El Camino Real High School
Mr. Sodek

Reading Questions:
Silent Spring by Rachel Carson

First published in 1962, *Silent Spring* alerted a large audience to the environmental and human dangers of the indiscriminate use of pesticides, spurring revolutionary changes in the laws affecting our land, air, and water.

Chapter One: A Fable for Tomorrow	
1.	How is the imaginary town described and why do you think the author presents the imaginary town the way that she does?
Chapter Two: The Obligation to Endure	
2.	Why is the concept of "time" so important? What does the author mean by the phrase, "the rapidity of change"?
3.	How do Darwin's ideas of the survival of the fittest affect the insect vs. insecticide relationship?
4.	Why does the author suggest the use of the term "biocide"?
5.	What is "overproducing"? What are the possible consequences of reducing the amount of species diversity in an area?
6.	What are the dangers of introducing new non-native plant or animal species in an area? What efforts are made to help reduce these dangers?
7.	Explain the quote, "The obligation to endure gives us the right to know".
Chapter Three: Elixers of Death	
8.	What are the differences between pre and post-WWII chemicals?
9.	What are the dangers of synthetic chemicals at the cellular level?
10.	How are modern insecticides categorized?
11.	What properties of carbon make it such an important biological element?
12.	Draw and label a molecule of methane, methyl chloride, chloroform, and carbon tetrachloride.
13.	Who is Paul Miller?
14.	Where is DDT stored in the body?
15.	Explain how DDT works its way up the food chain. (Biological magnification).
16.	What is chlordane and how does it differ from DDT?
17.	In what way does the author suggest that the suburbanite is at risk?
18.	Why is heptachlor particularly dangerous?
19.	Explain some of the characteristics of dieldrin, aldrin, and endrin.
20.	How do organic phosphorous insecticides affect the nervous system?
21.	How long does parathion persist in the environment? Explain.
22.	What is malathion used for?
23.	What "protects" mammals from malathion?
24.	What is the significance of the author's "common salad bowl" example with regard to the effects of malathion on mammals?
25.	What is a "systemic insecticide"? Explain.

26.	In what ways does the author suggest that herbicides may be harmful?
Chapter Four: Surface Waters and Underground Seas	
27.	Explain the author's statement, "It is not possible to add pesticides to water anywhere without threatening water everywhere." Give supporting detail.
28.	What explained the presence of the pesticide 2,4-D in local well water?
29.	What is the relationship between surface water quality in California and the Pacific Flyway?
30.	What were some of the consequences of the efforts to eliminate the gnat, *Chaoborus astictopus*, from Clear Lake, California? Why did it take numerous and increasingly stronger treatments to eliminate the gnat?
31.	What pattern was found with regard to the intake of DDE by other species?
32.	Why is the fact that the insecticides were being applied in low concentrations meaningless?
33.	Explain the author's statement that "nothing in nature exists alone."
Chapter Five: Realms of the Soil	
34.	Describe the formation and composition of "healthy" soil?
35.	Charles Darwin is most famous for his book, On the Origin of Species. What other book does Rachel Carson reference and why is it important?
36.	Why is it important to consider soil ecology when contemplating the use of herbicides and insecticides?
37.	Why is it important to consider the predator-prey relationships of soil organisms?
38.	Is it accurate to suggest that adding chlorinated hydrocarbons to the soil is safe if the application is small enough? Why or why not?
39.	What is the concern that arises from having contaminated soil? Use the examples of the baby food manufacturer or the application of heptachlor.
Chapter Six: Earth's Green Mantle	
40.	Describe the sage-grouse-antelope relationship.
41.	What is the danger of arbitrarily removing a particular species from an area?
42.	What determines when a plant is considered a "weed"?
43.	What is the significance of bees? What other species are these bees inextricably tied to?
44.	What are the pros and cons of blanket spraying Vs. selective spraying?
45.	How did scientists solve the nematode worm infestation of roses in Holland parks?
46.	How might the spraying to eliminate ragweed actually produce more ragweed?
47.	Discuss the significance of the author's explanation of the "intricate web of life whose interwoven strands lead from microbe to human."
48.	Explain the metaphor, "Once again, we are walking in nature like an elephant in the china cabinet."
Chapter Seven: Needless Havoc	
49.	The author contends that through indiscriminate spraying programs, " a record of destruction and death of American wildlife has accumulated." Give an account of the Detroit, Michigan example (pg. 87-91) or the Sheldon, Illinois example (pg. 91-94).
50.	What are "natural controls"?
51.	What does the author contend were the inherent problems governmental cost estimates regarding how expensive it would be to eradicate beetles through the spread of milky spore disease?

52.	Explain your thoughts on the quote, "The question is whether any civilization can wage relentless war on life without destroying itself, and without losing the right to be called civilized."
Chapter Eight: And No Birds Sing	
53.	How is the robin fatefully linked with the American elm tree?
54.	Summarize the effectiveness of spraying campaigns in Greenwich, Connecticut and Toledo, Ohio.
55.	How did New York state gain an impressive record in containing and suppressing Dutch elm disease?
56.	How did exposure to DDT and other chemicals reduce eagle populations (and others) so effectively? (Note: Though almost driven to extinction from exposure to DDT, the bald eagle was removed from the endangered species list in 2007.)
57.	Symbolic of the book's title, explain your feelings of the quote, "Can anyone imagine anything so cheerless and dreary as a springtime without a robin's song?"
58.	In your own words, explain the relevance of the quote, "Who has decided- who has the *right* to decide- for the countless legions of people who were not consulted that the supreme value is a world without insects, even though it be a sterile world ungraced by the curving wing of a bird in flight."
Chapter Nine: Rivers of Death	
59.	How did the spraying of the budworm affect the Miramichi salmon?
60.	How did Hurricane Edna affect the Miramachi salmon?
61.	What are the characteristics of fish with insecticide poisoning?
62.	Explain some alternative that the author suggests for preserving forests and fishes as well.
63.	Summarize the results of heptachlor, Dieldrin, and toxaphene spraying for fire ants and boll weevils in the southern Unites States.
64.	What happened in the Colorado River below Austin, Texas in 1961?
65.	How do insecticides pose a particular threat to shrimp fisheries and the commercial shrimp market?
66.	At the conclusion of the chapter, what does the author suggest that research money be used for?
Chapter Ten: Indiscriminately From the Skies	
67.	Explain how both the gypsy moth program and the campaign to eliminate the fire ant demonstrate how "a vast amount of damage can be done when reckless large-scale treatment is substituted for local and moderate control".
68.	What is the major concern of spraying insecticides on grazing lands?
69.	What does the spraying of fire ants have to do with raccoons, woodcocks, turkeys, blackbirds, sparrows, and quail?
70.	In the end, after a great deal of ecological damage had been done, what methods were developed to most effectively deal with the fire ant problem?
Chapter Eleven: Dreams of the Borgias	
71.	In what ways does the author explain how dangerous chemicals have infiltrated our lives?
72.	Where did scientists look to find people with a diet free of DDT? Explain the results.

73.	What does the author suggest were the two major limitations the Food and Drug Administration had over food safety?
Chapter Twelve: The Human Price	
74.	Explain the author's argument about the cumulative effects of toxic materials.
75.	What is adipose tissue and what is its significance to the chapter?
76.	What is the effect of chlorinated hydrocarbon insecticides on the liver? How does the liver deal with "less harmful" chemicals like malathion and methoxychlor?
77.	What are some of the documented effects of insecticides on the nervous system?
78.	How is the study of insecticide exposure on humans more complicated than a controlled study on laboratory animals?
79.	Explain how a supposedly innocuous chemical may suddenly be hundreds of times more dangerous.
80.	What are some of the consequences of organic phosphate poisoning?
Chapter Thirteen: Through a Narrow Window	
81.	How is the use study of dangerous pesticides like "a very narrow window through which at a distance one can see only a crack of light? As one comes closer the view grows wider and wider, until finally through this same narrow window one is looking at the universe."
82.	Summarize the process of cellular respiration.
83.	What does the author mean by the term, "uncoupler"?
84.	What happens to cells when the enzymes of cellular respiration stop working?
85.	Explain what was found when scientists tested bird eggs for the presence of DDT and other hydrocarbons.
86.	List some evidence of reproductive harm caused by DDT to various organisms and other chlorinated hydrocarbons.
87.	What effect of pesticides does the author propose as "the last and greatest danger to our civilization"?
88.	What did Charlotte Aurbach and William Robson discover in the early 1940s?
89.	Comment on the state of knowledge regarding chromosomes and DNA.
90.	What is a gynandromorphy? Why is it relevant?
91.	List the mutagenic effects of phenols, carbamates, BHC, and 2,4-D.
92.	What is Kleinfelder's syndrome and Turner's syndrome?
Chapter Fourteen: One in Every Four	
93.	In what way has man changed the evolutionary relationship between cancers and organisms.
94.	Who tended to get cancer in the 1700s and 1800s? Why?
95.	According to the author, what explains the high rates of cancers in children today?
96.	What does the author suggest is unique about leukemia? What evidence does the author use to link leukemia to pesticide use? Based on the evidence presented, has the author proven this link? Explain.
97.	Explain the Warburg theory.
98.	Explain the proposed connections between pesticides, liver damage, vitamins, and cancer.
99.	How does the author suggest the cancer situation is similar to that of infectious disease in the late 1800s? What two strategies need to be employed?

100.	What does the chapter title, *One in Every Four* refer to?
Chapter Fifteen: Nature Fights Back	
101.	What is "the final irony"?
102.	What are "the two critically important facts that have been overlooked in the designing of modern insect control programs"?
103.	If each female cod fish lays millions of eggs, why isn't the ocean a mass of cod fish?
104.	What happens to prey populations when predators are weakened, removed, or killed?
105.	Describe three interesting examples of predatory insect behavior that serves as a natural control against other insects.
106.	Is spraying always successful on the target insect? Explain.
107.	What are some of the consequences when spraying *is* successful on the target insect?
108.	Give three reasons that explain why spider mites were able to thrive after spraying.
109.	How did the two approaches to pest control by California citrus growers in the late 1800s and mid 1900s differ?
110.	Why are mollusks an important consideration when discussing pesticide spraying?
Chapter Sixteen: The Rumblings of an Avalanche	
111.	What is the "Age of Resistance"? Give an example.
112.	Name some insect-borne diseases and the insects that transmit them.
113.	What is the traditional response by agencies when a species of insect begins to show signs of resistance?
114.	Explain two unpleasant economic facts that the chemical industry has had to face.
115.	Provide context for the quote, "Humbleness is in order; there is no excuse for scientific conceit here."
Chapter Seventeen: The Other Road	
116.	What is a "biological control".
117.	What was Dr. Knipling's idea? Was it successful?
118.	What are chemosterilants? What is the major concern that accompanies their use?
119.	Describe another type of biological control.
120.	Describe one more type of biological control.
121.	Can and/or should man attempt to control nature? Give examples and provide your own perspective.