

A karyotype is an organized profile of a person's chromosomes. In a karyotype, chromosomes are arranged and numbered by size, from largest to smallest. This arrangement helps scientists quickly identify chromosomal alterations that may result in a genetic disorder. In this activity, you will use a computer programs to complete a karyotype.

Site 1: <http://learn.genetics.utah.edu/content/begin/traits/karyotype/>

- Click on the chromosome in the “pool” on the left. Drag it to its partner on the right. (Try it without turning the hints on!) It will stay in place if matched correctly. Pay attention to the banding patterns.
- When complete, answer the questions.
 1. Is this a karyotype for a male or female? How do you know?
 2. Does this individual have any chromosomal abnormalities?

Site 2: http://www.biology.arizona.edu/human_bio/activities/karyotyping/karyotyping.html

- In this activity, you will use the computer to complete 3 karyotypes, use the karyotypes to look for abnormalities and diagnose the patient.
- Read the introduction and answer the questions before beginning.
 1. What type of dye is used to stain the chromosomes?
 2. True or False, Each of the dark bands represents a gene.
- Begin by clicking on Patient Histories.



Patient A: Patient A is the nearly-full-term fetus of a forty year old female.

Chromosomes were obtained from fetal epithelial cells acquired through amniocentesis.

- Click the hyperlink Complete Patient A's Karyotype.
- While completing the karyotype, answer the following question regarding Patient A
 1. The 1st chromosome pictured is the homolog to which chromosome? _____
 2. The 2nd chromosome pictured is the homolog to which chromosome? _____
 3. The 3rd chromosome pictured is the homolog to which chromosome? _____
 4. The 4th chromosome pictured is the homolog to which chromosome? _____
 5. The 5th chromosome pictured is the homolog to which chromosome? _____

Making a diagnosis: Listed below are some syndromes caused by an abnormal number of chromosomes.

6. What diagnosis would you give patient A? Circle your diagnosis.

Diagnosis	Chromosomal Abnormality
Down's Syndrome	Trisomy 21, extra chromosome 21
Trisomy 13 Syndrome	Extra chromosome 13
Klinefelter's Syndrome	One or more extra sex chromosomes (i.e., XXY)
Turner Syndrome	Missing one of the sex chromosomes (i.e., X)

7. List two symptoms Patient A will possess.

Patient B: Patient B is a 28 year old male who is trying to identify a cause for his infertility. Chromosomes were obtained from nucleated cells in the patient's blood. Complete Patient B's Karyotype. While completing the karyotype, answer the following question regarding Patient B.

1. The 1st chromosome pictured is the homolog to which chromosome? _____
2. The 2nd chromosome pictured is the homolog to which chromosome? _____
3. The 3rd chromosome pictured is the homolog to which chromosome? _____
4. The 4th chromosome pictured is the homolog to which chromosome? _____
5. The 5th chromosome pictured is the homolog to which chromosome? _____
6. The 6th chromosome pictured is the homolog to which chromosome? _____
7. The 7th chromosome pictured is the homolog to which chromosome? _____
8. The 8th chromosome pictured is chromosome? _____

Making a diagnosis: Listed below are some syndromes caused by an abnormal number of chromosomes.

9. What diagnosis would you give patient B? Circle your diagnosis.

Diagnosis	Chromosomal Abnormality
Down's Syndrome	Trisomy 21, extra chromosome 21
Trisomy 13 Syndrome	Extra chromosome 13
Klinefelter's Syndrome	One or more extra sex chromosomes (i.e., XXY)
Turner Syndrome	Missing one of the sex chromosomes (i.e., X)

10. List two symptoms Patient B will possess.

Patient C: Patient C died shortly after birth, with a multitude of anomalies, including polydactyly and a cleft lip. Chromosomes were obtained from a tissue sample. Complete Patient C's Karyotype. While completing the karyotype, answer the following question regarding Patient C

1. The 1st chromosome pictured is the homolog to which chromosome? _____
2. The 2nd chromosome pictured is the homolog to which chromosome? _____
3. The 3rd chromosome pictured is the homolog to which chromosome? _____
4. The 4th chromosome pictured is the homolog to which chromosome? _____
5. The 5th chromosome pictured is the homolog to which chromosome? _____
6. The 6th chromosome pictured is the homolog to which chromosome? _____
7. The 7th chromosome pictured is the homolog to which chromosome? _____
8. The 8th chromosome pictured is the homolog to which chromosome? _____
9. The 9th chromosome pictured is chromosome? _____

Making a diagnosis: Listed below are some syndromes caused by an abnormal number of chromosomes.

10. What diagnosis would you give patient C? Circle your diagnosis

Diagnosis	Chromosomal Abnormality
Down's Syndrome	Trisomy 21, extra chromosome 21
Trisomy 13 Syndrome	Extra chromosome 13
Klinefelter's Syndrome	One or more extra sex chromosomes (i.e., XXY)
Turner Syndrome	Missing one of the sex chromosomes (i.e., X)

11. List two symptoms Patient C will possess.

Site 3: <http://learn.genetics.utah.edu/content/begin/traits/scientists/>

1. What are the three key features used to read chromosomes?
2. Centromere position can be described in three ways: metacentric, submetacentric or acrocentric. Sketch and describe each.