**Examining Tumour Evolution Inquiry Project**

Your task is to highlight your understanding of the cell cycle, evolution, and cancer. Cancer is a complex disease and can be very difficult to treat. This project will provide you the opportunity to examine cancer from an evolutionary perspective. You will have choice in how you want to present your inquiry project, for example, multimedia (ie powerpoint, prezi), poster, through story etc

**Part 1:** You will be expected to create a project outline with your learning goals and timeline for how you will go about completing the steps necessary to achieve your goals. Hand in project outline to teacher for feedback: DUE **Thursday, November 30th**

Below are the questions that must be embedded within your inquiry project.

Background Information: Darwinian Evolution and Cancer

* What are the necessary factors for Darwinian Evolution to occur?
* What is cancer?
* What causes cancer?
* What does it mean when a patient develops resistance to therapy?
* Why are cancers difficult to treat?

Applying your Understanding

* What research suggests that cancer cells are evolving?
* How can approaching cancer treatment from an evolutionary perspective help treat cancer?

**Part 2:** Review questions for inquiry project and complete research:

All research completed: DUE end of class on **Monday, December 4th**

**Keep track of your references as you complete your research.**

Helpful Resources: And a good place to start!

Swanton. C. (2016) Cancer Evolution Through Space and Time Retrieved from: <https://www.youtube.com/watch?v=UTMG1Goz_a0>

Berkeley Edu. (2007) Another perspective on cancer: Evolution within. Retrieved from <http://evolution.berkeley.edu/evolibrary/news/071001_cancer>

Final Project Completed: DUE **Wednesday, December 6th**

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| **Quality**  | **Exemplary**  | **Accomplished**  | **Developing**   | **Beginning**  |
| **Applying your understanding**  | Student demonstrates strong evidence of applying their understanding of evolution, cancer and treatments. Considers social/ethical implications, and examines how this affects the future of our community. Conclusions lead to development of new questions and ideas.   | Student demonstrates good evidence of applying their understanding of evolution, cancer and treatments. Conclusions lead to development of new questions and ideas.   | Student demonstrates some evidence of applying their understanding of evolution, cancer and treatments.  | Student does not demonstrate evidence of applying their understanding of evolution, cancer and treatments.  |
| **Summary of research findings**  | Main conclusions, supporting evidence are fully explained and are correct interpretations of the research.  | Main conclusions, supporting evidence are adequately explained, and mostly correct with no or minor technical errors in interpretations.  | Main conclusions and supporting evidence are partially explained, or have some incorrect interpretations.  | Main conclusions and supportive evidence are minimally explained, or there are some major errors in interpretations.  |
| **Inclusion of background information and understanding**  | Relevant background is fully included and is correct. All questions provided were addressed.   | Relevant background information is present at adequate levels, and is correct. Few questions were not addressed.   | Relevant background information is insufficient, or moderately incorrect. Many questions were not addressed.  | Relevant background information is missing or highly incorrect. Most questions were not addressed.  |
| **References** | In-text APA-style citations are used correctly where required, in APA style. Reference list provided | In-text APA style citations are used correctly where required, with no more than two minor formatting errors. Reference list provided   | In-text citations are used where required, in an incorrect style.  | Outside material/information is not cited.  |
| **Communication** | Always comprehensible without having to refer to original articles or other sources; any specialized vocabulary is defined and necessary; language is not too technical.  | Almost always comprehensible without having to refer to original articles or other sources; any specialized vocabulary is defined and necessary; language is occasionally too technical | Sometimes comprehensible without having to refer to original articles or other sources; unnecessary specialized vocabulary is used; language is somewhat too technical.  | Largely incomprehensible; cannot be understood without having to refer to original articles or other sources; vocabulary is either highly technical or highly simplified.  |