

Chromosome Analysis: Creating Karyotypes

- Begin by opening the PowerPoint presentation and going through the first few slides.
- Show the instructions for the activity using the PowerPoint presentation slide “Creating a Karyotype”
- Pass out an envelope to each student at random. Girls do not have to receive XX karyotypes, boys do not have to receive XY. Each envelope contains cut-outs of chromosomes to be arranged into karyotypes. Each envelope will have a number in the upper left-hand corner.
- Allow the students about 10-20 minutes to complete their karyotypes. Walk around the classroom as they work to look for obvious mistakes or to answer any questions.
- Bring up the slide “What kind of results do you see?”
- Write on a board or something all the students can see : 46,XX and draw a line under it. Do the same thing for 46, XY.
- Ask the students how many have a 46, XX karyotype and write the number under 46, XX on the board. Do the same for 46, XY. You will be given a sheet explaining how many of each karyotype should be present, and which numbered envelopes contain abnormal karyotypes.
- Then ask the students how many have a karyotype of something other than 46, XX or 46, XY. There should be 5 students who have a different karyotype. If more or less than 5 raise their hand, you can work out who actually has the different karyotypes by asking for the numbers on their envelopes.
- With each student with a different karyotype, ask them the following:
 - How many chromosomes are there total?
 - Is anything missing? What?
 - Is there anything extra? What?
 - Which sex chromosomes are present? (This may be answered in the course of answering the other questions)
- Write the different karyotypes up on the board. It may be the students are not 100% right in determining which chromosome is extra or missing. If this is the case, go through a process of elimination of what is definitely *not* extra or missing. For example, in the case of Trisomy 21, the extra chromosome can't be chromosome 1 because it is too small. Remind them how complicated this is and that cytogenetic techs train for a long time in order to do this right!
- You should end up with one karyotype each of: 47, XY, +21; 47, XXY; 47, XX, +18; 47, XY, +13; 45, X. Underneath the trisomies, write Trisomy 21, Trisomy 13, and Trisomy 18.
- Go through the slides about each of these chromosomal disorders on the PowerPoint.
- Go through the questions at the end of the slide show.