

Lesson 1 slide notes for suggested discussion guides for teachers

- Slide 1:** Tell students that they will be applying the genetic terms they reviewed previously to some of the *Harry Potter* characters. If possible, display the [Basic Genetic Terms Worksheet for Teachers](#) for students to refer to as needed during the lesson.
- Slide 2:** Conduct a brief discussion to help students identify examples of genetic physical traits observed in different characters in *Harry Potter*.
- Slide 3:** Read aloud these excerpts as examples of possible genetic traits described in the series.
- Slide 4:** Review the definition of phenotype from the [Basic Genetic Terms for Teachers](#) sheet on display, and have students identify some of the phenotypes, observable traits, described in the excerpts on slide 3.
- Slide 5:** Let students know that they will be exploring the phenotypes and genotypes of these four physical traits.
- Slide 6:** Remind students about the terms phenotypes and genotypes, and help students understand that a genotype contains the allele pair containing genetic codes that results in a phenotype.
- Slide 7:** Model how to identify phenotypes and genotypes for a genetic trait using freckles as an example. Discuss and help students understand that genotypes are often represented by a letter from a trait, and that an upper-case letter connotes a dominant trait and a lower-case for a recessive trait.
- Slide 8:** Demonstrate how a genotype consists of two letters that represent the two or pair of alleles inherited from two parents. And apply the definitions of the terms, dominant and recessive from [Basic Genetic Terms for Teachers](#), to the gene responsible for freckles—when a gene has an allele pair with one dominant and the other recessive traits, the dominant trait overrides recessive one. You can also reintroduce the term, heterozygous which applies to an allele pair with two different forms of the gene.
- Slide 9:** Have students think aloud about what the possible allele letters are for red hair color that is recessive to the brown color. Ask students how they would respond to the question in identifying possible genotypes and their corresponding phenotypes for this example.
- Slide 10:** Provide the answer for the question. Reiterate that the dominant trait becomes observable or expressed over the recessive trait. At least one allele with a dominant trait in the allele pair of a gene results in the dominant trait phenotype, while the recessive trait phenotype requires that both alleles in the gene have to be recessive.

- Slide 11:** Introduce the Punnett Square to students as a graphic way to evaluate probability and possibility of genotypes of parents and children. If appropriate, provide an introduction using the suggested web sites in the [Background Information](#) section of the lesson plan web site.
- Slide 12:** Review the terms, homozygous and heterozygous, from [Basic Genetic Terms for Teachers](#) on display. Ask students to determine the genotypes of parents with freckles using the earlier example used in the class. Guide students to justify their answers.
- Slide 13:** Clarify the answers and justification for them. Model how the word “homozygous” is used to solve the parents’ genotypes for freckles.
- Slide 14:** Demonstrate how both parents’ genotypes are placed on the square before determining their children’s possible genotypes.
- Slide 15:** Allow students to explore how the Punnett Square helps determine the children’s possible genotype(s) and their probability.
- Slide 16:** Conduct a brief question-and-answer session with the slides 16-19. Coach students in using their knowledge to solve the question step by step.
- Slide 17-18:** Assess students’ understanding of how to use the Punnett Square and how they apply genetic terms and concepts through discussion. And help students work through any misconceptions along the way.
- Slide 19:** Ask or help students interpret the Punnett Square information into a probability/chance in percentages.
- Slide 20:** Guide students in using Punnett Square to determine the parents’ genotypes when their children’s genotypes are known.
- Slide 21:** Think aloud about how known genotypes of children can provide the probable genotypes of their parents. The Punnett Square is filled with the children’s possible genotypes (derived from all of them having red hair and freckles) that are used to draw conclusions on the possible genotypes of their parents.
- Slide 22:** Distribute the [Potters’ Hair Color](#) handout to each student and have students work in pairs to answer the two questions on the handout. If needed, display slide 10 to remind students about the genotypes they worked on between red and brown hair colors.

Have student pairs volunteer their answers, and guide their reasoning using slides 23-25 for Question 1, and slides 27-28 for Question 2.

- Slide 23:** Ask students how the described hair colors of Lily, James and Harry Potter may help determine their genotypes for that trait. If needed, clarify that different phenotypes, observable traits, result from different allele combinations of a genotype. This means their described hair colors provide information about the genotypes that resulted in their respective hair colors.
- Slide 24:** Have students volunteer their answers to each question while providing details on how they arrived at their answers. Confirm and correct based on the correct or false reasoning and answers that students provide.
- Slide 25:** Clarify that Harry cannot have RR genotype which also result in dark/brown hair color. The only possible genotype for his hair is Rr. Also ask students to consider what else the two Punnett Squares show about the possible hair colors that Harry's sibling could have. Guide students to think about the two different Punnett Squares and have them use the percentage to indicate the probability of each. For example, one Punnett Square shows that Harry's sibling has 50% chance of having brown/dark or red hair. But the other Punnett Square shows that his sibling will have brown/dark hair just like him—100% chance.
- Slide 26-28:** Restate Question 2 and ask students to volunteer their answer and explain how they arrived at the answer.
- Slide 29:** Display this [Human Mendelian Trait Examples](#) chart and distribute the [Human Mendelian Traits](#) worksheet. Allow students to work in pairs and have student pairs share their findings. Collect the completed worksheet to evaluate students' understanding of the concepts covered during the lesson.