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We're getting everything ready for you. The page is loading, and you'll be on your way in just a few moments. Thanks for your patience! 0 ratings0% found this document useful (0 votes)342 viewsThe document describes an experiment to determine a person's blood type using ABO blood grouping. The experiment involves taking a blood sample and mixing it with anti-A and anti-B serum on ...SaveSave Cariaga Lab Report. Blood Typing For Later0%0% found this document useful, undefined Format: In-person or online Authors: Katherine E. Brent and Sydney Quinn Chizmeshya Source: Modified from Classroom Activity on Antibodies, Oxford Sparks. Time needed: 30-40 minutes total. 15-20 minutes for the activity; 15-20 minutes for the reflection questions Supplies Needed Milk, vinegar, water Red gel food coloring Eyedroppers or pipettes (5 per group) Permanent marker Toothpicks or stirrers (6 per group) Small containers or sealable test tubes (5 per group) Blood typing test plate (attached) laminated or placed in a plastic sheet protector (1 per group) Student worksheet (attached) Readings In this lab students will perform a blood type test, also called an agglutination assay, on the simulated blood of three individuals. They will observe the agglutination reaction, and determine the blood types of three individuals. Subsequently, students will answer reflection questions about the observations they made during the experiment, as well as consider the inheritance patterns for ABO blood types and what characteristics of this trait are regarded as "Mendelian". Steps Prepare three solutions: vinegar with food coloring, milk with food coloring, and water with food coloring. Slowly add food coloring little by little to ensure that the dye does not coagulate the substance. Each group of students should be given the following lab kit materials: Labelled test tubes or small containers: Individual #1: Dyed vinegar (this will simulate Type A blood) Individual #2: Dyed milk (this will simulate Type B blood) Individual #3: Dyed water (this will simulate Type O blood) Anti-A Serum: Milk Anti-B Serum: Vinegar Five eyedroppers or pipettes Permanent marker Six toothpicks or stirrers Blood Typing Test Plate (attached) laminated or placed in a plastic sheet protector (1 per group) Student worksheets Students should use the instructions on their worksheet to complete the lab. When students perform the experiment, they must use each pipette for only the substance it is intended to be used for, as cross-contamination may provide false coagulations. Using the pipette for Individual #1, they will pipette several drops of Individual #1's blood sample into the circles comprising the first column of the laminated blood typing test plate. Individual #2's sample should be pipetted into to the second column, and Individual #3's sample pipetted into the third column. Using the pipette for Anti-A Serum, pipette several drops of Anti-A serum into each blood sample in the first row of the test plate. Using the pipette for Anti-B Serum, pipette several drops of Anti-B serum into each blood sample in the second row of the test plate. Students will stir each sample using a different toothpick for each of the six samples. Students will observe each sample to see if it has coagulated (agglutinated) or not, and determine the three individuals' blood types based on the results. Students will complete the reflection questions on their worksheet. Students will practice observation and problem solving through this lab, as well as review key concepts about Mendelian inheritance and blood typing. Reflection questions are provided on the student worksheet and instructors are encouraged to review some or all of these questions as a class afterwards. 1 Not adaptable 2 Possible to adapt 3 Easy to adapt With clear directions most students could create the artificial blood and serums, as well as complete the experiment, in their home. Instructors could also record a short video showing the experiment for students to watch and reflect on at home. ThePenguinProf. Blood Types: ABO and Rh (with donuts and sprinkles!) Wake, Carol. 2005. "ABO/Rh Blood Typing Model: A Problem-Solving Activity." The American Biology Teacher 67 (3): 158-162. Arnold, Savitree Rochanasmita, Tussatrin Kruatong, Chanyah Dahsah, and Duongdearn Suwanjinda. 2012. "The Classroom-Friendly ABO Blood Types Kit: Blood Agglutination Simulation." Journal of Biological Education 46 (1): 45-51. Mann, Hayley, Xazmin Lowman, and Malaina Gaddis. 2019. "Chapter 3: Molecular Biology and Genetics." In Explorations: An Open Invitation to Biological Anthropology, edited by Beth Shook, Katie Nelson, Kelsie Aguilera, and Lara Braff. Arlington, VA: American Anthropological Association. This lab explores the concepts of Mendelian inheritance using the ABO Blood Group System as an example. Please review the corresponding sections: "Mendelian Genetics" and "Example of Mendelian Inheritance: The ABO Blood Group System" in Explorations Chapter 3: Molecular Biology and Genetics, which will provide the background information to complete the lab exercise. In this lab, you will be performing a blood type test (agglutination assay) on the simulated blood of three individuals. Subsequently, you will answer reflection questions about the observations you made during the experiment. As a reminder: Blood types in the ABO Blood Group System are A, B, O, and AB. A and B alleles are dominant over the O allele, and are codominant with each other. This is because possessing the A or B allele always leads to the production of the corresponding antigen. Blood Types Table Type A blood with A antigens will coagulate (agglutinate) when they come in contact with anti-A serum (antibodies), but produce anti-B antibodies in a living person, so will not coagulate with anti-B serum. Type B blood with B antigens will coagulate (agglutinate) when they come in contact with anti-B serum (antibodies), but produce anti-A antibodies in a living person, so will not coagulate with anti-A serum. Type AB blood has both A and B antigens, and will coagulate (agglutinate) when they come in contact with either anti-A or anti-B serum (antibodies). These individuals do not produce anti-A or anti-B antibodies. Type O blood produces both anti-A and anti-B antibodies, so it will not coagulate with Anti-A or Anti-B Serum. Lab Kit Materials Labelled test tubes or small containers: Individual #1 Blood Sample Individual #2 Blood Sample Individual #3 Blood Sample Anti-A Serum Anti-B Serum Five eyedroppers or pipettes Permanent marker Six toothpicks or stirrers Blood Typing Test Plate laminated or placed in a plastic sheet protector Instructions Using the permanent marker, label each of your five pipettes with one of the substance names (e.g. Individual #1, Anti-A serum). When you perform the experiment, you must ensure that you use each pipette for only the substance it is intended to be used for, as cross-contamination may provide false coagulations. Using the pipette for Individual #1, pipette several drops of Individual #1's blood sample into the circles comprising the first column of the blood typing test plate. Individual #2's sample should be pipetted into to the second column, and Individual #3's sample pipetted into the third column. Using the pipette for Anti-A Serum, pipette several drops of Anti-A serum into each blood sample in the first row of the test plate. Using the pipette for Anti-B Serum, pipette several drops of Anti-B serum into each blood sample in the second row of the test plate. Using a different toothpick for each of the six samples, stir each sample. Observe each sample to see if it has coagulated (agglutinated) or not. Reflection Questions Observe each sample for coagulation. Based on what you see... a. What blood type does Individual #1 have? What is/are the possible genotype(s) for Individual #1? b. What blood type does Individual #2 have? What is/are the possible genotype(s) for Individual #2? c. What blood type does Individual #3 have? What is/are the possible genotype(s) for Individual #3? Suppose that the three samples are from two parents and their child. a. Which individuals are the parents? Which individual is the child? How do you know? b. What genotype must each individual have for this scenario to be possible? c. Draw a Punnett square using the parents' genotypes. Circle the genotype that belongs to the child that you have blood typed. d. What is the percent chance that these two parents would have a child with this blood type? There is one blood type not represented in these samples. a. What blood type is it? b. What would you predict would happen if you added Anti-A serum to this type of blood? c. What would you predict would happen if you added Anti-B serum to this type of blood? d. Why is the genotype that codes for this blood type considered "codominant"? Is ABO considered a "Mendelian Trait"? a. What is "Mendelian genetics"? How would you identify a trait that follows a pattern of Mendelian genetics? Review the section "Mendelian Genetics" in Chapter 3 to help you. b. How does the ABO blood type system follow the rules of Mendelian Inheritance? c. In what ways is the ABO blood type system more complex than the pea plant traits that Mendel observed?