**Introduction:**

The process of cell division is very detailed and exact. If cell division doesn’t happen exactly like it is supposed to errors can occur. The focus of this project is to get an in-depth look at the effects these errors can have on humans. Several different topics related to these effects will be investigated. The essential questions this project will address are listed below.

Your team has been given the mission of researching and creating a presentation on a particular area influenced by errors in cell division by the Medical Board at the University of Chicago. This presentation, when finished, will be presented to a Board of Representatives (your classmates). The board will then vote on which team had the best presented and researched project. The winning team will receive praise from the Director of the Board and will be awarded money for further research (EXTRA CREDIT!).

**Essential Questions:**

* How can errors in mitosis lead to changes in genetic material? And to disorders?
* What role does cell division play in common disorders? How are these caused? Treated? Diagnosed?
* How do cell division and DNA mutations contribute to the spread/prevalence of the flu and Ebola?

**What you will have to do:**

1.) Pick your research team (no more than 3 students per group).

2.) Your topic is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3.) Research this topic using the computer and books available to you.

4.) Create an informational presentation in Google docs.

5.) Give your presentation.

**REQUIREMENTS:**

1.) WORK HARD

a. Part of your grade comes from PARTICIPATION (see rubric)

b. If I see you not working during class, you will LOSE these points

c. Use your time wisely. You will not have an unlimited amount of time to complete this project (see TIMELINE)

2.) Use computer appropriately

If I see you on a website that does not pertain to this project, you will lose your computer privileges, this will NOT be good for your group, so DO NOT DO THIS!

3.) Research properly- Follow research tips from Ms. Jurgenson on finding credible sources.

4.) Cite your sources

a. Need to have a **REFERENCES** slide at the end of your powerpoint

b. APA style - Look at APA citation handout

5.) Create and give an amazing presentation.

a. **Look at the handout “WHAT MAKES A GOOD PRESENTATION”.**

b. Every person in the group must talk during the presentation.

c. Presentation must be between 6-8 minutes.

6.) Create a handout for your classmates to take notes on your presentation. (Please limit to one page.)

7.) Develop 4-5 questions for a quiz about your topic. (#6 & #7 must be submitted the day before your present for copying purposes through Google docs.)

8.) Listen to other presentations and ask at least one question during another group’s presentation.

***Your presentation needs to include ALL of the following:***

1. Be well organized & neat.
2. Use proper grammar.
3. Include pictures and graphs of statistics related to your topic. Be prepared to explain any pictures or graphs you use.
4. Define and explain your topic. Address all of the angles/questions in your topic summary on the attached document. Put each of these on separate slides. Be sure to include how it relates to our over arching topic of Cell division.
5. Keep the amount of words on each slide to a MINIMUM! Use short phrases/sentences NOT paragraphs.

***Topic Summaries***

* **Aneuploidy**
  + Definition
  + How does it occur? What effect does aneuploidy have on cell division?
  + How is aneuploidy linked to cancer? (Does it cause cancer?) Relate how aneuploidy is linked to a specific type of cancer (possibly use chronic myeloid leukemia)
  + Why is the fact that cancer cells are aneuploid and rapidly divide contradictory?
    - How do scientists believe this contradiction is overcome by cells?
    - Look into research of this in mice, etc.
  + How could this be used to create cancer treatments?
  + Additional resources:

National Cancer Institute [www.cancer.gov](http://www.cancer.gov/)

American Cancer Society[www.cancer.org](http://www.cancer.org)

Cancer and Aneuploidy <http://jnci.oxfordjournals.org/content/97/2/87.full>

* **Stem Cells**
* What are stem cells?
* What current research is going on related to stem cells? What are they learning about them? What problems are they hoping to solve? How could stem cells be beneficial?
* How could stem cell research help in cases of ALS? What is ALS and what causes it?
* What are some of the ethical issues surrounding stem cell research? Present both sides of the argument and then decide where you stand with this issue.
* Additional resources:

National Institutes of Health <http://stemcells.nih.gov/info/basics/pages/basics1.aspx>

* **Ebola vs. Influenza**
  + What is a virus? How is it different than bacteria? How does this affect the way it is treated?
  + **Ebola:** Cause, Transmission (how is it spread), First occurrence (background), incubation period, diagnosis, symptoms, treatments, (why are viruses difficult to treat?) Prevention
  + **Flu:** How is Ebola similar to the flu? Compare/contrast their mortality rates, treatment, length of illness, prevalence, transmission, etc.
  + How do mutations affect the strains of these viruses?
  + Additional resources:

WHO-Ebola <http://www.who.int/mediacentre/factsheets/fs103/en/>

Center for Disease Control – <http://www.cdc.gov>

* **Cancer**
  + Breast Cancer vs. Lung Cancer – or -- Leukemia vs. Skin Cancer
  + 2 different groups → compare/contrast cancers caused by genetics vs. lifestyle
  + Definition, causes, diagnosis, treatment, prevention, risk factors, occurrence, mortality/survival rates, recent research and advancements.
  + Additional resources:

National Cancer Institute [www.cancer.gov](http://www.cancer.gov/)

American Cancer Society [www.cancer.org](http://www.cancer.org/)

* **Chromosomal Disorders** as a result of errors in copying/division
  + Down Syndrome, Klinefelter’s Syndrome, Turner Syndrome, Triple X syndrome’
  + How are these caused? How prevalent are they? What effects do they cause? Does anything increase the risk of these occurring? If someone has this disorder, how likely are they to pass it on to their children (if they can have them)?
  + Are there treatments for these disorders? What’s the prognosis?
  + Additional resources:

National Human Genome Research Institute [www.genome.gov](http://www.genome.gov)

Medline Plus <http://www.nlm.nih.gov/medlineplus/geneticdisorders.html>

Overview of Chromosomal Disorders in Mitosis/Meiosis

<http://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=90&ContentID=P02126>

* **Mutations in DNA**
* Choose 4 disorders from the list below.
* What type of mutation causes this disorder? How did the mutations occur? What are the signs, symptoms, treatments, prevalence, prognosis for these disorders?
* What is the current research targeting these disorders?
* Tay Sachs defects in genes → stops production of enzyme
* Progeria – point mutation
* Sickle Cell Disease- mutation
* Marfan Syndrome
* Hemophilia
* Huntington’s Disease
* Cystic Fibrosis
* Duchenne Muscular Dystrophy

Additional resources:

National Human Genome Research Institute [www.genome.gov](http://www.genome.gov)

Medline Plus <http://www.nlm.nih.gov/medlineplus/geneticdisorders.html>

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<http://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=90&ContentID=P02126>