

Climate 101 Week 4

Concluding Group of OSS Unit 1 Sessions

Overview of this Week:

- * Participants apply understandings from ocean densities/circulation to wind patterns, especially the concept that warmer air rises.
- * Nautical challenges enable learners to deepen and demonstrate their understandings of ocean and wind currents that arise from uneven heating of the planet.
- * Participants relate part of local climate variability to ENSO.

Before Teaching this Week:

Session 1.9 focuses on continental coastal locations and phenomena that do not happen on small Pacific equatorial islands. We still do Session 1.9 because it connects what participants have learned about density effects in the ocean with density effects in the atmosphere. The phenomenon being studied (sea breezes which are changes in wind direction between day and night) are much more prominent on continental coasts than on small tropical islands. Note that we are skipping Session 1.10. We will use other materials to teach about the water cycle.

- * Get materials needed for Sessions 1.9, 1.11 and 1.12, especially the labs and Nautical Challenges in Session 1.11.
- * Download from the OSS Resource Disc the slides in Unit 1 for Sessions 1.9, 1.11 and 1.12. Be prepared to project these slides as needed.
- * Review the three Sessions in the Teacher's Guide.
- * Make enough copies of Handouts from Copymaster Unit 1 (CM1) from OSS Resource Disk page 36 for Writing Revised Ideas in Session 1.9; pages 39 through 62 for Session 1.11; and pages 63-64 for Session 1.12.

Day 1: Session 1.9: Moving Air

Mostly follow the Teachers Guide instructions. Main idea is to apply the concepts from convection in the ocean to convection in the atmosphere. The same general concepts apply.

You can show the very short video of the "Lantern Festival in Thailand." It can be accessed at

<http://mare.lawrencehallofscience.org/curriculum/ocean-science-sequence/oss68/unit1>

Day 2: Session 1.11: Global Winds and Ocean Surface Currents

Do Session 1.11 pretty much the way it is written except for the very beginning. Start by showing a Global Wind Animation. The animation is available under Session 1.10 in Unit 1 Resources accessed at:

<http://mare.lawrencehallofscience.org/curriculum/ocean-science-sequence/oss68-overview/oss68-resources/unit1>

A very similar animation from Prentice Hall can be accessed at:

<http://www.geography.hunter.cuny.edu/~tbw/wc.notes/7.circ.atm/animations/GlobalWind.html>

Help participants notice when Ideal Hadley Cell is turned on:

- * where the warm air (red) flows,
- * where the air becomes cooler as it rises, and
- * that clouds form near the equator where the warm air gets colder as it rises.

Turn on the “Develop Tropical and Midlatitude Components” and help participants notice:

- * the different kinds of winds,
- * the names of winds generally refer to the direction they are blowing from,
- * the band of clouds near the equator called the ITCZ (these are described on page 5 in the RMI Climate booklet),
- * that winds in the equatorial Pacific generally blow from East to West, and
- * that the curve in the wind patterns (indicated by the grey arrows) is due to Earth’s rotation on its axis.

There are also supporting videos available on LHS Unit 1 Resources web page. The most relevant for Session 1.11 is a video called, “What Causes the Gulf Stream?”

Transitioning to the lab, arrange participants to work in small groups on the experiments with surface currents in a model ocean. Have participants debrief results and discuss. Use this discussion as a springboard for participants doing the Nautical Challenges. There are 10 Nautical Challenges. We have the choice of having each participant do at least one Nautical Challenge, try to have all of them covered, and then debrief as a whole group. Alternatively, we could select a subset and have participants work in small groups and just debrief the selected Nautical Challenges.

Do Maritime Mystery if there is enough time.

Homework Assignment is to use an active science reading strategy for a reading that is needed for the next lesson. Half the participants use the active reading strategy for “Wind, Water, and Wild Weather” (pages 46-47 in Investigation Notebook). Half the participants use the same active reading strategy for “Upwelling Zones and El Niño” (pages 48-49 in Investigation Notebook).

Day 3: Session 1.12: Ocean Currents, Global Winds, and El Niño

Session begins with pairing participants who did one reading with participants who did the other reading. They share with each other and are instructed to report what they learned that was the same in both readings and what was different. Follow with brief whole class discussion of ENSO. Connect this discussion with climate variability by referring back to the ENSO write-up and the “Main Climate Features” Table in the RMI Climate booklet (pages 5-6).

Now mostly follow the Teachers Guide instructions except that participants will have done the reading before the class. Students use resources to practice writing revised ideas.

There is a supporting video called “Earth System: El Niño” that is available on the LHS Unit 1 Resources web page associated with Session 1.12.

Homework Assignment is to write about our Two Guiding Reflections (same questions used at the end of every week):

- 1) Choose a concept of activity from this week. How would you teach this concept or activity with your students?
- 2) What would be hard for your students to understand about this concept or activity?