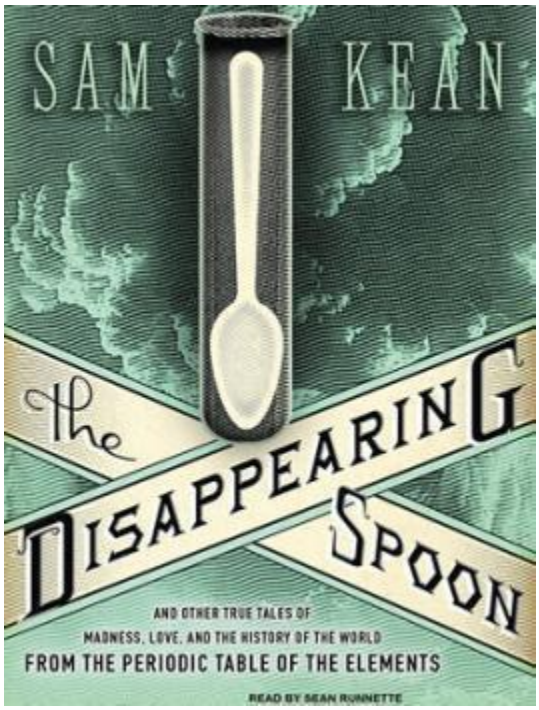
PAP Chemistry: Summer Assignment

The Disappearing Spoon: and Other True Tales of Madness, Love, and the History of the World from the Periodic Table of the Elements
By Sam Kean



Below are 26 questions based on The Disappearing Spoon by Sam Kean. As part of your Summer Project for PAP Chemistry, you will read the book and answer all of the questions given.

Here are a few guidelines:

- All answers must be in your own words using proper terminology. Do not simply copy what you find in the book.
- For each question, write the question and the answers in complete sentences.
- Before you turn the completed assignment in, make sure to check for spelling and grammatical errors.
- This is **NOT** a Group Assignment. Copying is not allowed. If any copying of answers is identified, both participants will receive a zero for the assignment.
- If you have any questions, feel free to email me.

Assignment is due no later than Wednesday, August 26th, and will count as a test grade.

Part I - Orientation: Column by Column, Row by Row

Chapter One: Geography is Destiny

1. Elements are described as solids, mostly metals, gasses and liquids. Which two are liquids at room temperature?
2. How does helium behave when cooled down to -456 F (two degrees above absolute zero Kelvin)?
3. List at least three characteristics of antimony.
4. What is the story behind the headline "S.D. Mother Wins Nobel Prize"?

Chapter Two: Near Twins and Black Sheep: The Genealogy of Elements

1. Why is it doubtful that life somewhere in the universe is based on silicon?
2. What role does silicon play in electronics?

Chapter Three: The Galápagos of the Periodic Table

1. This book was named for a trick done with gallium. Describe this trick.
2. What happened in Ytterby?

Part II - Making Atoms, Breaking Atoms

Chapter Four: Where Atoms come From: "*We Are All Star Stuff*"

1. How are elements with atomic numbers greater than iron formed?
2. What is the most abundant element in the universe?
3. What is neon rain?
4. How did Patterson determine the age of the Earth (4.55 billion years old)?

Chapter Five: Elements in Times of War

1. Haber both won a Nobel Prize for his process to produce ammonia from nitrogen and he was charged with being a war criminal. Why was he thus charged?
2. You probably have tantalum or niobium in your pocket right now. What does this mean?

Chapter Six: Completing the Table...with a Bang

1. What is the difference between a "dirty" bomb and a conventional nuclear bomb?
2. What is "MAD"?

Chapter Seven: Extending the Table, Expanding the Cold War

1. Who is Glenn Seaborg?

Part III - Periodic Confusion: The Emergence of Complexity

Chapter Eight: From Physics to Biology

1. List at least three achievements of Linus Pauling.
2. What is an antiproton?

Chapter Nine: Poisoner's Corridor: "Ouch-Ouch"

1. Describe cadmium's poisonous character.
2. Why is thallium known as the poisoner's poison?
3. What is so different about bismuth?

Chapter Ten: Take Two Elements, Call Me in the Morning

1. How did the Blue Man in the 1900s become blue?
2. List some properties of sulfonamide.

Chapter Eleven: How Elements Deceive

1. Discuss the discovery of the usefulness of titanium for implants?
2. What is the importance of iodine in the role of maintaining human health?

Part IV: The Elements of Human Character

Chapter Twelve: Political Elements

1. Why did Pierre & Marie Curie win the 1903 Nobel Prize in Physics?
2. Why did Marie Curie win the 1911 Nobel Prize in Chemistry?
3. How long does it take the human body to recycle an average water molecule?
4. What did the discovery of nuclear fission lead to?

Chapter Thirteen: Elements as Money

1. What is bronze?
2. In reality, what was Midas' touch?
3. How does Europium combat counterfeiting?
4. What process changed aluminium from the most precious metal into the cheapest to produce?

Chapter Fourteen: Artistic Elements

1. How did strontium research help shape the periodic table?
2. What was used to cap the tip of the "world's most wanted pen?"
3. Describe Satan in Mark Twain's story "Sold to Satan."

4. How does lithium act as a mood stabilizer?

Chapter Fifteen: An Element of Madness

1. What led to people believing that the megalodon still roamed the ocean?
2. What is cold fusion?
3. What discovery made Rontgen think he had lost his mind?

Part V: Element Science Today and Tomorrow

Chapter Sixteen: Chemistry Way, Way Below Zero

1. What type of matter is Jell-O?
2. What is the difference between a laser and a maser?
3. Explain Heisenberg's Uncertainty Principle.

Chapter Seventeen: Spheres of Splendor: The Science of Bubbles

1. How did Rutherford determine the Earth's age to be 500 billion years old?
2. Which elemental gasses produced "stars in a jar?"
3. Why does a Diet Coke explode when a Mentos is added to it?

Chapter Eighteen: Tools of Ridiculous Precision

1. What elements make up the International Prototype Kilogram?
2. What is the official definition of a meter?
3. What is the official measurement of time?
4. What makes Oklo unique?

Chapter Nineteen: Above (and Beyond) the Periodic Table

1. What is the rarest element? How much of it exists at any one time in the universe?
2. Why is 114 considered a "magic number?"