

Name: \_\_\_\_\_

## Lab 9: Topographic Map

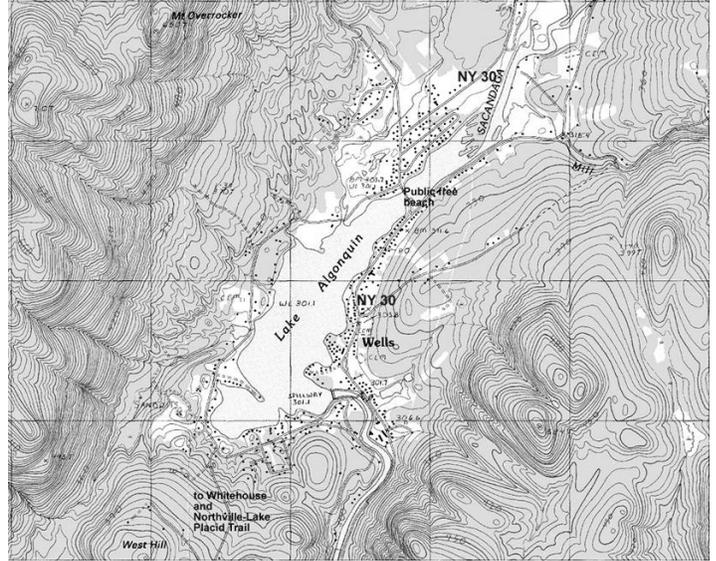
Earth Science

Date \_\_\_\_\_

**Introduction:** In previous exercises, you have studied latitude and longitude, compass direction, the field quantity of elevation and horizontal distance scales. In addition, topographic maps show many natural and man-made features.

**Objective:** You will apply your knowledge of contour mapping to interpret actual topographic maps.

**Background Information:** The United States Geological Survey has prepared detailed large-scale maps of a large part of the United States. On these maps, the country is divided by latitude and longitude lines. These divisions are called quadrangles, which are of definite area and have definite boundaries. The most common areas mapped are shown in 7.5 minute series maps. Each quadrangle sheet is given a name, usually of an important town or feature of the map.



### Materials:

- The Boothbay Harbor, Maine 7.5 minute series map
- Hand lenses
- Wall map of the United States or northeastern states

### Problems:

**A. What part of Maine does this map sheet cover?** The Boothbay Harbor map sheet covers an area of 7.5 minutes (1/8 degree) of latitude, and 7.5 minutes of longitude. The map follows the usual arrangement of having north at the top, south at the bottom, east at the right, and west at the left.

1. What is the latitude of the southern parallel of the map? \_\_\_\_\_
2. What is the latitude of the northern parallel of the map? \_\_\_\_\_
3. How many minutes of latitude does the map include? \_\_\_\_\_
4. What is the longitude of the eastern meridian of the map? \_\_\_\_\_
5. What is the longitude of the western meridian? \_\_\_\_\_
6. How many minutes of longitude does the map include? \_\_\_\_\_
7. Describe the location of the Boothbay Harbor quadrangle in the state of Maine. Refer to the sketch map in the lower right margin. \_\_\_\_\_

**B. Which Topographic Map Areas Adjoin the Boothbay Harbor Area?** Along the bottom of the Boothbay Harbor Quadrangle you will find a key showing the adjoining maps. Complete the diagram below by writing all of these names in their proper places.

Why are there no names at the southeastern and south central locations?

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	Boothbay	

**C. How can you best describe the location of places on this map sheet?** In addition to the boundaries of the sheet, other parallels and meridians have been marked 2.5 minutes apart. These divide the sheet into nine rectangles, which are numbered as follows.

R1	R2	R3
R4	R5	R6
R7	R8	R9

To locate a place, you can use both rectangle number and compass directions. For example, the Cuckolds Lighthouse is in the southern corner of rectangle 9 (R 9, NW). **Find it!**

Using this system, describe the locations of...

- a. Beech Hill (northwestern part of map) \_\_\_\_\_
- b. Squirrel Island (east central part of map) \_\_\_\_\_
- c. Five Island (west central part of map) \_\_\_\_\_
- d. McFarland Island (northeast part of map) \_\_\_\_\_

**D. What are contour lines?** At the bottom of the map “CONTOUR INTERVAL 10 FEET” is stated. This tells us that in addition to the sea level outlines or shorelines of the islands on the map, we will also find lines drawn to show us where the land is 10, 20, 30, 40, 50 etc. feet above sea level. These lines are printed in brown, and are called contour lines.

Contour lines are lines that join points at a constant height above sea level. The contour interval is the regular difference in elevation between two adjacent contour lines. In level areas the contour intervals may be only 5 or 10 feet. In mountainous areas it may be as much as 100 or 200 feet. An average contour interval, like that on this map is 10 feet.

1. In R3, the McFarland Island has no contour lines on it. What does this tell you about its elevation?

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2. Name and locate 2 other islands below 20 feet in elevation.

a. \_\_\_\_\_ b. \_\_\_\_\_

3. Name and locate one example of an island for each of the following elevations:

**Name**

**Location**

a. More than 20 feet, less than 30 feet. \_\_\_\_\_

b. More than 30 feet, less than 40 feet. \_\_\_\_\_

4. What two things are done to every fifth contour line to make elevation easier to read? \_\_\_\_\_

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5. What is the maximum height of Squirrel Island in R6? \_\_\_\_\_

6. In R7, a building is shown near Little River Ledge Island. Its exact height is 20 feet above sea level.

How is this shown? \_\_\_\_\_

7. As a rule, compass directions are used to describe location. For example, Squirrel Island is South of the town of Boothbay Harbor. Using this method, complete the following:

a. Charles Pond is \_\_\_\_\_ of Reid State Park.

b. Dogfish Head is \_\_\_\_\_ of Knubble.

**E. What do the following colors represent on a topographic map?**

Black \_\_\_\_\_

Blue \_\_\_\_\_

Green \_\_\_\_\_

Brown \_\_\_\_\_

**Locate and draw the symbol for:**

School \_\_\_\_\_

Swamp \_\_\_\_\_

Highway \_\_\_\_\_

Church \_\_\_\_\_

Railway \_\_\_\_\_

Trail \_\_\_\_\_

Cemetery \_\_\_\_\_

Dirt Road \_\_\_\_\_

**F. Using the Pittsford Quadrangle find the answer to the questions below.**

1. What is the scale of this map? \_\_\_\_\_

2. Look at the bottom of this map. What year was the information on this map last checked? \_\_\_\_\_

3. What is the magnetic declination of this map? \_\_\_\_\_

4. How many minutes of latitude does this map cover? \_\_\_\_\_

5. How many minutes of longitude does this map cover? \_\_\_\_\_

6. What is the topographic series of this map (in minutes and seconds) \_\_\_\_\_

7. What is the contour interval of this map? \_\_\_\_\_

8. Locate **Allen's Creek**, do contour lines bend upstream or downstream when crossing this stream? \_\_\_\_\_

9. What is the elevation of the intersection near French Road School? \_\_\_\_\_

10. What is the compass direction from **Quaker Pond** to **Lock 32**? \_\_\_\_\_

11. Calculate the gradient from the intersection of Westfall Rd. and Clinton Rd. (R1) to the intersection of Clinton Rd. and the Canal (R1). **Hint: Use the bench marks for elevations.**