**10th Grade Biology Syllabus November 23rd – December 18th 2015**

**Comparative Embryology, Anatomy & Physiology**

**Teacher:** Kyle Collins  **Contact Info:** (707) 575 – 7194 Ext. 127

    kyle@summerfieldwaldorf.org

I encourage students to bring questions, information, and their ideas to the class. I’d like this class to be student‐centered, I wish to create an atmosphere where we can really delve into the concepts and content that motivate us.

Guiding Block Goals

1. Students continually draw connections between the content of the block and their own life experiences.
2. Students’ preconceptions, perspectives, and understanding of the world are transformed through this block.

3. Students feel as if they are an integral part of the classroom community.

**Grading**

Participation 15% (Involves participation in class discussion, lab groups, etc.)

Main Lesson Book 45% (Scientific diagrams, concept/process write-ups, and lab reports)

MLB Checks 10% (Two for the block @ 5% each, check due dates)

Quizzes 15% (Three during the block, check dates)

Final 15% (Given on the last day of class, covering all block content)

**Participation:** Students will be graded daily on participation. Students must actively participate in careful observation, procedure, and clean up of labs. Students must participate cooperatively and wholeheartedly in all activities, including listening carefully to others and helping to create an environment where others can learn. Students must be prepared for class, including wearing proper clothing for lab work and being ready to start class promptly at 8:00am.

**Lab Safety:** Lab safety is an important issue. Students are asked to be mindful and careful while using chemicals and other hazardous lab materials. Be conversant with basic safety rules. An atmosphere suitable for concentration and serious work is required. A lab can be a potentially dangerous place if basic safety procedures are not followed. Basic cleanliness is very important. Wear gloves when handling biomaterials and chemicals, always use goggles, clean up carefully and wash hands at the end of each period. Neglecting to clean up will result in a score of zero for your participation points of that day.

**Main Lesson** **Books:** Books will be graded on completeness and presentation. Book assignments (4-5 per week) will be given in class and will include drawings/diagrams, writing (notes and essays), research investigations, and formal lab reports. Drawings and compositions should be of a finished quality.

**MLB Checks:** Twice during the block, you will be asked to turn in your main lesson book assignments up-to-date to that point (5% or your final grade for each check). This will help me gauge your progress and understanding of the material and motivate you to keep pace with the class. Please check the list of dates on the back for scheduled MLB checks.

**Completed Main Lesson Books are due on The Last Day of Class:**

**Friday, December 18th 2015**

**Important Dates:**

Quiz #1 Wednesday, November 25th

MLB Check #1 Monday, November 30th

Quiz #2 Friday, December 4th

MLB Check #2 Monday, December 7th

Quiz #3 Friday, December 11th

Final Friday, December 18th

Main Lesson Book Due Friday, December 18th

**Main Lesson Block Curriculum**

Cell Division: Meiosis and Mitosis – What are the cellular processes responsible for growth, development, and hereditary diversity?

Comparative Embryology – How is it that a human being is generated from a single cell? How is this process different from other animals? What are the similarities?

* Oogenesis & Sprematogenesis
* Human Reproductive System(s)
* Fertilization
* Cleavage
* Implantation
* Development of the Embryo
* Development of the Fetus
* Genetic Engineering and Embryonic Stem Cell Research

The Human Nervous System – What is homeostasis? How do our bodies maintain equilibrium? What is thought and consciousness?

* Brain and Cranial Nerves
* Spinal Cord and Spinal Nerves
* Pathways and Integrative Functions
* Autonomic and Somatic Nervous System
* The Sense Organs

Things to do to be prepared:

1. Make copies of the syllabus (32)\*
2. Research Creation myths and views on life timeline\*
3. Write out notes for First Day – Spermatogenesis, Oogenesis\*
4. Harvest Onions or leeks, stash them in the bio lab in water
5. Look up and collect together all of the needed materials for the onion root lab
6. Collect Sea Urchins from Bodega Bay\*
7. Practice gathering gametes from sea urchins
8. Get: Gloves, 5-gal bucket, syringe, KCL or filtered sea water\*
9. Gather up all of the necessary materials for the sea urchin lab: look these up online
10. Draw Stages of Gamete development and Meiosis on the board for the first day\*
11. Research and plan Meiosis acting/play labs, get materials (if needed)\*
12. Organize Sea Urchin Lab into a detailed Lab Outline for the students, make copies (32)
13. Find/create lab sheet of onion root tip lab
14. Look up the story of the microscope
15. Make copies of intro poem, pg. 45 Life Science Colloquium\*
16. Pull the book, The Man Who Mistook His Wife for a Hat, glean it\*
17. Write student names and lab partners into grade book\*
18. Make a seating chart\*
19. Print/Find notes on Meiosis\*

Day One - Introduction – Stories of the beginning of life

* Classroom procedures, due dates, syllabus, expectations, class overview
* Timeline on views on the beginning of life from ancient India and Greece to Modern Times
	+ Incan Creation Myth
	+ Christian Creation Myth
	+ Hindu
	+ Others

Questions: What is life? How did it begin? What are the threads of similarity between our creation myths and the modern day science-based explanation for how life began?

Homework: Have students share their own family/ancestral creation myths. Have them go home and research and record a creation myth to bring and share on day two.

* Lecture/Discussion on Embryology
	+ Gametogenesis
		- Spermatogenesis & Oogenesis
		- Gamete Development
		- Meiosis
* Classroom Activity: Acting out Meiosis (look this up in my Genetics Unit Plan)
	+ Eurythmy Inspiration

Day Two – Embryology

* Story of the microscope and the telescope (lievenhoek)
* Overview of the first stages of the development of an embryo
	+ Cleavage
		- Fertilization
		- Zygote
		- 2-cell, 4-cell, 8-cell
		- Morula
		- Blastocyst

First cell divisions, cleavage

* Lab with Sea Urchins
* Lab with Obelia Medusae
	+ Using Microscope:
	+ Release of Gametes
	+ Fertilization
	+ Cleavage
	+ Embryonic Cell Layers
	+ Comparative Empryology: Human Beings vrs. Animals
	+ Sexual vrs. Asexual reproduction

\*\*\* This will take us into day 3. Start Day 3 with an overview of the procedures for the lab. Ask the students to share their observations and discuss any questions that came up during the lab.

Day 3 – Latter Part

Explore cell division – Mitosis and Meiosis, how do they differ? How are they similar? What are the functions of each? Where might we be able to view each process happening in nature?

Review all concepts, pictures, and ideas up until this point:

* Meiosis, Mitosis, Gamete Development, Fertilization, Cleavage, etc.

Day 4 – Onion Root Tip Lab

* Mitosis and Meosis
	+ Lab on Mitosis in Onion roots: microscopy
* Fertilization/conception
	+ Responsibility, true love, sexuality, etc.
	+ Man/woman, husband/wife, mother/father

Day 5 – Review, Quiz , Clarifications, and Catch-Up

* Check progress of Sea Urchin development
* Finish all lab write-ups
* Turn in main lesson books

Week Two – Day One

Embryonic Cell Layers

Comparative Embryology: Human Beings vrs. Animals

Sexual vrs. Asexual reproduction

The Human Nervous System

What are Hormones and how do they work?

Endocrine vs. Exocrine Glands

* What are the reciprocal and dynamical relationships between hormones and their target tissues/organs?
* Try to avoid the mechanistic downfalls of the cause-and-effect approach

How do we maintain shape and form?

* What is homeostasis? How is it maintained?
* How do we maintain balance in our bodies?

How do we grow?

* How do our bones grow?

How do we deal with stress?

* The adrenal glands
* Fight-and-flight mechanism

Emotions and sensations

Sleep and Dreams

* What happens when we sleep?
* Melatonin
* Rhythmic Cycles

Ovarian and menstrual cycles