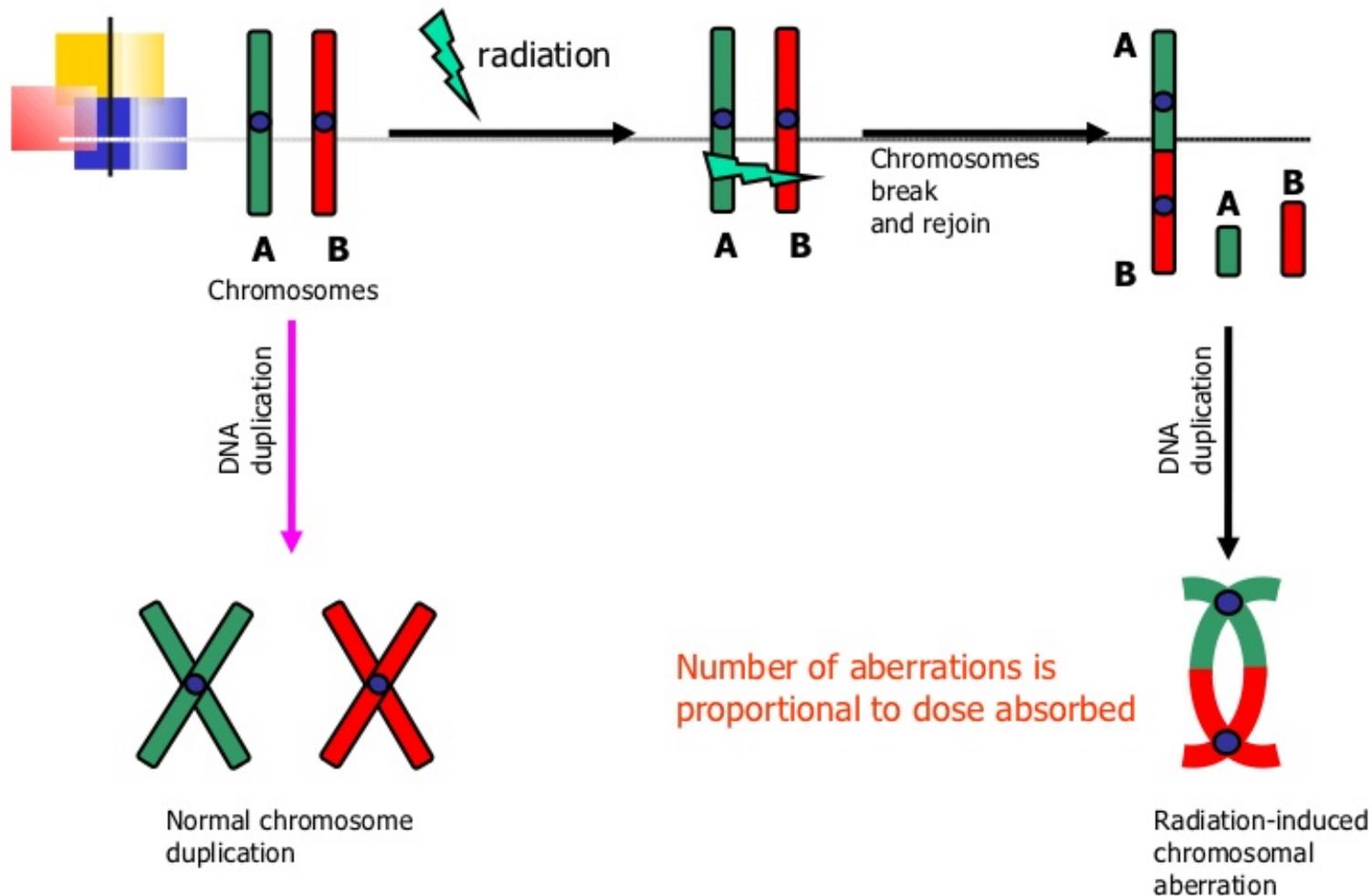
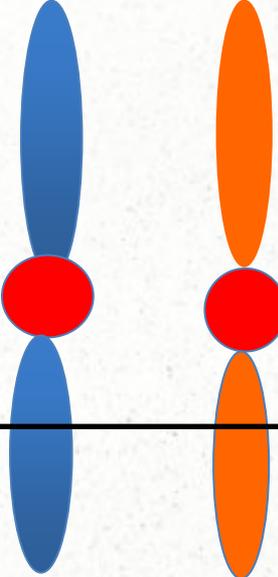


Basis of Chromosome Analysis (Dicentric Analysis)

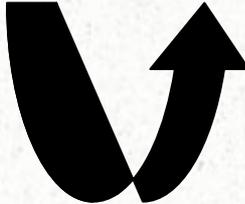
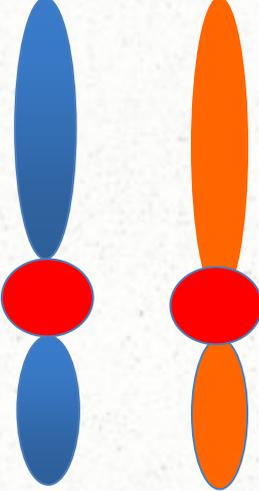


Dicentric Chromosome Formation

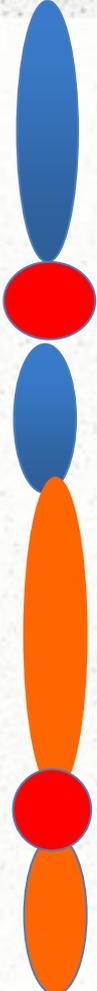
Radiation exposure



Breaks in two chromosomes

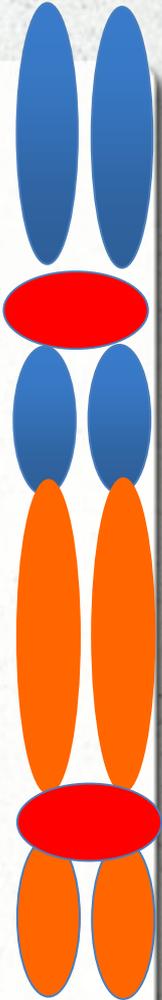


Fusion

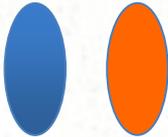


Dicentric chromosome

DNA replication



● Centromere



Acentric fragment



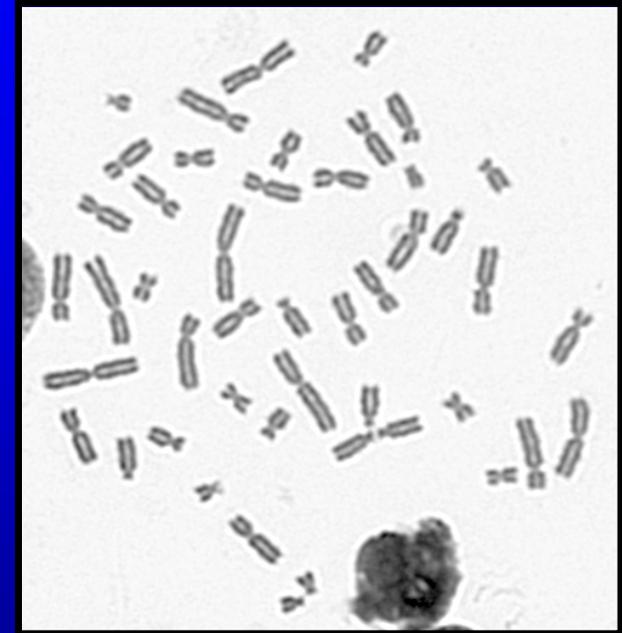
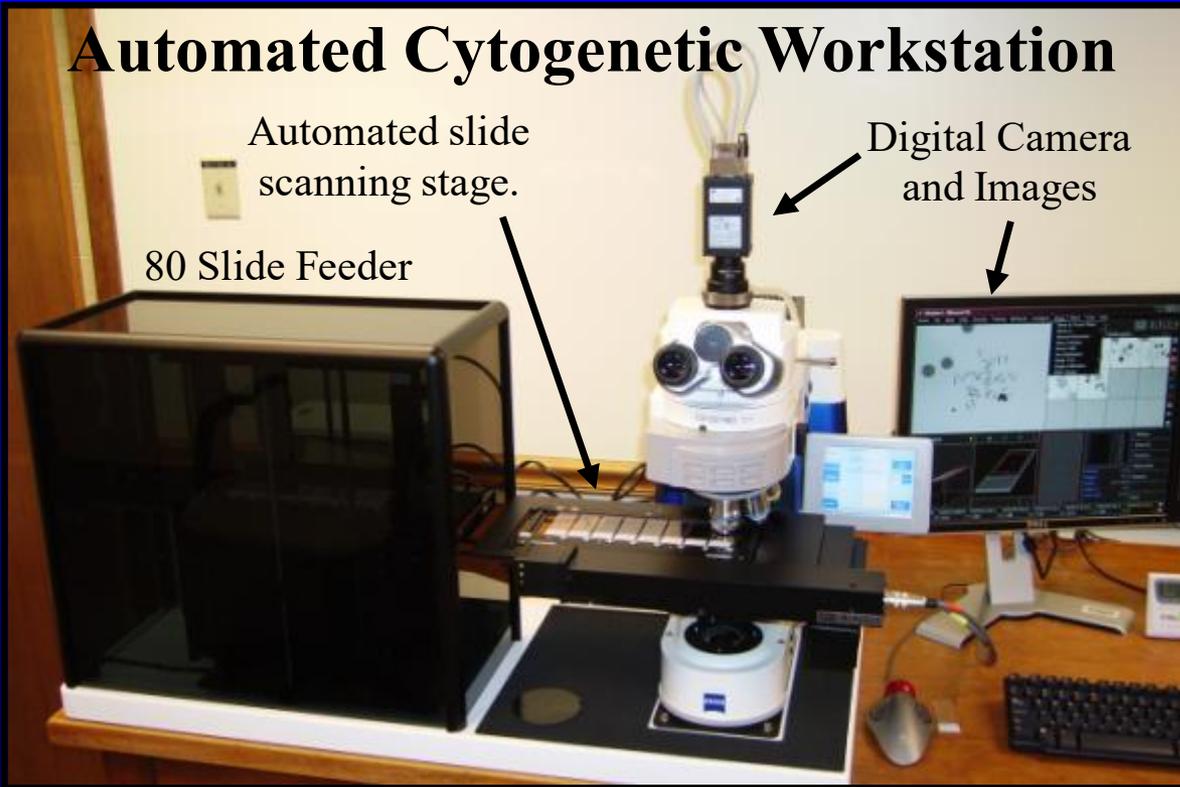
Scoring Dicentric with New Technologies

Automated Cytogenetic Workstation

Automated slide scanning stage.

Digital Camera and Images

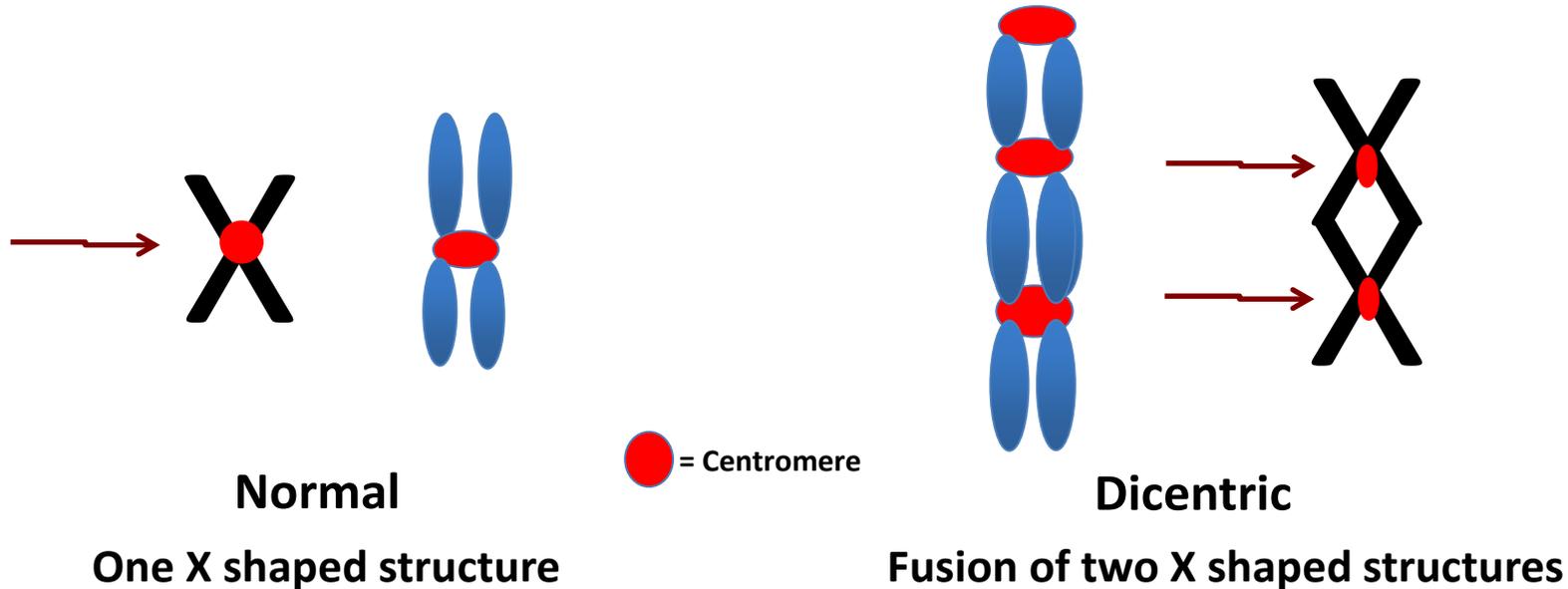
80 Slide Feeder



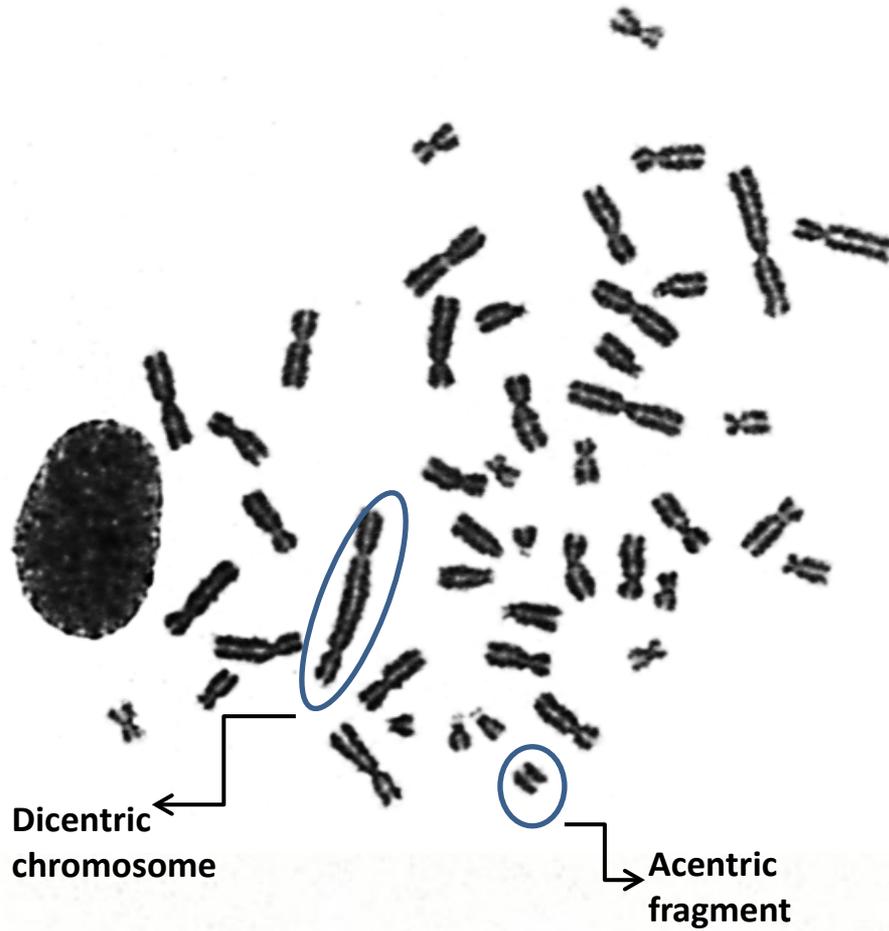
Digital images are used for scoring chromosome aberrations (dicentric).

Dicentric Chromosome Scoring Procedure

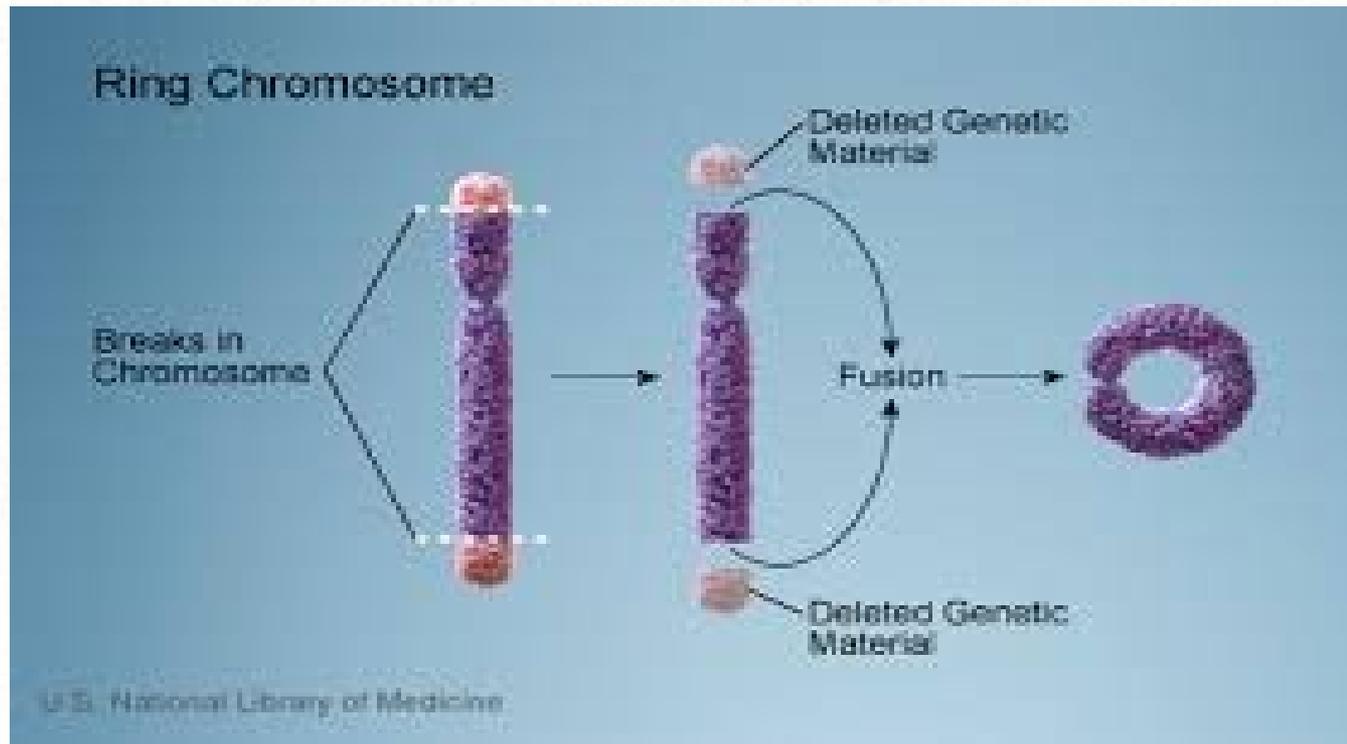
1. **Write down the Cell ID** located on the top of the slide.
2. **Count and record the number of centromeres** to make sure that the metaphase cell has 46 well spread chromosomes (range 45-48).
3. **Look for, count, and record dicentric chromosomes** - have two primary constrictions (centromeres).



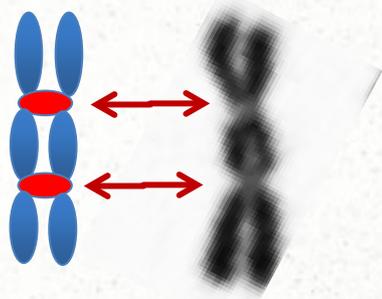
4. Look for, count and record **acentric fragments** - fragments of DNA that do NOT have a centromere.



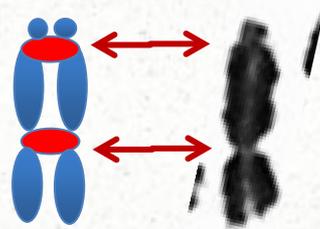
5. **Look for, count and record centric rings** - fragments of DNA in the shape of a circle with only a centromere present holding it together.



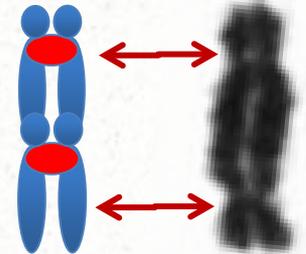
Dicentric Chromosome Shape



Centromeres in the middle



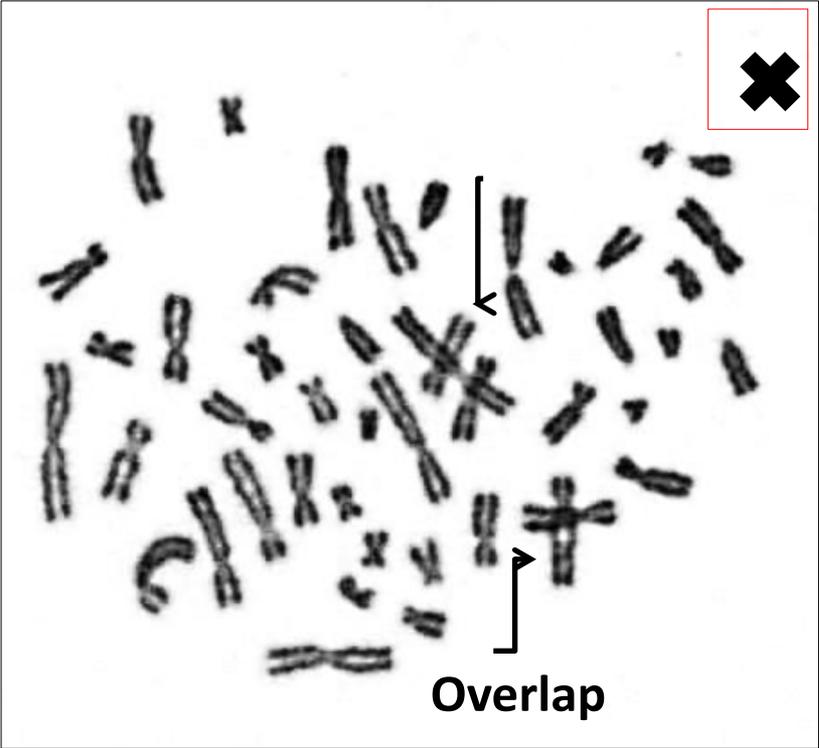
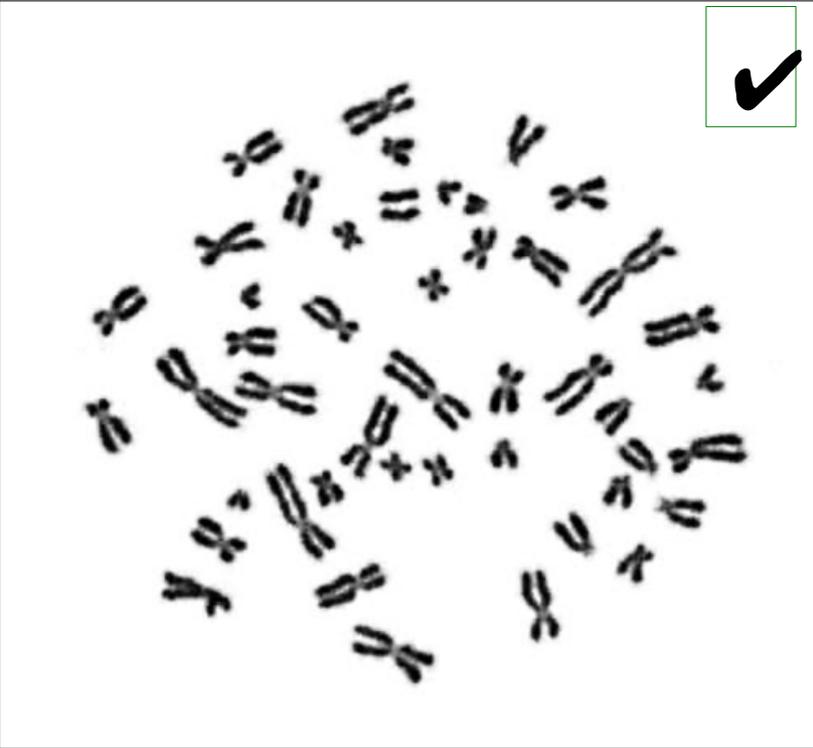
One centromere proximal and one in the center



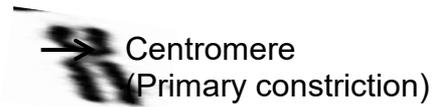
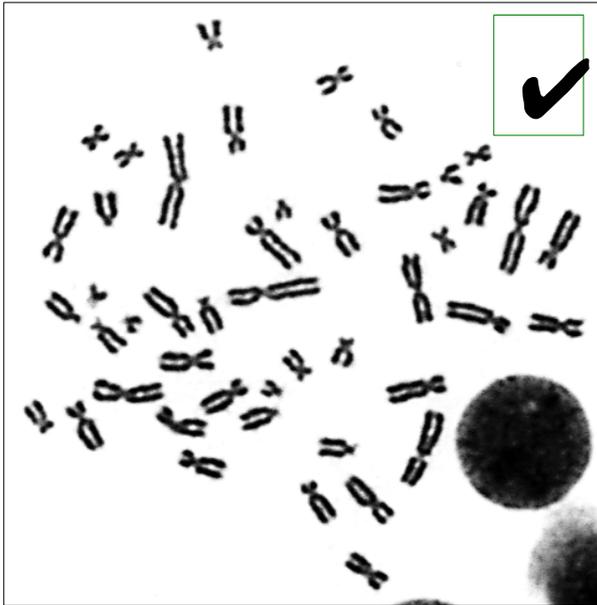
Both centromeres at the ends

● Centromere

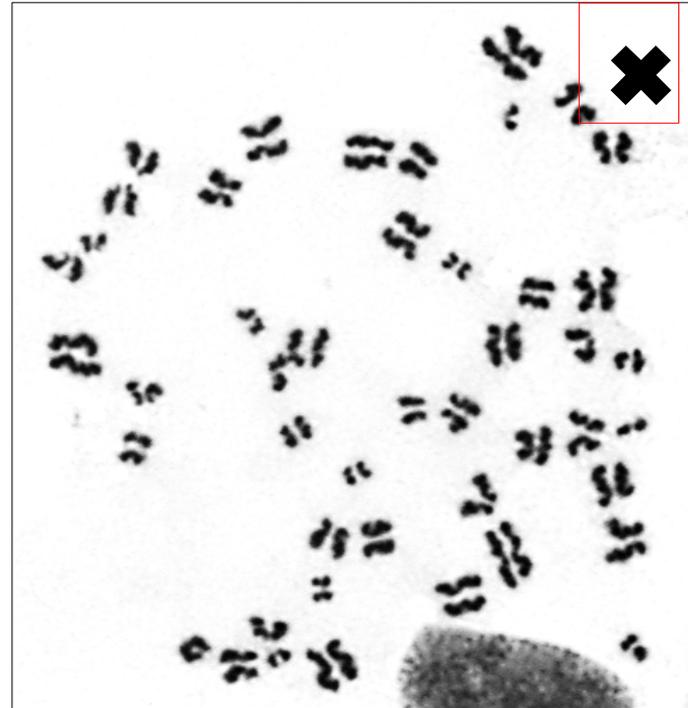
Chromosomes are well separated without any overlap



Centromeres are clearly visible with well separated chromosome arms



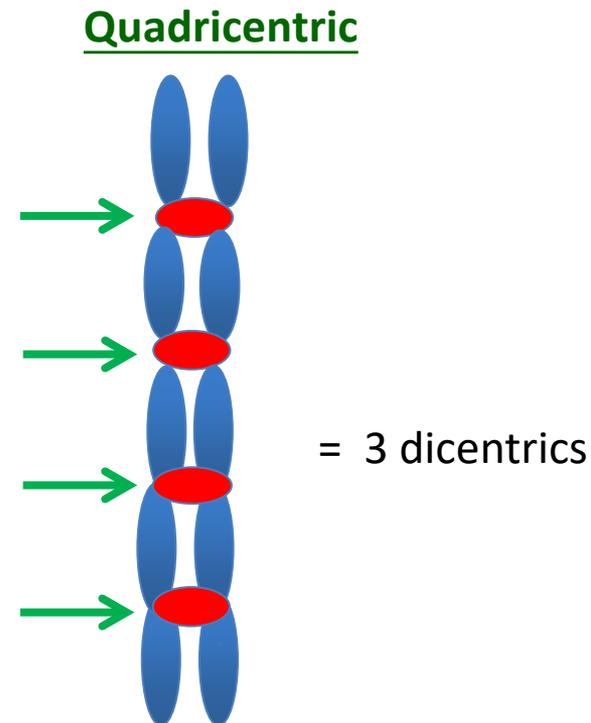
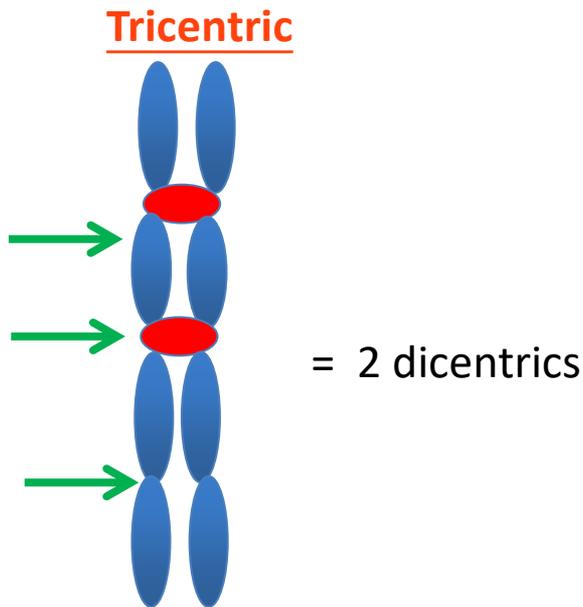
Anaphase cells with completely separated sister chromatids must be rejected from analysis



Things to remember while scoring dicentric chromosomes

Occasionally, chromosomes with three centromeres (tricentric) and four centromeres (quadricentric or tetra centric) are observed. A tricentric chromosome is scored as two dicentric chromosomes and a quadricentric chromosome is scored as three dicentric chromosomes.

For example, if one dicentric chromosome and one tricentric chromosome are found in a metaphase cell then the total number of dicentric chromosomes observed is 3.

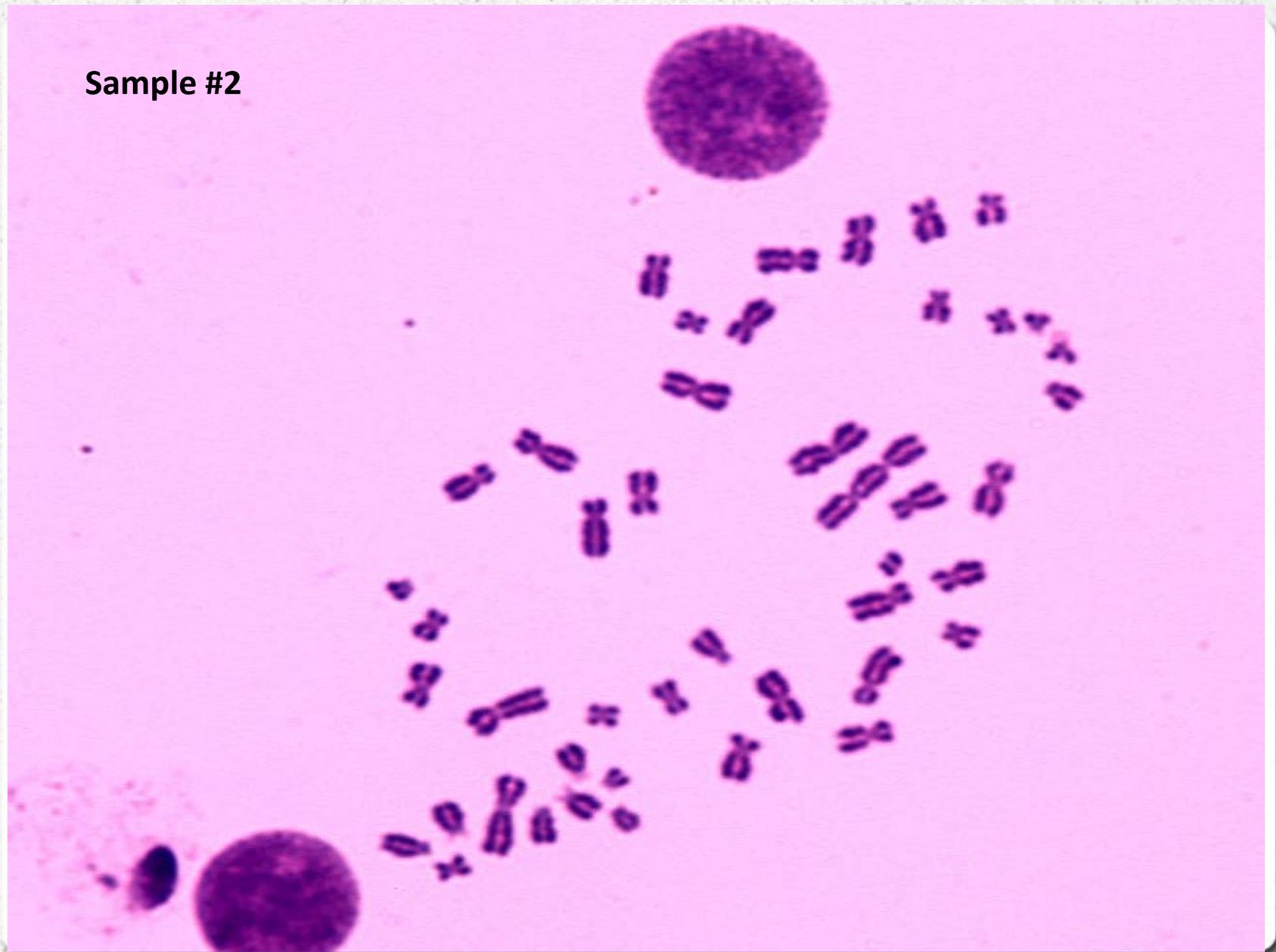


Sample Chromosome Assays

Sample #1



Sample #2



Pair-Share Dicentrics Activity:

- Work with a partner to determine the cell ID, number of centromeres, number of dicentric chromosomes, number of centric rings, and number of acentric fragments for each of the chromosome assays given in the shared Google slide presentation named “**Pair-Share Dicentrics Activity**”.
- Record all data in the table provided. Each student must turn in his or her own data sheet.
- Each chromosome assay is worth 10 points. Total = 100 points.

Ticket Out the Door: 3-2-1 Activity

*****Turn in as you leave class today!***

- List THREE objects found within a chromosome assay.
 - What are TWO parts of a chromosome?
 - Define ONE new term used today in class.