Winter Fun Pack 2016-2017

Over the winter, AP Biology students will be required to complete a few assignments. Part of the work is getting ahead for second semester as well as a review of first semester work.

Students will complete the following:

1. Read chapters 15, 16 Complete the Reading Guides. Look though CH 55 and 56 Reading guides, that content will be on the test in May. We will do a bit more on productivity in April.

2. Complete research on one Bioethical topic – be ready to share in class. You will turn in your research sheet as well as an article for **and** against your topic. You will use the GALE resources from the library page to complete your research (opposing Viewpoints)

   http://galesites.com/menu/index.php?loc=belm56107

3. Complete– Diet and the evolution of Salivary Amylase – Complete the entire packet.

4. Complete genetics problem set II (on the website) be ready to turn them in – see Due Dates on the Calendar

5. JAE – do a **Experimental Design Analysis** on the article Artificial light attracts Sea Turtle Hatchlings.
   https://drive.google.com/file/d/0BzO83KAJ5dNwaWlhX0xlTWhfckk/view?usp=sharing
   JAE directions and a sample are on the website (activities page)

Enjoy your break!

Bioethical Issue research

(50 points)

What is Bioethics?

Bioethics is a sub-discipline of ethics that involves the decisions made in science and medicine. It branches into areas of science such as medicine, ecology, genetic engineering, animal rights, etc. There is a high-speed movement into the age of technology. The practice of science has become much more complicated and involves doctors and patients and consumers in ways never thought 20 years ago. The media has helped bring about awareness, making the public much more aware of these issues. In addition to awareness of scientific discoveries, many more people are aware of the issues of social justice. Social justice not only relates to individuals but to society as a whole and we are forced to think of this arena. The ability to diagnose fetuses before they are born gives us choices we never thought would be ours. Should we allow a child with a serious genetic disease to be born and perhaps become a burden on society? Should we allow terminally ill patients to be kept alive on respirators no matter what the cost? If a gene or genes for criminal behavior were found, should we allow more criminals into this world? The questions are endless.

Why is Bioethics Important?

The importance of bioethics lies in the future. Medical technology and science is increasing at a tremendous rate. As mentioned before, new information is immediately conveyed to the public sector and winds up in headlines in newspapers all over the world. We know about it, we want to know how to use it but are we ready to use it? In the future we may be cloning children, using genetically engineered products, testing for diseases we don't even know yet and EVERYONE will be effected in the decision making.

1. **Stem Cell Transplant:**

Some day soon, the living cells of unused embryos may keep adults alive, healthy, and youthful. Stem cells at the proper stage of development can reach maturity and function normally if transplanted into the organs of mature humans. The use of embryonic tissues in scientific and medical research is vigorously challenged by anti-abortionists. They believe that the harvesting of living cells from intentionally aborted fetuses is as outrageously immoral as the use of the victim of the holocaust in medical research by Nazi doctors. These opponents of stem cell research perceive the acquired living cells of the unborn as a poison fruit, and no matter how much good can be derived from their use, nothing can redeem the moral wrong of the induced abortion.

Advocates of the stem cell research argue that they are operating under a moral code based on compassion and rationality. They claim that the embryonic cells of the fetuses are far too valuable to discard, and that to ignore this available resource would itself be an immoral act. In the U.S. alone, medical research with stem cells offers hope for two million diabetics and Alzheimer's patients, 1.5 million victims of Parkinson's disease, and 300,000 people with spinal injuries. Against the argument of complicity in abortion, advocates of embryonic tissue research argue that using these cells no more implicates the researcher in abortion than using the surviving organs from an automobile accident implicates one in the accident. Stem cells are harvested not only from aborted embryos, but embryo's that were created in a laboratory for use in-vitro fertilization. Some couples have decided to donate any remaining embryos to science after they have had all the children that they desire. There are other sources of stems cells as well, they are not just found in embryonic tissue.

People with such degenerative diseases as Parkinson's, paralysis, and insulin-dependent diabetes can replace their degenerative cells with new healthy cells by means of stem cell transplant operation. While the procedure is still in the experimental stages, early results with humans seem promising. As research and medical applications of stem cell transplants go forward, philosophers have already started delving into the ethical issues involved in putting the living cells of aborted fetuses into bodies of people for whom new tissue may mean longer, happier lives.

Today the uses of embryonic tissue for any purpose arouses strong emotional responses, because of its relation to the grave moral issues associated with abortion, and the status of human embryos and fetuses. The questions that follow have provoked a considerable amount of controversy.

Questions to answer:

- **What are stem cells?**
- **What are the different kinds? Where are they found?**
- **Why are they important?**
- **What is Cloning? How is it different from using stem cells?**

3. **Genetically Modified Organisms (GMO): Try not to focus on GM foods**

Genetically modified organisms are organisms whose genetic makeup has been directly altered by humans. Many of an organism's physical and behavioral traits are determined by the genetic information encoded in deoxyribonucleic acid (DNA). The process of genetic modification involves identifying the portions of DNA that are responsible for a particular trait in one organism, extracting or copying these DNA sequences, and then introducing them into a

different organism (usually with the use of vectors). The aim is to change the traits or functions of the recipient organism, and the result is a GMO.

Genetic engineering does not represent our first effort to influence the characteristics of living organisms. For thousands of years, humans have taken advantage of naturally occurring genetic variation within species to selectively breed organisms with desirable traits. Many of the characteristics of domestic animals and agricultural crops have been developed through selective breeding.

What is so revolutionary about genetic engineering is that it involves the transfer of genetic material between organisms that would never be able to breed in any natural or laboratory setting. Vast evolutionary boundaries can be crossed, such as those separating different phyla, or even different kingdoms.

Human beings have the ability to mix the genetic composition of organisms that have been on separate, distinct evolutionary paths for thousands or millions of years. For example, we have placed genetic information from humans into mice, and scorpion genes into corn. This genetic mixing is possible because the genetic information of all organisms is carried in the same DNA codes. If a DNA sequence in a pig is responsible for the production of a particular animal protein, that sequence can be introduced into a plant cell's DNA, and the plant cell will produce the same protein.

Because of its revolutionary nature, risk and uncertainty surround the process of genetic engineering and the resulting GMO product. By transferring new "regulatory" genetic information into the recipient organism, genetic engineering can destabilize the way DNA replicates, transcribes, and translates. Our understanding about the role of such regulatory information is incomplete, and so the alteration of the DNA sequence may have unintended and unexpected effects on the cellular processes of the recipient organisms. As a result of altered regulatory functions, GMOs may exhibit increased allergenic tendencies, toxicity, or altered nutritional value.

These risks are compounded when a GMO product is released into an uncontrolled environment. The interaction of GMOs with other complex biological systems, such as the human body or natural ecosystems, cannot, in many cases, be anticipated or fully tested before commercial release. The incredible complexity of even the simplest organism prevents scientists from knowing many important short- and long-term effects of genetic modification. While it is impossible to predict the long-term implications of releasing genetically manipulated plants or animals into the wild, grounds exist for proceeding with caution.

Despite these potential drawbacks, GMOs also have many possible benefits. For instance, scientists at Large Scale Biology, in Vacaville, CA, are developing cancer vaccines by injecting genes from cancer patients into tobacco plants. The vaccines produced by these plants are specifically tailored to combat the cancer of each individual patient. Another beneficial GMO is Golden Rice, a vitamin enriched form of rice that has been designed to prevent blindness and other nutrient deficiencies in people of third-world countries.

Some examples of genetically modified foods are purple, yellow, or white bell peppers, Flavrsavr tomatoes, etc. The bell peppers were modified by inserting the genetic codes for color from tulips. The Flavrsavr Tomato was modified by inserting backwards its own genetic code for the manufacture of an enzyme that softens it, thereby decreasing the softening process to allow its tomatoes to ripen on the vine without getting too soft to ship.

Questions:

- **What does GMO stand for?**
- **How are GMO's used in different areas (medicine production, food, medical therapy)**

Bioethical Topic Research

1. **Introduction:** What is your topic? What does it mean? What is it about?

2. **Arguments for your issue:**

    a.

    b.

3. **Arguments against your issue:**

    a.

    b.

4. **Where do you stand?** What can you say to your opponents to defend your ideas?

    a.

    b.

    c.