

SS&S Chapter 12 Instructor Guide

Introduction to Navigation

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 2-3: Lesson Objectives

Instructor:

Student:

(click to show bullets)

Review the objectives

Slide 4: Nautical Charts

Instructor:

Student:

(click to show bullets)

Discuss bullets.

- Charts are available from the National Ocean Service and the internet.
- The date of the chart is in the Title Block.

Bring a variety of charts of local area to show class. These will be used throughout the rest of the class. If possible, bring enough for students to work in small groups of two or three.

Slides 5: Nautical Charts/Features/Projections

Instructor:

Student:

(click to show bullets)

Explain that this is the most common projection used by the average boater. The Latitude and Longitude lines are perpendicular to each other and a course line crosses each at the same angle.

Slide 6: Nautical Charts/Features/Projections

Instructor:

(click to show bullets)

Discuss bullets.

Student:

The earth's surface is projected on a series of cones.
Gives the least distortion at northern and southern latitudes.
Great Lakes charts are often polyconic projections.

Slide 7: Nautical Charts/Features/Chart Scales

Instructor:

(click to show bullets)

Student:

Point out that the higher the scale the more area covered and the lower scales avail the greatest detail.
If possible, bring a variety of small and large scales of local area.

Slide 8: Nautical Charts/Features/General Information Block

Instructor:

(click to show bullets)

Have students locate the information on the charts. This is when the small groups work best using local charts or The 1210 Tr Chart.

Student:

Explain Vertical and Horizontal Datums.

Slide 9: Chart Features/What Charts Show

Instructor:

(click to show bullets)

Student:

Using the same groups and charts help students locate the items.

Slide 10: Ship's Compass

Instructor:

Student:

(click to show bullets)

Explain the different types.

Point out that the larger compasses are more stable and a night light is desirable.

Several types of compasses should be brought to class and passed around to the students. With the compasses, give them a piece of iron to show how its proximity affects compass readings. Install on or as close as possible to lubber's line with maximum visibility by helmsman.

Explain variation and various adjustment procedures.

Slide 11: Fixing Your Position

Instructor:

Student:

(click to show bullets)

Explain that a great circle is a plane cutting through the center of the earth.

Longitude lines are great circles while Latitude lines are not.

Slide 12: Fixing Your Position/Parallels of Latitude

Instructor:

Student:

(click to show bullets)

Explain the chart.

Slide 13 Fixing Your Position/Longitude Lines

Instructor:

Student:

(click to show bullets)

Explain the chart.

Explain need of prime meridian as a reference point and point out its location.

Explain time meridian at 180 degrees.

Slide 14: Fixing Your Position/Locating a Point on the Chart

Instructor:

Student:

(click to show bullets)

Explain how you can find your position by knowing latitude and longitude.

Make a comparison with finding your theater seat knowing row and seat number.

Slide 15: Fixing Your Position/Distance on the Earth's Surface

Instructor:

Student:

(click to show bullets)

Explain each term.

Use the 1210 TR chart or local chart to show how to use the latitude scale to measure distance using dividers or the piece of paper method.

Slide 16: Fixing Your Position/Course Plotting

Instructor:

Student:

(click to show bullets)

Bring a course plotter and parallel rulers and show how to use both.

Discuss the Compass Rose and stress using the outer ring for degrees true.

Slide 17: Sources of Compass Error

Instructor:

Student:

(click to show bullets)

Explain the 2 terms.

- Variation – the earth's magnetic pole is not at the geographical North Pole and the reading must be corrected, as a function of location.
- Deviation – is caused by the distribution of magnetic attractions on board. Discuss what might be on a boat that would affect the deviation.

Slide 18: Correcting a Compass Reading

Instructor:

(click to show bullets)

Explain TVMDC. Create a variety of problems for both correcting and uncorrecting the compass.

Student:

Slide 19: Finding Your Position

Instructor:

(click to show bullets)

Briefly explain each term.

Student:

Explain that a Line of Position means that you can be anywhere on that line.

Point out that by using a hand held compass, you don't have to turn the vessel around to take bearings and there is no deviation error to compute.

Slide 20: Finding Your Position/Fix

Instructor:

(click to show bullets)

Have the students describe the graphic on the chart.

Student:

Slide 21: Finding Your Position/Range LOPs

Instructor:

(click to show bullets)

Have the students describe the graphic on the chart.

Student:

Slide 22: Finding Your Position/Bearing LOPs

Instructor:

(click to show bullets)

Have the students describe the graphic on the chart.

Student:

Slide 23: Finding Your Position/Binoculars

Instructor:

(click to show bullets)

Student:

Explain that on the water, the 7 X 50 binocular is the best to use on a boat.

Slide 24: Speed - Time - Distance

Instructor:

(click to show bullets)

Student:

Speed can be measured with a speedometer or a tachometer based speed table.

Both measure speed through the water and must be adjusted for current to determine speed over ground.

Use a watch for time.

Distance is measured on the chart.

Create a variety of problems for students to practice calculating speed, time and distance.

Slide 25: Dead Reckoning

Instructor:

(click to show bullets)

Student:

Working in small groups, create a hypothetical DR Plot and have students use their charts to plot the intended course. Use three legs of the course and have them properly label.

Slide 26: Tides

Instructor:
(click to show bullets)

Student:

Explain that the tides are caused by the gravitational pull of the moon and sun.

Bodies in line, Spring Tides result in greatest variation, i.e. higher high tides.

Bodies at 90 degrees Neap Tides result in lowest variation, lower highs, higher lows.

Slides 27: Tides

Instructor:
(click to show bullets)

Student:

- Diurnal occur in Gulf of Mexico - one high, one low a day.
- Semi-Diurnal occur on east coast US – two highs, two lows a day, each high and each low about equal to the other
- Mixed occurs west coast US – two highs, two lows a day. One high is higher and one low is lower than the other.

Stress that:

Since we are concerned how much water we have under keel, low tides are recorded. However bridge clearances are listed at high tide.

Slide 28: Tide Tables

Instructor:
(click to show bullets)

Student:

Tide tables should be brought to class and distributed to the students and discussed.

Slide 29: Electronic Navigation

Instructor:

(click to show bullets)

Explain each system.

Student:

Loran has disadvantages such as coverage and environmental interference.

Slide 30: GPS Operation

Instructor:

(click to show bullets)

Student:

The ideal situation would be if someone could bring a working unit to class and demonstrate it.

Point out that for smaller vessels, a hand held is useful.

Slide 31: A Further Invitation

Instructor:

(click to show bullets)

Student:

The Coast Guard Auxiliary has more courses available to increase your navigational skills. Check this website for courses available.