

School-wide Interdisciplinary Summer Reading Initiative
Class of 2027

Schoolwide guidelines:

- Book Assignment
 - **Class of 2027 - *The Violinist Thumb* by Sam Kean**
 - Science/Fine Arts or Comp Sci (including Squarespace and Entrepreneurial Thinking)
 - Creative Project due Orientation Day ie **August 28, 2024**
 - You will hear from our Science (Mr. Z. Snyder) or Fine Arts (Mrs. S.Alpach) Discipline Coordinators with more information on how to submit the creative project digitally(if necessary) in August.
 - Extemporaneous Writing - prompt will be provided on **September 3, 2024** and completed in homeroom during community time that day
- Schoolwide Standards
 - Students are encouraged to annotate the hardcopy of the book while reading and are permitted to use **ONLY** the hardcopy during the writing assessment on September 3, 2024
 - For each book, a reading guide is provided. Students should complete this reading guide as they progress through the book. The reading guide is ungraded and designed to assist the students as they prepare for the extemporaneous writing prompt - think of the reading guide as a study guide. Students will not be permitted to use or reference their completed reading guide when answering the writing prompt.
 - Grading
 - What will the weighting be?
 - Quiz or quiz equivalent
 - Where will the grade land in the grade books?
 - The grade will land in **both** discipline's grade books
 - How will the grade be calculated?
 - A single, blended grade based on the rubric scores for the creative project and the response to the extemporaneous writing prompt
 - The final grade is a 50/50 blend of the rubric score on the creative project and the rubric score on the writing prompt.
 - Students who complete only one part (either project or writing prompt) of the assignment on time (firm deadlines) will earn a 50. Students who do not complete either part of the summer work on time (firm deadlines) will receive a zero.

Reading Guide for *The Violinist's Thumb*

Below are a set of questions separated by chapter for your summer reading assignment. These questions are not required to be answered for any one specific assignment, but may help in guiding your reading of the book and assist in the development of your creative project and your notes for the writing assessment that you will have upon your return to school. **This reading guide may not directly be used as a resource for your writing assignment, but you may write notes in your book as a resource.**

Chapter 1

1. Would you be interested in submitting your DNA to be analyzed for your ancestry or genes related to your health? Why or why not?
2. What are the differences in the meaning of the terms “DNA” and “genes”?
3. Oftentimes, the work of musicians and artists is not initially appreciated as noteworthy or revolutionary, but is later found to be an amazing piece of work (such as in the lives of Johann Sebastian Bach or Claude Monet). How does this relate to the work of scientists like Gregor Mendel or Friedrich Miescher?

Chapter 2

1. What issue was at the center of the debate between Darwinists and Geneticists?
2. How did the work of Thomas Hunt Morgan and his associates with fruit flies help to unify the understanding of how traits are inherited through generations?
3. Why are fruit flies so useful in the study of genetics?

Chapter 3

1. How were the genetics of individuals who survived the atomic bombing of Japan (such as engineer Tsutomu Yamaguchi) forever changed by the effects of the bombing?
2. Why is it that survivors of the bombings were able to have children that were generally free from any genetic defects, even if the DNA of the survivors was altered by the bombings?
3. What did scientists James Watson and Francis Crick contribute to our understanding of DNA?

Chapter 4

1. Explain the knot theory Lewis Carroll designed. Was it accepted? Why or why not?
2. What is Zipf's law? Take as an example an essay you have written and test it to see if the law fits.
3. What are mutations, and how are they mirrored in music and literature? How were scientific techniques used to analyze the plays *The Two Noble Kinsmen* and *Pericles*?

Chapter 5

1. Sister Miriam Michael Stimson spent her entire lifetime trying to determine the structure of DNA. Was she successful? Was she supported? Why or why not.
2. Explain Lynn Margulis's theory of endosymbiosis. Was it accepted? Why or why not.
3. What did Erwin Chargaff contribute to the discovery of DNA structure?
4. Barbara McClintock studied DNA. What observations did she make? Were her ideas accepted? Why or why not.

Chapter 6

1. What is the *sonic hedgehog* gene? How does an excess of vitamin A affect it?
2. What were the two camps that arose to explain cell division? How was Hans Spemann able to settle the debate?
3. What do some scientists think should be the fifth letter in the DNA alphabet? What does this molecule do?
4. What happened to Willem Barentsz's crew after eating polar bear liver? How are polar bears themselves able to avoid a similar fate?

Chapter 7

1. How is human evolution (including changes to our DNA) affected by the activity of various microorganisms?
2. What do you think about the experience of Jack Wright and Cat Crossing? How much of an impact do you believe *Toxoplasma gondii* made in living this way?
3. Do you believe that microorganisms may still have an active role in driving our own behaviors? Why or why not?

Chapter 8

1. What are atavisms, and how do they provide evidence for evolutionary relationships between organisms?
2. How does the story of Mayumi and Emiko help us understand more about the inheritance of not just genetic disorders, but diseases as well?
3. What is the MHC, and why is it so important to not only human development and survival, but for all mammals?

Chapter 9

1. How do you feel about the work of biologist Ilya Ivanovich Ivanov? Do you think he took his work too far? Or do you think that there is something to be said for pushing the limits of ethical research in order to gain knowledge?
2. What is a typical number of chromosomes that are present in human cells? How was this discovered?

Chapter 10

1. The human *apoE* gene, aka “meat-eating gene” has mutated twice. What two mutations happened that allowed humans to live twice as long as early humans?
2. Before the late 1700s, the idea of species going extinct was not believed by scientists. What French naturalist helped support this theory? What skeleton supported his theory?
3. DNA sequencing determines the A-C-G-T sequence of each individual DNA fragment. How did the scientists use DNA to prove that Neanderthals are not direct human ancestors?
4. What does the lack of variety in modern human DNA say about the human population?
5. How did researchers use DNA to trace the African origins and migration patterns of human populations?

Chapter 11

1. Why does the author believe there is a biological basis for human intelligence?
2. What scientist with his own theory and subsequent own brain contradicted the early belief that more brain mass meant more thinking power?
3. How did the death of Albert Einstein prove that brain heft and braininess are not necessarily related?

Chapter 12: The Art of the Gene: How Deep in Our DNA Is Artistic Genius?

1. In what ways do visual arts and genetics share the same aspects?
2. In what ways have scientists turned DNA into art?
3. This chapter claims “Evolution has wired artistic expression into our DNA.” In what ways do animals show artistic skills?
4. How does the author use the example of violinist Niccolò Paganini to prove the theory that tiny bits of DNA can determine talents but they must work with environmental cues to bestow artist gifts?

Chapter 13 - The Past Is Prologue - Sometimes

1. The author claims we love to diagnose famous people from the past with ailments and illnesses. Do you ever privately diagnose yourself, particularly when things are not going well or you are feeling down? If so, how do you regain your confidence or affirm that you are okay?
2. Pharaoh Amenhotep rejected the polytheism of Egypt in order to perpetuate a monotheistic culture. Why would a leader want to erase a culture's history?
3. In 2007, the Egyptian government allowed for DNA testing of ancient mummies. The tests revealed incestual reproduction. Why do you think the Pharaohs reproduced with family members? What might have been a benefit? What negative consequences may have occurred?
4. There was a plan to examine Abraham Lincoln's DNA to determine if he had a disease called Marfan, but his right to privacy, as well as his descendant's rights came into question. The plan was abandoned, but why would it have mattered anyway? What would be the benefit of diagnosing this disease in someone who was assassinated anyway? Why would this plan have anything to do with his descendants?

Chapter 14 - Three Billion Little Pieces

1. What were some of the reasons the scientific community did not like the Human Genome Project (HGP)?
2. In order to gain congressional funding, congress was told gene sequencing could lead to the elimination of disease, or even hunger, poverty, and crime. Do you think it's okay to mislead or exaggerate to people who don't understand your cause if the results may advance our society?
3. Scientists are supposed to perform in an unbiased manner and remove personal opinion from their work, however, there was obviously a decent amount of clashing egos during the HGP. Do you think this drives the project forward? Or did it hinder its progress? Support your position.
4. "Most human geneticists aim to cure diseases." At the time this book was written, had the HGP genetic sequencing identified any genes to target related to diseases? Give some examples why?

Chapter 15

1. The study of epigenetics revealed that baby mice neglected by their mothers cannot function successfully under stress when older. Do you think this can be observed in humans? Support your position.
2. An epigenetic study showed the diet of men and grandfathers between the ages of nine

and twelve could affect the health of their children and grandchildren. If famine occurred during those years of growth (9 to 12), the subsequent children and grandchildren were actually healthier. If this is true, using deductive reasoning and considering the typical American diet of our current society, what comparison could be made about our current young generations? Likewise, what implications might we expect for future generations?

3. Due to epigenetics, why might the prolonged use of drugs like cocaine and heroin be detrimental to your DNA?

Chapter 16 and Epilogue

1. The practices of altering DNA or performing cloning have historically been met with controversy and hesitation. Why is this?
2. What ethical dilemmas are present in discussions about the possible alteration of human DNA?
3. Are you afraid of how your genes may affect your biological health in the future as you grow and age? Why or why not?

Creative Project

Choose a specific individual (scientist or artist) from the book that was significant to you in your reading. For this individual, create a piece of media (using the examples provided below as options) that represents their contributions made to fields of science or art.

- Options for project
 - Produce a work of art
 - Design an experiment
 - Design your own text art
 - Create a collage
 - Make a film
 - Produce a TED Talk
 - Film a “Sizzle Reel”
 - Write and perform a song
 - Create a model or diorama

Choose an option that works toward your strengths as a creator, or maybe try something new if you feel some inspiration. Be sure that your project truly conveys the importance of the work for the individual you have chosen!

Rubrics

Creative Assessment

Poor (0 Points)	Good (1 Point)	Exceptional (2 Points)
	Makes specific references and connections to the text	
	Originality of work	
	Idea clearly communicated	
	Sufficient Effort	

Writing Assessment

Poor (0 Points)	Good (1 Point)	Exceptional (2 Points)
	Makes references to specific individuals in the text (minimum one artist and one scientist)	
	Answers the prompt directly	
	Relates and connects prompt to self	
	Response is of sufficient length	

Grading Scale for both assessments:

8 points -100

6-7 points - 98

4-5 points - 95

2-3 points - 90

1 point - 80

0 points - 0

