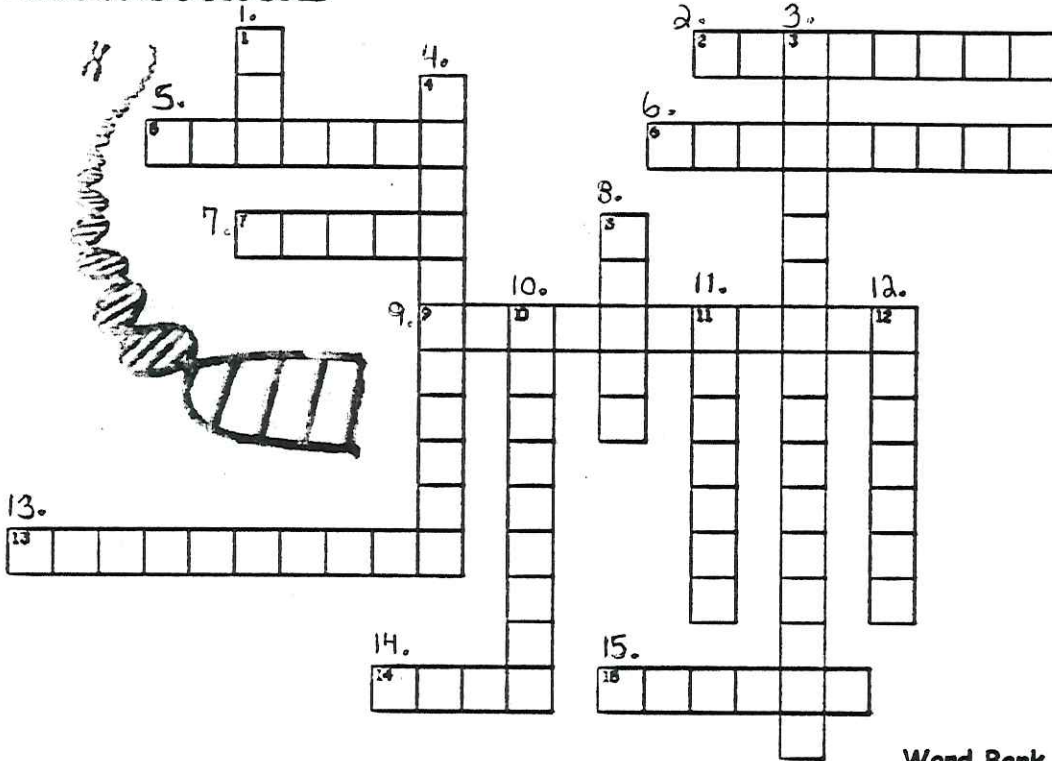


Student's Name: _____ Date: _____ Pd: _____

HW #9
Packet

DNA Warm Up

DNA CROSSWORD



Across

- 2. the two sides of DNA held together by weak _____ bonds
- 5. always pairs with cytosine
- 6. where protein is assembled from the message on the RNA
- 7. the shape of DNA, double _____
- 9. process of copying DNA
- 13. composed of a sugar, a base, and a phosphate
- 14. sections of DNA that code for a trait
- 15. replaces thymine in RNA

Down

- 1. carries the message of DNA to ribosomes
- 3. what does DNA stand for _____ acid.
- 4. the sugar found in DNA
- 8. DNA's structure established by Watson and _____
- 10. the sides of the DNA ladder composed of sugar and _____
- 11. always pairs with thymine
- 12. where DNA is found in the cell

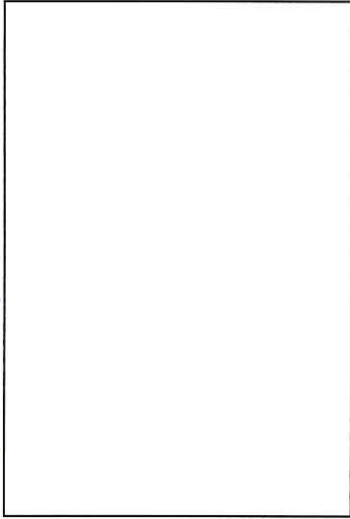
Word Bank

- uracil
- nucleus
- gene
- adenine
- nucleotide
- phosphate
- Crick
- replication
- deoxyribose
- helix
- deoxyribonucleic
- guanine
- RNA
- hydrogen
- ribosomes

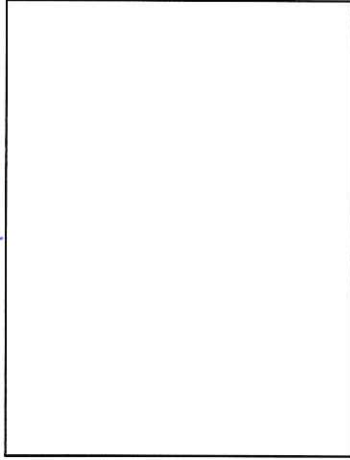
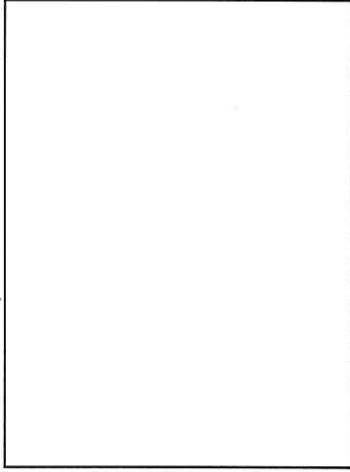
Picture and Caption is Required for Each Stage of Mitosis For ALL Boxes!!!!

Mitosis Cartoon Strip

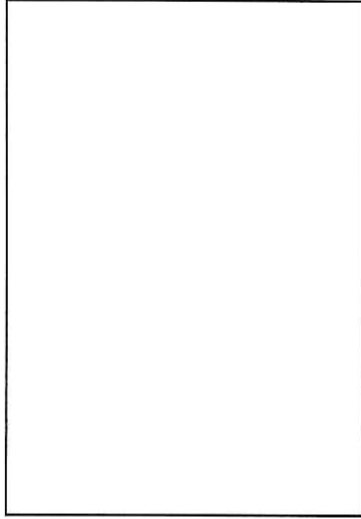
Interphase



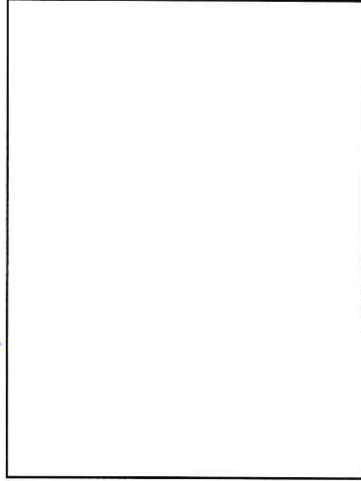
Metaphase



Anaphase



Telophase



HSA Practice Questions

- 1.) Which of the following does **NOT** occur during interphase?
 - a.) chromosome duplication
 - b.) cell division
 - c.) cell metabolism
 - d.) cell growth

- 2.) During which phase of mitosis are sister chromatids **pulled to opposite sides** of the cell?
 - a.) prophase
 - b.) metaphase
 - c.) anaphase
 - d.) telophase

- 3.) Organelles in **prokaryotic cells** include the
 - a.) mitochondria
 - b.) cytoskeleton
 - c.) golgi complex
 - d.) none of the above

- 4.) A **major difference** between **prokaryotic** and **eukaryotic** cells is that
 - a.) prokaryotic cells have a flagellum
 - b.) eukaryotic cells have a nucleus
 - c.) prokaryotic cells have cytoplasm
 - d.) eukaryotic cells have ribosomes

- 5.) Cell size is **limited** by the
 - a.) amount of cytoplasm
 - b.) cell's ability to get rid of wastes
 - c.) the size of the nucleus
 - d.) the size of the plasma membrane

6.) **Telophase** is accompanied by the division of cytoplasm between the two daughter cells. What is this **process** called?

- a.) prophase
- b.) cytokinesis
- c.) interphase
- d.) metaphase

7.) Which of the following **factors** limits the size of a cell?

- a.) surface area of plasma membrane
- b.) amount of DNA
- c.) speed of diffusion
- d.) all of the above

8.) Pairs of **chromosomes** having genes for the same **trait** are said to be

- a.) homologous
- b.) analogous
- c.) homozygous
- d.) none of the above

9.) **All** cells have the following:

- a.) plasma membrane, cytoplasm, and ribosomes
- b.) plasma membrane, nucleus, and DNA
- c.) DNA, ribosomes, and cell wall
- d.) plasma membrane, cytoplasm, and nucleus

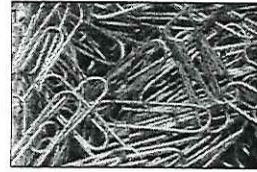
10.) The **cell theory** states that

- a.) all organisms are made of one or more cells
- b.) all cells come from already existing cells
- c.) all the basic life functions of organisms occur within cells
- d.) all of the above

ScienceNews for Kids November 2012—

Magnets That Kill Cancer Cells

By Stephen Ornes



Magnets hold things to our refrigerators, and inside compasses they help us find our way. Now researchers have found a way to use magnets like a remote control to turn on cell-killing, metal beads. The technology may point to new treatments for diseases such as cancer, which kills more than 7 million people every year.

Scientists at Yonsei University in South Korea developed the new technology, which can flip a "death switch" on cells, causing them to self-destruct. The researchers described how they used their method to kill cancer cells in the journal *Nature Materials*.

The outside surface of every cell contains many receptors, each functioning like a chemical lock. When the appropriate chemical slides into a receptor, this chemical acts like a key, unlocking some particular action of the receptor. In a sense, these receptors allow the outside world to communicate with the interior of cells.

Activating one of these receptors, known as death receptor 4, will release a signal that instructs the cell to die. For the Yonsei team, the trick was figuring out how to activate that receptor.

They turned to nanoparticles of iron. These bits are far too small to be seen with the human eye (and much smaller than the cells themselves). The researchers attached the metal particles to proteins that can find and stick to the death receptor.

In tests, the researchers added the iron-protein combos to a lab dish containing colon cancer cells. As the team had hoped, the protein "glued" the nanoparticles to the cells. Then the scientists used magnets to pull on the nanoparticles — and flip the death receptor's switch. At once, cells started to die. After 24 hours of this magnetic therapy, more than half of the cancer cells were dead.

"They've identified a major opportunity for magnetic nanoparticles [in medicine]," bioengineer Andrew MacKay told *Science News*. MacKay, who did not work on the new study, is from the University of Southern California. He and other bioengineers use knowledge about technology to better control living things.

It's too soon to know whether this magnetic therapy will be able to distinguish healthy cells from diseased cells. And that's important because the surface of healthy cells also contains the vulnerable death receptors. So the success of this potential treatment will depend on whether the scientists can design their nanoparticles to attach only to cells responsible for disease.

Power Words

cancer A disease caused by an uncontrolled division of abnormal cells.

bioengineering The application of technology for the beneficial manipulation of living things.

iron A strong, hard metal that's often used in construction.

nano Something characterized as being around a nanometer — one-billionth of a meter long — in at least one dimension.

protein A molecule made of one or more long chains of amino acids. Proteins are an essential part of all living organisms, especially the structural components of body tissues.





Science Journal Article Questions

ScienceNews for Kids November 2012 — Magnets That Kill Cancer Cells

By Stephen Ornes



- 1.) How many people are affected by various types of cancer each year?
- 2.) What do scientist mean by the phase "death switch"?
- 3.) Describe in detail how the receptors of the cell membrane and cell wall communicate with the interior of the cell.
- 4.) According to researchers at Yonsei University of South Korea, which "death receptor" has been pin-pointed to cause cancer cells to self-destruct?
- 5.) Explain in detail how the scientist tested their hypothesis of attacking colon cancer cells.
- 6.) What is one major challenge that researchers are facing with this new "magnetic therapy" regarding cancer cells?

