

Recombination

Crossing over is a process of exchanging segments of a chromosome for segments of a homologous chromosome. This process takes place in meiosis. Crossing over can result in recombination but can result in exchanging sections much smaller or larger than a single gene. Recombination is the process of exchanging genes between homologous chromosomes. This can result in a different set of alleles on each chromosome than either parent of an individual had.

Recombination produces recombinant type gametes. These are gametes where the chromosome has undergone at least one recombination event. There are many options of gametes that could occur from recombination taking place at different locations and each of these gametes could be used for fertilization to produce offspring. Offspring from the same parents can have many different combinations of alleles and thus they may have different characteristics. This genetic variability results in offspring looking different from one another.

Learning Objectives:

- Understand and be able to visualize what crossing over and recombination are.
- Understand and be able to explain why recombination results in genetic variability and siblings who are not identical.
- Comprehend the causal relationship between recombination and parental and recombinant type gametes.
- Be able to identify which offspring and gametes are recombinant type.
- Predict the resulting genotypes from double recombination.

Order of Activities:

1. Review what crossing over is by watching this video. <https://youtu.be/WcfAeZ0nEc8>
2. Visualize the process of crossing over by watching this video <https://youtu.be/op7Z1Px8oO4>
3. Complete the [hands on activity modeling recombination](#).
4. Test yourself by completing the [corresponding worksheet for this material](#). Attempt to first complete this on your own, then pair up with a partner or group to discuss when possible. There is an [answer key provided](#) so you can check your work and read through all explanations for the questions. Any questions you get wrong or confused about you should attempt to explain why the answer is correct and then complete again after you finish the activities in this guide.
5. After reviewing any topic, it is a good idea to have a metacognition check. Ask yourself the following questions:
 - What are my emotional responses to learning this material? Which material am I frustrated with and need aid in understanding?
 - What difficulties have I had with the learning tasks? What specific tasks will I do to master this content?
 - Do I understand all of the learning goals? Can I explain each of them out loud to someone clearly and concisely?
 - How is what I learned related to other things I have learned in this class? How is it related to other classes, my career, and my life?

6. If you would like to have more aid in learning this material, please reach out. There are numerous individuals who want to help you feel confident in your understanding. If your course has learning assistants or teaching assistant(s), you should reach out to them to review concepts you want to learn more about. Your professor is also a great resource to go to when you do not understand a topic. You can study with your peers or receive academic support through the LRC as well. If you would like help identifying how to receive the support you need, do not hesitate to contact the CU Denver Learning Resources Center at LRC@ucdenver.edu or stop by our front desk in the learning commons building.