

AP Environmental Science Summer Assignment (2021-2022)

Read *Silent Spring* by Rachel Carson and complete the study guide to be shared with me before our first class.

“Rachel Carson’s *Silent Spring* was first published in three serialized excerpts in the *New Yorker* in June of 1962. The book appeared in September of that year and the outcry that followed its publication forced the banning of DDT and spurred revolutionary changes in the laws affecting our air, land, and water. Carson’s passionate concern for the future of our planet reverberated powerfully throughout the world, and her eloquent book was instrumental in launching the environmental movement. It is without question one of the landmark books of the twentieth century.” (Goodreads Review)

We will begin our exploration into Environmental Science at the beginning: by reading the book that started the environmental movement. Pay particular attention to, and think about the following:

1. The basic structure of the book.
2. Carson’s use of ecological concepts and ideas.
3. Carson’s writing style and tone.
4. Carson’s repeated attempts to exploit previous public concerns about fallout and radiation hazards.
5. Carson’s evidence. (see List of Principle Sources)

INSTRUCTIONS

- As you read each chapter, answer the following questions.
- Your answers do not need to be in complete sentences - you may use bullet points - but give thoughtful answers.
- Please choose a different color font for your answers.
- We will discuss this book and its effect on the environmental movement when class begins.
- Feel free to add your feelings, thoughts, impressions at the end of the document for discussion.

CHAPTER 1

1. Carson begins with a fable about a rural town ravished by irresponsible pesticide use. What does Carson hope to accomplish in this opening chapter? How effective do you think it is? Is her story believable?

CHAPTER 2

2. According to Carson, humans are unique. How has their ability to alter the environment transformed since World War II? Why is she so concerned about the accelerated pace of this change, and what examples does she provide?

What term does she propose to describe the effects of the new generation of pesticides? Does she completely reject the idea of controlling insects?

3. What is the first specific pollutant Carson mentions by name in *Silent Spring*? (hint: see page 6)

4. According to Carson, why has the need for insect control increased? Who has most vigorously promoted the vision of a “chemically sterile, insect-free world”?

5. What do you think about Carson’s idea that Americans should have a fundamental right not to be exposed to poisons distributed either by private individuals or by public officials?

CHAPTER 3

6. What is unique about the modern age? How pervasive are the new synthetic pesticides? What event is linked with the sudden growth of the synthetic pesticide industry? What was the most common pesticide prior to 1945? What are its effects?

7. The pesticide that Carson spends the most time discussing is DDT. Where did it come from? Why was it considered safe? What happens to DDT when it enters the body? Carson claims that DDT, like other pesticides, concentrates up the food chain (i.e., “bioconcentrates”). What does that mean?

8. What are some of the other synthetic pesticides that Carson singles out for discussion? How toxic are they? Which is the most toxic of the chlorinated hydrocarbons? Why were organic phosphates originally developed in the late 1930’s and what effects do these substances have on living things? What happens when one or more of these pesticides are used (or ingested) together? According to Carson, do herbicides also present a threat?

CHAPTERS 4-9

9. In these chapters, Carson concentrates on how the indiscriminate use of the new synthetic pesticides have negatively impacted various aspects of the environment - the water, soil, plants, and wildlife. The examples differ widely in location and emphasis, but their overall message is similar: through careless and indiscriminate use of highly toxic pesticides, humans have destroyed countless non-target organisms, including those necessary to the healthy functioning of ecosystems. Moreover, even very low doses of pesticides can become dangerous as they concentrate up the food chain. Describe several of these examples. Pay special attention to the introductory and concluding sections of each chapter.

CHAPTER 10

10. In this chapter, Carson critiques two well known federal "eradication" campaigns involving aerial application of pesticides. What were the targets of these two campaigns? What does Carson see as the general lesson to be learned from them? (page 156)

11. How did the gypsy moth come to the United States? How and why did it spread? How did the federal government initially respond to the infestation? When did the "all-out chemical war" begin? How did the citizens of Long Island respond to aerial spraying of their neighborhood? How successful was the gypsy moth eradication campaign? What were the unintended effects?

12. How did state and federal officials initially respond to the invasion of the fire ant in the southeastern United States? When and why did this change? What is Carson's assessment of the fire ant eradication program (p 162)? What were the unintended effects of that program?

CHAPTER 11

13. Despite their acute toxicity, the new synthetic insecticides are made widely available to consumers. What kind of products are sold to the public? How are they advertised? What kinds of warnings about their toxicity (acute or long-term) are provided on their labels? What happened to the physician who regularly applied DDT and malathion to his garden?

14. In the second half of the chapter, Carson deals with the contentious issue of pesticide residues in food. What evidence does she provide to document her claim that DDT (and other pesticide) residue remain in food ingested by humans? In Carson's opinion, do federally established "tolerances" protect the food supply? If not, why not? What solutions does Carson suggest?

CHAPTER 12

15. According to Carson, what is the most important health hazard in modern society? Why is it easy to ignore (and hard to pin down) the biological effects of long-term, low-level exposure

to pesticides? How does Carson attempt to link the relatively well-documented effects of pesticides on the environment to possible effects on human health? Why do the effects of synthetic pesticides seem to vary from individual to individual? How do pesticide interactions complicate the story?

CHAPTER 13

16. According to Carson, how do pesticides affect cell function? What are the effects of disrupting this process in humans and wildlife?

17. According to Carson, how might pesticides damage our “genetic heritage”? Note that throughout this chapter Carson (again) resorts to the parallel between radiation and chemicals. What is the term for chemicals capable of producing genetic mutations? What specific evidence of this does she present? Note also (e.g., p 210) that Carson again claims parallels between humans and other organisms.

CHAPTER 14

18. Does Carson believe that natural or human caused cancers are more prevalent in modern society? What is the first specific carcinogen she discusses in the chapter? What evidence does she present for an increase in cancer rates and is it convincing? What happened with the new synthetic pesticide used against ticks and mites? What happened during the “cranberry scare” of 1959? Notice (again) Carson’s comparison of the health effects of radiation (including the *Lucky Dragon* episode) and chemicals.

19. In the second part of the chapter, Carson begins by discussing three recent theories about the origin of cancer. What are the three theories and what kind of evidence exists for each?

20. In the final section of this chapter, Carson discusses the “sea of carcinogens” which Americans are exposed to from the time of birth. According to Carson, is it possible to reduce these environmental exposure? Is Carson ultimately pessimistic or optimistic about the ability to reduce the threat of cancer-causing agents produced by humans?

CHAPTER 15

21. Why does Carson argue that even with all the associated environmental and health risks, the current pesticide program has been a failure? What is Carson’s opinion about “the balance of nature”? What happens when “friendly” insects are destroyed by pesticides? What examples does Carson provide?

22. In the closing pages of the chapter, Carson provides an analysis of why so few entomologists were researching the possibilities of biological control. Why the neglect of this option? How would economic entomologists be likely to respond to Carson's charges? Why does Carson believe natural controls might provide part of the answer?

CHAPTER 16

23. What does Carson mean by the "Age of Resistance"? How did agriculturalists respond to the problem? How quickly did insects develop resistance to the new pesticides accelerate this process?

CHAPTER 17

24. According to Carson, what are the two major pest major management options? What are the alternatives to intensive pesticide use? What is the general term for these alternatives, and what do they have in common? Describe how the screwworm control program in Florida succeeded? What other types of control systems that rely on the biological properties of insects does Carson discuss?

25. What does Carson have to say about "control of nature", "humility", and what does it have to do with her arguments about pesticides?

PLEASE ADD ANY ADDITIONAL COMMENTS YOU MAY HAVE: