



**A PILOT DVD PROJECT**

***WHY THE Y?***

***KARYOTYPING: DETERMINING SEX BY OBSERVING  
CHROMOSOMES***

**JOSE ALMEIDA**

**LISA DOWD**

**G. HOLMES BRADDOCK  
SENIOR HIGH SCHOOL**

## Why the Y?

### Activity Karyotyping: Determining the Sex of a Child by Observing Chromosomes

**Time Frame:** One hour

**Materials:** Student copies of Table 1 and Chromosome Cut-outs Black Line Master, red and blue color pencils, scissors, glue.

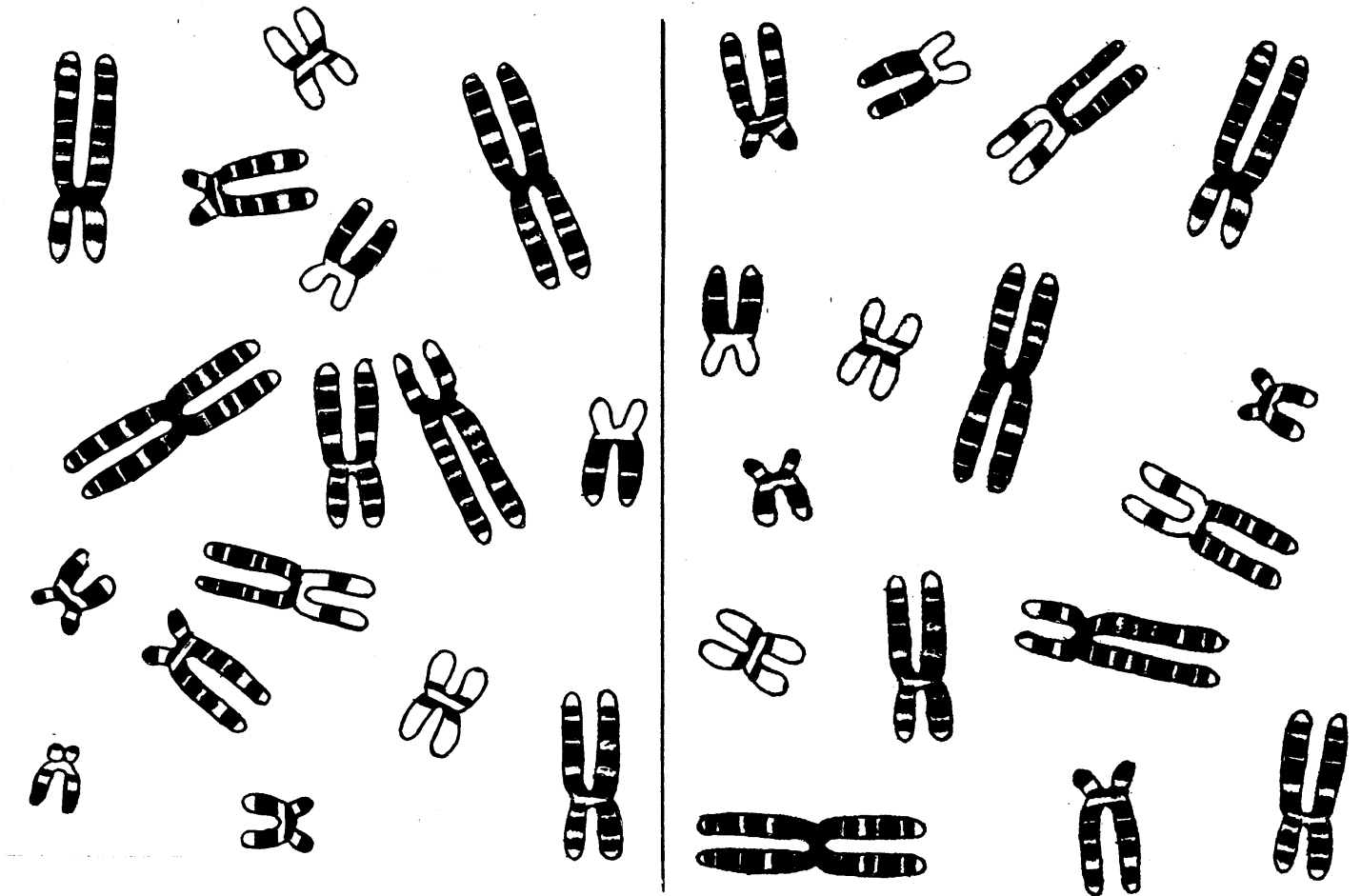
#### Teacher Directions:

- ❖ Using the Black Line Master, Chromosome Cut-Outs, color the chromosomes on the left side of the paper red, and all of the chromosomes on the right side of the paper blue.
- ❖ Cut out each chromosome.
- ❖ Match all of the chromosomes of the same color so that each chromosome has an identical partner.
  - Use banding patterns to help match each homologous pair.
  - Look for characteristics like overall size, location of the centromere and chromatids when matching the chromosome to its partner.
- ❖ Arrange the chromosomes so that they match the descriptions found in Table 1. When you are sure that the descriptions on Table 1 accurately match each chromosome pair, glue the chromosomes onto the Table 1 paper.
- ❖ After constructing the karyotype, identify some differences between the red and blue chromosomes. Write these descriptions on the bottom of Table 1.
- ❖ Watch the HHMI DVD, DVD Extras section, “Interactive Feature on Gender Testing” and look for differences in the karyotypes between males and females.

**Evaluation:** Students will be assessed on their completed work on Table 1.

**Web Connections:** <http://www.hhmi.org/biointeractive/gendertest/gendertest.html>  
<http://www.holidaylectures.org/>

Black Line Master: Chromosome Cutouts



Definitions/Questions for Table 1

1. Define homologous chromosomes.
2. What is the centromere?
3. Define chromatid.
4. Define autosomes.
5. Why might banding be important in matching homologous chromosomes?
6. What are sex chromosomes?
7. The \_\_\_\_ color represents a male. The \_\_\_\_\_ color represents a female.

Table 1: Representative Human Karyotypes

Red Karyotype

I large, centromere near center

II large, centromere ff-center

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III medium-large, centromere ff-center

IV medium-large, centromere t end

V medium, centromere off-center

VI small, centromere at center

VII small, centromere at end

VIII medium-large, centromere  
At center or a y shape

Blue Karyotype

I large, centromere near center

II large, centromere off-center

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III medium-large, centromere off-center

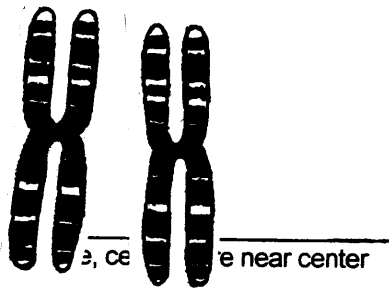
IV medium-large, centromere at end

V medium, centromere off-center

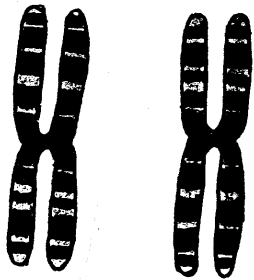
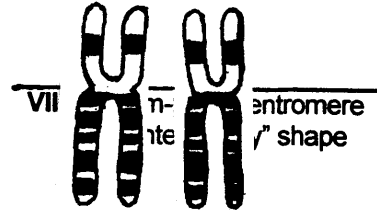
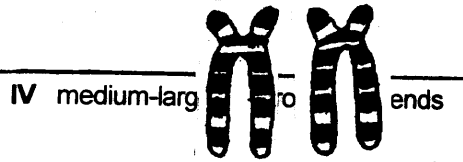
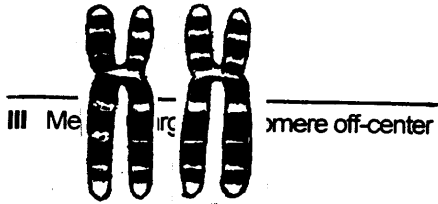
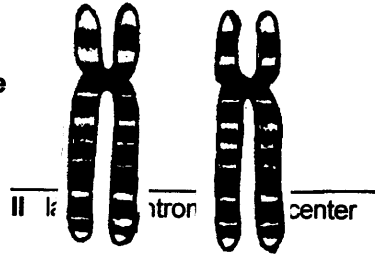
VI small, centromere at center

VII small, centromere at end

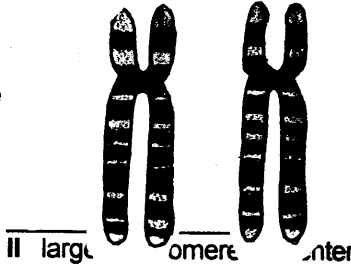
VIII medium-large, centromere  
At center or a y shape



Red Karyotype



Blue Karyotype



I large, centromere near center



III Med size, centromere off-center



IV medium-large, centromere at ends



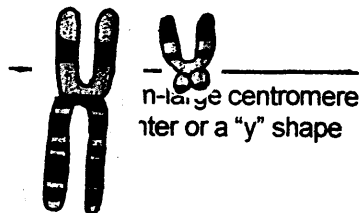
V medium, centromere off-center



V small, centromere at center



VII s, centromere at end



VI medium-large centromere near end or a "Y" shape

