

#SA 9 – Climate and Microclimates

LOOKING BACK: Study Assignment #8 emphasized the dynamic relationship between solar energy and the Earth’s atmosphere, land, and oceans. Solar energy is changed in quantity and quality as it interacts with the atmosphere and planetary surface. This interaction on a curved, tilted, rotating, revolving planet produces climatic variation which is recorded in climate diagrams.

FORWARD: Study Assignment #9, a short assignment, turns us from the *global scale* climate (macroclimate) to *local scale* climate or *microclimate*. Macroclimate as we hear it described in weather reports exerts important effects on a regional or continental scale. But, the microclimate concept teaches us that the environment of living organisms is influenced by short-term changes in local climate due to the presence of local structures (e.g. hills, lakes, buildings, trees) and events. Which matters more to a plant or animal (or you) in a given moment– the global biome you live in or your microclimate? Let’s see if you are right.

READING: Textbook: Molles Chapter 4, pages 90-93 (stop at “Aquatic Temperatures”)

PROCEDURE: Our focus is on “Concept” #1, p. 85. Read this statement and then, the “Summary Concept” version at the end of Chapter 4. Skim pages 90-93 and then read and study in detail. I hope that the concept of microclimate will bring a fascinating new dimension to your understanding of biology and ecology. Use the **STUDY QUESTIONS** to test your learning and record your insights.

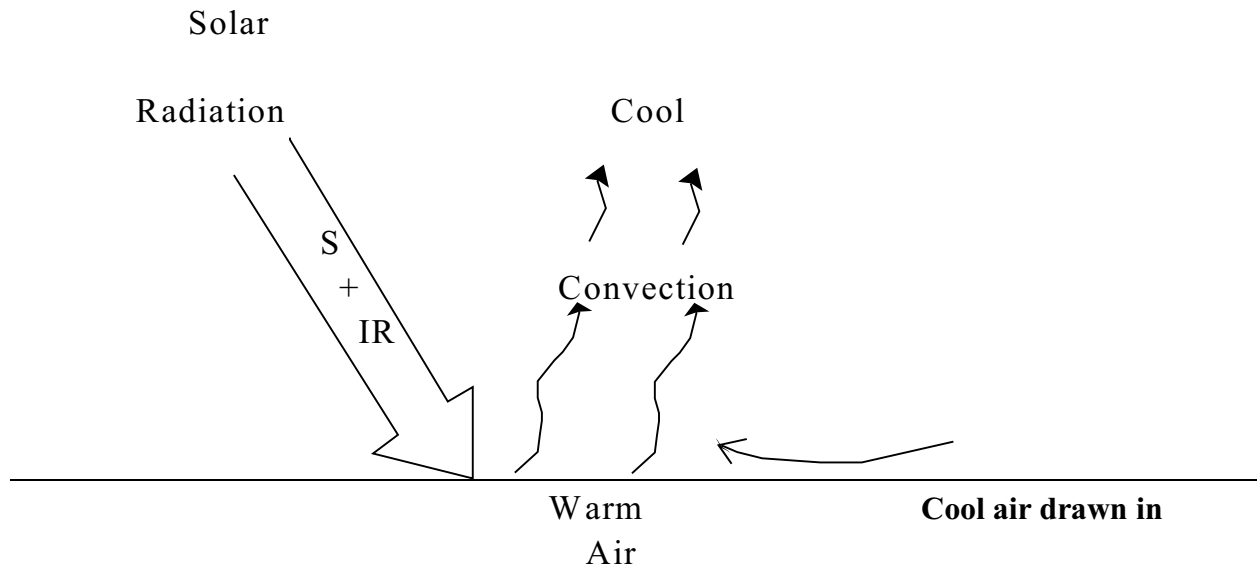
STUDY QUESTIONS:

1. List some natural phenomena and human-derived features that influence microclimate.
2. Chapter 4, “Review Questions” #1 and #2.
3. What is a thermal inversion? How might such an inversion become a factor influencing human health in a city that is located in a valley? [Study the attached graphic; then bring your thoughts to class discussion and be prepared to learn more.]
4. Discuss ways that you as a homeowner (now or future) might use “microclimate modification” for energy conservation and comfort. Explain energy relationships involved.

TAKE-AT-HOME QUIZ:

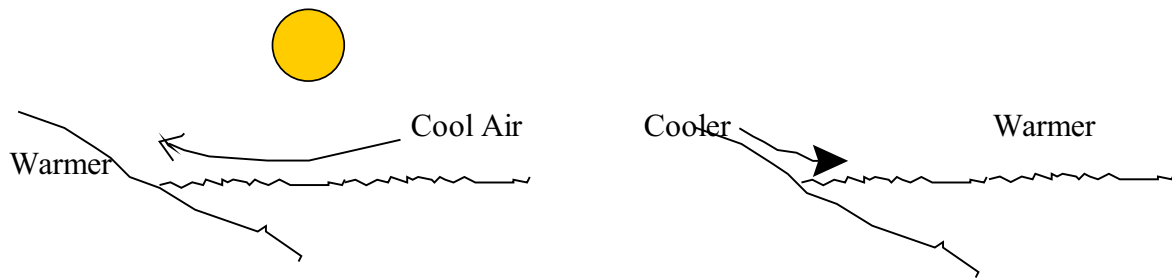
The first of a series of occasional “Take-At-Home Quizzes” is attached to this assignment. The earliest a quiz would be collected would be the date for which the study assignment is due. Thus, you would want to have this particular quiz completed along with this assignment the day before our class meets for this topic. See the attached quiz for more details.

LOCAL AIR MOVEMENT

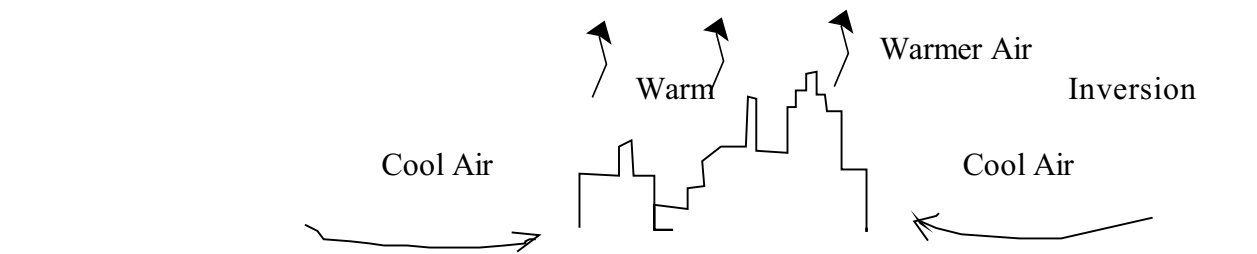


APPLICATIONS:

A. Coastal Breezes:



B. Urban Community



Take-at-Home Quiz

Lab Section (circle one): T W R

INSTRUCTIONS: Select the correct choice in response to each question and write the UPPER CASE LETTER of your choice in the appropriate box below, or write a short answer in one or two complete, concise sentences. To receive credit, you must have this quiz printed, completed, and ready to hand in when requested during lecture either on or after the date of the assignment to which this quiz is attached. You may complete the quiz alone or with others as long as you are mentally involved in answering the questions to assess your progress and to stimulate further learning.

1. Which of the following ecological investigations involves the lowest level on the hierarchy of levels of biological organization?
 - A. Correlating O₂ consumption rate with body temperature in a bumblebee.
 - B. Use of sediment cores to project climate in an area during past millennia
 - C. Determining the pathway to amino acid synthesis in Roundup® Ready soybeans.
 - D. Measuring the effect of deforestation of a stream valley on dissolved ions in stream water.
 - E. Measuring growth rates of different soybean varieties using quadrat sampling in farm fields.

2. A climate diagram as developed by Heinrich Walter provides all of the following information except:
 - A. elevation
 - B. dry seasons
 - C. mean monthly precipitation
 - D. mean annual temperature
 - E. global warming trends at that location

3. So-called “greenhouse gases” include all of the following except:
 - A. ozone
 - B. oxygen
 - C. nitrous oxide
 - D. carbon dioxide
 - E. chlorofluorocarbons

Score Answers Here -->	1.	2.	3.
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4. After reading the article “Humboldt’s Legacy...” by Sachs, please answer the two questions below. Make your responses a distillation of careful thought and reflection.

a. How did Humboldt and Darwin attempt to explain the existence of struggle and strife?	b. What traits or views of Humboldt or Darwin might you apply to your current learning?