Lab Practical Review

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| **Lab 1: Scientific Method** |
| **Key Concepts:** * Safety – Page 3 pg Lab Manual
* There are two main scientific approaches:
	+ Discovery (Often called observational)
	+ Hypothesis Based Science (Often called experimental)
* **The Steps of the Scientific Method**
 | * What is a Controlled Experiment? (purpose, experimental group, control group)
* Why cant you use the word prove?
* “Theory” in science
* theory vs hypothesis
* Hypoesis format
* Why is diversity important among scientists?

Spontaneous generation & Pasteur Experiment |
| **Lab2: Graphing and Metric**  |
| **Objectives**: Measurements and Exponents (Page5) 1. Exposure to the metric system
2. Development of skills for metric measures of length, volume and mass.
3. Practice with exponents.
4. Application of graphing skills and interpretation.
 | **Objectives**: Creating Graphs and Tables (Page11) 1. Be able to create tables for data analysis.
2. Be able to use appropriate types of graphs to graph data presented in tables.
3. Be able to analyze and interpret data presented in tables and/or graphs.
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| **Sample Conversions:** Page6Macinosh HD:Users:admin:Desktop:Screen Shot 2015-11-16 at 11.22.22 PM.png | **Practice Questions:** * When do you use a pie graph?What graph do you use for change over time?
* What are the components needed in a well labeled graph?
* What goes on the y axis?
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| **Lab3: Water Lab** |
| **Objectives**: 1. Understand and be able to draw and label the structure of water
2. Understand how hydrogen bonds cause the unique properties of water
3. Identify all unique properties of water.
4. Explain capillary action, and how it causes some ink drops to leak and others not to.
 | **Practice Questions:** * Why is water known as the universal solvent, and what properties of water allow for that?
* Draw and label the structure of water and be able to lable the bonds between 2 water molecules.
* What is the difference between adhesion and cohesion?
* Why are hydrogen bonds important to cailary action?
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| **Lab 4: Using the Compound Microscope & Cell Lab** |
| **Microscope Lab Objectives**: (page 17) 1. Understand magnification as it relates to microscopes.
2. Learn the parts of a microscope.
3. Learn the proper use of all objectives.
4. Prepare a wetmount.
5. Learn and use appropriate care and cleanup of scopes and slides.

**Practice Questions:*** What goes into the total magnification?
* When can you use the course grain focus knob?
* What do you use to clean the scope lenses?
 | **Cell Lab Objectives**: (page 23) 1. Use the microscope to view prepared and live prokaryotic cells.
2. Name the three types of bacteria and describe each.
3. Use the microscope to view eukaryotic cells, compare and contrasting them with  prokaryotic cells.
4. Observe animal and plant cells, comparing and contrasting structures found in each.
5. Know the stages of the cell life cycle (including mitosis).
6. Learn the stages of mitosis in and explain the activities and organelles involved.
7. Observe and recognize each stage of cell division on a slide.

Compare and contrast plant and animal cell division.**Practice Questions:*** Which evolved first – prokaryotic or Eukaryotic Cells? How can you tell?
* Looking at a cell in a scope and it doesn't have nucleus, what type of cell is it?
* What key characteristics to plant cells have that animal cells don't?
* 3 types of bacterial cells?
* What organielle are inside a cell? Which are large enough to see with a microscope?
* What is the cell mambrane made out of? How does it affect the movement of substances? (Semipermiable)
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| **Lab 5: Plant Lab** |
| **Objectives**: (page 43) 1. Differentiate monocots from dicots.
2. Understand the adaptations of plants that have allowed them to live successfully on land.
3. Learn the parts of a flower and their functions.
4. Understand the benefits of winged seeds.
5. Understand the significance of pollen and seeds to the success of angiosperms and gymnosperms.
6. Understand the differences between angiosperms, gymnosperms, and pteridophytes.
 | **Practice Questions:*** Know the different plant groups. – which evolved first and key characteristics of each.
* What is the differnece in pollen between a gymnosperm and angiosperm?
* Know the structure and function of plant **Adaptations** to land: cuticle, stomata, roots, guard cells
* Benefit of winged seeds and fruit? Other methods of seed dispersal?
* Know the flower parts.
* Xylem vs Phloem
* Monocot Vs Dicot – key structures, which evolved more recently – how can you tell?
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| **Lab 6: Mitosis Lab** |
| **Objectives**: (page 27) 1. Identify the stages of the cell cycle in plant cells using a microscope.
2. Understand what occurs at each stage of the cell cycle.
3. Understand the similarities and differences between mitosis and meiosis.
 | **Practice Questions:*** Looking at a slide of an union root tip – what is the most common phase of cell devision you see and why? Looking at a slide of an union root tip – are you observing mitosis of meiosis?
* How is mitotic devisions different in a plant cell vs an animal cells?
* Know and be able to recognice all stages of mitosis and meiosis
* What is the benefit of mitosis over meiosis, when does meiosis offer an advantage?
* What three ways does meiosis use to iincrease genetic diversity and in which stages do they occur?
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| **Lab 7: Goldfish La​b** |
| **Objectives**:1. Have a greater understanding of the purpose of cellular respiration.
2. Understand the role that oxygen plays within the respiration process and how it is directly linked to ATP production.
3. Understand the difference between poikilothermic and homeothermic organisms and the advantages and disadvantages to both.
4. Understand how to take and analyze data as part of a formal lab write up.
 | **Practice Questions:*** What is the exquation for cellular respiration?
* Why do cellular respiration? (talk about ATP)
* What does it mean to be poikilothermic?
* Fish doent have lungs, so how do we measure their breathing?
* What was the control in ther experiment?
* What are the parts of a lab report?
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| **Lab 8: Human Genetics** |
| **Objectives**: (page 93) 1. To understand how genes come in alternate versions called alleles, and to learn how these traits are passed from one generation to the next.
2. Understand the difference between recessive and dominant genotypes; complete dominance, incomplete dominance, and co-dominance.
3. To understand how to work monohybrid, di-hybrid, and sex-linked problems through the use of Punnett Squares.
4. To understand how genes come in alternate versions called alleles, and to learn how these traits are passed from one generation to the next.
5. Understand the difference between recessive and dominant genotypes; complete dominance, incomplete dominance, and co-dominance.
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 | **Practice Questions:*** What is a karyotype? How is it differnet for somebody with downs syndrom vs sombedy without downs?
* Phenotype vs genotype?
* Is the ability to taste PTC (phenylthiocarbamide) a phenotype or genotype?
* Why is flipping a coin to determine allele given more accurate than face blending software?
* Why are dominant genes more common in a populaiton?
* Why arent recessive genes eliminated?
* What does it mean to be a carrier?
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| **Lab 9: DNA Lab** |
| **Objectives**: (page 75) 1. Describe the molecular composition of a nucleotide and DNA.
2. Describe the bonding between the nucleotide bases.
3. Construct a molecule of DNA with a specific nucleotide sequence.
4. Transcribe a molecule of messenger RNA from the DNA template.
5. Translate an amino acid sequence (polypeptide) from the mRNA.
6. Evaluate the effect of a change in the base sequence due to a variety of Mutations.
7. Extract DNA from a piece of fruit.
8. Recognize that DNA is found in all cells.
9. Explain the steps needed to isolate DNA from a cell.
 | **Practice Questions:*** What 3 barriers needed to be broken to release the DNA in a strawberry cell – how dod we break each?
* Why dud we use strawberries?
* What does Adenine bond to? How many hydrogen bonds are used?
* What are the componenets of a nucleotide? What bonds bind them together?
* Steps and enzymes of replication – why do we need to do DNA replication?
* Steps of transcription and translation
* What is a codon?
* How could a point mutation mess with a codon?
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| **Lab 10: Red Queen** |
| **Objectives**: (page 99) 1. Be able to define the following terms: evolution, natural selection, and extinction.
2. Distinguish between efficient predators and less efficient predators.
3. Distinguish between prey successfully avoiding capture and those more likely to  be a predator's meal.
4. Observe the effect of more efficient predators on the relative number of surviving prey items.
 | **Practice Questions:*** What is the red queen hypothesis? – how did we use beans to show this?
* Why do prong horn run so fast?
* Why do prey seem to evolve faster?
* Lynx Vs Hare: What is population cycling and lag time?
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| **Lab 11: Case Study​​** |
| **Objectives**: (Not in lab book) 1. Understand the water cycle and its effect a landscape?
2. Understand the implications of pollution spreading and how it may be biomagnified in a food web.
3. What is a watershed – and how do you use knowledgeof it when planning a community?
4. Effects of pollution on populations.
 | **Practice Questions:*** What are the two types of pollution? Know the differences
* Why does mercury biomagnify & vit.C not? What is the difference between bioaccumilate & biomagnify?
* How was fecal coliform density-dependent?
* Why does polluition effect aquatic living organisms (think amphibians like frogs) more severly?
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| **Lab 12: Owl Pellet** |
| **Objectives**: (Not in lab book) 1. Understand how a food web is constructed.
2. Distinguish between keystone species and other species
3. What is a niche and what factors are involved in forming one?
4. Adaptations of owls (predators) and prey (rodents)
 | **Practice Questions:*** Why did mercury effect the top predator more than the producers?
* What is a producer? Why do we need them?
* How are the eyes of an own an adaptation for them as predators?
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| **Lab 13: STD Lab** |
| **Objectives**: (page 69) 1. Be able to follow an epidemic.
2. Be able to identify patient zero using analysis and evaluation.
3. Be able to relate the simulated epidemic to a real STD epidemic.
4. Be able to use appropriate types of graphs to graph data and determine trends.
5. Suggest means of controlling spread of the epidemic and important characteristics  of the disease related to that spread.
6. Know the names, causes and symptoms of the most common STDs.
7. Understand how STDs are spread and what precautions can be taken.
 | **Practice Questions:*** Why are some STD’s worse for females?
* Why is it dangerous for an STD to go unnoticed?
* How did we track an epidemic back to patiant zero?
* Why should you be tested early and often for STDS? Even if you don't have symptoms?
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| **Lab 14: Reproduction and Birth Control Lab** |
| **Objectives**: (page 61) 1. Know the organs of the male and female reproductive systems and their functions.
2. Know the biological events which lead up to pregnancy and the birth of a baby
3. Know the common methods of birth control used in the United States
4. Be able to distinguish between the concepts of birth control and contraception.
 | **Practice Questions:*** Be able to interpret the three graphs presented of males and female horomone cycles.
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