Review for Unit Test #3:
Cellular Reproduction: Mitosis, Meiosis, Karyotypes and Non-disjunction Disorders

It may help you to review mitosis, meiosis and non-disjunction by watching the following narrated animations. They are excellent. There is a summary of the important points and a quick quiz at the end of each:

Mitosis in animal cells (do not worry about kinetochores)
http://www.sumanasinc.com/webcontent/animations/content/mitosis.html

Meiosis in animal cells (do not worry about interkinesis)
http://www.sumanasinc.com/webcontent/animations/content/meiosis.html

Non-disjunction disorders (do not worry about aneuploidy or polyploidy)
http://www.sumanasinc.com/webcontent/animations/content/mistakesmeiosis/mistakesmeiosis.html

1. Know and understand the definitions and meanings of the following terms.

prokaryotic cell	Cell cycle	crossing-over
eukaryotic cell	interphase	chiasmata
chromatin	mitosis	gametes
histones	meiosis	fertilization
DNA replication	cytokinesis	zygote
mutation	cleavage furrow	spermatogenesis
point mutation	cell plate	oogenesis
frameshift mutation	Interphase, Gap 1	ova (ovum)
gene	Interphase, Synthesis	sperm
oncogene (from homework)	Interphase, Gap 2	pollen
unduplicated chromosome	prophase, prophase I and prophase II	karyotype
duplicated chromosome	metaphase, metaphase I and metaphase II	autosome
chromatid	anaphase, anaphase I and anaphase II	sex chromosome
sister chromatids	telophase, telophase I and telophase II	non-disjunction
centromere	homologous chromosomes	syndrome
haploid	synapsis	monosomy
diploid	tetrad	trisomy

2. Clearly explain the difference between the following:

a) chromosomes and chromatin
b) the cell cycle and mitosis
c) cytokinesis in plant and animal cells
d) chromatin and chromatid
e) mitosis and cytokinesis
f) mitosis and meiosis
g) anaphase I and anaphase II
h) autosomes and sex chromosomes

3. Regarding the cell cycle:

a) What are four reasons that cells divide?
b) What are the two main stages of the cell cycle? Clearly explain the difference between these two stages.
c) What two things have to divide during the division stage? What is the name given to each of these types of division?

4. Regarding interphase:

a) What are the three phases of interphase? Briefly describe what happens in each phase.
b) Give two examples of types of cells that spend a long time in interphase.
c) Give two examples of types of cells that spend a very short amount of time in interphase.

5. Regarding mitosis:

a) What steps take place in mitosis? Describe the critical events that take place in each of these steps.

b) For diagrams of cells in mitosis, be able to recognize which phase is taking place.

6. What is a **karyotype**? What stage of mitosis is the best for preparing karyotypes?

7. What are **genes** and what is their function?

8. What are the roles of the following in the Cell Cycle?

a) spindle fibers b) centrioles c) centromeres d) cell plate

9. Identify the following phases of Meiosis from the description. Include whether it is meiosis I or II.

a) Homologous chromosomes pair up and form tetrads

b) Spindle fibers move homologous chromosomes to opposite poles

c) Nuclear membrane reforms, cytoplasm divides, 4 daughter cells form

d) A haploid number of chromosomes line up along equator

e) Crossing-over occurs

f) Chromatids separate

g) Homologous pairs of chromosomes line up along the equator

h) Cytoplasm divides, 2 genetically unique daughter cells are formed

10. Regarding meiosis:

a) Which type(s) of cells perform meiosis?

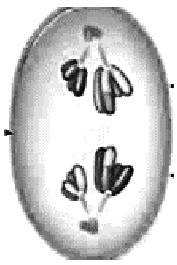
b) What are the two main (overall) purposes of meiosis?

c) Which two processes of meiosis increase the genetic diversity of the offspring? During which stages of meiosis do these processes take place?

11. What is the advantage of increased genetic diversity?

12. What problem can occur during meiosis, and what are the two points at which this problem may arise? What is the effect on the gamete and on the zygote?

13. Name the following stages of meiosis. Include whether it is meiosis I or II.



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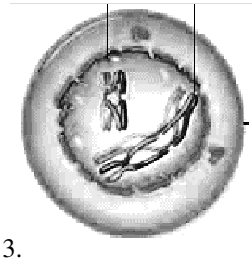

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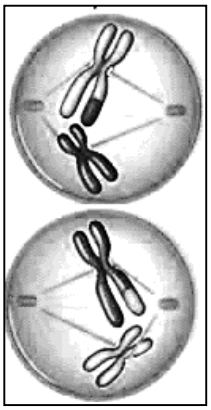

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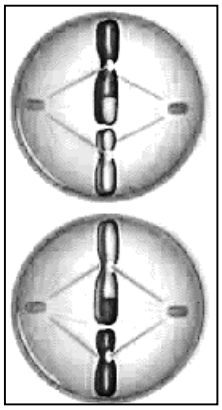

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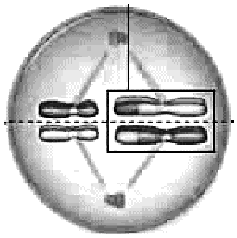

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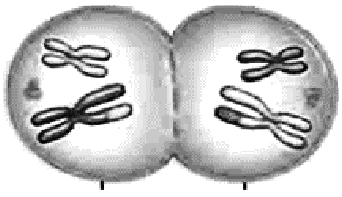

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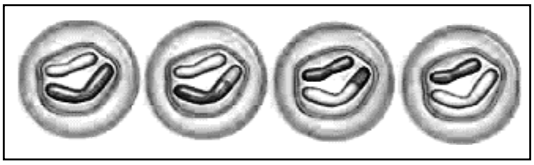

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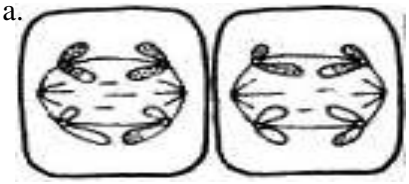
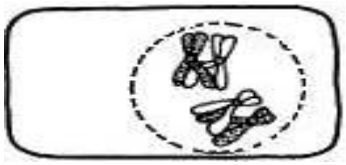
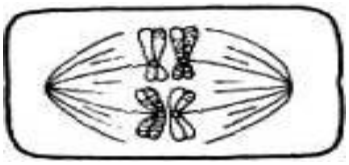
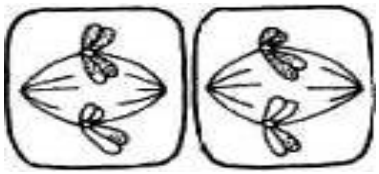
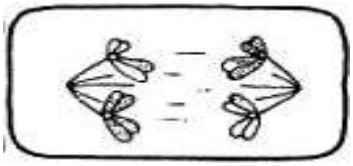
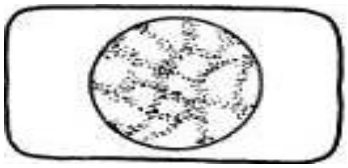
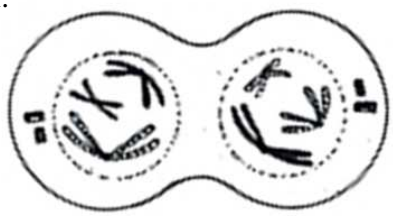
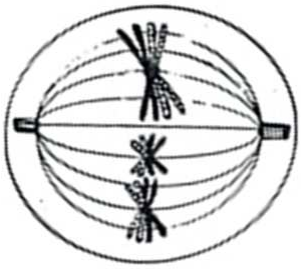
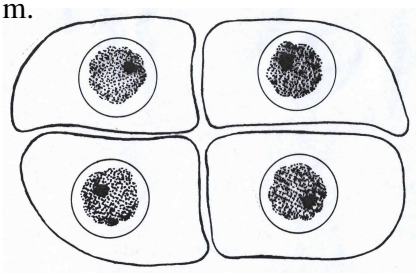
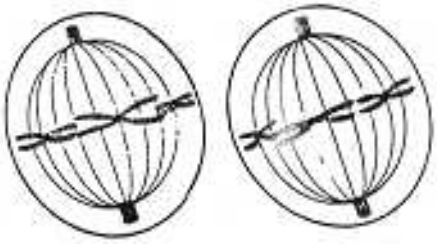
14. Identify the following stages of mitosis, meiosis I and meiosis II.

a. 	b. 	c. 
d. 	e. 	f. 
g. 	h. 	i. 
j. 	k. 	l. 
m. 	n. 	o.