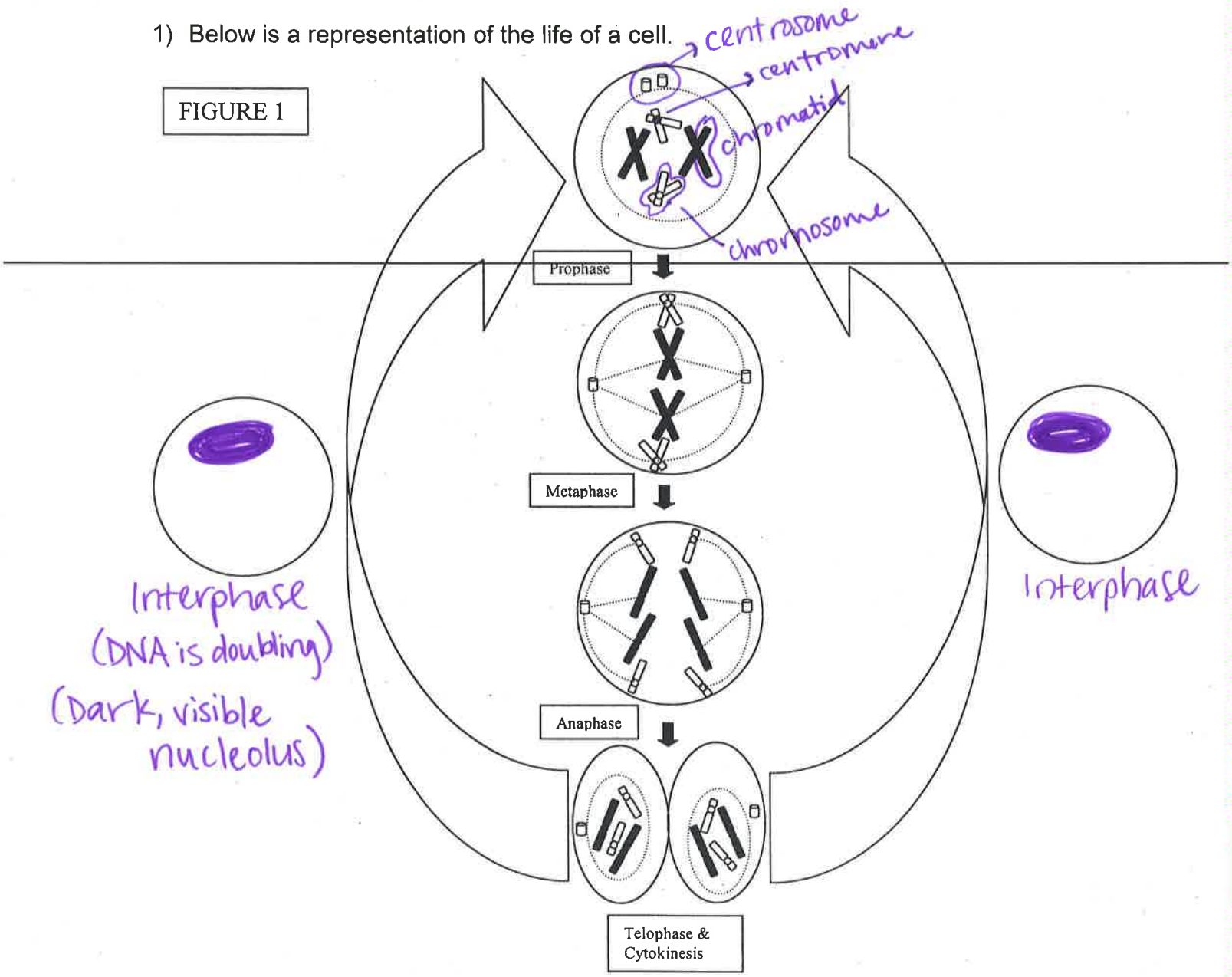
Name_____ Date_____

Unit 6 – Growth and Reproduction Exercise 2

1) Below is a representation of the life of a cell.

FIGURE 1



a. In the **prophase** and **telophase** stages in the diagram, label the following structures:
   i. Chromosome
   ii. Chromatid
   iii. Centromere
   iv. Centrosome

b. Is this cell an animal cell or a plant cell? HDYK?

Animal - no cell wall (would be a polygon!)

c. What phase is represented by the arrows?

interphase

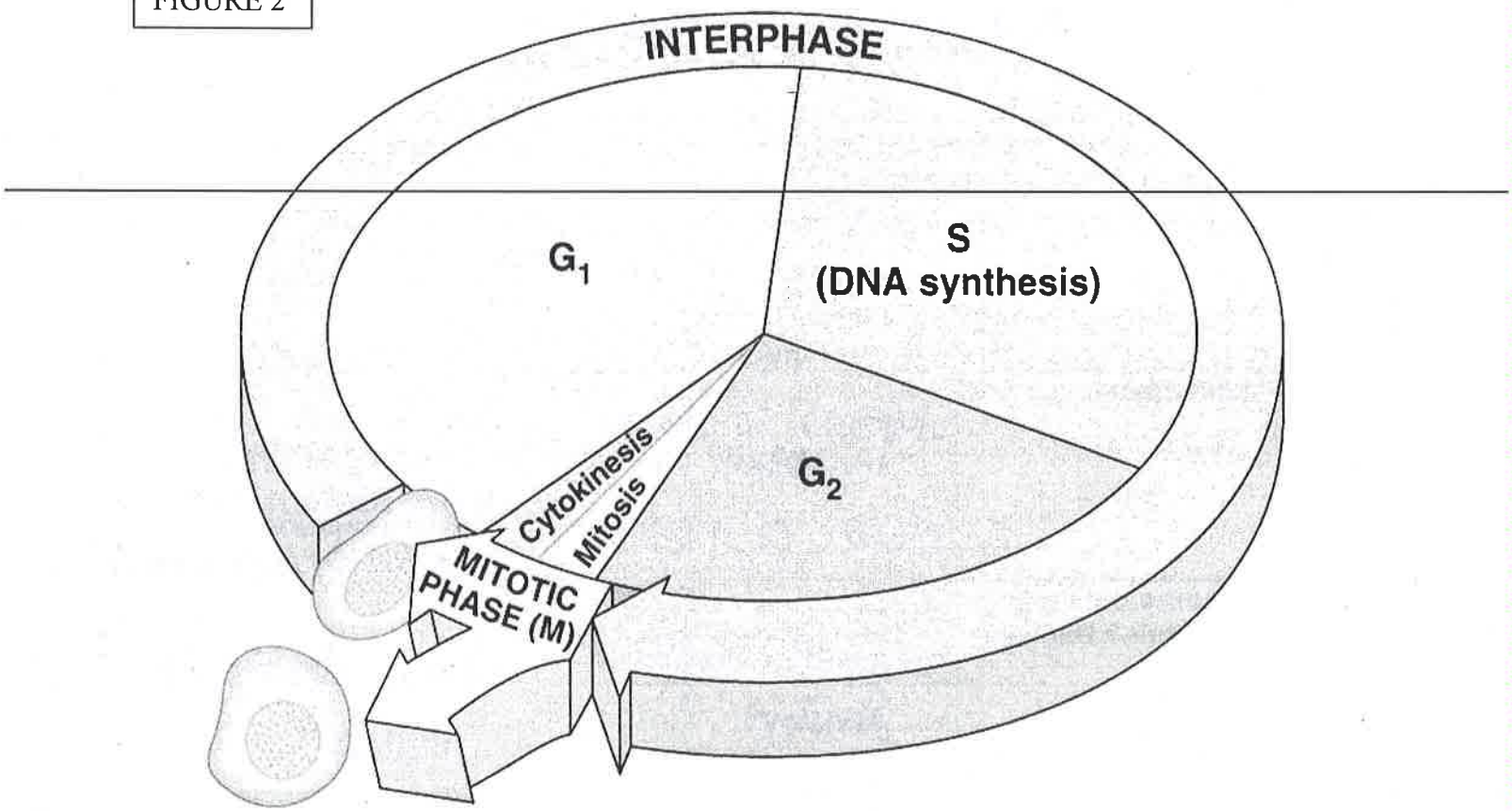
i. What is the cell doing during this phase?

growing, duplicating DNA

ii. In the circles provided in figure 1, draw a representation of the cell during this phase.

2) An alternate way to represent the life of a cell.

FIGURE 2



a. During which phase are the chromosomes duplicated?

Synthesis in Interphase

b. The M phase is mitosis.

i. Why are there 2 arrows?

2 cells are produced as a result of mitosis

they can continue w/ normal cell activities OR divide again

ii. What will happen along the path represented by the bottom arrow in the M phase?

continue w/ normal cell activity

c. G_1 and G_2 were originally known as Gap phases.

i. What misconceptions does the term "gap" generate?

that nothing is happening

ii. What events are happening during these phases which makes the term "gap" a misnomer?

growing
preparing for mitosis

3) Compare the representations of the cell cycle.

	Figure 1	Figure 2
Advantages	-Mitosis is shown in detail -shown as a cycle	-whole cell life cycle is shown -more details about interphase -shows cells don't always÷
Does the figure create any misconceptions? Explain	-suggests continual division	-lacks details of mitosis

a. Are there any misconceptions generated by the representation in one figure that are addressed by the other figure? If so, which ones?

Yes - Fig 2 lacks mitosis details

- ~~Fig~~ 1 shows that division is continuous but it isn't!

b. Draw your own representation of the life of a cell which maximizes the advantages of the representations in Figures 1 & 2 and minimizes the disadvantages. Be sure to label.

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Unit 6: Growth & Reproduction Exercise 3

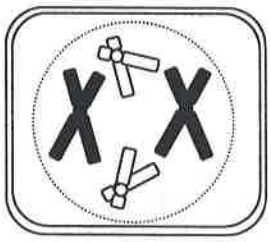
1) Many weed killers disrupt mitosis. To see what one such weed killer would do, a class of high school students examined slides of onion root tip cells which had been exposed to a weed killer. They counted the number of cells in each stage of mitosis and compared them to the frequencies which they observed for the unexposed onion root tip cells. The data is shown in the table below.

Proportion of Cells in a Specific Mitotic Stage in Treated versus Untreated Onion Root Tips

Mitotic Stage	Untreated Onion Root Tips	Onion Root Tips Treated with Weed Killer
Prophase	60%	60%
Metaphase	15%	39%
Anaphase	10%	< 1%
Telophase	15%	< 1%

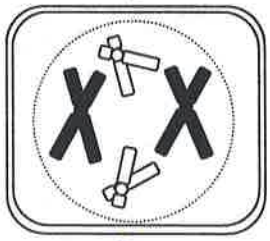
a. Starting with the cells shown below, diagram the mitotic sequence for an untreated versus a treated onion root tip cell. Be sure to label the stages.

Untreated Onion Root Tip Cell

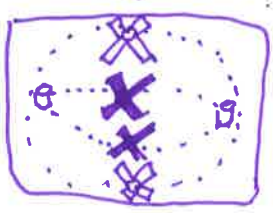


just like Fig. 1

Treated Onion Root Tip Cell



*Note: Cells are square because plant cells (onions) have cell walls!



Stop!

b. In the experiment on the previous page, identify the:

i. IV weed killer

ii. DV how many cells were in each phase of mitosis

iii. Control unexposed onion root cells

c. ~~How does the data for the untreated onion root tips compare to:~~ we did not do in class

i. your data

ii. the combined data for your class or several classes

iii. How might you account for any discrepancies? Explain.

d. Which stages of mitosis are not seen in the root tip cells treated with weed killer?

Anaphase & Telophase

i. What do you think the treated cells are unable to do which accounts for the absence of these stages? Justify your answer.

Centrosomes cannot pull chromosomes to the poles / separate chromatids at the centromeres

ii. Propose a way to test your hypothesis.

e. Weed killers often carry warning labels which state that they should not be applied in the presence of pregnant women and small children. In light of the results presented above, give a reason why these particular groups of people should not be exposed to weed killers. Justify your answer.

Pregnant women are growing a fetus, and small children will still be growing too. Mitosis is required for growth, and weed killers inhibit mitosis!

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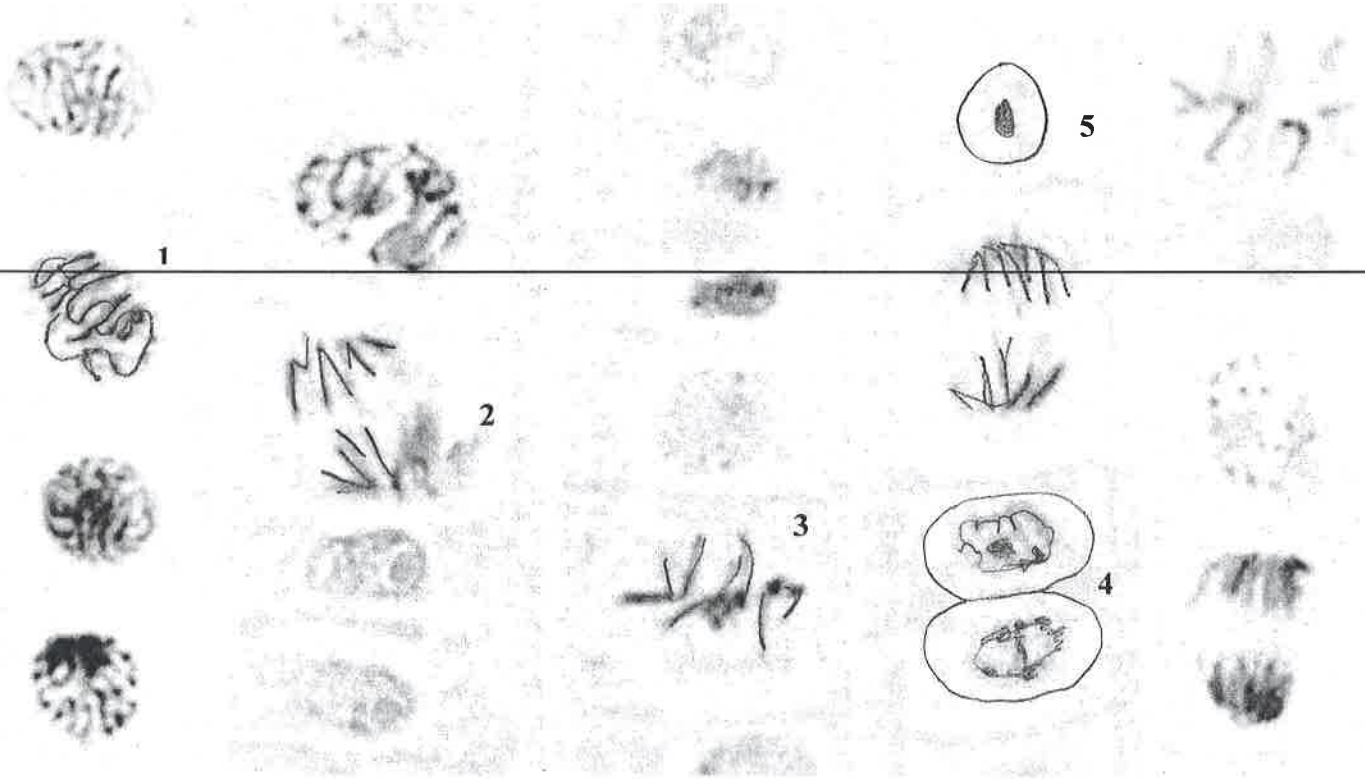
Unit 6: Growth & Reproduction Exercise 3

2) Identify the stages shown in the pictures below and write a brief explanation of what is occurring in each stage.



From: http://www.histol.chuvashia.com

1. prophase

2. anaphase

3. metaphase

4. telophase

5. interphase