

CASE STUDIES IN GRADE 10 SCIENCE - BIOLOGY

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This activity was a problem-based learning project where students choose cases for context, determined the problem, researched and then shared or presented their learning to the class.

Their projects included:

- sharing their learning about specific cell specialization (example the circulatory system and types of specialized cells needed to meet its needs for form and function)
- student-designed microscope specialized cell comparison
- student-designed dissection inquiry
- ethics component - related to their specific case study
- medical technology connections related to their specific case study

Note:

In addition to this project, we did a few lessons on cell structure, specialization and mitosis. We completed interactive activities and demos in class to develop areas and concepts needed throughout the unit.

Science Safety Note:

Board and school policies were adhered to at all times. Before each lab activity, safety procedures were reviewed and students incorporated safety precautions into their designs.

Online Safety Note:

Digital citizenship and literacy lessons were integrated throughout the entire course.

PRE-LEARNING

Before we started the unit we read this article on problem-based learning (http://fhs.mcmaster.ca/mdprog/pbl_what.html) and collaboratively created a list of questions to ask a med student from McMaster University Medical School. My students also answered these questions (https://docs.google.com/document/d/14DCZ8bCaGuXGSxwvhfHFNvDAe8B-s5YHnwJgr5_mVxE/edit?usp=sharing). The questions students formulated were answered when our class Skyped a med student from McMaster (we simply emailed the med school to get in contact with someone willing to do this). This helped students make connections between problem-based learning in and out of high school.

At the end of the unit, students created review notes on the major concepts and used this to study from as needed.

RESOURCES AND DIGITAL TOOLS USED

- I purchased temporary access to the PDF of this textbook (<http://www.jblearning.com/catalog/9781449604998/>) to get our case studies from (there is a Google Preview of the text). We used case studies on Jimi Hendrix, Karen Carpenter, Aunt May, Temple of Doom, etc. I chose case studies based on the major organ systems. It was easy to differentiate among groups by helping them choose appropriate case studies with varying entry point.
- Students collaborated using Google Drive, OneNote or Evernote to define the problem together, collect and share research and plan
- A variety of specimens for dissection and microscope investigation. Students had to plan their own microscope inquiry (define a question and compare cells to look for information) and dissection. They had to design a dissection that would help them learn more about something (they defined what). They needed to outline the procedure they would take, safety precautions, etc.
- Students used a variety of digital tools (and paper, posters, models, etc.) to share their learning with their classmates. Some of the digital tools included Google Slides, Explain Everything app, Soundcloud to record audio, etc. When they chose a digital tool, they brought it to me with the Terms of Use and Privacy Statement and we reviewed the tool to ensure it was appropriate.
- In class I brought in textbooks from University, grade 11 and 12 biology textbooks and we co-created a list of great sites with information about human organ systems
- We used a learning management system to keep track of checklists, rubrics, etc. This handout (https://docs.google.com/document/d/1ghzn03o17_8pxIABJq6l0OrHC7nd6lAKCsKKx68szX8/edit) has some of that material collected together.

SOME STUDENT PRODUCTS INCLUDED:

- detailed model of the ear
- hands-on activities created for their classmates using models of the heart from local doctors
- videos (in addition to presenting to class):
 - <http://vimeo.com/55900571> (<http://vimeo.com/55900571>)
 - <http://vimeo.com/56878393> (<http://vimeo.com/56878393>)
 - <http://vimeo.com/56046089> (<http://vimeo.com/56046089>)
 - <http://vimeo.com/5603774> (<http://vimeo.com/5603774>)

DURING DISSECTIONS AND MICROSCOPE ACTIVITIES:

Groups were each dissecting different things, looking at different systems or comparing different cells. Each group quickly shared with the class what they learned and also documented the procedure with camera (phone or tablet). Success criteria were created with the student groups to fit their needs.



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RESOURCES

- Textbook of medical case studies (<http://www.jblearning.com/catalog/9781449604998/>)
- Rough student handout (https://docs.google.com/document/d/1ghzn03o17_8pxIABJq6I0OrHC7nd6IAKCsKKx68szX8/edit)

ELEMENT

- Technology Enabled Learning (/expert-elements/technology-enabled-learning)



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