Discovering Life

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Introduction:

This unit takes students into the world of cells. The unit is composed of no less then six days of activities that will enrich the students giving them a base knowledge for future topics discussed in life science class. The entire unit gives knowledge of how to use a microscope; discovering microscopic organisms and learning the parts of a cell. The unit will lead to a collaborative group project that will tie in art, technology and several habits of mind. Through out the lessons students will be asked to reflect through the use of illustration and class discussion. The students have just finished a unit about classifying living and non-living things. They have the background knowledge of what the seven characteristics of a living thing is (Needs water, obtains energy, respiration, reproduction, growth, movement, made of cells)

Attributes:

This unit takes pieces of the FOSS science kits and implements them will supplemental materials to enhance the students learning and enrichment. Students will also use the website www.Unitedstreaming.com to view videos and pictures. The final project will be done with www.msdwt.k12.in.us/webquests/rasquest/cell_city.html.

Description of classroom setting:

This is a 7th grade Life Science class that has 24 students. Periods span for 55 minutes. There are six tables set for cooperative learning. In the classroom there are six special education students and eighteen regular education students. The six special education students require some modifications that will be addressed in the lesson plans themselves.

Materials needed for the entire unit.

- 6 Microscopes
- Pre-made slides (can be bought online)
- Box of glass slides
- Box of cover slips
- Several glass jars
- Eye droppers
- Dry yeast
- Cotton balls
- Red Dye (FOSS Kit)
- Overhead of microscope
- Poster Board
- Markers
- Sample of paramecium (FOSS kit)
- FOSS text book "Diversity of Life"

Massachusetts Curriculum Frameworks covered in this Unit:

Science

2.1 Relate cell parts/organelles (plasma membrane, nuclear envelope, nucleus, nucleolus, cytoplasm, mitochondrion, endoplasmic reticulum, Golgi apparatus, lysosome, ribosome, vacuole, cell wall, cytoskeleton, centriole, cilium, flagellum, pseudopod) to their functions. Explain the role of cell membranes as a highly selective barrier (diffusion, osmosis, facilitated diffusion, active transport).

Technology

2.1 Identify and explain the steps of the engineering design process, i.e., identify the need or problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign.

Activity One
What does the microscope do?

Prep: (10 min) Before the students come into the room, line the microscopes along the counter. In front of each microscope a glass slide, cover slip and pair of scissors will be placed.

Science Concept: Learn the parts of a microscope.

Process Skills: Predicting, Observing

Habit of Mind: View science and technology thoughtfully

Materials: Microscope, Paper, Pencils, 6 Glass Slide, 6 letters printed on paper, Overhead projection of a microscope.

Procedure: Students will begin the lesson by examining the microscope. A brief safety and handling procedure will be given from the teacher prior to the lesson. Each group of students will cut a letter printed on a piece of paper out and create a slide of it. Students will be given the opportunity to put the slide under the microscope and examine it, using the various knobs to focus the letter they have cut. After the students have found what they used to focus and magnify the slide, the class will have a discussion with the teacher, to report their findings. The teacher will use an overhead transparency to display a picture of a microscope. Letting the students describe what happens when each moving piece of the microscope is adjusted entices the goal of using magnification and focus in the discussion. Students can then go over common vocabulary with the teacher, labeling the parts of the microscope on the over head projector. To re-enforce the class lesson the students will be asked to draw and label their own picture of a microscope to be displayed in the classroom. This not only produces classroom art, but posts a resource through out the classroom of the primary tool for research the students will be using through out the unit.

Time	Instruction	Questions	Procedure
10-15 min	Safety Procedure for using a microscope. (Remember to tell them what happens if you move the high power lens to low on the slide)	How do you think I should carry the microscope? How much do you think this microscope costs? Look what happens when I use the high magnification, it can touch the slide, you have to be careful, because it can break the slide!	Demonstrate proper handling of microscope.
15-20 min	Allow students to manipulate the microscope.	Cut a letter from one of your science papers and put it on the microscope slide. And place the cover slip on top.	Have getters take materials back to table. Because the microscope has to be carried with two hands the students

		Examine the slide. What do you see? What happens to the image as you change magnification? What does each lens do? What is the stick in the eyepiece doing? Why is the image backwards?	will have to take two trips.
20 min	Drawing the Microscope	I have a picture here of the same microscope. What happened when you moved this? (the Slide) What happened when you turned this? (The focus knobs) Compare the fine focus knob to the coarse focus knob. Did you find the pointer in the eyepiece useful?	As the students answer these questions speak back to them using the vocabulary. Coarse focus, fine focus, eyepiece, diaphragm, slide, stage, stage clips, base, arm, objective lens, magnification, inverted.

Homework: Who uses microscopes? Look on the web to find your answers.
Bring in one glass jar per group next class.
(Students will not be using the glass jar till lesson three)

Activity One Day Two
Fun Findings

Prep: (10 min) Set microscopes up around the room at six stations. In each station leave two pre-made slides for students to view.

Science Concept: Students will be able to adjust magnification of the microscope and learn the strength of each objective lens.

Process Skills: Observing

Habits of Mind: Be curious. Be careful and accurate in observations.

Materials: Microscope, Pencils, Worksheet (1.0) (copy for each student), 6 Pre made slides.

Procedure: Students will begin the class by illustrating and reflecting what they learned the day before about the microscope. Using the overhead projection labeled by the class and teacher the day before the students will copy and label there own microscope for their notes. As the students label the teacher will circulate and have discussion about the different pieces again. That night for homework they will describe what each piece does on a separate sheet of paper. Accommodations for special education allow for a pre-made drawing for the students to label.

Once the drawing has been copied the teacher will hand out a worksheet for students to illustrate what they are examining under the microscope. Students will work in their groups to examine the pre-made slides, illustrating what they see at different magnifications. Students will rotate through the room every five minutes. As groups work to illustrate their findings the teacher will talk to each group and formatively asses their vocabulary and understanding of how to use the microscope.

Time	Instruction	Questions	Procedure
15 min	Speak to students about what they talked about the day before. Ask about different parts as they draw. (Accommodations): Give sped students a pre-made drawing of the microscope to label.	What is the name of the piece you look through? Which focus knob would you use to raise the stage small distances? What lens magnifies at the lowest power? What does the diaphragm do?	Circulate through the room as the students draw and label using the example from yesterday. Students will illustrate on worksheet 1.0.
30-40 min	Students will observe different slides under the microscope and illustrate what they see at each magnification.	What is the difference between coarse and fine focus? Why is the pointer in the eye piece useful? What do you think the numbers on the side of the objective lens mean? What are you	As students draw what they are observing, circulate from group to group and have conversation using the new vocabulary.

		looking at? What different details can you see at each magnification?	
10 min	Talk to class about home work. "Who uses microscopes?" See who brought in empty jars.	Who uses microscopes? What do they use them for? Why else would we use a microscope other then looking at these slides?	Have students label their groups jars with a piece of tape.

Homework: Write on a separate sheet of paper what each part of the microscope does and put it inside your notebook. Fill in worksheet 1.1.

* Teacher note: Remember to reserve the computer lab for two days, to do Cell City.

Activity Two
Pond Hunting

Prep: (10 min) Prior to class make sure the principal will allow the students to leave the school yard for a mini field trip. Also draw maps of where the students will be walking to so they can navigate themselves to the destination. Set up an area of the classroom with a light to keep pond samples under.

Science Concepts: Collect pond samples to look at under the microscope.

Process skills: Observing, Communicating

Habits or Mind: Know why curiosity, openness, and skepticism are so highly regarded in science and how they are incorporated into the way science is carried out; exhibit these traits in our lives and value them in others.

Materials: Jar (Brought in for homework), map (made by teacher)

Procedure: Students will spend a class period walking to the local river to collect water samples to view under the microscopes. Students will also collect river scum in still water pools by the riverside. To get to the river the students will be given each a map to follow to reach their destination.

Time	Instruction	Questions	Procedure
2 min	Hand out map to the swamp and explain to the students we are having class here today. Don't forget your bottles.	No questions.	Prompt students to stand and follow the map.
45 min	Remind students about safety when you are outside the school building. When you reach your location tell students where to get the best samples, (in the still waters of the pond)	Where do you think the map is taking them? Why are we collecting samples of this water? Why do we need samples of the scum?	Allow students time to explore and gather samples of water and scum.
13 min	When you return to the classroom instruct students to leave there samples under the light.	What are we going to do with these tomorrow?!	

Homework: Write a summary of your day in science; make sure to include positives and negatives about how your group worked together.

Activity Three
Discovering Life

Prep: (10 min) Teacher places eye droppers, glass slides, cover slips and napkins in the materials box.

Science Concepts: Students will discover the world of microorganisms.

Process skills: Predicting, classifying

Habits or Mind: Open-minded, willing to change your mind in the face of reliable evidence, and respect another's point of view.

Materials: Pond Samples, 6 Eyedroppers, Glass Slides (enough for each student), Cover Slips (Enough for each student), paper towels, Drawing paper, Pencils, Microscopes.

Procedure: Students will begin class by discussing what there favorite parts of the pond trip was. After a brief discussion the students will then take their pond samples back to the tables and predict what could be in the water. Students will then be shown how to make a wet mount slide using the eye dropper and the glass slide and cover slip.

The groups will observe there slide under their groups microscope and illustrate what they see. On their illustration the students will classify microorganisms by shape, color, size, and living or non-living.

Time	Instructions	Questions	Procedure
5 min	Ask students to discuss in their groups their favorite part of the field trip.	What was one good thing and what was one bad thing?	
10 min	Tell students to place their microscopes in the middle of the table so no one plays with them. Next instruct the students to each take a slide, cover slip, and napkin. Instruct the students to take one eye dropper full of the pond sample and place a drop on each slide. Next place the cover slip over it. Tell them this is called a wet mount slide.	Why are we putting a cover slip over the water sample? Why are we each making a slide instead of just on for the group? Isn't it all the same water?	Students will make a wet mount slide using the materials from their lab kit.
25 min	Each student will	What are you	The students will be

	take their slide and place it under the microscope one at a time. Take turns looking at each others slides. As they observe, they will draw each of the things they see, without worrying about classifying them into categories.	looking at? Is anything moving? Did you think there was anything inside the water you took a sample of? What are these things inside the water? Do you think these things are in all water? Are these things performing any of the seven characteristics of a living thing?	looking through the microscope. Prompt students to use different magnifications. Remind them to be careful not to crack the slide while using the high power lens. Allow students time to make their illustrations. Give them a time count every five min.
8 min	Look at each of your drawing. Classify the different things you saw in your sample by shape, color, size and if you think it is living or non-living. Talk about it with your group members.	What do you think these things are? How do they move? Do you think they can communicate? Are they fish? Compare the ones that have color to the ones that do not.	Demonstrate how to list and classify on the board, using an example from one of the student's findings.
7 min	Time to clean up the science lab.	Did you wash your slides and place them in the drying rack? Are all of your cover slips accounted for? Be careful handling the glass, it can cut your fingers. Make sure all eyes droppers are washed out. Put your pond samples back where you got them.	Give students a time check every 2 min.

Homework: Make any more classifications on your illustration you didn't have time to do in class.

Activity four
The Lowly Paramecium

Prep: (10 min) Set up materials boxes.

Science Concept: Students will learn what a single celled organism is. Students will learn what a cell membrane is, a cilia, cytoplasm and nucleus.

Process Skills: Observation, Inferring

Habit of Mind: Buttress their statements with facts found in books, articles, and databases, and identify the sources used and expect others to do the same.

Materials: Microscopes (6), Sample of Paramecium (FOSS Kit), Eye Droppers (6), 6 Glass slides, 6 cover slips, paper towels.

Procedure: Students will use the sample of the paramecium in the FOSS kit. When the students have made a slide of the paramecium sample they will observe the movements and the different organelles that are visible in this power microscope. Students will observe and illustrate what they see. Using the FOSS text book they will be able to fill in the parts of the single celled organism that they had not been able to see in the microscope. Students will then label and build vocabulary. The students will be able to understand that the cell membrane hold the cell together, cilia helps the paramecium move, cytoplasm is the part of the cell that keeps it moist and protects the organelles in place, and the nucleus is the brain of the cell.

Time	Instruction	Questions	Procedure
5 min	Tell the getters that after they have brought the materials back to their groups they need to bring the eyes dropper up to the teacher's desk to take and eye dropper full of the paramecium sample. (this is done to ensure there is enough for the other two classes and there is no spilling)		Students take an eye dropper full of the sample and bring it back to their groups.
2 min	(As groups make a slide of the sample) Instruct groups that they will be observing a paramecium. This	Let me know if you recognize this organism.	Allow students time to create a slide of the sample.

	is something that they may had seen yesterday in their pond samples.		
25 min	Tell the students to look at the slide first under the low power magnification lens. They will notice the paramecium is moving quickly all over the slide and is hard to catch. Tell them to use the medium power lens. This is probably the best lens to use because if you go to the high power the point of view will be too narrow to catch the paramecium.	Do you see the paramecium? What is it doing? How does it swim? What are all those little black dots inside it? Which characteristics of a living thing is this performing? Is it living? How could you tell if it was doing the other things that cannot be seen right now? How do you think we could get it to stay still so we could observe it closer?	Allow the students time to observe and talk about their findings. Make sure to give time counts so one students does not spend too much time looking. Have students draw what they are seeing. Do not let them use their text books yet because the exact drawing is in there. Let them draw their own observations.
20 min	Give the students the FOSS text book "Diversity of Life" Have them move to page 8. On the page there is a full illustration of the paramecium and all the labeled organelles. Have students look and compare what they just saw in the microscope to what they see in the text.	What did you see when you looked in the microscope? Compare that to the text. What things do you think you saw in the microscope? Does any of these things have names? "Well I know we all saw the cell membrane." What do you think that is used for? How about the nucleus? Did anyone see the nucleus? What do you think that is used for? How did the paramecium swim? (cilia)	Talk with the students and use the discussion rubric to evaluate the substance of their discussion. Give the students the text book to fuel the conversation. Have the students compare their findings with the book.

Home work: Think of one way we could test to see if this organism is performing one of the 7 characteristics of life we could not observe in the microscope today. Complete worksheet 1.2.

Activity five
Feeding time

Prep: (10 min) Go onto www.unitedstreaming.com and download the single cell organisms video. (25mins long) Pre make the yeast and red dye solution and leave in a jar.

Science Concept: Students will be able to see exactly were the paramecium's organelles are and infer that the paramecium has a digestive system.

Process Skills: Observing, Inferring

Habit of Mind: Offer reasons for findings and consider reasons suggested by others

Materials: Video, paramecium sample, 6 cotton balls, 6 dry yeast, red dye, 6 eye droppers, 6 slides, 6 cover slips.

Procedure: Students will begin class by watching a short film of single cell organisms. The film includes a trip to the pond, just like they had done previously, and students looking under microscopes at samples. The students will watch the film and make comparisons of the illustrations they had made the day before and the organisms they are looking at up close on the computer.

After the video, students will look at paramecium under the microscope, using yeast and red dye mix and observe the paramecium eating the yeast. Students will be able to see the paramecium organelles being filled with the red dye solution.

Time	Instruction	Question	Procedure
2 min	Remind students the rules for watching a video. Cue video.		Remind students to be silent during the video so others can concentrate. Tell students to not take notes but to watch carefully.
15 min	Watch video. The whole video does not need to be watched, after about 15 minutes it is irrelevant to the class.	Have you seen any of these organisms before? Notice the different sizes of them, why is this?	Remember to point out the organelles in the different organisms. Make sure to point out the part when the paramecium eats through its oral groove.
30 min	Tell getters to eat get the try with all of the supplies on it. Allow getters to come back and pick up the microscopes. Instruct students that you have a	What is yeast? What do parameciums eat? Why will they eat the yeast? What happens when the food goes into them? How do you know they have	Students create the slide of the dye and paramecium. The paramecium begin to eat the yeast in the dye mixture. Students will be able to see the

	mixture of yeast and dye. The dye can stain clothes so be careful with it. Tell students to place a drop of the paramecium sample on the slide they are working with. Next tell students to pull off a piece of the cotton ball and place it on top of the water droplet. Next tell the students to drop some red dye on the cotton. Cover the slide with the cover slip. Instruct students that if they use the high magnification to be careful because the slide can be a little messy from the dye.	eaten it? Why are we putting the cotton ball on the slide? Remember how fast the paramecium are? What are the paramecium doing? Now how can you tell they have eaten the dye? Who has a good sample we could share with the whole class? Can you see the organelles? What was the purpose of the cotton?	organelles inside the paramecium because the food vacuole and water vacuole will be dyed red.
8 min	Instruct students to clean up. Wash off the slides and put the microscopes away.	Did you make sure all the red dye is off the slide? Is there any red dye on the table? Did you make sure there was no red dye on the lens of the magnifying glass?	

Home work: Compare your body to the paramecium's, write a brief comparison of the two on a piece of notebook paper.

Activity six
Cell City (Two Days)

Prep: (10 min) Computer lab should have been reserved.

Science Concept: Students compare cell parts to a city's working parts.

Process Skills: Defining operationally

Habit of Mind: Be aware that there may be more than one good way to interpret a given set of findings.

Materials: Computers, Notebooks

Procedure: Over a three day period students will be working in the computer lab to discuss and create a "cell city" the city will have four parts. A map (done by everyone), a travel brochure (done by the travel agent), a news paper (done by the journalist) and a song to advertise your city (done by everyone). In groups of three, students will work together to create this project. Students will use the background knowledge of what cells are over the past unit to make a comparison of how a city works and how a cell works. On day one the students will be introduced to the project and given the rubric. Students will be using the web site www.msdwt.k12.in.us/webquests/rasquest/cell_city.html to give them guidelines and ideas.

Time	Instruction	Questions	Procedure
15 min	Students will be introduced to the project. Put the students in groups of three and explain that each person will be responsible for their portion of the project. Hand out the rubric. Remind students that they should use the notes they have made in class, their illustrations and their memories of their observations.	How could a cell's parts be related to a city's parts? What are some important aspects we need to focus on when creating our city? Who in the group will do what part? Does everyone understand the rubric?	Introduce project. Hand out the rubric. Create a list of ideas on the board.
35 min	Take students to the computer lab. Remember there is no eating or drinking in the computer lab, also respect the computers. Anyone not staying on task will have one warning then, they	Does everyone know what part of the project they are concentrating on? Did everyone bring something to take notes on? Does anyone need something?	Remind students of computer room rules. Give the students the web site to use. Allow them time to look at it and try different things.

	will not be allowed to use the computer.		
5 min	Line up class and walk them back to their room.	Did anyone think of something they might need tomorrow to set up their project? Did anyone find any good ideas they could share with the class?	Return to class

Activity six
Cell City (Day Two)

Prep: (10 min) Computer lab should have been reserved.

Science Concept: Students compare cell parts to a city's working parts.

Process Skills: Defining operationally

Habit of Mind: Be aware that there may be more than one good way to interpret a given set of findings.

Materials: Computers, Notebooks, Copy Paper, Pencils

Procedure: On day two of the project students will return to the computer room for a full period. During this period students will be able transform ideas to sketches and rough drafts. The goal of this period is to put all the information down on paper so on day three they will be able to make final copies of their cities.

Time	Instruction	Questions	Procedure
10 min	Tell the students today is when they should get the bulk of their work done. Students should begin to individually work on their parts and spend the last ten minutes on the collaborative parts.	Does everyone know what they are working on today? Make sure you have a blue print of your city and a description of the comparison done by the end of this class. (Does anyone need guidance?) Who is going to keep time for the group?	Take students into the computer lab. Supply them with copy paper to illustrate rough drafts.
45 min	Work through groups to make sure they are on task.	Are you beginning to write your advertising song? Is your individual work complete before you work on the map and song?	Make sure groups are completing everything they need for the final compilation tomorrow.

Home Work: Students that still have individual work done should complete it for homework. Students that have finished should take an extra part of the group work to complete at home.

Activity six
Cell City (Day 3)

Prep: (10 min) Materials should be laid out for easy access.

Science Concept: Students compare cell parts to a city's working parts.

Process Skills: Defining operationally

Habit of Mind: Be aware that there may be more than one good way to interpret a given set of findings.

Materials: Notebooks, Copy Paper, Pencils, Markers, Poster Board, Classroom computers.

Procedure: The final part of the project is to be done in the classroom. Students should have completed their individual work at home and are now using this period to put it all together. Using copy paper and poster board, the students can create final copies of brochures, and city map. The journalist can type their article on the computer, and the group song can also be typed. Students will post work on the classroom walls at the end of class for grading.

Time	Instruction	Questions	Procedure
5 min	Show students where the materials are for their final project. Instruct them to respect the materials and leave some for the rest of the class. Tell students that computer time is to be limited to 15 minutes. Tell students they should let the journalist type the article and the song while the other two group members draw the map. The brochure should be ready in final draft to copy onto a clean piece of paper.	Does everyone know their task today? Can we accomplish what needs to be done in the time allotted? Are you following the rubric, so not to leave anything out? Is their enough supplies? Does anyone need anything extra?	Students work in their groups and individually on the computer to finish their projects. When finished they will put their projects on the classroom wall for the teacher to grade.
45 min	Circle through the groups to see if they are completing their tasks. Make sure to monitor computer use and allow everyone a chance	Are all your city parts and organelles labeled? IS your final project neat and clean? Is it presentable to be handed in? Are	Instruct students where to hang work when finished. If there is any free time left, have them work on fine tuning and finishing

	to use it that needs to.	there any pieces you are missing?	touches. Allow students to critique and view other work.
5 min	Tell students they must clean the room and put any materials that are not use away.	Are all the pieces of your project hanging on the wall?	Allow time for clean up. Do a double check to see if all pieces of student work has been hung.

Home Work: If for some reason a student has not completed their work, instruct them to finish it for homework, and they will be marked down for late work.

Lesson Reflections: Parts of the Microscope

When doing my lesson on the parts of the microscope there were several good things and bad things I observed, as well as several things I changed. The activity went well overall. The students enjoyed manipulating the microscope and seeing what each part of it does. Looking at the slide of a letter in the microscope and seeing it reversed raised some good conversation and well as seeing how ink printed on paper looks close up. The students learned a new vocabulary word "inverted" which they will now know throughout life.

Some positive aspects of the lesson were the level of engagement, students' conversation, and the understanding of concepts. The students were excited to be touching and trying different things with the microscope, especially after I told them that it was a very expensive microscope and they have to treat is very carefully. The students were asking me many questions about what each knob does and why there was a "stick" in the eyepiece. I allowed them to make their own conclusions, giving them a hit or two. The students also learned anew vocabulary word. This was important because the classroom dynamic is mostly bilingual students. Anytime the students can learn a new word in the English language it gives them another small part of communicating. After the lesson was done the students had, for the most part, understood the concepts about what each part of the microscope does or at least understood the main parts that they will be using in the future. Also the illustrations we made were a great way for the students to have a reference in their notebooks and for me to give a formative assessment.

There were a couple downsides to the lesson. Some students did not listen during the safety precautions and needed to be reminded about how to hold the microscope. Also a couple of the students had already learned about a microscope in another school, so they did not have as heightened of an interest as the other students. The illustrations went well but we ran out of time in the class. The students were so interested in using the microscopes that I allowed them to extra time to manipulate and to put other things on the slide, such as a piece of hair or string from a shirt.

A couple things I changed this time were the questions I asked, and a disclaimer for the high magnification lens (how it can break the slides). Also the next time I teach the lesson I am going to give them the illustration assignment at the same time they are using the microscopes, so they will be able to draw between taking turns using the microscope. By introducing the illustration as they do their observations it gives the students more time with the microscopes and they will be able to use the actual microscope as a reference instead of only the overhead projection.

Lesson Reflection: Discovering Life

When doing the discovering life lesson with the students there were several good things I observed and several bad, as well as several things I changed. The overall activity went well. The students were highly engaged; for the most part they understood the concept, except a couple students. The students also worked very well together in their groups. This lesson really helped me assess how they are progressing in cooperative learning groups. The students are at the point now where the group roles are understood and it is a natural part of class. During class I also observed other groups sharing slides and working with each other. One of my classes actually took it on themselves to swap all of their slides to the next group after they had seen them. I was extremely impressed, although this was my higher tracked class; it was still amazing to see that they were this interested in the water samples to want to share and observe other groups.

The positive things that happened in my class were the group participation, and the student engagement. The groups all worked together and shared findings. The students were highly engaged. I fielded many questions, but did not give answers, only answered their questions with questions, and pointing to their group mates to give input on what their opinion was for the inquiry. Later the illustration were drawn with nice detail and most students labeled colors, shapes and made notes about how the microorganisms they were observing moved.

A couple negative things in the lesson were the fact that there were two or three kids that could not handle the group setting. Because the classroom was noisy and people were moving around from different groups these students were out of control and needed to be reprimanded. There were two kids with fine motor skill issues that had trouble drawing. The problem was easily solved though because the other students in the groups helped with their drawings; one student I sat with and drew as he told me what to draw. Finally the length of time it took to clean up was longer then I had anticipated. In this lesson I allowed the students too much time to observe because they were so interested in the lesson, and our clean up was sloppy.

Next time I run this lesson, I will make sure I allow myself enough time to clean and put things away. Also for the students that have a hard time drawing I will have some pre draw shapes on a paper that they can use to draw and color. (eg: an oval, for a paramecium, so they can draw any cilia or shade in the color). Other then that I don’t think I would change much in the lesson. Maybe some extra paper towels, the tables were messy.

Draw what you see at each magnification: (Wks: 1.0)

Slide 1: ( )

4x	10x	40x

Slide 2: ( )

4x	10x	40x

Slide 3: ( )

4x	10x	40x

Slide 4: ( )

4x	10x	40x

Slide 5: ( )

4x	10x	40x

Slide 6: ( )

4x	10x	40x

Follow up writing questions: (Wks: 1.1)

Compare and contrast the fine focus to the coarse focus:

What details do you see at each magnification?

How does the diaphragm affect the object in which you are viewing?

“I” statements (Wks: 1.2)

Using these statements, tell me about the past science classes.

The things I am still wondering about are….

I discovered….

I’m beginning to wonder why….

I learned….

I could improve by….

I never realized that….

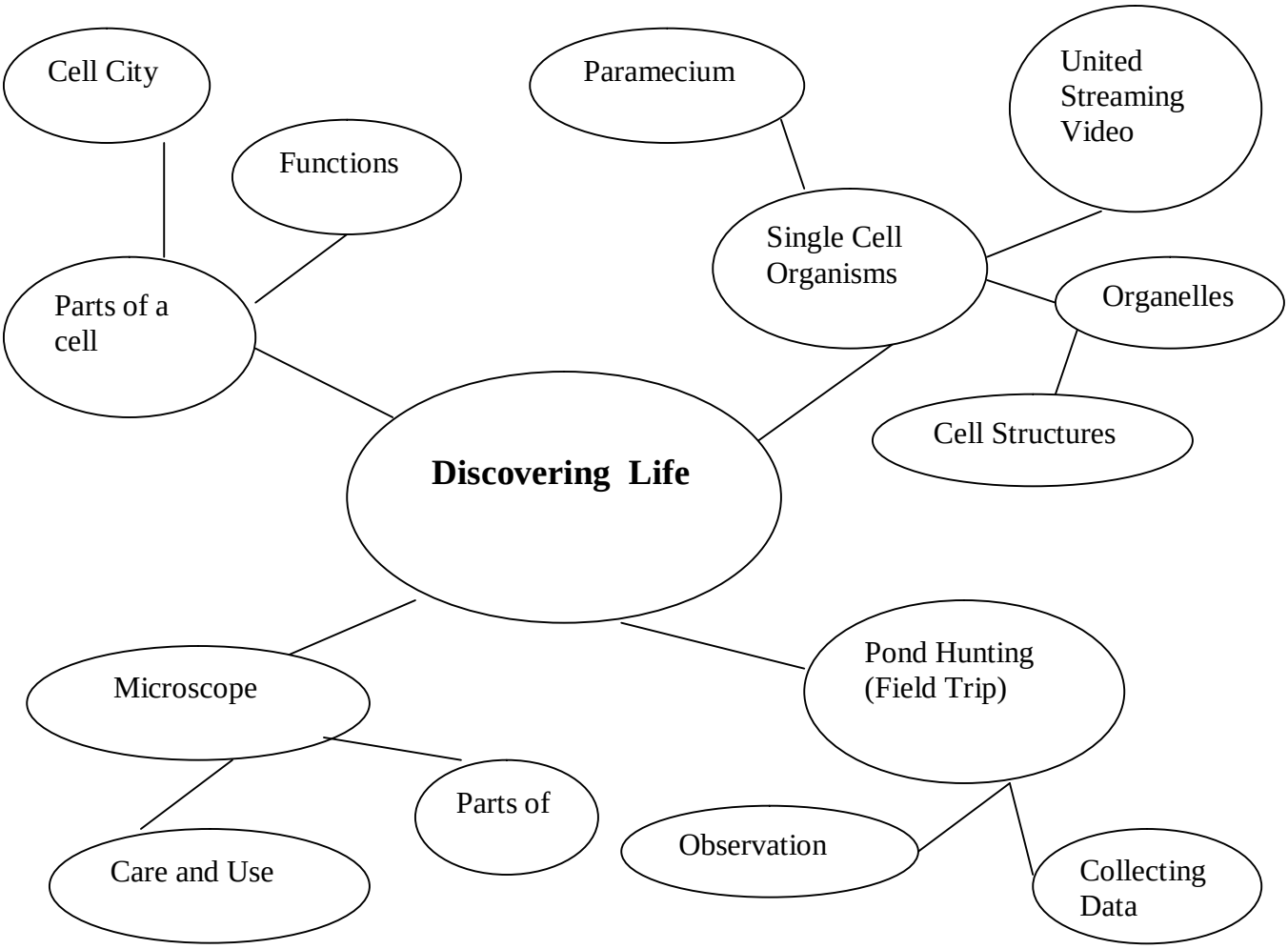
I was surprised that….

	Illustration Rubric
Score	**Description**
4	- Illustration includes detailed description of the content being drawn. - ALL parts are labeled correctly with arrows or color coded. - ALL information drawn and labeled is correct. - A detailed description of the illustration is included, demonstrating relevant and specific evidence from the text or classroom discussion using direct quotation, paraphrasing (student's words) or a combination of both.
3	- Illustration includes detailed description of the content being drawn. - MOST parts are labeled correctly with arrows or color coded. - MOST information drawn and labeled is correct. - SOME description of the illustration is included, demonstrating relevant and specific evidence from the text or classroom discussion using direct quotation, paraphrasing (student's words) or a combination of both.
2	- Illustration includes partially detailed descriptions of the content being drawn. - SOME parts are labeled correctly with arrows or color coded. - SOME information drawn and labeled is correct. - LITTLE to NO description of the illustration is included. General information is listed and has some relevance to the content.
1	- Illustration is messy and has no detail, but is generally related to content. - Limited parts are labeled. - Labels and information are not relevant to content or is incorrectly labeled. - NO description is given.
0	- Illustration is not related to content. - Incomplete drawing.
Blank	- No work is submitted.

	Discussion / Short Answer Writing Rubric
Score	**Description**
4	-Discussion includes use of topic sentence that restates the question(s) being asked - Response to question(s) is complete and answers ALL parts of question. - The question(s) are clearly discussed and ALL information is correct. - All relevant and specific evidence discussed is from the content and is explained through direct quotation, paraphrase (student's words) or a combination of both.
3	- Discussion includes use of topic sentence that restates the question(s) being asked - Response to question(s) is fairly complete and answers MOST parts of question. - The response is clearly discussed with a correct explanation. - Relevant but often GENERAL evidence discussed is from the content and is explained through direct quotation, paraphrase (student's words) or a combination of both.
2	- Discussion includes use of topic sentence that restates the question(s) being asked. - Response to question(s) are NOT complete and does NOT answer all the question(s). - The response to question(s) discussed is unclear with little correct information. - Some relevant but GENERAL and unclear evidence discussed is from the content and is explained through direct quotes or paraphrased(in student's words)
1	- Discussion does not include a complete topic sentence that restates the question(s) being asked. - The response to question(s) discussed is unclear with incorrect information. - The discussion has NO correct examples from the content - Relevant evidence not explained.
0	- The discussion does not include a topic sentence and answers only a SMALL part of the question(s). - Verbal response is incorrect.
Blank	- Discussion is totally incorrect or not related to content. - No response

Cell City Rubric

Score	Description
4	- Project includes ALL pieces of work assigned. - Neatness and illustration of drawings is pristine. - ALL organelles have a direct relation to pieces of the city. - Individual work has ALL detail and is written to grade level. -ALL work is descriptive and relative to topic content. - Song is relevant to the subject content. - ALL pieces are labeled
3	- Project includes all pieces of work assigned. - Neatness and illustration of drawings is well drawn, some marks or smudges. - MOST organelles have a direct relation to pieces of the city. - Individual work has MOST detail and is written to grade level. -MOST work is descriptive and relative to topic content. - Song is mostly relevant to the subject content. - ALL pieces are labeled
2	- Project includes most pieces of work assigned. - Neatness and illustration of drawings is a little sloppy, marks or smudges and craftsmanship is mediocre. - SOME organelles have a direct relation to pieces of the city. - Individual work has SOME detail and is written to a grade level or two below. -SOME work is descriptive and relative to topic content. - Song is partly relevant to the subject content. - SOME Pieces are labeled
1	- Project includes few pieces of work assigned. - Neatness and illustration of drawings is sloppy, marks or smudges and craftsmanship is poor or messy. - FEW organelles have a direct relation to pieces of the city. - Individual work has LITTLE detail and is not written to a grade level or two below. -LITTLE work is descriptive and relative to topic content. - Song has LITTLE to NON relevance to the subject content. - FEW pieces are labeled
0	- Project includes NO pieces of work assigned. - Neatness and illustration of drawings is un-attempted, no final copy, marks or smudges and craftsmanship is incomplete. - No organelles have a direct relation to pieces of the city. - Individual work has NO detail and is not written to a grade level or two below. -NO work is descriptive and relative to topic content. - Song has NO relevance to the subject content. - NO labels


Cell City
Paramecium
United Streaming Video
Functions
Single Cell Organisms
Parts of a cell
Organelles
Cell Structures
Discovering Life
Pond Hunting (Field Trip)
Microscope
Parts of
Observation
Care and Use
Collecting Data