

Student Activity Worksheet: The genetics puzzle

Directions: Complete the first set of questions with a partner. Use the *Science News Explores* article “[Explainer: What are genes?](#)” and other “[Scientists Say](#)” articles for reference information and definitions of some of the terms.

Then read the *Science News* article “[The Y chromosome’s genetic puzzle is finally complete](#)” in class as directed by your teacher and complete the remaining prompts with your group and as a class.

Genetics basics

1. What is DNA and how is it organized? Where did you get your DNA?

2. What are genes? What are alleles? How do they relate to a genotype?

3. Draw a Punnett square that shows the possible combinations of chromosomes between male (XY) and female (XX) sexes. Circle the instances in which chromosomes combine to produce a female-sexed baby and give the probability that this might occur.

4. With a partner, use the *Science News Explores* article “[Explainer: What are genes?](#)” to create a diagram that shows the relationships among the following terms: DNA, nucleotide, gene, chromosome, telomere, centromere, nucleus and cell. Think about starting with a sketch of a cell, labeling its parts, then creating more sketches as needed until all the terms have been depicted and labeled. Note: Some of the terms are linked to *Science News Explores* “[Scientists Say](#)” articles that will give you more information.

Gathering new puzzle pieces

After reading the *Science News* article, work in groups to identify every new piece of information that scientists learned from the new studies mapping Y chromosomes. Write each new finding on its own sticky note and place it on the wall of your classroom. Check to see if other groups already put sticky notes with similar information on the wall — if so, overlap your sticky notes.

As a class, review the sticky notes and add any findings that are missing. For each sticky note discuss what was known prior to the new finding. Did that finding disprove information that was previously

accepted as true? Then, discuss how scientists determined the new finding and what challenges they faced, as described in the article.

Putting the puzzle together

1. Why was the sequencing of 43 people, 21 of whom were of African descent, integral to the ability of scientists to discover the findings in this study?

2. Based on the article, what is one takeaway about what is important in the design of genetics research studies?

3. What do you think the next step should be for the scientists in the article? Why?

