**Chapter Questions for “Napoleon’s Buttons”**

**Chapter 8: Isoprene**

1. Why were the first samples of rubber, brought back to Europe by Christopher Columbus, mainly a novelty item?
2. Define a “colloidal emulsion”.
3. What is the difference between a cis double bond and a trans double bond?
4. What are some characteristics of isoprene molecules in the cis arrangement? What are some characteristics of isoprene molecules in the trans arrangement?
5. Explain isoprene’s contribution to the modern day golf ball. Be sure to include an explanation of the evolutionary process that the golf ball underwent.
6. Who was Charles Macintosh and what did he do with isoprene that had a great impact on products still used today?
7. What does sulfur do to rubber? What does it mean to “volcanize” rubber?
8. Describe the disparity between the rubber barons and their workers. Include in this discussion, the tactics employed by Belgians to convince whole African villages to harvest rubber.
9. What was the biggest problem with making synthetic rubber?
10. What is chicle? How was it used in WWII?
11. What did Karl Zieglar and Giulio Natta do to win the 1963 Nobel Prize in chemistry?

**Chapter 9: Dyes**

1. What were the origins of early dye? What were sofr
2. What used to be the major source of the dye color “blue”? How was this blue color extracted? Describe the process and chemical reaction.
3. What used to be a major source of the dye color “purple”? How was this purple color extracted? Describe the process and chemical reaction.
4. How are the origins for blue and purple dyes similar?
5. Who is credited with the discovery of purple dye?
6. Where was synthetic indigo invented? How is synthetic indigo commonly used today? What property of indigo made it particularly useful for this purpose?
7. What is responsible for the colors that we see in different dyes?
8. How can the bonds between molecules affect the color that we see in different dyes?
9. How did Alexander the Great use dye to his advantage during the Persian war?
10. Where does red dye come from?
11. What allows the molecule alizarin to absorb visible light and reflect a color while anthraquinone, the colorless molecule from which alizarin originates, cannot.
12. Where does the dye cochineal come from? Why was it so expensive to produce?
13. What is the most expensive spice produced in the world today. What color dye is also produced from the same plant that produces this spice? Where is this plant produced? Why is it so expensive to maintain and harvest?
14. What was Perkins trying to do when he accidentally invented the synthetic purple dye, mauveine? What were some of the consequences of this find?
15. Why was Germany such a major player in the creation and manufacturing of dyes?

**Chapter 10: Wonder Drugs**

1. Which types of medicinal molecules played some of the most influential roles in lengthening the average lifespan of humans?
2. Who invented aspirin? How could one speculate that the increase in the demand for aspirin may have hastened the development of TNT-based explosives?
3. What are some of the benefits of taking aspirin besides pain relief?
4. Explain the chemistry behind the idea of Ehrlich’s “magic bullet”.
5. What was Ehrlich trying to find a cure for? What was the current treatment for this illness? Did Ehrlich’s magic bullet prove completely successful?
6. How did prontosil red make its way into the world of medicine? What diseases were effectively treated by this dye? What about the dye’s chemistry made it so effective against bacteria?
7. How did sulfa drugs drastically alter the number of injury-related deaths between WWI and WWII?
8. Why is the sulfanilamide drug so effective in killing bacteria? Explain in detail.
9. Why don’t sulfanilamide drugs have the same harmful effects on human tissue?
10. Why are sulfa drugs much less widespread today?
11. What circumstances led to Fleming’s discovery of the antibiotic effects of the mold penicillin?
12. Although penicillin was highly effective in treating bacterial infections, the chemical structure of the antibiotic was not known at the time of discovery. How would this present a major problem in its widespread use?
13. What made the structure of penicillin so unusual? Why was this structure so difficult to synthesize? How does this structure make the chemical so effective in fighting bacteria?
14. Why does penicillin have to be stored at low temperatures?
15. How have antibiotics changed the world we live in today?

**Chapter 11: The Pill**

1. How did longer life expectancies lead to the development of safe and effective birth control?
2. What were some of the early attempts at contraception?
3. If a drug company invented a pill that would eliminate all of the cholesterol in your body, would you take it? Why or why not?
4. What do all steroids have in common?
5. Why would increased testosterone in the body cause the testes to shrink
6. What is the chemical basic for contraception? Why is natural progesterone not an effective option for easy and inexpensive birth control?
7. How did Marker create pure, synthetic progesterone?
8. What was Djerassi’s contribution to the contraception industry?
9. Why is there no oral contraceptive for men?