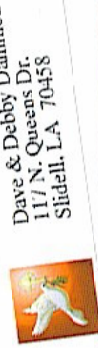


Office of Independent Study
 E 106 Pleasant Hall
 Louisiana State University
 Baton Rouge, LA 70803
 StudyNet: www.is.lsu.edu

Telephone College: (225) 578-3920 • 800-234-5046
 High School: (225) 578-3199 • 800-234-5047

This lesson will be returned to you in a window envelope. Please write or print your complete address clearly in ink. Then fold this cover sheet on the dotted line below so that the address will appear in the window.

Name _____ Apt _____
 Street or Box _____ Apt _____
 City, State _____ Zip _____



Dave & Debby Dammou
 117 N. Queens Dr.
 Slidell, LA 70458

LESSON COVER SHEET

A cover sheet should be completed, folded on the dotted line, and submitted with each lesson.

Lesson Number 7
 Course & Number Biol 1001
 Enrollment Number 577942

To be completed by the instructor:
 Lesson Grade: D
 Instructor's Signature: Kathy Starn
 Date: 2-15

(Fold along this line)

Instructor's Comments:

1. Chromosomes.

	Shape	Number	Location	Divide By	Amount of Protein
Prokaryotic	Twisted <i>loop</i>	3,000 genes <i>one</i>	Membrane Plasma	Binary fusion	<i>very little</i>
Eukaryotic	Diffused mass of very long very thin fibers	46 humans 100,000 genes <i>in pairs</i>	Nucleus	Cell cycle; mitosis and cytokinesis	? <i>A lot</i>

2. List three parts of interphase and briefly relate what is going on in each part.

Interphase is 90% of the time required for cell cycle.

G1, Is the gap between cell division and DNA Synthesis. This time is when the cell increases its supply of proteins, increases its organelles and grows in size. Also a holding spot in the control mechanism.

S Phase, DNA synthesis; each chromosome is single and at the end all are double. This is the replication phase.

G2, After the S phase and before the actual cell division.

3. List four phases of mitosis and the main events for each phase.

Prophase- Changes occur in both nucleus and cytoplasm. Within the nucleus chromatic fibers become more tightly coiled and folded. Within the cytoplasm the mitotic spindle begins to form as microtubules. Late in this phase the nuclear envelope breaks into fragments. Some of the microtubules attach to the kinetochores of the chromosomes.

Metaphase - The mitotic spindle is fully formed with the daughter chromatids attached to different poles at opposite ends of the cell. The centromeres of all the chromosomes are lined up on the metaphase plate.

Anaphase - Separation of the two sister chromatids. The daughter chromosomes walk up/down the microtubules to their perspective centrosomes. Spindle microtubules not attached to chromosomes continue to lengthen.

Telophase - The cell elongation continues. Daughter nuclei appear at the two poles of the cell as nuclear envelopes form around the chromosomes. The chromosomes start to uncoil and nucleoli reappear.

4. You have fallen in love with a person who has a younger brother with Down syndrome. What are its effects, and should you be concerned that

your own children will be born with Down syndrome? Why or why not?
 How can it be diagnosed prenatally?

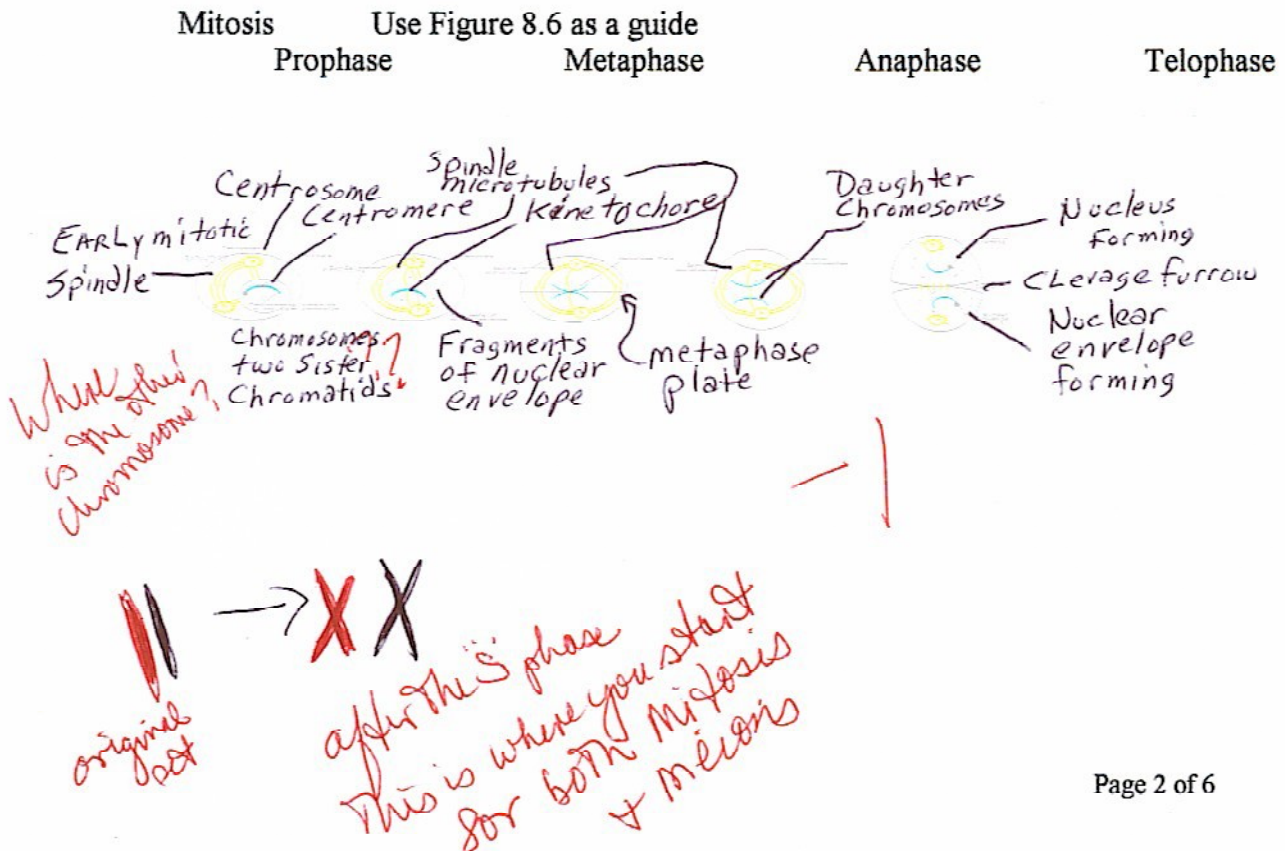
The minor effects of Down syndrome are a round face, flatten nose bridge and small irregular teeth. Some of the more major effects are short stature, heart defects, susceptibility to respiratory infection, leukemia, and Alzheimer's disease. They also generally have a shorted life span than normal. The risk of Down syndrome increases with the mothers age, so if the younger brother was born after the mother was over 35, or more so if she was in her 40's, then the chances of your own children having Down syndrome are less than if the mother carried the syndrome itself. The syndrome can be easily detected by preparing a karyotype. This checks for the number of chromosomes in abnormal numbers.

amniocentesis - 0.15

5. Explain how growth factors and density-dependent inhibition are related to cancer. How does chemotherapy combat this?

In cancer cell growth factors and density-dependent inhibition are by passed in the cell-cycle. They go on dividing indefinitely as long as they have a supply of nutrients. Chemotherapy attacks/disrupts cell division. Antimitotic drugs prevent cell division by interfering in one way or another with the mitotic spindle.

6. Using colored pencils (one color for the maternal homologue and another for paternal) follow one pair of homologous chromosomes through mitosis, meiosis I, and meiosis II.



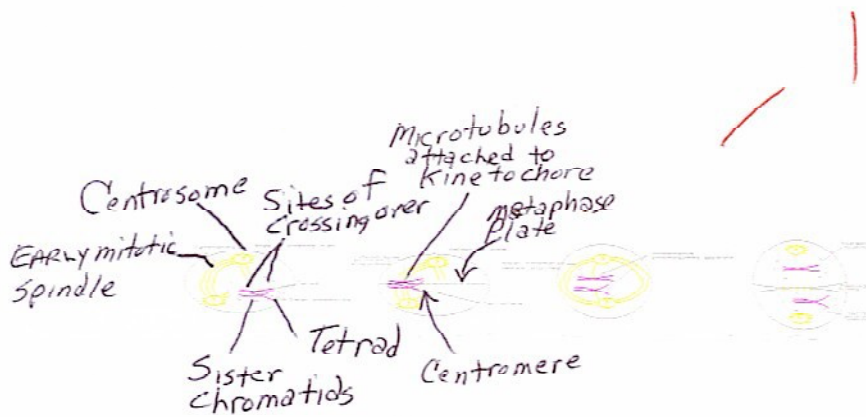
meiosis I Use Figure 8.14 as a guide

Prophase

Metaphase

Anaphase

Telophase



meiosis II

Prophase

Metaphase

Anaphase

Telophase



7. List three major ways that mitosis and meiosis differ.

	Mitosis	Meiosis
1	Produces daughter cells genetically identical to the parent cell.	Produces haploid daughter cells with one member of each homologous chromosome pair.
2	Involves one division of the nucleus and is usually accompanied by cytokinesis producing two diploid cells	Involves two nuclear and cytoplasmic divisions yielding four haploid cells.
3	When the cycle is complete daughter cells contain all chromosomes from parent. $2n=2$	When both cycles are complete sister chromatids are separated. $2n=4$

8. List three ways genetic variation occurs in sexually reproducing organisms. Explain one.

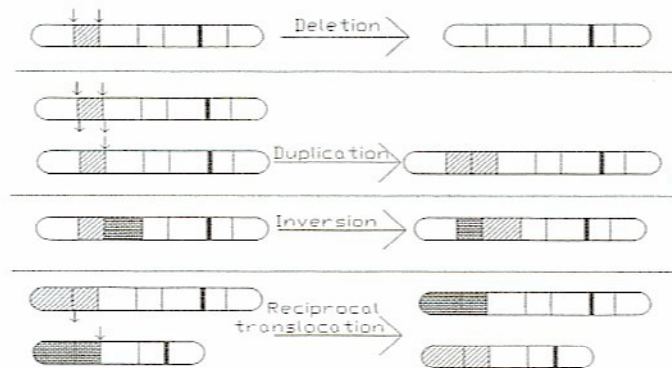
1. Independent orientation of the chromosomes at metaphase I.
2. Random fertilization
3. Crossing over during prophase I of meiosis.

Random fertilization is the fact that we have 23 different sets of genes in our makeup. Each partner has 2^{23} or about 8 million possible chromosome combinations. When both combinations are added together, the union of the male and female, the possible chromosome combinations are around 64 trillion.

9. Describe how Klinefelters and Turners syndromes are alike and how they differ in chromosome array and in phenotype.

Abnormal combinations of the sex chromosomes cause both syndromes. Klinefelters syndrome affects males and Turners syndrome affects females. Klinefelters syndrome carries an extra X chromosome and Turners syndrome lacks an X chromosome.

10. Draw four ways chromosomes are altered in ways that can cause cancer and birth defects.



11. Include an article from last two years on one topic covered in this lesson. In a couple of paragraphs, what did you learn?

I learned that gender chromosomes cause more than Klinefelter, Metafemale and Turner syndromes. This type of break through boggles the mind. While on one hand this helps keep couples from having children born of physical and mental defects but it also opens a new can of worms. Think of what a Hitler could have done with this technology in building his perfect world. "

Also think about the possibilities going the other way. Terrorist's of the world could take a small nation and in a couple of generations wipe out all the people by genetically altering mothers, disabling them from having babies. These along with other new technological advances have strong pros and cons. Someone has to be the world police to keep terrorist from using what someone thought up for good and using it for their own agenda.

Choosing a child

Screening embryos may avoid gender-linked diseases

By MARILYNN MARCHIONE

Last Updated: March 30, 2003

When she was 19, she learned she carries the gene that causes Duchenne muscular dystrophy, an incurable neurological disease that strikes only males.

When she was 23, she watched her younger brother die of it, his last years spent in a wheelchair, his parents spoon-feeding him baby food.

So when she was 35 and wanted to have a baby, she and her husband went first to a Milwaukee infertility specialist. He analyzed their embryos and implanted only females so she wouldn't bear a child who would face the same fate as her brother.

"I have a good reason for what I'm doing," said the Madison woman, who is expecting in July and declined to be identified. "Why would I want to have a child and know it's going to die at age 20? My parents went through hell."

Situations like this are why doctors at Children's Hospital, Froedtert Memorial Lutheran Hospital and the Medical College of Wisconsin are starting a new program to offer pre-implantation genetic diagnosis, or PGD, to screen embryos before a pregnancy begins. About 50 infertility clinics around the country now offer it.

The Medical College program will screen embryos only for gender-linked genetic diseases - those that predominantly affect males because they have only one X chromosome - and chromosomal abnormalities like those that cause Down syndrome.

But one Milwaukee doctor in private practice, K. Paul Katayama, also is doing it in limited circumstances to help couples select the sex of their baby.

He said he considers doing it "if someone has a certain ethnic background, such as Indian. In their culture, males have to take over."

"American people usually don't care. They want a baby, period," he added.