Subunits | Functions |
| Carbohydrate |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Diffusion/Osmosis/Water Potential

Calculate the solute potential of a 0.1 M NaCl solution at 25°C. If the concentration of NaCl inside the plant cell is 0.15 M, which way will the water diffuse if the cell is placed into the 0.1 M NaCl solutions?

What must the turgor pressure equal if there is no net diffusion between the solution and the cell?

**For the following questions, assume we are using dialysis tubing to make baggies. The dialysis tubing is semipermeable and its pores are large enough to allow water, Iodine, NaCl, and glucose to pass, but too small for sucrose or starch to pass.**

Draw the scenario of 0.8M sucrose in a baggie inside a beaker of distilled water. Predict the direction of water movement and explain why using the terms hypertonic and/or hypotonic.

Draw the scenario of 0.6M NaCl in a baggie inside a beaker of 1.0M NaCl. Predict the initial direction of water movement and explain why using the terms hypertonic/and or hypotonic. Then discuss what would happen after 24 hours.

Draw the scenario of 15% glucose and 5% starch inside a baggie in a beaker containing iodine and distilled water. Iodine turns black when it reacts with starch. After 1 hour, predict where the color change will happen. After 24 hours, predict whether a glucose dipstick text will come up positive inside the baggie and/or beaker.

A plant cell placed in an open beaker of 0.3M sucrose solution at 25 degrees Celsius experiences no net diffusion. What must the water potential of the plant cell be? Give your answer to the nearest hundredth of a bar.

Enzymes

After an enzyme is mixed with its substrate, the amount of product formed is determined at 10-second intervals for 1 minute. Data from this experiment are shown below.

Time (sec) 0 10 20 30 40 50 60

Product formed (mg) 0.00 0.25 0.50 0.70 0.80 0.85 0.85

a. What is the initial rate of this enzymatic reaction? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Show your calculation:

b. What is the rate after 50 seconds? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Show your calculation:

Free Energy

What is Gibbs Free energy? = a measurement of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When ΔG is positive this means the reaction will happen \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When ΔG is negative this means the reaction will happen \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Cell Signaling

Complete this cell - signaling table:

|  |  |
| --- | --- |
| STAGE | MAIN EVENT |
|  |  |
|  |  |
|  |  |

Describe how the G protein receptors function.

What are the two cellular responses to a signal?

A hormone is available to all cells in the body. why do some cells respond to this hormone, and others cells do not respond? (Remember enzymes, the same general principle is at work here.)

BIG IDEA #1

What are the 5 conditions of Hardy-Weinberg equilibrium? MEMORIZE THESE!

What do each of the following represent?

• p=

• q=

• p2=

• q2=

• 2pq=

What are the 2 equations you use to solve any Hardy-Weinberg question?

BIG IDEA #4

Transpiration Lab

Which condition would result in the higher rate of transpiration: light or dark?

Which condition would result in the higher rate of transpiration: humid environment or dry environment?

Which condition would result in the higher rate of transpiration: breezy conditions or still air?

Which condition would result in the higher rate of transpiration: hot environment or warm environment?

Why do you have to calculate leaf surface area?

Draw an exponential growth curve. Draw a logistic growth curve, and label the carrying capacity.

Explain how density-dependent and density-independent factors operate in limiting population growth.

Discuss the differences between r-selected species and K-selected species with respect to body size, life-span, number of offspring, relative time of reproduction (earlier or later in life), type of survivorship curve, type of growth curve (S-shaped or boom-and-bust).

Describe the process of ecological succession, indicating why the species in a given area change over time. Distinguish between primary and secondary successions, and give an example of each. Also, summarize the trends seen in many successions, and explain what is meant by a climax community.

Explain the types of interspecies relationships and tell how each member of the pair is affected by the interaction (include predation, parasitism, commensalism and mutualism).

Distinguish between gross primary productivity and net primary productivity.