

Ploidy

In this course, how is ploidy defined?

What is a chromosome type?

1. Cut out two identical long narrow rectangles of construction paper (your group leader will show you an example of size). These two rectangles represent homologous chromosomes of chromosome 1.

2. Using same-colored strips of construction paper to represent homologous chromosomes

And
different colors to represent chromosome types,

In the space below, create a representation of the genome of a diploid organism that has a total of 4 chromosome types.

3. Give each chromosome (homologous and type) a centromere.

How do you write the full ploidy statement for the organism you created in #3?

4. On your construction paper representation (above) of the diploid organism with 4 chromosome types indicate which part of the visual gives you each number in the ploidy statement. *Explain your designations below:*

5. Below, create a representation of this organism if this organism was polyploid instead of diploid.

How do you write the full ploidy statement for this organism?

6. On your construction paper representation of the polyploid organism with 4 chromosome types (above) indicate which part of the visual gives you each number in the ploidy statement. Explain your designations below:

7. Create a diploid organism with 3 chromosome types.

How do you write the full ploidy statement for this organism?

8. Looking at the genomic representation of your diploid organism with 3 chromosome types (#7) place 'gene A' somewhere along the length of the first chromosome on your left.

9. Place another 'gene A' in the other location in the genome where it is found

10. Place another gene – make up any name you wish – on one of the other chromosome types (above).

Where did these homologous chromosomes come from?

Will the version of each of the genes the sperm parent has always match the version of each of the genes the egg parent has?

11. Imagine sperm parent and egg parent donated different versions of gene A to this offspring. What could that look like?

What are these different versions called?

12. Now take this genome through DNA replication (S phase). What happens to each of these homologous chromosomes? Create a representation of this below.

Note: Use tape to attach your copies. Don't twist them together.

What have we created?

We count the number of chromosomes by the presence of a centromere. The centromere is where two chromatids are attached to each other after DNA replication. How many chromosomes are in this cell?

How many chromatids?

How many sets of homologous chromosomes?

Which of the above is different from before S-phase?

Which is the same?

13. Add 'gene A' to the representation you created in #12 (above) using different alleles as in #11 and the other gene you created using the same alleles.

Genes are identical on _____ but can be different variants (alleles) on _____

Notes to self: