

FAST PLANTS - HINTS FOR TEACHING

- Explain that the “model” is a mental rather than a physical model. Give some examples of physical models and mental models. For example we made physical models during the Chemistry Unit when we built molecules using the chemistry model sets, we also made physical models during the Cell Unit when students constructed their assigned organelles. We used a mental model in the Diffusion/Osmosis Unit to understand diffusion. We sprayed a room deodorizer in the air and observed how the scent spread through the room and used this example of diffusion to understand how substances diffuse into and out of cells.
- Tell them what a pure breeding line is and how one is created.
- Do not allow students to use Punnett squares in their presentations. If they follow the three rules we have established for creating the model, the Punnett square will not be necessary. Forcing them to explain their model without using Punnett squares ensures that they are understanding what is happening inside individual cells during meiosis. Once students have a thorough understanding of the P1 & P2 cross and the F1 & F1 cross, a Punnett square or multiplication matrix may help them to calculate and determine what the F2 offspring.
- Allow students to propose the concept of dominance and recessiveness and the critical role it plays in explaining traits in the F1 generation.
- Allow students to uncover the role of independent assortment in getting the proper ratios of F2 offspring.
- Allow students to learn from their mistakes. Allow them to struggle through the process because their mistakes will help them better understand the final model. The purpose of the whiteboarding process is for other groups to see errors in the model being presented and to give feedback that will help the presenting group revise their model. In other words, refrain from directing student groups to the “right answer. Help them to develop their models by asking questions that will make them think about the direction their model needs to go, but don’t give them solutions and answers because that defeats the purpose of this constructivist approach. Students will be frustrated because the process of developing a model will not always be a smooth one. As a teacher, you will be tempted to give them answers or to give hints that lead them quickly to a solution. Resist the temptation to do this. After the whiteboarding session, all groups should be able to see the problems with their models and at that time you can give them a little more direction in the revision of their model.
- During the whiteboard process (the formation of their model) let students make the mistake of representing a pure breeding trait with only one chromosome. If they use one chromosome they will see that after meiosis occurs some sex cells will be lacking a chromosome and therefore the information that codes for that trait!
- Do individual plants of the F2 generation that look alike (have same phenotype) share the same genetic makeup (genotype)? How could one find out? See if students can determine that a cross between the F2 individual in question would need to be performed against a pure recessive parental individual and that the offspring would need to be scored. This is called a Test Cross.