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Table of Contents

1.1 Technology Autobiography	3
1.2 Thoughts on Technology Integration.....	4
2.1 Reflection on Understanding	5
2.2 Generative Topic Statement for Curriculum Unit	7
2.3 Essential Questions	8
1.3 Technology Integration.....	8
Technology Plan for Curriculum Unit	9
3.1 Six Bloom's Taxonomy Questions.....	11
Integrating Technology Into A Curriculum Unit	12
3.3- 3.5 Unit Activities and Performances.....	13
3.5 Assessment Samples	15

1.1 Technology Autobiography

One of the primary reasons for my interest and “expertise” in technology is due to my oldest son. As my son was becoming more adept at technology my husband and I had to become proficient as well. This was many years ago, our son is now out of the Marines and repairs computers and my students have benefited from my excitement by all things technological. I truly enjoy learning new technologies but I am also a science geek and with life science I would rather my students experience organisms and biology first hand rather than through a computer. We therefore use technology to collect data, report on labs, and explain phenomena.

I have long had students record data in Excel to analyze and graph their data. I had my own website long before it was the norm but now we are switching to blogs. I am trying to find the best way to utilize this new networking tool. I adopted a Smart board last year and have been experimenting with new lessons and activities using the interaction this tool allows. I have recently become enamored with the movie making programs, both movie maker and I-movies. I think this is an exciting way to present information to students as well as have students display their understanding. My students have reported on ecosystems in Biome commercials, created vocabulary lessons in I-movies, recorded microorganisms to teach others as well as creating brochures, word processing and graphing. I am looking forward to continuing my journey as I try and keep up with the innovative technologies my students are so comfortable using. I am pursuing my masters in Technology in Education to continue to learn and explore new applications and new tools and to share my love of learning, technology and science.

1.2 Thoughts on Technology Integration

I find that there is a time and place for technology. As I indicated previously, not every lesson needs technology but every unit can and should have a technology component. With 21st century students we must explore the applications our students use in their everyday life as well as prepare them to learn and integrate new technologies into their work. Though I am not truly aware of the extent of technology use in European or Indian classrooms, I do believe we are stifled in the United States. Often there is too much bureaucracy when new ideas, hardware or software becomes available. For example, last year Windows Vista became available but our county will not launch this program for five or more years. I understand the need for waiting for the kinks to be worked out but this slow implementation is the norm in our and many other counties. Freedom to try new ideas and applications would be the one item I would change at my school. I strongly dislike finding a new and exciting technology then not being able to share this with my students.

2.1 Reflection on Understanding

I love to play in my garden. I was not always a good gardener although God knows the multitude of plant carcasses in my past can attest that I tried. I actually used to have a “black thumb”. If you gave a plant to me soon it was withering either from inattention or too much attention. I would drown them, prune them to death or ignore them. More recently, however I have become quite a gardener. I could say I learned from my mistakes but more likely my greening thumb is due to less time occupied with growing my six children. I wouldn't say I have more time but I do have more opportunities to nurture other organisms now than in the past.

My garden now thrives and I can even take dying plants from other budding gardeners and nurture them back to health. Though opportunity is a major factor in my budding botany skills, I have also been tenacious in my pursuit of a beautiful yard and home. A landscape architect previously owned the home we had moved into. The yard was resplendent in native plants of South Florida. Luckily, since the plants were indigenous to the area, I had little responsibility in keeping them alive. A new friend and neighbor was constantly in her yard and often we would visit as she was gardening. We also carpoled together to school several days a week discussing plants and gardening. I soon caught the gardening bug again. Somehow plants that I traded with my friends thrived compared to the store bought versions. I began asking fellow gardeners questions about care rather than just going to the books.

My lawn is slowly shrinking as flower beds encroach into its margins. House plants dot my home and classroom. Living in my hometown again gives me the opportunity to explore Georgia natives. Trading plants continues to be a fun way to connect with other gardeners. I am even able to share my love of gardening with my children. My youngest daughter became interested in gardening due to mom digging in the dirt much of her life. She would thrill when she received a package of seeds for her birthday and soon we were both up to our ankles in fresh earth. Scientific method and cell processes units in my

classroom often involve some aspect of plant growth. Students comment that they "...always thought plants were boring but not anymore." Others now ask my advice about which plants to use in their yard, how to prune azaleas, where to obtain a good Dogwood and though I do not know all the answers I enjoy helping them discover the love of our environment.

In developing curriculum to support understanding, I want to learn more about how to use perspective and empathy in my teaching. Science naturally incorporates many aspects of understanding including explaining, interpreting, applying and even self knowledge. Much of our theories are based on what we know. Scientists base their hypotheses on research, of course, but also on prior knowledge. Helping students tap into that prior knowledge and assess its accuracy however continues to be a challenge. In reflecting upon my own experiences with gardening, I need to remember that it is good for mistakes to be made and to learn from mistakes. Students sometimes need the opportunity to revisit a lesson to gain an enduring understanding of a subject or skill. Lack of time will always be a challenge when attempting deeper awareness but the value in attaining the skills and enduring understanding cannot be denied. Teachers, curriculum developers, administrators, school board members, community members, and politicians need to recognize the importance as well.

2.2 Generative Topic Statement for Curriculum Unit

Cells Sustain Survival: Students must understand that without the function of cells, life as we know it would not exist. I believe this topic is generative because in order to come to this understanding students need to comprehend the function of various cell parts and how the structure of a cell affects its function. Cells are the basis of all life systems. Components of a cell build to make tissues in eukaryotic organisms which together make organs. Various organs working together build to organ systems which collectively comprise the entire organism. In an ecosystem, the organisms that live together make the population which interact with other populations in the ecosystem to constitute communities, the communities along with the abiotic components of their environment encompasses their ecosystem or biome. Students could even then see how all the biomes jointly make our earth, earth with other planets make up our solar system, the solar systems make the universe and on. This topic is appropriate to my students because they can appreciate the interconnectedness of components of systems in many areas even outside of science. I am interested in this primarily because it is a new way to attack a very abstract topic. I am hoping students will gain a deeper understanding of cellular biology and a cells place in sustaining life.

The enduring understandings for this topic are structure and function of systems and the interdependence of life. Students can then transfer this information to other components of study and life including but not limited to systems of government, mathematical equations and necessary elements of a job or career.

2.3 Essential Questions

To what extent is survival dependent on cells?

1.3 Technology Integration

Evidence that technology tools are being used effectively would include programs such as Chicago's handheld initiative and Some of New York's laptops for all. But it is not the technology that is available which is the true evidence. True evidence is exhibited by schools such as Newsome Park Elementary's multitude of uses for the technology they have. Evidence that curriculum standards are being addressed was primarily within the articles. It was somewhat difficult to see discrete standards but the activities and involvement of teachers into the higher levels of thinking portrayed by the lessons. Adapting what I have read into my own classroom is difficult in some ways. The funds to obtain some of this equipment may be a detriment but it is better to focus on the technology available and utilize it within your curriculum. You should always strive to make the best of the available resources but also find ways to improve those resources as well. I have written two successful grants to obtain media tools, video cameras and digital cameras, for teacher and student use. I am currently researching grants in order to obtain a permanent Smartboard for my classroom. Presently I have a portable Smartboard that I share with other teachers. The tools we presently have can be incorporated in many applications. Students can take technology and other tools to reach their goals for and explain their understanding. Technology integration completely leads itself to differentiation and project based learning. I am hoping to incorporate a new year-long focus on our Dodgen pond into our content, characteristics and habits standards. Incorporated in this project will be such components as reporting and collecting data on our organism sampling, collaborating with scientists about the health of our pond, determining how genetics plays a role in the organisms in and around our pond. In order to reach these goals and more we use digital cameras, Excel, PowerPoint, digital microscopes, WebQuests and more. I am trying to use technology as appropriate to achieve our goals rather than incorporate

technology simply for the sake of technology despite my inundation in my masters in Technology in Education.

Technology Plan for Curriculum Unit

Too often students use technology to wow their audience rather than choosing the appropriate technology for the assignment. Students will use technology in our cells unit to further their understanding of a very abstract topic. Students often have difficulty understanding the inner workings of cells much less the concept of a cell itself. It is vitally important that students learn how to learn technology rather than learn one specific hardware or software. I find that it is most beneficial to have students learn an application as they are working on an assignment rather than learn the technology in a separate unit. Usually we have a short introduction to the specific technology, and then they work on projects utilizing the technology just learned.

In this unit students will use digital microscopes to capture images of organisms from the Dodgen pond. Dodgen has several portable digital microscopes as well as handheld microscopes which can capture microscopic images and video. The portability of these imaging devices is ideal because we can even bring the handheld scopes to the source. After a short introduction encompassing one class period with centers and a teacher created Smartboard activity, students continue to fine tune their microscope aptitude as they use the scopes for measurement and observations. Students will create spreadsheets to display which organisms have been found in the Dodgen Pond and their cell type. Students will create a PowerPoint or webpage to display images and summaries of organisms found in and around our school. All computers at Dodgen have PowerPoint and Excel software for student use. Since students have been using teacher created spreadsheets, they are already familiar with some of the uses of this program. We have also learned how to create simple data tables to record our science fair data. Lessons in PowerPoint at this level for

my students usually encompasses training students to limit the “bangs and whistles “ and focus on the content and how to deliver it.

Students use the Smartboard to explain cellular organization. Students will create Smartboard lessons as they devise analogies of cell organelles to various pictures. I have a portable Smartboard in my classroom as well as two computers, each with the Smartboard notebook software. At this stage however it is usually easier for students to import a PowerPoint into the program and then to modify the information to make it more interactive. I will need to make sure the labs have Smartboard software installed in order for each student to have access when we visit a lab. Students will also use Microsoft Word write a postcard to the nucleus acting as an organelle trying to explain why they are an important part of the cell “team”. I plan on allowing students to have the postcard option or students may opt to use Word to describe their cell organelle with a simile or metaphor.

With these technologies students learn about organisms they never knew existed. Spreadsheets allow a quick analysis for students to learn from their information gathered. Time in Dodgen labs is limited to two days a month so usually students have time to complete a project if it has been well planned ahead of time. Often I have students conduct research at home then compile a plan prior to going to the lab. Having two desktops, a PC and an Apple laptop in my room allows some work to be completed in class or as centers. Having such a variety of technologies accessible allows students to challenge themselves in learning a new piece of equipment or software or to choose a more comfortable technology when needed.

Exploratorium’s Microscopic Imaging Station, http://www.exploratorium.edu/imaging_station/gallery.php?Asset=mouse_embryonic_1&Category=cellmotility&Type=video , gives straight forward information about the immense variety of cells. It provides detailed stories which can even be used to spark interest for students. Much of this website reminded me of my cell

biology classes. When talking about cells, one can not forget Cells Alive, <http://www.cellsalive.com> . I return to this site each year to refresh my knowledge of the cell organelles as well as news about bacteria and viruses. Jefferson Labs, <http://education.jlab.org/indexpages/teachers.php> provides activities as well as information to help me understand the new research in microscopy.

Students must learn to use a compound microscope in order to view plant and animal cells as well as microscopic organisms from the pond. University of Delaware has a wonderful virtual microscope <http://www.udel.edu/biology/ketcham/microscope/scope.html> . The virtual microscope allows a tour to teach the microscope and gives pointers if a student has chosen the incorrect lens or adjustment knob. I especially like the interactivity of this simulation which makes it perfect to use with the Smartboard. Another website for students might use during this unit is Build a Cell, <http://www.bioscope.org/taste/builda.htm> from Bioscope. This sight is best used as a review or re-teach activity after students are introduced to cell organelles and their functions. Southwest Schools, <http://www.southwestschools.org/jsfaculty/Microscopes/Usage.html> , in Ohio has developed information and several online activities which may be used for introducing cells and microscopes and even to assess information learned.

3.1 Six Bloom's Taxonomy Questions

Competence	Questions
Knowledge	Label each organelle of an animal cell.
Comprehension	Describe the similarities and differences between an animal cell and a plant cell.
Application	Classify cells as either prokaryotic or eukaryotic.
Analysis	Explain the importance of specialized cells for macro invertebrates.
Synthesis	Explain what would happen if prokaryotic organisms were able to grow to a large size.
Evaluation	Act as an organelle of your choosing, compose a letter to the nucleus to defend your position in the cell.

Integrating Technology into A Curriculum Unit

Mary Barkley	Grade Level: Seventh Grade	Subject Area(s): Life Science
State: Georgia	URL: http://www.georgiastandards.org/SearchResults.aspx	
Generative Topic Title: Cells Sustain Life		
Essential Questions	Question 1 To what extent is survival dependent upon cells?	
Unit Goals		
Unit Understanding Goal 1	1. Students will describe the structure and function of cells, tissues, organs, and organ systems. Learning Targets: Performance Skills, Reasoning, Knowledge & Comprehension	
Associated Curriculum Standard (Reference)	S7L2	
Unit Understanding Goal 2	2. Students will examine the dependence of organisms on one another and their environments. Learning Targets: Reasoning, Performance Skills, Dispositions, Knowledge & Comprehension	
Associated Curriculum Standard (Reference)	S7L4	
Unit Understanding Goal 3	3. Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities. Learning Targets: Products, Performance Skills	
Associated Curriculum Standard (Reference)	S7CS4	
Unit Understanding Goal 4	4. Students will have the computation and estimation skills necessary for analyzing data and following scientific explanations. Learning Targets: Performance Skills, Products	
Associated Curriculum Standard (Reference)	S7CS3	
Unit Understanding Goal 5	5. Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works. Learning Targets: Dispositions, Performance Skills	
Associated Curriculum Standard (Reference)	S7CS1	
Unit Understanding Goal 6	6. Students will enhance reading in all curriculum areas by: Reading in All Curriculum Areas Learning Targets: Reasoning, Dispositions	
Associated Curriculum Standard (Reference)	S7CS10	
Unit Understanding Goal 7	7. Students will communicate scientific ideas and activities clearly. Learning Targets: Performance Skills, Products, Reasoning	

Associated Curriculum Standard (Reference)	S7CS6
<p style="text-align: center;">Technology Goals For Use of Computers & Other Technologies (From state or ISTE Standards)</p>	Goal 1 Use content-specific tools, software, and simulations (e.g., environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research.
	Associated Curriculum Standard (Reference) ISTE NETS # 4
	Goal 2 Design, develop, publish, and present products (e.g., Web pages, videotapes) using technology resources that demonstrate and communicate curriculum concepts to audiences inside and outside the classroom.
	Associated Curriculum Standard (Reference) ISTE NETS # 6
	Goal 3 Collaborate with peers, experts, and others using telecommunications and collaborative tools to investigate curriculum-related problems, issues, and information, and to develop solutions or products for audiences inside and outside the classroom.
	Associated Curriculum Standard (Reference) ISTE NETS # 7

3.3- 3.5 Unit Activities and Performances

Types of Performances	Activities Required	Goals Addressed by this Activity	Nature of Technology Use	Assessment Strategies
Introductory Performances	(Teacher) Introduce cell organelles and functions of organelles with short video segments from Peachstar video streaming and lecture. Students will take two column notes in their science journal on the structure and function of each cell organelle: mitochondria, nucleus, lysosome, vacuole, endoplasmic reticulum, cell membrane, chloroplast, and cell wall.	Goal 1, 6, 7	Peachstar video Streaming	Checklist
	Students will check for their own understanding by completing the assessment quiz provided by Peachstar. Students may review lesson on their own in the media center or at home if they have not earned a sufficient score (80% or above)	Goal 1	Peachstar video Streaming	Teacher Quiz or Online quiz
	Role play: students act out parts of cell or devise a career for their organelle as an analogy to their randomly assigned cell part.	Goal 1, 5 ISTE NETS # 6	Digital Video Camera, moviemaker, I-Movie	Observation
	Students will use a Smart Board to arrange specialized cells into tissues, organs, organ systems, and organisms.	Goal 1, Goal 3 ISTE	Smartboard notebook	Observation

	Write a post card to the nucleus describing why your cell part must remain in the cell despite the energy crunch (budget cuts). A picture is required on the reverse side of the postcard. OR Students create an analogy comparing the cell organelle to something else and why this organelle can be analyzed in this way. An illustration is required to accompany this analogy.	Goal 1, 6 Goal 3 ISTE	Word and Paint Or Publisher and Paint	Rubric
	Digital Video Microscope Training- Online virtual microscope, http://www.udel.edu/biology/ketcham/microscope/scope.html , as well as hands on practice in centers for students to become experts in microscope techniques.	Goal 2, 3 Goal 1 ISTE	Motic Digital Microscope	Observation
	Students will use digital cameras and digital microscopes to capture images of macro-invertebrates as well as other organisms from the pond.	Goal 2, 3 Goal 1 ISTE	Digital photography Motic Digital Microscopes	Checklist
	Students will incorporate video microscope images into a short film to explain that tissues, organs, and organ systems serve the needs cells have for oxygen, food, and waste removal. Atomic Learning available for those that need a review on Movie Maker and Adobe Premier Elements.	Goal 1, 2 Goal 2 ISTE	Movie Maker or Adobe Premier Elements	Rubric
Guided Inquiry Performances	Students devise a cell from available pictures using Smartboard gallery pictures. Students must be able to explain WHY they choose the various pictures and explain their analogy to the cell part that their picture represents.	Goal 1, 7	Smartboard notebook	Observation, checklist
	Macroinvertebrate Mayhem Project Wet activity is used to simulate the dependence of organisms on their environment.	Goal 2, 5		Observation, checklist
	Students will conduct data collection according to Adopt a Stream macroinvertebrate sampling protocol.	Goal 2, 3 Goal 1 ISTE	Excel	Observation
	Data from Macroinvertebrate Mayhem activity and sampling activity will be graphed in Excel to analyze what happens to organisms when their cells break down and they are unable to survive environmental stress. Students will write a conclusion based on data and analysis.	Goal 4, 5 Goal 1 ISTE Goal 3 ISTE	Excel	Checklist
Culminating Performances / Final Projects	In collaborative groups students will take previously created diagrams, spreadsheets and stories to incorporate into a publication of student's choice to display student understanding of the importance of cells to the survival of our macroinvertebrates as well as all living things.	Goal 2, 4, 7 Goal 2 ISTE Goal 3 ISTE	Publisher, moviemaker, I-movie, Adobe Premiere Elements, PowerPoint	Rubric

3.5 Assessment Samples

Culminating Project: Cells Sustain Survival

Teacher Name: Mrs. Barkley

Dodgen Header:

CATEGORY	Cell Survivalist (4)	Cell Biologist (3)	Cell Explorer (2)	Cell Observer (1)
Why cells?	Explains in depth why ALL organisms including macroinvertebrates need cells. Subject knowledge is excellent.	Includes essential knowledge about organisms' dependence on cells. Subject knowledge appears to be good.	Includes information about organisms dependence on cells but there are 1-2 factual errors or too little information.	Content is minimal OR there are several factual errors
Cell Information	Includes in depth information on the structure and function of cells. Subject knowledge is excellent.	Includes essential information on the structure and function of cells. Subject knowledge appears to be good.	Includes information on the structure and function of cells but there are 1-2 factual errors or too little information.	Content is minimal OR there are several factual errors.
Macroinvertebrate Information	Includes in depth analysis and data from Macroinvertebrate Mayhem and sampling. Subject knowledge is excellent.	Includes essential analysis and data from Macroinvertebrate Mayhem and sampling. Subject knowledge appears to be good.	Includes analysis and data from Macroinvertebrate Mayhem and sampling but there are 1-2 factual errors or too little information.	Content is minimal OR there are several factual errors.
Requirements	All requirements are met and exceeded.	All requirements are met.	One requirement was not completely met.	More than one requirement was not completely met.
Originality	Product shows a large amount of original thought. Ideas are creative and inventive.	Product shows some original thought. Work shows new ideas and insights.	Uses other people's ideas (giving them credit), but there is little evidence of original thinking.	Uses other people's ideas, but does not give them credit.
Workload	The workload is divided and shared equally by all team members.	The workload is divided and shared fairly by all team members, though workloads may vary from person to person.	The workload was divided, but one person in the group is viewed as not doing his/her fair share of the work.	The workload was not divided OR several people in the group are viewed as not doing their fair share of the work.
Organization	Content is well organized using introductions, headings or bulleted lists to group related material.	Uses introductions headings or bulleted lists to organize, but the overall organization of topics appears flawed.	Content is logically organized for the most part.	There was no clear or logical organizational structure, just lots of facts.

Comments:

Final:

Cell Organelles Quiz

Modified True/False

Indicate whether the sentence or statement is true or false. **If false**, change the identified word or phrase to **make the sentence or statement true**.

- ____ 1) The cell theory states that cells are produced from nonliving cells.

- ____ 2) The outer boundary of a cell is the cell membrane.

- ____ 3) Organelles that use energy from sunlight to produce food are called mitochondria. _____

Multiple Choice: Identify the letter of the choice that best completes the statement or answers the question.

- ____ 4) Which of the following statements is NOT part of the cell theory?
A) Cells are the basic unit of structure and function in living things.
B) All cells are produced from other cells.
C) Only animals are composed of cells.
D) All living things are composed of cells.
- ____ 5) What is the function of a cell wall?
A) to protect and support the cell
B) to perform different functions in each cell
C) to prevent water from passing through it
D) to prevent oxygen from entering the cell
- ____ 6) What is the function of a cell membrane?
A) to protect and support the cell
B) to perform different functions in each cell
C) to control what enters and leaves the cell
D) to form a hard outer covering for the cell
- ____ 7) Chromatin in the nucleus of a cell
A) contains instructions that direct the functions of a cell.
B) controls what substances come into and out of a cell.
C) protects the nucleus with a rigid layer of cellulose.
D) produces ribosomes and proteins.
- ____ 8) Which organelles produce most of the energy needed by a cell?
A) mitochondria
B) chloroplasts
C) ribosomes
D) Golgi bodies
- ____ 9) Which organelles produce proteins in the cell?

- A) Golgi bodies
- B) chloroplasts

- C) ribosomes
- D) vacuoles

___ 10) Which organelles release chemicals that break down large food particles into smaller ones?

- A) endoplasmic reticulum
- B) Golgi bodies

- C) lysosomes
- D) vacuoles

___ 11) How does a bacterial cell differ from a plant or animal cell?

- A) It is larger.
- B) It does not have a nucleus.

- C) It has no cytoplasm.
- D) It has no organelles.

___ 12) Which organelles found in plant and animal cells are also found in bacterial cells?

- A) endoplasmic reticulum
- B) Golgi bodies

- C) chloroplasts
- D) ribosomes

___ 13) Absence of cells indicates that an object is _____.

- A) a plant
- B) an animal

- C) nonliving
- D) living

___ 14) Human cheek cells are different from _____.

- A) human nerve cells
- B) Elodea cells

- C) human muscle cells
- D) all of the above

___ 15) Which of the following cells might be an animal cell?

- A) a cell with a nucleus, chloroplasts, mitochondria, and cytoplasm
- B) a cell with a cell membrane, a cell wall, mitochondria, and cytoplasm
- C) a cell with a cell membrane, a nucleus, mitochondria, and cytoplasm
- D) a cell with a nucleus, a cell wall, cytoplasm, and mitochondria

Matching Match each item with the correct statement below.

- A) nucleus
- B) chloroplasts
- C) cell membrane

- D) cytoplasm
- E) mitochondria

___ 16) receiving department of the cell

___ 17) power plants of the cell

___ 18) green structures inside plant cells

___ 19) gel-like material inside cells

___ 20) controls cell activities

Macroinvertebrate Data Collection Checklist

	Yes	No
1. Follows safety precautions.		
2. Follows Adopt a Stream protocol for sampling.		
3. Describes the characteristics you would use to identify a dragon fly larva, damselfly larva, leach, midge larva.		
4. Explains why are we taking samples of macro invertebrates.		
5. Explains why are we taking samples four different times over four months.		
6. Explains why it is important to put all the sampled organisms back into the pond when we are finished		
7. Makes a clear hypothesis about the samples we will find on December 9, 2007.		