B1 L6 Challenge worksheet: Cell division: mitosis

Name: _____ Class: _____

A. Chromosome numbers

Help: online screens 3, 6 and 9 [5]

Table 1 shows the number of chromosomes in a body cell of five organisms.

Table 1

Organism	Number of chromosomes in a body cell
human	46
dog	78
horse	64
onion	16
fruit fly	8

(a) A dog skin cell divides by mitosis. How many chromosomes are in each daughter cell? [1]

_____ chromosomes

(b) How many pairs of chromosomes are in a horse body cell? [1]

_____ pairs

(c) A student says: “The more chromosomes an organism has, the more complex it is.” Use Table 1 to explain whether the student is right. [2]

_____

_____

_____

(d) One fruit fly body cell divides by mitosis. In each round, every cell divides once. After 3 rounds, how many cells are there, and how many chromosomes does each one have? [1]

_____

_____

B. Time spent in mitosis

Help: online screen 7 [5]

A student looked at an onion root tip squash. She counted 400 cells. 30 of them were in mitosis. One cell cycle in these cells takes 20 hours.

(a) Calculate the percentage of cells that were in mitosis. [1]

_____ %

(b) Calculate how long mitosis takes in these cells. Give your answer in minutes. [3]

Use: **time in mitosis = (cells in mitosis ÷ total cells) × time for one cell cycle**

_____ minutes

(c) Suggest one way the student could make her estimate more accurate. [1]

_____

_____

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C. Doubling

Help: online screen 9 [5]

Skin cells can be grown in a lab dish to make new skin for people with bad burns. A skin cell taken from the patient divides by mitosis every 24 hours. Every new cell divides in the same way.

(a) How many cells are there after 5 days? [1]

_____ cells

(b) Calculate how many cells there are after 20 days. Give your answer in standard form to 2 significant figures. [2]

_____ cells

(c) Suggest one reason why the real number of cells grows more slowly than this. [1]

_____

_____

(d) Explain why all the cells in the dish are genetically identical to the patient's skin cell. [1]

_____

_____

D. Extended response

Help: online screens 4, 6 and 10 [6]

A student grazes her knee. Over the next two weeks, the skin heals. Describe how the cell cycle makes new skin cells, and explain why the new skin cells have the same genetic material as the old ones. [6]

In your answer, describe all three stages of the cell cycle.