***Silent Spring* Study Guide**

Rachel Carson's *Silent Spring* (1962) is one of the most important and influential books of the twentieth century. This skillfully crafted volume marshals together a wealth of evidence in support of the author's contention that Americans are poisoning their environment, and ultimately themselves, with newly developed pesticides that are deadly, long-lasting, and non-selective. Carson attacks the government-business-academic complex responsible for the development, promotion, and use of these new pesticides, but her ultimate target is the prevailing Western ethos that places humans apart from and above nature. As you read *Silent Spring* pay particular attention to/think about the following:

THROUGHOUT THE BOOK   
1. The basic structure of the book   
2. Carson's use of ecological concepts and ideas   
3. Carson's writing style and tone   
4. Why did the book have such an strong impact on the public?   
5. Carson's repeated attempts to exploit previous public concern about fallout and radiation hazards. What function do these links serve, and how effective are they?   
6. Carson's evidence (see "List of Principle Sources")   
7. Compare/contrast *Silent Spring* with *A Sand County Almanac*

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 is it? Is her story believable?

CHAPTER 2   
2. According to Carson, how are humans 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 are the results of these changes? What term does she propose to describe the effects of the new generation of pesticides? What does she see as the "central problem[s] of our age?" What is the fundamental irony of the introduction of new pesticides designed to increase agricultural production? 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"? Does Carson reject the idea of using chemical insecticides?

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 is different about synthetic (as compared to previous) pesticides? How has the rate of pesticide production changed since the end of World War II? What was the most common pesticide prior to 1945? What are its effects?

7. According to Carson, modern pesticides are much more deadly than their predecessors. What are the two major kinds of synthetic pesticides? What is common to both? 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 persistent pesticides, concentrates up the food chain (i.e., "bioconcentrates"). What does this mean?   
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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? For what purpose were organic phosphates originally developed in the late 1930s? What effects do these substances have on living organisms? What are some examples of commonly used organic phosphates? What happens when one or more of these pesticides are used (or ingested) together? What are systemics? According to Carson, do herbicides also present a threat?

CHAPTERS 4-9 (skim)   
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 the 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. Skim through the pages of this section of the book, paying special attention to the introductory and concluding sections of each chapter.

CHAPTER 10   
9. 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 (p. 156)?

10. How did the gypsy moth come to the United States? How and why did it spread? How did the federal gov. 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 neighborhoods? How successful was the gypsy moth eradication campaign? What were the unintended effects?

11. How did state and federal officials initially respond to the invasion of the fire ant into 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   
12. Despite their acute toxicity, the new synthetic insecticides are made widely available to consumers. What kinds 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?

13. In the second half of the chapter, Carson deals with the contentious issue of pesticide residues in foods. What evidence does she provide to document her claim that DDT (and other pesticide) residues remain in food ingested by humans? Does she believe the Food and Drug Administration has been successful in protecting the American food supply from contamination? Is there any place on earth entirely safe from these hazards? What special hazards do the misuse of pesticides present? In Carson's opinion, do federally established "tolerances" protect the food supply? If not, why not? What solutions does Carson suggest?

CHAPTER 12   
14. 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? How do synthetic pesticides affect the liver and the nervous system? Why do these effects seem to vary from individual to individual? How do pesticide interactions complicate the story? What are some of the probable long-term effects?

CHAPTER 13   
15. According to Carson, how do pesticides affect cell function? What is the molecule responsible for storing energy in cells? What are some of the ways in which pesticides might disrupt this vital process? What are the effects of disrupting this process in humans and wildlife?

16. 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? Note also (e.g., p. 210) that Carson again claims parallels between humans and other organisms. What specific evidence of pesticide-induced mutagenicity does Carson present?

CHAPTER 14   
17. Does Carson believe that natural or human-caused cancers are more prevalent in modern society? What is the first specific carcinogen she discusses in this chapter? What evidence does she present for an increase in cancer rates? Is it convincing? How much evidence does Carson present for the carcinogenicity of pesticides in humans and animals? What happened with the new synthetic pesticide used against mites and ticks? What happened during the "cranberry scare" of 1959? Why does Carson believe that we are not able to yet gage the "full effect of the new" pesticides? How is leukemia different from most cancers? How has the leukemia rate changed over the decade of the 1950s? What examples of pesticide-induced blood disorders does Carson present? Notice (again) Carson's comparison of the health effects of radiation (including the *Lucky Dragon* episode) and chemicals.

18. 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?

19. In the final section of this chapter, Carson discusses the "sea of carcinogens" which Americans are exposed to from the time of birth. What are some of the specific challenges to understanding the threat posed by these chemicals? What relationship does Carson see between outbreaks of cancer in wildlife and potential outbreaks in humans? According to Carson, is it possible to reduce these environmental exposures, or should we focus on finding a cure for cancer? Why has this approach to fighting cancer been largely ignored? Is Carson ultimately pessimistic or optimistic about the ability to reduce the threat of cancer-causing agents produced by humans?

CHAPTER 15   
20. 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 two critical factors have been ignored in the design of modern pest control programs? [Note the reference to the Kaibab deer irruption!!] What happens when "friendly" insects are destroyed by pesticides? What examples does Carson provide?

21. 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   
22. What does Carson mean by the "Age of Resistance"? How have agriculturalists responded to the problem? How quickly did insects develop resistance to the new insecticides developed after WWII? What are some of the resistant species? Why do the new pesticides accelerate this process? What about the possibility of human resistance to the new pesticides?

CHAPTER 17   
23. According to Carson, what are the two major pest 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?

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