

@ Tech & Science **has only ( 5 ) units** thus PBL Lessons are **included** for 3 SemHrs GC! @  
((( Project Based Learning Lessons \* Suggested “Only” Topics \* Print Out Components )))

**Biology Lecture Summaries Week 1 First and Last Name**

People, especially children, are curious by nature. They ask lots of questions, usually beginning with “why”. Biology helps teachers answer. Biology is defined as “the study of LIFE and the changes that take place with and around all living things”. Handy information to know. Biology4Kids breaks down the discipline into 8 sections: scientific studies, cells, plants, microorganisms, invertebrates/vertebrates, and animals and offers an in depth look at each complete with links, quizzes and an activity section with pictures and a slideshow. The scientific method is based on asking questions and then trying to develop probable answers. Isn't this what every kindergartner does? Only, scientists need evidence to support their idea. The scientific studies section covers the scientific method, logic and reasoning, taxonomy, labels, kingdoms, species, relationships, evolution, humans, and careers. It has an amazing amount of information useful for all grade levels and covers everything from how to develop an idea (scientific method) to how every living thing is named and classified including animals, plants, and humans and how they interact with one another.

The Microorganisms section lends itself to providing background information to the class and then using the microscope to explore. It creates a nice avenue for technology integration into the class. It highlights prokaryotes, eukaryotes, viruses, bacteria, protozoa I and II, fungi, lichen, good and bad microbes. All important vocabulary words are in bold face making it reader friendly. There are “real” pictures as well as diagrams showing the differences in the microorganism. If you open the activity section and scroll down the page, the microorganisms section pictures are there for further looking. The photography is well done and extra information is available. All pictures are available to be used as wallpaper. Printing the pictures and asking the students “what is it?” would be a great activity.

One sure fire way to get students' attention is to announce it is “experiment day”. Biology offers endless possibilities for experiments depending upon the lesson target. The book, *Experiments with Plants and Other Living Things* by Trevor Cook (Published by Rosen Publishing @2009), covers a dozen opportunities. It is written for elementary children complete with pictures and clear labels. It further offers technology integration by providing an “online list of Web sites related to the subjects in the book” at [www.powerkidslinks.com/scilab/living/](http://www.powerkidslinks.com/scilab/living/) . There is also a glossary of terms and an index. Each subject ranging from seed germination, wormery building, to sensory experiments is explained using an adaptation of the scientific method. The author lists the following for each experiment: 1). You will need...2). The plan...3). What to do...4). What's going on...5). What else can you do... Some of the experiments also have a Very Important section or a Warning. Each section has pictures of what the experiment should look like, instructions for how to proceed, and observations students should do.

The book lends itself nicely to the classroom. The experiment for *Transpiration* is a classic. It uses flowers and food coloring to illustrate the evaporation of leaves drawing water into a plant but asks students to go one step further to use colored flowers and dye to see what happens. The example they give is to use a red flower and green dye. They suggest using a magnifying glass to examine the flower. The *Wormery* was a great idea to make science “real” in the class. Students would be able to observe what is going on “underground” and keep daily records. All materials for all the experiments are readily available and the difficulty level is minimal. Solid ideas for the class and activities are explained and presented in a effective manner. Activity materials are very exciting and made for the Kids to enjoy and have fun learning.

The Biology WWW exploration had eight sites to check out. The Anatomy for Kids...Human Exploration link opened to a page that covered every anatomy subject for humans and frogs too! Who needs a scalpel and embalming fluid when you have this... a virtual frog dissection accompanied by rock- n -roll! There are several other dissections too, but class maturity would play a huge role. The Anatomy Arcade covered bones, muscles, the eye, body systems, and the brain. It is perfect for reinforcement of lessons and test review. The “Whack A Bone” game was cool. There are three levels to work through, each level having sub levels. All levels are timed and scored and the player must pass prior to moving through to the next level. Players must place a bone on the model or xray the bone from the model. Then you get to see the skeleton and based on the commands... “whack a bone”. Talk about making learning fun. The link to “Your Gross and Cool Body” is every fifth grade boy's dream... You can say “fart” and “poop” and the teacher won't yell.

“Cool Science” had several sections you could visit depending on your purpose. The “Ask a Scientist” would serve technology integration in the class. Students could pose a question or look up previous Q/A, get homework help, or science fair ideas. The “for Curious Kids” link had some experiments and/or projects for your class. The butterfly project depicting the life cycle correlates biology and art was perfect for PreK – 3. It also gave excellent career information for anyone thinking of becoming a scientist. The “Educators” section opened to a page full of resources organized by the discipline (biology, chemistry etc) giving ideas for the classroom. It also allows you to search by type, topic, or grade level.

*Science News for Kids* is a huge web site with articles, puzzles, games, and ideas for teachers and students ranging from animals to weather and everything in between. Choosing from the left hand list by clicking on the subject line was easy (I opened “Dinosaurs and Fossils”) and a page (of many) sub-categories appeared. Sup-categories allow you to filter by time, name of article (abc order), or popularity. Links for more in depth evaluation appear at the bottom of each article and a Talk Back section too, ask for comments from the reader making it more interactive. The *Halls Of Dinosaurs* article is great for educators within driving distance of Carnegie. Using technology integration, students could research, as well as, “see” the murals, use the links to the museum, and then do a field trip. On page two, *Supersight* gave new evidence to T-Rex's vision but what is impressive is the in depth links that lead to further study. Kids love dinosaurs. Setting them loose on these articles would make their day.

“Space and Astronomy” afforded the viewer some great photography. The articles are filtered the same as above but following some of the articles, *power words* and their definitions are listed. The feature article *The Most Popular Stars* is a comprehensive view of different stars complete with pictures. It discusses how stars are powered and new discoveries. *Deep Space Dancers* will keep the interest of all the sci fi readers as scientists now have a candidate for a double black hole (“full power Spock”). All of the articles have a Talk Back section at the bottom to allow comments from the reader and make it more interactive. The site offers teachers reinforcement to their lessons or researching students support for their assignments. The puzzles, games, and science fair ideas are icing on the cake.

**( Sample Assignment ) PBL Lesson Week # \*\*\* First and Last Name**

State Theme of PBL, Design Major Question, Plan for Assessment, Layout Project, Describe Components

Biology, the study of life, and Ecology, the study of where life lives, will give students many doors to open as they explore this **project based lesson (PBL)**. Environmental studies are a hot button topic these days. Without stepping into politics, students will develop ideas and strategies to help their school environment. Students of all ages need to appreciate what surrounds them and think outside of the box on how to better use what is available instead of always buying new . The PBL will target technology integration, language, math, art, science, and oral speaking skills.

The driving force behind **this PBL is recycling** within their school environment and reusing the supplies in a different capacity within the school environment. “**How can we make our school more GREEN?**” is the **question posed to grades 4-8 students**. The goal is to have the students realize how much is wasted and ways to use it again.

**Assessment** will be based on several factors. **First** there will be a *group assessment*. The class will be divided into groups with four members each. Each group member will be assigned a role for the week (roles will cycle): leader, secretary, researcher, collector. Worksheets with a rubric will be used to keep students on track and will be completed by the group on Friday of each week. All students must participate in Monday's brainstorming session. **Second** there will be an *individual assessment*. At the end of the PBL each student will self- evaluate on how well they think they did in each assigned role. Each student will evaluate themselves on how well they cooperated, followed directions, observed, researched, and followed safety guidelines. Their assessment worksheet will handed into the teacher at the end of the PBL. The PBL is planned for four weeks.

**Exemplary performance** will be assessed for students who actively participated in all roles. As a leader, did they keep the group on track, make good decisions, listen to group members? As a secretary did they complete the worksheets neatly and on time, create an eye catching poster, and record data on donations? As a researcher did they listen to group members and find assigned information on time? As a collector did they make and keep appointments with other staff members to collect their donations and deliver them to the assigned parties? A scrapbook containing the research, Friday worksheets, Monday brainstorming session notes, photos of posters, a list of donations and recipients, and a graph depicting donations to recycling centers is created by each group and presented to class.

**Students will be taken on a field trip around the school.** They will be asked to observe things they may never have noticed and take written notes. We will begin at the dumpster and observe how much garbage our school has. Could anything have been reused in the school or recycled to a center. We will interview the art teacher for supplies she may be collecting for projects. We will interview the cafeteria workers for what is thrown away from food preparation and see if it could be reused. Students can then determine who they may want to interview, what they may collect, how they could reuse etc in a brainstorming session immediately following the field trip. Groups will be assigned. Let the critical thinking begin. **Each Monday** will be check in time and I will sit in on their brainstorming session to determine what they are doing for the week, what their roles are, and give them a worksheet to complete for Friday helping to keep the project on track.

**Each week each group** will need to complete for the **scrapbook**: one interview, a poster asking for specific donations, information on the computer about the donations (can they be recycled or only reused, how are they made, etc), a record of who gave donations and who accepted the donations and the intended use of the donations, and data records for items being sent to the recycling center.

**At the end of the project** each group's scrapbook will be presented to the class. All members need to present some aspect of the scrapbook. As a group they need to determine some type of conclusion summary statement. Then, as a class, a conclusion summary answer to “how can we make our school more GREEN” needs to be discussed. All students can participate in any capacity. Since it is a group project, the teacher will select students and can pair up those who need more guidance with the natural leaders in the class. Cooperative learning is fundamental in this PBL. By having to try different roles, students can stretch and grow through critical thinking and problem solving. The PBL is flexible enough to allow for different learning styles and group leaders for the week may use the learning style where they are most comfortable. Although only planned for four weeks, it has the potential for being a year long project.

**Note URL below shows 5 to 7 components for a PBL Lessons described at eCollege Units!**

**<http://www.itws.org/SampleProjectBasedLearningLessonFormatStepbyStep.pdf>**