

Chapter 7: Ecological role of Solar Radiation

Read: All sections but don't get into the real nitty gritty of the content like the details of pathways, values of wavelengths, etc.!

1. Briefly trace the fate of solar radiation from the sun to the earth's surface. (Where is light reflected, absorbed, re-radiated?)
2. Describe the difference between solar radiation and light, and several effects of solar radiation other than light on plants and animals.
3. Describe several effects of high light and low light intensities of plant photosynthesis and plant morphology.
4. Describe several ways in which plants and animals respond to temporal variations in solar radiation. What is a photoperiod and how do variations in its length affect plants?
5. What is "photosynthetic efficiency"? What types of ecosystems have high (and low) photosynthetic efficiency? (we covered this previously in class – see lecture notes)
6. Graph the relationship between net photosynthesis and light intensity. What is this curve called? What is the compensation point and saturation point? What will a plant probably look like if it is growing under its light compensation point?
7. What are some differences between sun leaves and shade leaves? For example, which are likely to have a lower compensation point? What are some differences in their morphology? Which is likely to be more photosynthetically efficient?
8. Discuss what it means for a plant to be shade tolerant?
9. Discuss how the amount of sunlight hitting the forest floor changes with percent of crown closure, stem spacing, height position above ground, and time of day (Figure 7.7).

Chapter 8: Temperature as an Ecological Factor

Read: All sections **except** 8.5 or 8.6.

1. List and briefly describe (in a non-quantitative fashion) the factors that influence the energy budget of a ground-based organism (such as tree seedling or small mammal).
2. Describe how two objects exposed to the same amount of solar radiation can be different temperatures.
3. Describe the impact of topography on energy budgets.
4. Describe the effect of moisture on the temperature of soils.
5. Describe why weather reports and average temperatures presented in atlases are relatively meaningless from an ecological standpoint.
6. Identify two principal causes of temperature-related injuries to plants and give an example of each.
7. Describe several physiological and morphological adaptations that plants have made to extreme temperatures.
8. List several reasons why foresters and other resource managers should understand the effects of temperature on the organisms they manage.

Chapter 9: Wind: Ecological Effects of Atmospheric Movements

Read: All Sections EXCEPT 9.2, 9.4

1. Briefly describe at least three effects of wind on the following: plant propagation, plant physiology, and plant morphology (how plants look). Give an example of each.
2. Describe two negative and two positive effects that wind can have on entire ecosystems.
3. Briefly describe two reasons that foresters (and others who manage forested landscapes) should understand the relationship between forests and wind.

CHAPTER 12: FIRE: A Pervasive and Powerful Environmental Tool

Read: All Sections.

1. The term “forest fire” often conjures up a single image. Describe the 3 major types of fires and why their ecological implications vary dramatically from place to place.
2. Briefly describe the major impacts of fire on soil (physical, chemical, and biological).
3. List 5 ways that plants have evolved to survive, and even flourish in the face of fire. Give one example of each.
4. Briefly describe how fires affect animal communities in the forest.
5. Briefly describe how fires affect energy flow and nutrient cycling in forested ecosystems.
6. List and describe 5 ways that humans use fire to manipulate forested ecosystems, and 3 problems associated with excluding fires from forested systems.