Wards ap bio lab 5 answers

Pearson, as an active contributor to the biology learning community, is happy to provide free access to The Biology Place Classic edition to all educators and their students. The purpose of this activity is to help you review material that you have learned in class or have read your text. Some materials will expand your knowledge beyond your class work or textbook reading. At the end of each activity, you can rate your progress through Self-Quiz.To start, click the event title. Introduction to AP Lab Cell Respiration 5: Cellular respiration is the release of energy from organic compounds by the chemical oxidation of metabolism in the mitochondria in each cell. Cellular respiration involves a number of enzyme-mediated reactions. The equation for glucose oxidation is C6H12O6 + O2 à CO2 + H2O + 686 kilokallories per fly oxidized glucose. There are three ways cellular breathing can be measured. Consumption of O2 (how many O2 flies are consumed in cellular breathing). Production of CO2 (how many CO2 flies are produced in cellular breathing?) and energy release during cellular breathing. In this lab, the volume of O2 consumed by germinated peas and not germinated at two different temperatures will be measured. PV = nRT is the law of inert gas. P is gas pressure. V is the volume of gas. n is the number of gas molecules. R is a gas constant. T is the temperature of the gas in degrees K. This law tells us some important things about gas. If the temperature and pressure remain constant then the volume of gas is directly proportional to the number of gas molecules. If the temperature and volume remain constant, then the pressure of the gas changes in direct proportion to the number of gas molecules. If the number of gas molecules and temperature remains constant, then the pressure is inversely proportional to the volume. IF the temperature changes and the number of gas molecules remains constant, then the pressure or volume or both will change in direct proportion to the temperature. In this lab, CO2, which is made during cellular respiration, will be eliminated by potassium hydroxide (KOH) and will make potassium carbonate (K2CO3). Carbon dioxide is removed so that the change in gas volume in the respirometer will be directly proportional to the amount of oxygen consumed. In the experiment the water will move towards a lower pressure area. During breathing, oxygen will be consumed and the volume will be reduced to solid. The result is a decrease in the volume of gas in the tube, and a decrease in associated pressure in the tube. Respirometers only with glass beads will allow volume changes due to changes in atmospheric pressure or temperature changes. Hypothesis: A respirometer with only germinated peas will have greater oxygen consumption and will large amounts of CO2 are converted into K2CO3 rather than respirometers with beads and dried peas and respirometers with beads only. Material: Materials used in the laboratory are as follows: thermometer, 2 water baths, tap water, cover tape, germinated peas, non-germination peas (dry), 100 mL pass n cylinders, 6 bottles, 6 rubber stoppers, absorbent and non-absorbent cotton, KOH, 5 mL syringe, 6 pipettes, ice, and 6 pipettes, ice, and 6 Methods: First, set room temperature 25oC and water bath 10oC. Make sure you allow time to adjust the temperature in each bath. To get a temperature of 10oC add ice to the bath until the temperature in the bath is 10oC. Next, get a 100 mL graduate cylinder and fill it with 50 mL of water. Drop 25 germinated peas and determine the amount of water that evacuates. Record the volume of 25 germinated peas. Then remove these peas and place them on a paper towel. They will be used in respirometer 1. Next, refill the passing cylinder with 50 mL of water and drop 25 un germinated peas into it. Then drop the glass beads into the respirometer until the volume is equivalent to the expanded germinated peas. Discard the beads and peas. They will be used in respirometer 2. Next, refill the passed cylinder with 50 mL of water. Determine how many glass beads it takes to reach a volume equivalent to germinated peas. Remove the beads. They will be used in respirometer 3. Then repeat the procedure used above to prepare a second set of germination peas, dried peas + beads, and beads to be used in a 4,5,and 6 respirometer. Raft six respirometers with 6 bottles, each with a stopper attached and pipette. Then place a small blob of absorbent cotton on the bottom of each bottle and, using a syringe, saturate the cotton with 15% KOH make sure not to get the KOH on the respirometer side. Then place a small blob of dry cotton on top of the KOH-soaked absorbent cotton. Repeat these steps to create five other respirometers. Be sure to use about the same amount of cotton in each bottle. Next, place the first set of germinated peas, dried peas + beads and beads in bottles 1,2, and 3. Place the second set of germinated peas, dried peas + beads, and beads in bottles 4.5, and 6. Put a stopper in each bottle with the right pipette. Place the washing machine on each pipette for heavy use. Create a shell using sticky tape and attach it to each side of the water bath to hold the pipette out of the water for a period of time Ten minutes. Bottles 1,2, and 3, must be in a bathtub containing 25o C water. Bottles 4, 5, and 6 must be in a bathtub containing water of 10oC. After the period the balance completely immerses all six respirometers in the water completely. Water will enter the pipette for a short distance and stop. If that happens Stop, there's a leak. Make sure the pipette is facing so you can read it. The bottle should not be shifted during the experiment and your hands should not be placed in the water during the experiment. Allow the respirometer to be calibrated for another three minutes and then record the initial water at any 0 pipette time. Check the temperature in both baths and record it in table 5.1. Every five minutes for 20 minutes, take a water position reading in each pipette, and record the data in table 5.1. Result: Table 5.1: Measurement of Oxygen Consumption with Wet and Dried Pea Seeds at Room Temperatures of 25o C and 10oC Using Volumetric methods. Temp o C Time (min) Reading at time X Diff. Reading at time X Diff. Corrected Diff. Reading at time X Diff. Corrected Diff. 25 Initial- 0 14.4 13.9 14.2 25 0 to 5 14.1 .3 13 .9 .6 14.1 .1 -.2 25 5 to 10 14.0 .4 11.1 2.8 2.4 13.9 .3 -.1 25 10 to 15 13.9 .5 10.3 3.6 3.1 13.7 .5 0 24 15 to 20 13.9 .5 8.8 5.1 4.6 13.5 .7 .2 10 Initial – 0 14.2 14.2 14.7 10 0 to 5 14.8 -.6 14.0 .2 .8 15.2 -.5 .1 10 5 to 10 14.6 -.4 13.5 .7 1.1 15 -.7 -.3 10 10 to 15 14.8 -.6 13.2 .9 1.5 15 -.7 -.1 10 15 to 20 14.9 -.7 12.6 1.6 2.3 15 -.7 0 Graph : Konsumsi Oksigen untuk Berkecambah Kacang Polong dan Kacang Polong Kering pada 10oC dan 25o C. Pertanyaan : 1. In this activity, you are investigating the effects of germination versus non-germination and warm temperatures versus cold temperatures at respiratory level. Identify the hypothesis being tested in this activity. The hypothesis being tested in this activity is that peas germinated in a 25 o C tub of water will have a higher respiratory rate than other bottles. 2. This activity uses a number of controls. Identify at least three controls, and explain the purpose of each control. One control is that each bottle has the same volume. This indicates that the volume of the bottle does not affect the level of breathing. Another control is a bottle with beads only. The beads do not do breathing. The final control is a balance period of 10 minutes. This allows the contents of the bottles to perform breathing for a short time before they are completely immersed in the water. 3.Graph results from corrected difference column for germinated and dried peas at room temperature and at 10oC. 4. Explain the relationship between the amount of oxygen consumed and the time. Over time the increase in oxygen consumption increases. 5. From the slope of the four lines on the chart, determine the oxygen consumption level of germinated and dried peas during the experiment at room temperature and at 10o C. Conditions Indicate Calculation Rate in mL O/min Germinated peas at 10oC 2.3-1.5 = .8 / 5 .16mL O2 /min Germinated peas at room temperature 4.6-3.1/5 .3mL O2 /min Dried peas at 10oC (.1)/5= .02 mL O2/min Dried peas at room temperature (.2-0)/5=)/5= mL O 2 /min 6. Why is it necessary to improve the reading of peas with readings from beads? Beads do not perform cellular respiration. Peas do it. Changes in atmospheric pressure can cause changes in breathing levels and improving readings provide the most accurate results under certain conditions. 7. Explain the effect of germination versus non-germination on the breathing of pea seeds. Germination causes higher levels of respiration than peas that do not germinate. 8. Graph predicted results up to 45o C. Describe your predictions. When the temperature increases cellular respiration increases, but after a certain temperature the breathing rate will begin to drop. The peak is the optimal temperature. 9. What is the purpose of KOH in this experiment? KOH eliminates carbon dioxide that forms during cellular breathing. 10. Why should the bottle be completely sealed around the stopper. The stopper is completely sealed to prevent water from entering the respirometer. 11. If you used the same experimental design to compare the respiratory rate of reptiles 25g. and mammals 25 g. at 10oC what results would you expect? Explain why you are. Mammals will perform higher levels of cellular respiration. This is because mammals maintain a constant temperature higher than the temperature of cold-blooded reptiles that will have a temperature of 10 C. 12. If breathing in small mammals was studied at room temperature of 21 o C and 10oC what results would you predict? Explain why you are. The cellular breathing rate will be higher at 21 degrees C because a temperature of 10 degrees C can cause the body's overall mammalian temperature to drop the most. 13. Explain why the water moved to the respirometer pipette. Water is moved to the pipette because oxygen is being consumed and allows the water to move only partially into the pipette. 14. Design experiments to check cellular breathing rates in peas that have germinated for 0, 24, 48, and 72 hours. What results would you expect? Why? I'll use the same format using a respirometer to measure the cellular respiration rate of peas. Peas that have germinated for 72 hours will have higher respiration rates because they have higher energy demand. Error Analysis: Several factors may cause inaccurate results in this experiment. First, not maintaining a constant temperature in the water bath can lead to inaccurate results. Also moving the bottle in the water after the experiment starts could lead to inaccurate results. Putting your hands in a tub of water while the bottle is in the water can lead to inaccurate results. Letting peas come into contact with KOH can also lead to inaccurate results. Finally do not have the same amount of cotton in bottles can be cause errors in the results. Conclusion: In this experiment the bottle with only germinated peas had the greatest oxygen consumption. This is because germinating peas performs a faster cellular respiration process than peas that do not germinate. Beads do not perform cellular respiration. Peas that do not germinate require less energy than germinated peas so dried peas perform a slower cellular respiration process. This in turn leads to less oxygen being consumed in bottles with peas that do not germinate than bottles with germinated peas. Higher temperatures cause cellular breathing to occur at higher levels which in turn leads to greater oxygen consumption. Oxygen.