

SS&S Chapter 15 Instructor Guide

Weather and Sailing

The PowerPoints (PPT) slides for this SS&S chapter were copied from the BS&S-13th Ed PPT because they are identical. Only the chapter numbers have been changed. Therefore, the Instructor Guide notes remain in the same format as published for the BS&S which are slightly different from the sailing chapters.

Slide 1: Title Slide

Instructor:

Student:

Slide 2: Lesson Objectives

Instructor:

Student:

(click to show bullets)

Review the objectives

Slide 3: Weather Information

Instructor:

Student:

(click to show bullets)

Ask: What are some of the sources you can check for weather information?

Answers should include:

- Telephone information
- National Weather Service
- Internet
- AM radio static
- Shortwave radio broadcast

Slides 4: Wind and Boating

Instructor:

Student:

(click to show bullets)

Ask: What can happen to a vessel caught in a storm?

Lead a discussion noting all the things one may encounter when caught in a storm with heavy winds and rains.

Ask if any of the students have been caught at sea in a storm and if so to describe what happened.

Explain that the fetch is the distance over which the wind blows.

Slide 5: Winds and Boating

Instructor:

Student:

(click to show bullets)

Discuss bullets.

Explain that a storm surge is caused by raising sea levels in the low pressure areas around the storms. If these elevated sea levels reach shore they will add to high tide levels.

Swells are waves coming from a distant disturbing force resulting in decreased heights and longer wave lengths.

Breaking waves can occur on navigable waters as well as on shore. Released energy can be dangerous.

Significant wave height is the range of wave heights which will occur 70% of the time.

Waves in shallow water can be dangerous to small craft.

Slide 6: Winds and Boating

Instructor:

Student:

(click to show bullets)

Explain table

The scale was designed by a British Admiral Sir Francis Beaufort to correlate wind speed and wave height.

Slide 7: Understanding Weather

Instructor:

(click to show bullets)

Student:

Explain that land heats quicker than water. During the day the air over land heats quickly, becomes less dense and rises forming clouds. New air from the ocean takes its place and the cycle continues. When the clouds cool the moisture condenses and we have rain. In the evening the process is reversed since land cools quicker than water.

Slide 8: Understanding Weather

Instructor:

(click to show bullets)

Student:

Explain that the air is warmed at the equator, rises, goes north and south, is cooled and falls again. When it reaches the earth, it goes north and south again, warms up, rises and repeats the cycle twice more resulting in three “doughnut” shaped air masses circulating on each side of the equator.

The Coriolis Force, which turns moving masses to the right in the Northern Hemisphere and left in the southern, results in continuous wind patterns around the globe.

Note that early navigators, like Columbus, made use of these wind patterns in their journeys.

Slide 9: Understanding Weather

Instructor:

(click to show bullets)

Discuss bullets.

Student:

The warmer the temperature of an air mass, the more water it can hold.

To change from water to vapor, added energy is required. To go from vapor to water energy is released.

A low temperature air mass is dense forming a high pressure system and a warmer air mass results in a low pressure system, each having different weather characteristics. These air masses move across the US roughly from west to east.

Slide 10: Understanding Weather

Instructor:

(click to show bullets)

Discuss bullets.

Student:

Note that winds spiral inward and outward. The Northern Hemisphere is shown. Wind reverses direction in the Southern Hemisphere.

Slide 11: Understanding Weather

Instructor:

(click to show bullets)

Ask: Why do we have inclement weather with a low pressure system?

Student:

Answers should include:

- A low pressure air mass is unstable, i.e., it is less dense, or lighter than the surrounding air mass and therefore easily displaced.
- Lows contain warm, moist air; highs contain cool dry air.

Slide 12 Understanding Weather

Instructor:
(click to show bullets)

Student:

Explain Buys Ballot's Law.

Slide 13: Understanding Weather/Fronts

Instructor:
(click to show bullets)

Student:

Discuss characteristics of the types of fronts and what happens as the fronts pass in relation to the air mass.

Slide 14: Understanding Weather/Clouds and Fronts

Instructor:
(click to show bullets)

Student:

Ask: Who recalls the three types of clouds and characteristics of each that accompany fronts?

Answers should include:
Cirrus, stratus, cumulus

Cirrus – thin high-level made of ice crystals

Stratus – flat, layered

Cumulus – fluffy, piled up; can change into thunderstorms.

Slide 15: Understanding Weather/Weather Clues from Clouds

Instructor:
(click to show bullets)

Student:

Cold Fronts

Explain that a cold front is comprised of dense air and as it moves it pushes all the air in front of it aloft where it cools forming cumulous nimbus clouds and heavy rains.

Slide 16: Understanding Weather/

Instructor:
(click to show bullets)
Warm Fronts

Student:

High thin cirrus clouds ahead of a warm front.

Explain that a warm front that climbs over the colder air in front resulting in stratus clouds and a drizzling rain for an extended period of time.

Slide 17: Understanding Weather

Instructor:
(click to show bullets)

Student:

Discuss each situation listed under Deck-Level Forecasting on pages 376- 377.

Slide 18: Understanding Weather

Instructor:
(click to show bullets)
Fog

Student:

Fog is caused by condensation of water on minute particles in atmosphere.

Advection cloud caused by warm moist air blowing over cold sea.

Discuss the conditions necessary for fog to form.

Slide 19: Fog Precautions

Instructor:
(click to show bullets)
Ask: What precautions must be taken in fog?

Student:

Lead discussion discussing the dangers that can be encountered.

Since visibility is reduced special care must be taken such as slowing headway and posting a lookout.

Slide 20: Non-Frontal Weather/Thunderstorms

Instructor:
(click to show bullets)

Student:

Discuss each stage.

Slide 21: Thunderstorms

Instructor:
(click to show each bullet as a new slide)

Student:

Point out dangers of lightening.
Be sure boat is grounded.
Can predict distance from storm by timing lightening flash and thunder – 5 seconds = one mile.
Microbursts are strongest in direction storm is moving.
Tornadoes spawn in squall lines ahead of cold fronts.
Waterspouts form from a tornado that has gone to sea or occur in fair weather over water with winds either clockwise or counterclockwise.

Slide 22: Non-Frontal Weather

Instructor:
(click to show bullets)
Ask: What should you do if caught in a thunderstorm?

Student:

Answers should include:

- Put on life jacket
- Close ports and hatches
- Note location of vessel
- Reduce speed
- Keep sharp lookout
- Head into wind
- Approach waves at 45 degree angle
- Stay low in boat
- Keep away from metal objects

Slide 23: Non-Frontal Weather/Tropical Storms

Instructor:

(click to show bullets)

Student:

Discuss characteristics of each.

Slide 24: The Go, No-Go Decision

Instructor:

(click to show bullets)

Ask: What are some of the considerations for making a decision to go or not to go?

Student:

Answers should include:

- Is weather suitable for cruise?
- Necessary equipment for safe operation
- Crew confidence
- Proper food and necessities
- Getting weather info.
- Boating and safety knowledge
- Navigation ability
- Back up plan
- Float plan
- Comfort level