**Genetics**

**Lewisburg High School Fall 2023**

**Mrs. Summer King, Room D16**

**Remind Code: text @genlhs23 to 81010**

*Joining my remind is required and will count as a daily grade*

Course Description

The Genetics course is a 0.5 credit course. This course is designed to expand upon the Genetics unit introduced in the Biology courses and to show the importance of Genetics in taking our understanding of humans to a new level. The goal is to make students aware of the complexity involved in designing organisms (more specifically humans) and to demonstrate both the fragility and sturdiness of the materials that make up our genomes. We will explore the ethics of cloning and genetic engineering. We will also focus heavily on how genetics impacts clinical components such as one’s health physically and psychologically. Students will learn about some of the most prominent genetic disorders as well as some of the rarest. The end goal is that students will have a more comprehensive understanding of what people with genetic diseases must endure and that they will leave this class with a heightened sensitivity and awareness of those that may be different than themselves.

Classroom Rules

Rule 1 – Be POLITE and KIND

Rule 2 – Be PROMPT

Rule 3 – Be PREPARED

Rule 4 – Be RESPECTFUL

\*Remember: all other school rules will be enforced like *dress code, cell phone policy, COVID19 procedures, and no food or drink on lab days*

Consequences

1ST offense – Warning

2nd offense – Teacher-student conference

3rd offense – Teacher-parent conference or phone call

4th offense – Discipline referral/office

Rewards

PRAISE!! I am always willing to make a phone call or text home to your parent(s) praising your efforts in class.

Classroom Procedures

1. ARRIVAL – There will always be a bottle of hand sanitizer at the front of the classroom. Please stop on your way in and apply some to your hands. Then PROCEED STRAIGHT TO YOUR DESK AND STAY SEATED.
2. Please make sure you arrive PREPARED WITH PENCILS, BOOKS, OR OTHER NECESSARY SUPPLIES as we will limit how much we share materials or move around the classroom to help prevent the spread of disease. *Please bring your school issued devices. We will utilize them in class most every day.*

3. Begin bell work. We will spend 10-15 minutes 2-3 days/week on bell work. This usually consists of an article or other material related to the topic of the day.

4. Once bell work is completed, we will move into the time of instruction. This will last around 45-50 minutes. Instruction will consist of lectures, videos, power points, and/or labs.

5. Most days will end with completing any work that has been assigned as homework. While I have every intention of helping you learn while you are in my class, I have zero intention of creating more stress in your lives. I hope by ending each day in this manner, that it will help alleviate some of the stress created by schoolwork.

1. Dismissal – remain seated until the end of the bell. We will NOT gather at my door or in the hallway while we wait on the bell to ring. Anyone attempting to do so will promptly be written up.

Absences and Makeup Work

You should have all make up work turned in within the same number of days that you were absent. For example, if you have missed 5 days of class, you have 5 days to get any missed work completed and turned in. **You** are responsible for coming to me to get your assignments. Remember, assignments can also be found on Schoology.

Assignments

1. DAILY ASSIGNMENTS: There will be assignments given regularly in class. Bell work will be done 2-3 times per week. You will receive a participation grade for this at the end of the week.
2. LABORATORY WORK: Work in the lab will be done by all classes at different intervals during the year based on progress in the classroom. Lab safety will be emphasized. We will be using gloves during instances when we have to share material*.* EVERYONE is expected to participate in any labs done. *Please let me know if you have an allergy to latex!*
3. QUIZZES: Quizzes will be given on occasion, both pop quizzes and scheduled quizzes
4. TESTS: Tests will be a combination of multiple choice, completion, explanation, labeling, and discussion.

Weight Categories

Daily Grades/Homework: 15%

Exams: 20%

Labs/Quizzes: 25%

Tests/Projects: 40%

Grading

The grading scale is as follows:

100-90 A 89-80 B 79-70 C 69-60 D Below 60 F

Cell Phone Usage

The science department has decided that we will be collecting cell phones during class. Once class time/lecture/work begins, your cell phones need to be put it in the cellphone caddy at the front of my room until our work is completed. This will help prevent any distractions and will hopefully help prevent me from having to repeat myself over and over. Any time a device is needed for research or anything pertaining to the daily lesson, we will utilize your school issued laptop.

Remind

Please use the code at the beginning of this syllabus to get signed up for my class. Signing up for my Remind counts as your first daily grade.

Units Covered:

*Please note – Since this is a 9 weeks course, we may not be able to cover every single chapter in its entirety. We may only briefly cover some of the topics such as some of the things that have already been covered heavily in Biology. I also plan to show a documentary called “Life According to Sam” covering a genetic disorder known as Progeria. I also like showing “Still Alice” which explores the genetics of Alzheimer’s as well as the movie “Wonder” which portrays the story of a young boy with Treacher Collins Syndrome, a rare genetic disorder.*

**UNIT 1: INTRODUCTION**

**Chapter 1:** What is in a Human Genome?

1.1 Introducing Genes and Genomes

1.2 Levels of Genetics and Genomics

1.3 Applications of Genetics and Genomics

1.4 A Global Perspective on Genomes

**Chapter 2:** Cells

2.1 Introduction Cells

2.2 Cell Components

2.3 Cell Division and Death

2.4 Stem Cells

2.5 The Human Microbiome

**Chapter 3:** Meiosis, Development, and Aging

3.1 The Reproductive System

3.2 Meiosis

3.3 Gametes Mature

3.4 Prenatal Development

3.5 Birth Defects

3.6 Maturation and Aging

**UNIT 2: TRANSMISSION GENETICS**

**Chapter 4:** Single-Gene Inheritance

* 1. Following the Inheritance of One Gene
  2. Single-Gene Inheritance is Rare
  3. Following the Inheritance of More Than One Gene
  4. Pedigree Analysis

**Chapter 5:** Beyond Mendel’s Laws

5.1 When Gene Expression Appears to Alter Mendelian Ratios

5.2 Mitochondrial Genes

5.3 Linkage

**Chapter 6:** Matters of Sex

* 1. Our Sexual Selves
  2. Traits Inherited on Sex Chromosomes
  3. Sex-Limited and Sex Influenced Traits
  4. X Inactivation
  5. Parent-of-Origin Effects

**Chapter 7:** Multifactorial Traits

7.1 Genes and the Environment Mold Traits

7.2 Polygenic Traits Are Continuously Varying

7.3 Methods to Investigate Multifactorial Traits

7.4 A Closer Look: Body Weight

**Chapter 8:** Genetics of Behavior

8.1 Genes and Behavior

8.2 Sleep

8.3 Intelligence and Intellectual Disability

8.4 Drug Addiction

8.5 Mood Disorders

8.6 Schizophrenia

8.7 Autism

**UNIT 3: DNA AND CHROMOSOMES**

**Chapter 9:** DNA Structure and Replication

9.1 Experiments Identify and Describe the Genetic Material

9.2 DNA Structure

9.3 DNA Replication – Maintaining Genetic Information

9.4 Sequencing DNA

**Chapter 10:** Gene Action: From DNA to Protein

10.1 The Importance of Proteins

10.2 Transcription Copies the Information in DNA

10.3 Translation of a Protein

10.4 Processing a Protein

**Chapter 11:** Gene Expression and Epigenetics

11.1 Gene Expression Through Time and Tissue

11.2 Control of Gene Expression

11.3 Maximizing Genetic Information

11.4 Most of the Human Genome Does Not Encode Protein

**Chapter 12:** Gene Mutation

12.1 The Nature of Gene Variants

12.2 A Closer Look at Two Mutations

12.3 Allelic Diseases

12.4 Causes of Mutation

12.5 Types of Mutations

12.6 The Importance of Position

12.7 DNA Repair

**Chapter 13:** Chromosomes

13.1 Portrait of a Chromosome

13.2 Detecting Chromosomes

13.3 Atypical Chromosome Number

13.4 Atypical Chromosome Structure

13.5 Uniparental Disomy – A Double Dose from One Parent

**UNIT 4: POPULATION GENETICS**

**Chapter 14:** Constant Allele Frequencies and DNA Forensics

14.1 Population Genetics Underlies Evolution

14.2 Constant Allele Frequencies

14.3 Applying Hardy-Weinberg Equilibrium

14.4 DNA Profiling Uses Hardy-Weinberg Assumptions

**Chapter 15:** Changing Allele Frequencies

15.1 Population Matters: Steel Syndrome in East Harlem

15.2 Nonrandom Mating

15.3 Migration

15.4 Genetic Drift

15.5 Mutation

15.6 Natural Selection

15.7 Eugenics

**Chapter 16:** Human Ancestry and Evolution

16.1 Human Origins

16.2 Methods to Study Molecular Evolution

16.3 The Peopling of the Planet

16.4 What Makes Us Human?

**UNIT 5: IMMUNITY AND CANCER**

**Chapter 17:** Genetics of Immunity

17.1 The Importance of Cell Surfaces

17.2 The Human Immune System

17.3 Abnormal Immunity

17.4 Altering Immunity

17.5 Using Genomics to Fight Infection

**Chapter 18:** Cancer Genetics and Genomics

18.1 Cancer Is An Abnormal Growth That Invades and Spreads

18.2 Cancer at the Cellular Level

18.3 Cancer Genes and Genomes

18.4 Diagnosing and Treating Cancer

**UNIT 6: GENETIC TECHNOLOGY**

**Chapter 19:** DNA Technologies

19.1 Patenting DNA

19.2 Modifying DNA

19.3 Monitoring Gene Function

19.4 Gene Silencing and Genome Editing

**Chapter 20:** Genetic Testing and Treatment

20.1 Genetic Counseling

20.2 Genetic Testing

20.3 Treating Genetic Disease

20.4 CRISPR-Cas9 in Diagnosis and Treatment

**Chapter 21:** Reproductive Technologies

21.1 Savior Siblings and More

21.2 Infertility and Subfertility

21.3 Assisted Reproductive Technologies

21.4 Extra Embryos

**Chapter 22:** Genomics

22.1 From Genetics to Genomics

22.2 Analysis of Human Genome Content

22.3 Personal Genome Sequencing

Class/Lab Fee:

This year’s lab fee is $10. Please send in your money by August 31st. Follow the instructions listed below. However, you may also pay cash to me – I will provide you with a receipt and turn the money into the office.

*\*\* If you have a financial hardship that will prevent you from paying the lab fee, please reach out to me so we can work something out.\*\**

RevoPay (for Class Fee - $10)

[www.revopay.com](http://www.revopay.com)

* Click “make a payment”
* Click “go to payment”
* You can create an account or you can use the “quick pay” button to enter account number and credit card
* Your account number is your lunch number (it can be found on your portal)
* Follow the prompts and choose your class fee (KING – GENETICS)
* Follow prompts to complete payment

Bus Info:

<https://www.desotocountyschools.org/transportation>

Schoology login for students:

* Username: First initial and last initial and the last six of your lunch/msis # (ex: sk123456)
* Password: Patriots with a capital P then your birthdate (ex:Patriots081283)

Supplies Needed

3 Ring Binder (2” should suffice)

Pencils

School issued device

Genetics textbook (I have a classroom set that will always stay in my room. We will use the book most every day in my class.)

Wish List

Clorox or Lysol wipes

Kleenex

Hand sanitizer

Roll of paper towels

Candy