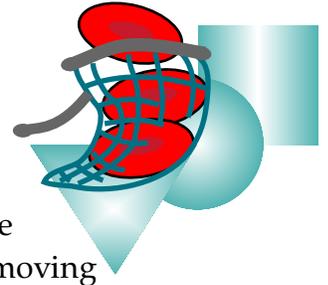


Born of Blood: Fun Puns

Student Information Page 3C - Part 3

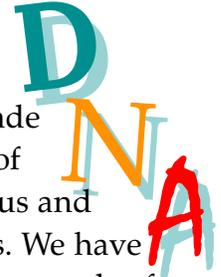


Activity Introduction:

Have you ever wondered how traits are passed down from parents to their offspring? Well, there is a way to predict the traits that might show up in the offspring – it involves using a **Punnett Square**. In this activity, you will get moving and learn about Punnett Squares in a fun way!

Activity Background:

We are complex beings made up of thousands of characteristics (*traits*). The “blue-print” for all of these traits is in our chromosomes. *Chromosomes* are made of DNA (deoxyribonucleic acid) and proteins. They are found in the nucleus of every body cell, except red blood cells. Red blood cells do not contain a nucleus and therefore do not contain the chromosomes found in body cells with a nucleus. We have a total of 23 kinds of chromosomes, each with information for hundreds or thousands of traits. Each kind of human chromosome is numbered 1 through 23. We inherit one of each kind of chromosome from our mother and one of each kind from our father. This means we end up with 23 *pairs* of chromosomes, for a total of 46.



Chromosomes are usually found in long, twisted strands in the nucleus, much like spaghetti twisted in a bowl. When a cell is ready to divide, the chromosomes become shorter and thicker and make copies of themselves. The two copies are held together at the center, which gives them the appearance of an “X” – at this point, they are visible under a light microscope. When a cell divides, each daughter cell gets one copy of every chromosome, or a full set of 46.

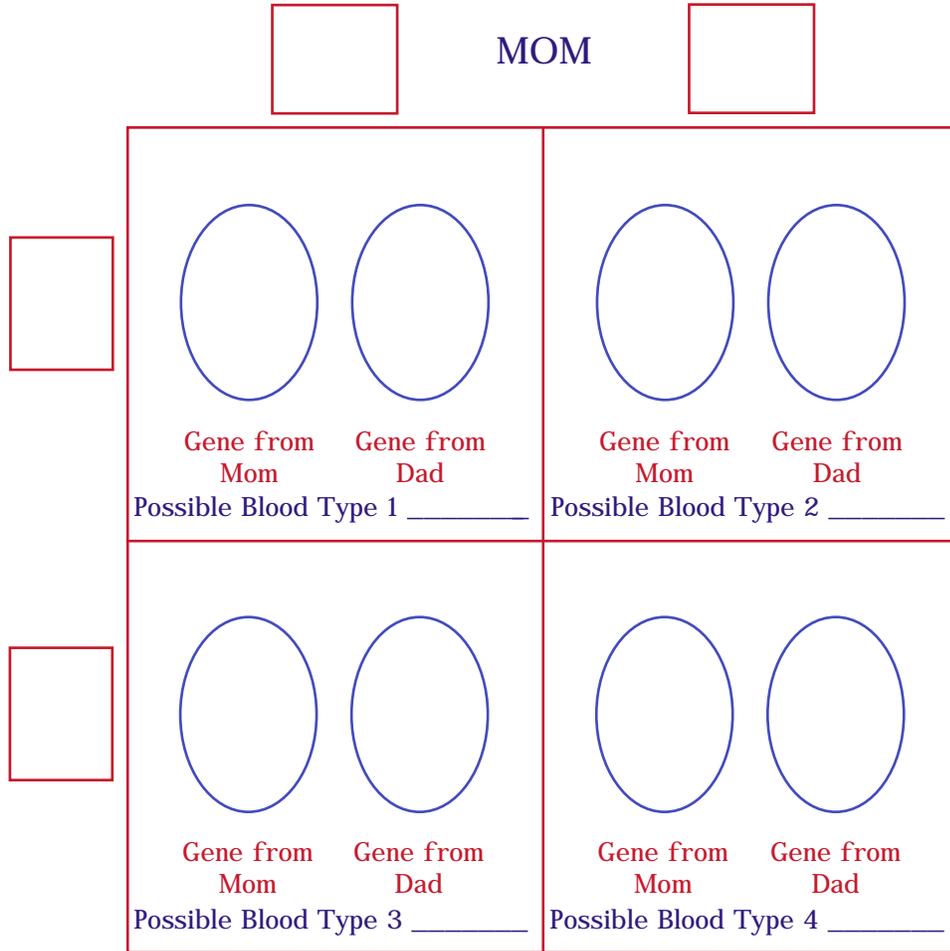
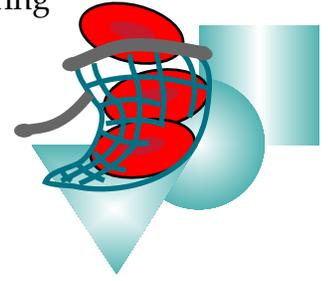


The traits you have are determined by the genes in the chromosomes you inherit from your parents. A *gene* is a specific place on a chromosome that is responsible for a trait (characteristic). Every trait is controlled by at least one gene from Mom and at least one gene from Dad, thus it takes at least one gene pair to control a trait. Some genes are controlled by only one gene pair and other traits are controlled by more than one gene pair. For example, having hair on your hands is a trait controlled by a single gene pair. Eye color is a trait controlled by three gene pairs. ABO blood type is controlled by at least two gene pairs. Since half of your chromosomes come from your mother, you may have many of the same traits that she has. You may also have many traits in common with your father since half of your genetic material comes from him. With thousands of traits being controlled by the genes, keeping track of all of them becomes quite difficult. Therefore, when we look at the inheritance of traits, we usually begin by looking at one trait at a time, as we will do in this activity.



LESSON 3
ACTIVITY 3C

A Punnett Square is used to predict traits that will be inherited by the offspring of two parents. See **Figure 1 Punnett Square**.



BLUE = B gene RED = A gene YELLOW = O gene

Figure 1 Punnett Square

Activity Materials: (per group of 8)

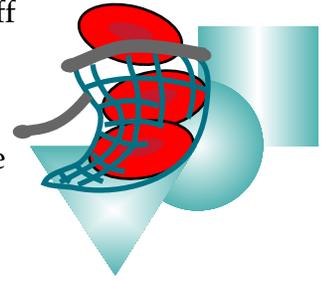
- 1 copy of *Student Information Page* per group
- 1 copy of *Student Data Page* per student
- 1 roll red crepe paper streamer (A gene)
- 1 roll blue crepe paper streamer (B gene)
- 1 roll yellow crepe paper streamer (O gene)
- 1 roll masking tape (colored if possible)
- 1 set task cards (laminated for reuse if possible)
- 1 set of Role Signs with string cords attached (laminated for reuse if possible)
- 1 set of *Chromo-Cross Cards* (laminated if possible)
- Meter stick
- Scissors
- 4 pair disposable gloves: one from each pair labeled *From Mom* and one from each pair labeled *From Dad*
- 1 Marker



LESSON 3
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CAST YOUR NET: ADVENTURES WITH BLOOD

Activity Instructions: Read the following instructions and check off each as it is completed.



- Look at the large, six-foot Punnett Square, shown in *Figure 1* below, that your group will be using for the activity. Notice where Mom G'Nome and Dad G'Nome stand and where each of the Likli' Hoods will sit in the numbered boxes.

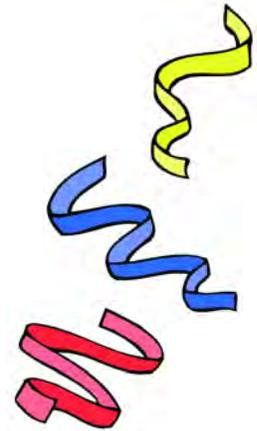
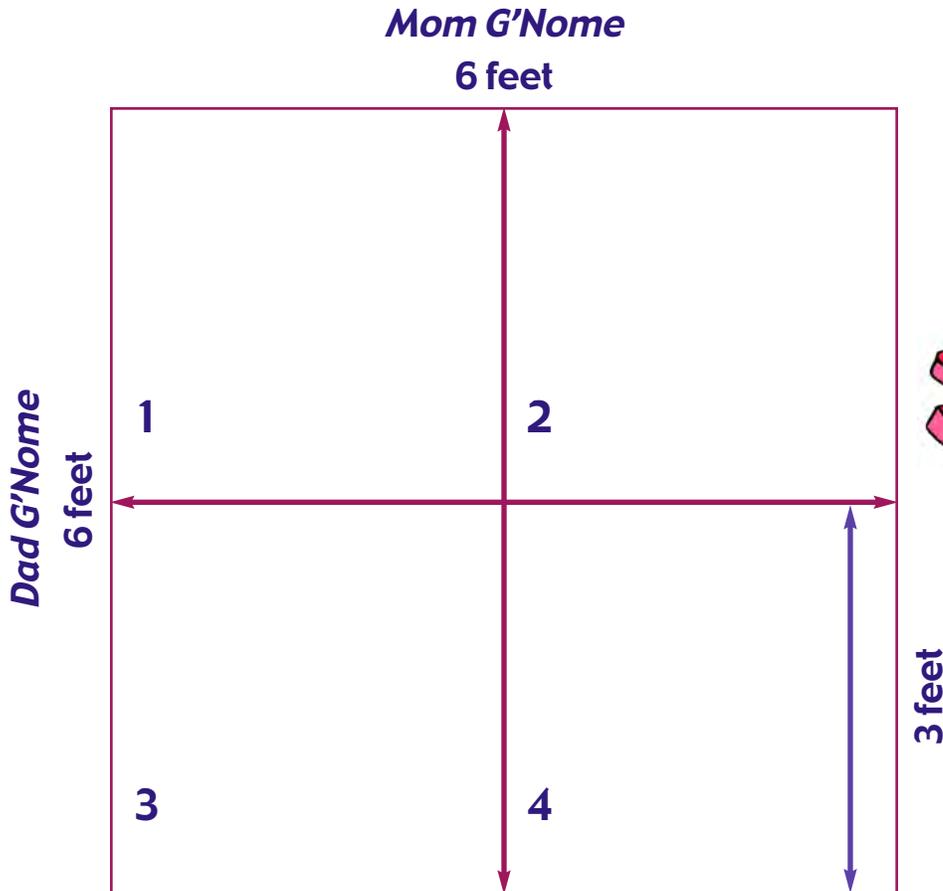


Figure 2 Dimensions for Fun-Punns

- Cut 8 one-meter strips of crepe paper in each color per group.
- Using a maker, make a mark 30 cm from one end of the crepe paper chromosome. Label it *ABO gene*. (See *Figure 3*)



Figure 3 ABO Gene

- If the crepe paper chromosome streamer is red, label the gene *A*. If the streamer is blue, label the gene *B* and if the streamer is yellow, label the gene *O*.
- Choose a *Role Card* and matching *Role Sign* with string attached so you can hang the sign around your neck. Read the *Role Card* and be sure you understand your job as described on the card.



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