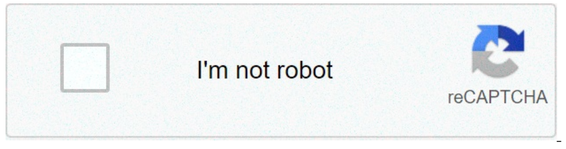


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# Biology extra credit dihybrid cross worksheet answer key

Class began with an entry task intended to provide students with practice identifying the four allele combinations possible from two different genes. A picture of the white board is shown below: Next, we transitioned in to the lesson about Down Syndrome. We discussed the first three slides of the Down Syndrome Case Study slide deck and then detoured to the Wikipedia entry on aneuploidy. We focused on the Types section of the entry, examining how, of the autosomal chromosomes, only Trisomy 21 will result in a viable fetus most of the time. Students learned that when trisomy occurs in most of the other autosomal chromosomes, the result is an embryo that is non-viable, often resulting in miscarriage. There was a lot of student interest in learning more about polyploidy in the sex chromosomes, and students are encouraged to keep learning outside of class! There were also students curious about my use of Wikipedia. I explained that in my opinion, Wikipedia is a powerful research tool as long as the information included in an article is properly cited. Students can use a Wikipedia entry to locate primary source documents and then reference those documents directly once the information they contain has been verified. I referenced scientific publications that have determined Wikipedia to be as accurate as more traditionally accepted credible sources. Ironically, although Wikipedia is freely available, the publications determining the credibility of Wikipedia are not. Students interested in learning more without paying for the publications can read the Live Science article from 2011 titled "How Accurate is Wikipedia" as a starting point and come up with their own conclusions. Back to the Case Study! To learn how Trisomy 21 occurs, students watched a short video illustrating non-disjunction. To put a human face on Trisomy 21, or Down Syndrome, students watched another short video about two young twins with Down Sydrome. Both videos are shown below: The second video naturally leads to questions about twins, so slide 5 explains the difference between identical and fraternal (non-identical) twins. In slide 6, students are introduced to an adorable set of fraternal twins whose skin-color genetics will be revisited in our next unit. The embed feature of the video is deactivated, so here is the link to the ABC News video shown on YouTube. Class concluded with a final look at the genetic phenomenon of X-inactivation. USing calico cats as the model, Mr. Anderson of Bozeman Science explains how in females, only one X chromosome is active in a given cell. We can visualize the result of this process in calico cats. At the end of the video, we explains how male calico cats, although extremely rare, can arise from the XXY phenotype (connecting back with our learning about aneuploidy). As a review from yesterday and to extend student learning of Punnett Squares to dihybrid crosses, we began class with the following video by Mr. Anderson of Bozeman Science: Students took notes throughout the video, with emphasis placed on understanding the connection between meiosis and fertilization (as represented by the Punnett Square), sex-linked traits, and how to determine the alleles in a dihybrid cross. After the video, we reviewed how to identify the alleles, with pictures from the white board shown below: We then worked through questions 1 and 2 of the dihybrid cross worksheet (pictured below), as well as portions of questions 3 and 4. We packed a lot into the short class period today. To reinforce concepts introduced in the video yesterday but not covered in the reading assignment, we spent today learning and applying the vocabulary of inheritance. We dusted off the cobwebs from student memories from middle school, reviewing the vocabulary words of genotype, phenotype, alleles, dominant, recessive, homozygous, and heterozygous. We then applied the vocabulary to an example Punnett Square about eye color inheritance patterns. Notes from the white board are pictured below: We then applied these concepts to a Punnett Square worksheet. We worked through the first two problems together (pictured below), and then students used the remainder of the class period to work through the remaining problems. Students in 4th period were very interested in learning more about the genetics of eye color. The NIH Genetics Home Reference website explains the genetics of eye color, complete with references to relevant scientific journal articles. The Tech Museum of Innovation website has a lengthy article written in more student-friendly language (with graphics!) on the topic. The article includes a calculator to predict the eye color of your offspring, and even provides evidence about how two blue-eyed parents can have a brown-eyed child (Surprise! High school genetics is over-simplified!). The question of traits "skipping a generation" also came up during 4th and 5th periods. We used problem 1 from the worksheet to explain how a grandparent and a grandchild can both share a trait that "skips" the generation in between. We closed out the unit today with a review of dihybrid crosses. Students received their scored unit quizzes from last Friday, and the common theme across all of my classes was that students needed more practice with dihybrid crosses. After the review today, students received a copy of the unit exam. They must turn it in on Monday, along with the scored copy of the quiz. Students who demonstrate improvement on the dihybrid cross question on the exam will have that question's score substituted for the score the received on a similar question on the quiz. Good luck! We returned to our class textbook for today's lesson. After an entry task designed to promote student thinking around which types of cells pass along traits to offspring (the gametes!), students worked together to construct histograms which they then used for the lesson from the textbook. Slides for today are attached here. Note: students who need additional time to complete Friday's quiz can complete the quiz in my classroom after school until 2:30 today. The quiz today covered one and two-trait Punnett Squares, challenged students to compare mitosis and meiosis using ten key unit vocabulary terms, and included a questioned designed to provoke student thinking around a topic incorporating genetics, evolution, and student opinion. For students interested in learning more about how genetics affect appearance, the links below are excellent resources: The genetics of eye color: What Color Eyes will your Children Have? The genetics of height: Number of genes linked to height revealed by study The genetics of skin color: Unpacking Human Evolution to Find the Genetic Determinants of Human Skin Pigmentation Students worked with partners to complete a single-trait Punnett Square worksheet. After working through the first question together (example below), students were presented with slides of key vocabulary and examples of the organisms discussed in questions 8 and 9. The degree of student collaboration and prior knowledge was impressive! Students who completed the worksheet early were challenged to construct a 2-trait Punnett Square (exampes below). Worksheet question 1: Example #1 of 2-trait Punnett Square: Example #2 of 2-trait Punnett Square: We are wrapping up the Genetics Unit and transitioning to the Evolution Unit. The Stranger Visions video is an excellent example of the merger of art, science, and technology. Give it a watch, and think twice the next time you spit out your gum! For the Lesson 8, the final lesson in the Genetics Unit, we learned about the "Levels of Heredity" and then how to make dihybrid crosses. A dihybrid cross is a Punnett Square that shows the possible inheritance patterns of two independently-assorting genes. The classwork for this lesson included a dihybrid cross (two-trait Punnett Square) worksheet and a reading with questions about the connection between Down Syndrome and Alzheimer's Disease. We will have our second quiz for the Genetics Unit on Friday, so study hard! Be sure to review Lessons 5-8, focusing on mitosis and meiosis, vocabulary (allele, genotype, phenotype, dominant, recessive, homozygous, heterozygous) and know how to make and analyze one- and two-trait Punnett Squares. Congratulations to the students who received a Golden Ticket for completing their Biology Task! Students who submitted final drafts on or before last Friday (2/14) received grades. Students who did not submit a final draft remain eligible for a Silver Ticket. Tasks receiving a score below proficient are eligible for one additional final Golden Ticket review on or before Friday, February 28, after which only Silver Tickets will be issued. Remember, Seniors and Sophomores may only defend Tasks that receive a Golden Ticket. All students must receive either a Gold or Silver Ticket to receive credit for a class. Because of the short week, students are working on their Heredity Projects. These short reports are due next Monday (February 24) and should be uploaded to Ms. H's Dropbox. There is a Heredity Project folder in each class period. The Heredity Projects will supplement lessons next week on multi-trait Punnett Square analysis and the inheritance of traits through changes to DNA. In order to continue enjoying our site, we ask that you confirm your identity as a human. Thank you very much for your cooperation. If you're seeing this message, it means we're having trouble loading external resources on our website. If you're behind a web filter, please make sure that the domains *.kastatic.org and *.kasandbox.org are unblocked. This is an extra credit assignment I created for my 7th grade Life Science class. I give this assignment to my students towards the end of my Genetics Unit. I give one to every student about 10 minutes before the period ends. We discuss the problem together and then set up the Punnett Square as a class. Then the students have a minute of two to start filling in their two trait Punnett Square. Then I give them a due date (about a week) and tell them to come see me for extra help if needed. Students LOVE doing this assignment and I get extra credit turned in from students who wouldn't normally turn it in.

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