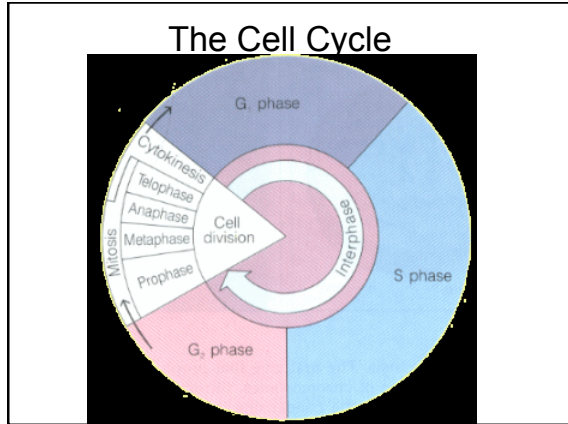


Cell Division



The Cell Cycle an overview

- What must happen to a cell before it can divide?
- Copy DNA and grow in size (interphase)
- Nucleus will divide (Mitosis)
- Cytoplasm divides (Cytokinesis) and the two daughter cells enter Interphase

The Importance of Mitosis

- Many **unicellular** organisms reproduce this way (asexual reproduction)
- **Multicellular** organisms use mitotic cell division for numerous reasons
 - Growth
 - Development
 - Repair
 - NOT FOR SEXUAL REPRODUCTION (that is meiosis)

Interphase

- **First and longest** stage of cell cycle
- Subdivided
 - G₁: **grow**
 - S: **synthesis of DNA**
 - G₂: **grow organelles used in mitosis**

Phases of Mitosis

- Prophase, Metaphase, Anaphase, Telophase
- During Mitosis, the nucleus will be divided into two
 - Prophase
 - Metaphase
 - Anaphase
 - Telophase

Prophase (preparation)

- The **Chromatids** attach to each other at the **centromere**
- Pair of **centrioles** appear

Labels in diagram: CHROMOSOME, CENTROMERE, CHROMATID, Nuclear envelope, Separating centrosomes, Mitotic spindle, Microtubules, Condensed chromosomes, Centromere with attached kinetochore.



Metaphase (middle)

- Chromosomes
- **Spindle**
- ◆ **chromosomes line up in middle**
- ◆ **attached to protein "cables" that will help them move**

Anaphase (apart)

- Chromatids are **pulled apart** at the centromere.
- Chromosomes move to opposite poles of cell.

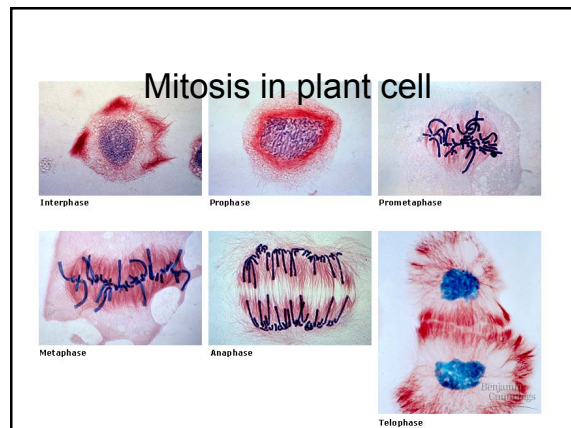
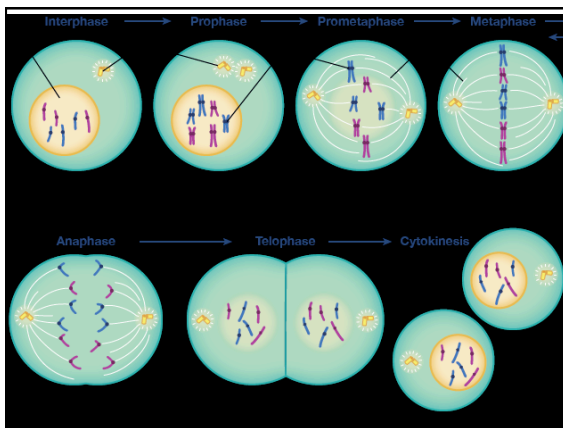
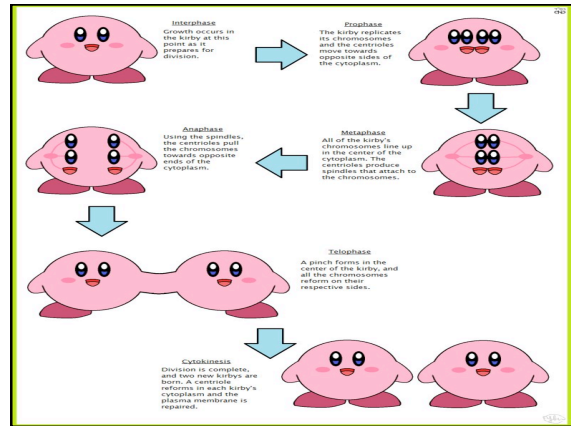
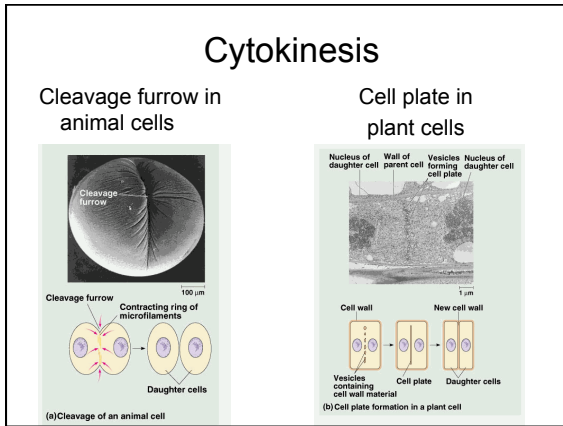
Telophase (two)

- Chromosomes uncoil and become threadlike mass, call **Chromatin**
- Nuclear envelope reforms
- **Spindle fibers** disappear

- Mitosis is now complete, but the rest of the cell still needs to divide

Cytokinesis the end of the M phase

- Two nuclei
- Cytokinesis is the **division** of the cytoplasm, and usually occurs simultaneously with telophase
- cleavage furrow vs. cell plate



Test Yourself Mitosis and Meiosis

- A. You will be shown images of cells in various stages of the cell cycle. Identify each stage.
- B. We will go over the answers.
- C. You will identify the stages individually and turn your papers in.

Test Yourself –Part A

A E

B F

C G

D H

Everyone Done?

We'll go over the answers now

Test Yourself



A. Telophase



E Anaphase



B Metaphase



F Interphase



C Anaphase



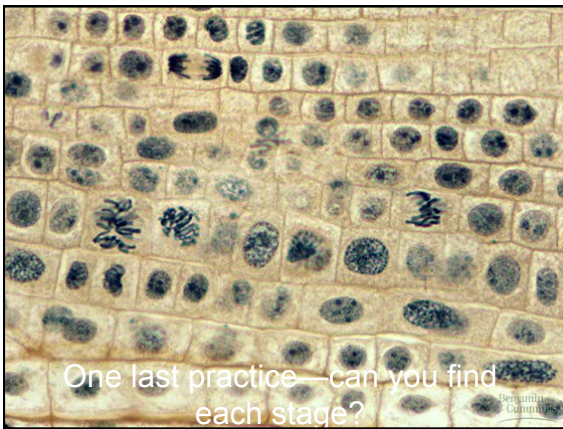
G Metaphase



D Prophase



H Prophase

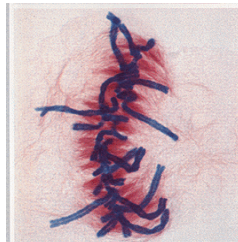


Any Questions?

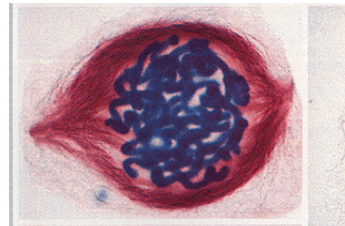
Quiz Time!

Number your paper 1-5
Identify the stage of the cell cycle shown in each image

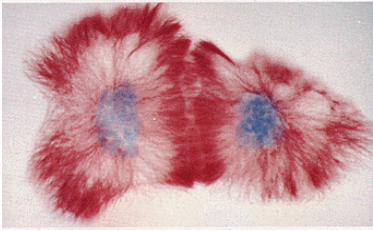
Question 1
Identify the stage shown below



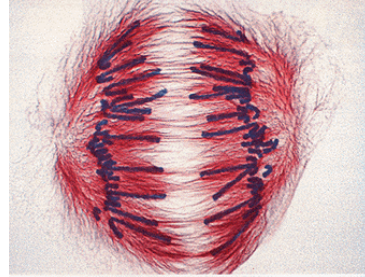
Question 2
Identify the stage shown below



Question 3
Identify the stage shown below



Question 4
Identify the stage shown below



Question 5
Put these words in chronological
order

- Anaphase
- Cytokinesis
- Interphase
- Metaphase
- Prophase
- Telophase