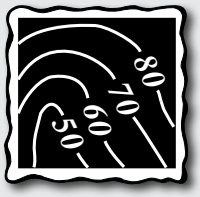
Topographic Maps and Mount Rainier



Grade Level: 5–12

Learner Objectives:

Students will:

- Read and understand map explanations, including the name, date and origin of the map, scale and contour intervals
- Understand contour lines and contour interval
- Recognize that contour lines on topographic maps represent the shapes of landscape features

Setting: Classroom

Timeframe: Two 50-minute, or one 90-minute period

Visualizing Topography—50 minutes

Topo Map Scavenger Hunt—50 minutes

Materials:

Visualizing Topography

- Adobe Acrobat program capability
- Computer projector or student computers

USGS science for a changing world

NATIONAL PARK SERVICE

Living with a Volcano in Your Backyard–An Educator's Guide with Emphasis on Mount Rainier

Prepared in collaboration with the National Park Service

U.S. Department of the Interior
U.S. Geological Survey

General Information Product 19

Overview

Students explore how lines on a topographic map represent the real landscape by comparing features on photographs and topographic maps. Later, students analyze and answer questions about a Mount Rainier National Park map.

- Copies of "*Visualizing Topography*" student pages
- Adobe Acrobat file "*Visualizing Topography Show*"

Topo Map Scavenger Hunt

- Topographic maps entitled "Mt. Rainier National Park, Wash." for each student group.
- Copy of *"Topographic Map Symbols"* for each student group or displayed overhead
- Copies of "*Topo Map Scavenger Hunt*" student page
- Rulers
- String
- Either the USGS pamphlet on map symbols or the Web site.

Vocabulary: Benchmark, contour interval, contour line, elevation, map scale, topographic map, topography

Skills: Measuring, inferring

Activity last modified: November 22, 2014

Benchmarks:

See benchmarks in Introduction.

Teacher Background

Map scale

Every map has a map scale that identifies the number of units of length in the real world that are represented by one unit of length on the map. A scale of 1:1 would be the same size as the real feature. The smaller the scale (in other words, the bigger the second number) the more area you can show on a map, although in less detail. The map entitled "Mt. Rainier National Park, Wash.," has a scale of 1:50,000, meaning one inch on this map translates to 50,000 inches on the ground, or less than one mile. If you measure one centimeter on the same map, it equals 50,000 centimeters on the ground, and if you measure one foot on the map it equals 50,000 feet on the ground. You can find distance on the bar scale at the bottom of a topographic map. Marked points of precisely measured elevation, called benchmarks, are shown on topographic maps as "BM," followed by the elevation in feet.

Contour review

A ***contour line*** is defined as a line of equal ***elevation*** on the map. If you were to walk on a contour line painted on the ground around the side of a hill you would neither go up nor down, but remain level throughout. The difference between contours, known as the ***contour interval***, is selected by the mapmaker. For any given topographic map, the contour interval remains the same. On topographic maps, every fifth contour line, regardless of map scale, is shown in bold, and has an elevation value of even hundreds. See more information about contour lines in the activity **Play-Dough Topo**.

This activity is divided into two parts; both enable students to analyze topographic maps. In *"**Visualizing Topography**,"* students work in small groups at a computer to examine and compare a topographic map with corresponding photographs of landforms at Mount Rainier National Park. An arrow on each topographic map indicates the direction from which the photograph was taken. This activity helps students to visualize what is represented on a topographic map and to recognize the value of map scale. The second part, *"**Topo Map Scavenger Hunt**,"* provides a series of questions about the topographic map that students will answer in groups. The questions point out some features common to all topographic maps. Students will also examine map scale and map symbols using some simple math questions. Understanding how to read maps will then help students prepare for planning their trip to the park.

This lesson can follow Play-Dough Topo, as it elaborates the subject of topographic maps, using contour lines to illustrate the variations in shape of the landforms. The questions have been selected to emphasize features common to all topographic maps. This activity will provide students with a good introduction to the value of topographic maps, and will help to prepare them for visits to Mount Rainier National Park. We recommend that the teacher show the photos and maps in the Acrobat presentation provided. This may take some setup time prior to each class. Information about map explanations can be found at the Topographic maps Web pages of the USGS Web site (See Internet Resources Page).

Procedure

Visualizing Topography

Students view ***"Visualizing Topography Show"*** at computers. They compare photographs of real landform features with map features. As an alternative, display ***"Visualizing Topography Show"*** for the entire class on a computer projection system.

1. Decide whether to conduct the activity as a class, with the display of ***"Visualizing Topography Show"*** on a computer projector, or whether you will divide class into small student groups and have them work at computers. In either case, distribute paper copies of the ***"Visualizing Topography"*** student page. ***Photos and maps should be viewed on a computer screen or classroom projection system.***

2. Review topographic map concepts with students, such as how three dimensions are represented in two dimensions through the use of contour lines, and the definition of a contour interval.

3. Explain that each photograph from the topographic map corresponds to a real location on or near Mount Rainier. Each topographic map contains an arrow, which represents the photographer's location and the tip pointing in the direction the photo was taken.

4. Students should look at both pictures and then answer the questions on the ***"Visualizing Topography"*** student page.

Topo Map Scavenger Hunt

Introduce students to a topographic map of Mount Rainier with the use of a paper copy of the map entitled "Mt. Rainier National Park, Wash." map and the student page *"**Topo Map Scavenger Hunt**."*

1. Regroup students (if necessary) into groups of three or four and give each group a map, *"**Topographic Map Symbols**"* and student page entitled *"**Topo Map Scavenger Hunt**."* Distribute string or ruler for use in comparing distances on the map and scale bar.

2. Each student group can work at its own pace, or the activity can be conducted as a true scavenger hunt where the first group with all the correct answers wins. The only problem with the latter scenario is that groups thinking ahead will subdivide the tasks, so everyone will not complete every task.

Hint: Your maps will last for years if you laminate and roll them instead of folding them.

Adaptations

- For *"**Topo Map Scavenger Hunt**,"* adjust number of questions assigned, based on student needs.

Extensions

- Conduct a Mount Rainier field trip. Instruct students to take photographs and find or mark their locations on the topographic map.

- Students find or are given topographic maps of other areas that show different kinds of landforms such as plains, broad river valleys, the topography of your community, and then answer questions assigned by the teacher.

- Instruct students to make a cross section or profile of a landscape feature from a topographic map.

Assessement

Use questions on the *"**Topo Map Scavenger Hunt**"* student pages to assess students' ability to apply the concept of contours to an actual map-reading activity. Look for their grasp of map purpose and of how contours represent real landforms. Note how students' understanding of map reading has progressed from part 1 to part 2. Instruct students to make a cross section or profile or a landscape feature from a topographic map.

References

National Geographic Society, 2003, Trails Illustrated—Mount Rainier National Park, Washington: National Geographical Society, Washington D.C., scale 1:55,000 and 1:27,500, 26 x 38 in., two sides, one plate.

National Geographic, Topo! state series—Washington CD-ROMS: National Geographic Society, Washington D.C., set of 7 CD-ROMS, PC format only.

Northwest Interpretive Association, 1999, Mount Rainier National Park—centennial edition map: Northwest Interpretive Association, Seattle, Wash., scale 1:30,000, 56 x 40 in., one plate.

U.S. Geological Survey, 1971, Mt. Rainier National Park, Wash.,: U.S. Geological Survey, scale 1:50,000, one plate.

Resources

Maps and publications can be obtained at park stores and via the Internet from the Northwest Interpretive Association, National Geographic, and the U.S. Geological Survey.

Refer to **Internet Resources Page** for a list of resources available as a supplement to this activity.

Photo Credits

All slide show photographs by Mike Roylance, National Park Service.

Student Page

Name _____

Visualizing Topography

Instructions: *Observe each map and photograph pair as provided by your teacher and follow instructions for each question.* ***Note: The small photographs and maps on the student page are for reference purposes only****.*

PHOTO AND MAP 1a

1. Examine photo and map 1a, Rampart Ridge as viewed from the southeast at Longmire. Note the exposed cliff of andesite. Describe how the map contour lines illustrate a cliff.

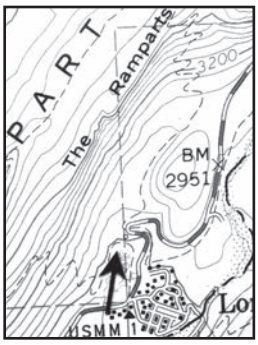
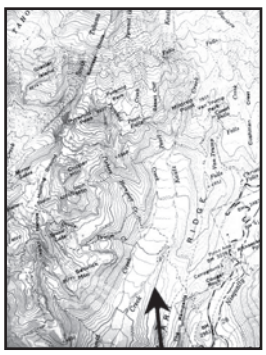


PHOTO AND MAP 1b

2. Now compare photos 1a and 1b. Observe the terrain immediately above the arrow on 1a. Describe how the north and south surface slopes of Rampart Ridge differ. Which side of Rampart Ridge would you find easier to ascend—the area shown in 1a, or 1b?



Student Page

Name _____

Visualizing Topography-continued

PHOTO AND MAP 2

3. The Nisqually River Valley, viewed in Map 2, is recently deglaciated. Photo 2 shows the view down valley from the highway bridge that crosses the Nisqually River. On the map, find the contour line immediately to the left of the arrow. In the space below, draw the contour line from the "Y" in Canyon Rim View Point to Christine Falls.

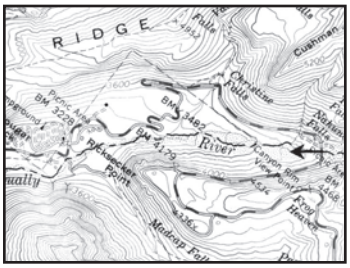
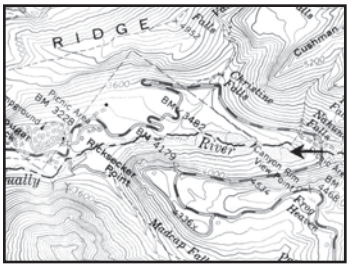


PHOTO AND MAP 2

4. Examine the cliffs near Benchmark (BM) 4179 on Map 2. Find the name of the high point on the left side of the photo and write its name below.



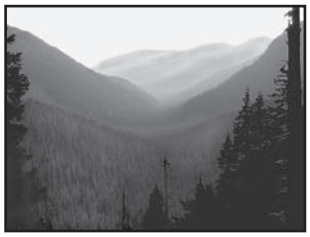
Student Page

Name _____

Visualizing Topography-continued

PHOTO AND MAP 3

5. This view is taken from the highway above Chinook Creek, looking downstream. Erosion at Chinook Creek and its tributaries has been dominated by stream activity. Draw the 3,600 foot contour where it crosses Dewey Creek.



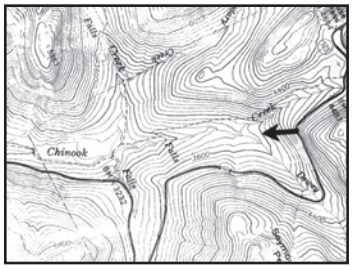
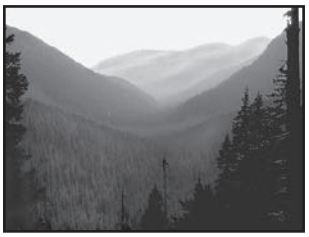
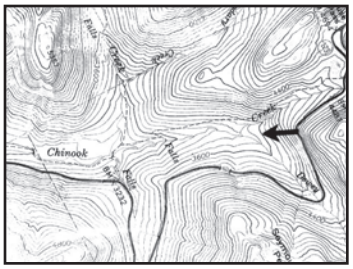


PHOTO AND MAP 3

6. Describe the difference between the shape of the contour lines across the Nisqually River and Chinook Creek. Which letters of the alphabet do each contour resemble?





Student Page

Name _____

Visualizing Topography-continued

PHOTO AND MAP 2 AND 3

7. Examine and compare Photos 2 and 3. Make some additional observations about the size and shape of the streambeds. How are the differences represented on the corresponding maps?

PHOTO AND MAP 4

8. This picture shows the Nisqually River, looking downstream from the former Sunshine Point Campground. On the map, what does the red line represent? Explain why many buildings exist left of the line and not to its right.

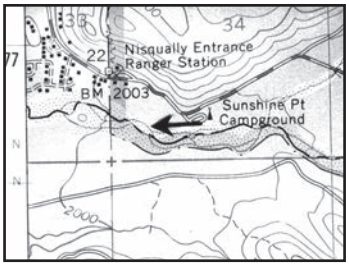


PHOTO AND MAP 5

9. List the name and elevation of the highest feature you see on the map.

Student Page

Name _____

Visualizing Topography-continued

PHOTO AND MAP 6

10. What hydrologic (water) feature exists between Pinnacle Peak and The Castle? Explain how Pinnacle Peak might have influenced formation of this feature.

PHOTO AND MAP 6

11. On the photo, examine the cliffs below Unicorn Peak. Describe what additional information the map provides that might help you climb Unicorn Peak easily and safely.

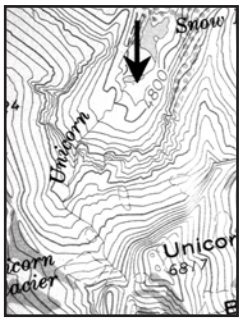
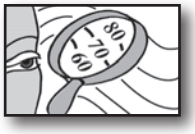


PHOTO AND MAP 7

12. Examine map 7 that shows Nisqually Glacier. Now examine photo 7. Name one difference between your perceptions of Nisqually Glacier when viewed on the photo and the map.

Teacher Page



Visualizing Topography—Answers

PHOTO AND MAP 1a

1. Examine photo and map 1a, Rampart Ridge as viewed from the southeast at Longmire. Note the exposed cliff of andesite. Describe how the map contour lines illustrate a cliff.
   Maps show cliffs through closely spaced contour lines. The more closely-spaced the contours, the steeper the cliff!

PHOTO AND MAP 1b

2. Now compare photos 1a and 1b. Observe the terrain immediately above the arrow. Describe how the south and north surface slopes of Rampart Ridge differ. Which side of Rampart Ridge would you find easier to ascend—that shown in 1a, or 1b?
Contours are closely spaced at the cliff shown on photo and map 1a. The north-facing side of Rampart Ridge seen in photo 1b, is a fairly gentle slope, compared to the cliff on the southeast side, as seen on 1a. The north-facing side would be easiest to ascend.

PHOTO AND MAP 2

3. The Nisqually River Valley, viewed in Map 2, is recently deglaciated. Photo 2 shows the view down valley from the highway bridge that crosses the Nisqually River. On the map, find the contour line immediately to the left of the arrow. In the space below, draw the contour line from the "Y" in Canyon Rim View Point to Christine Falls.
Students should draw a "shaky" U.

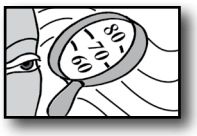
PHOTO AND MAP 2

4. Examine the cliffs near Benchmark (BM) 4179 on Map 2. Find the name of the high point on the left side of the photo and write its name below.
The cliffs in the photo will be those at Ricksecker Point.

PHOTO AND MAP 3

5. This view is taken from the highway above Chinook Creek, looking downstream. Erosion at Chinook Creek and its tributaries has been dominated by stream activity. Draw the 3,600 foot contour where it crosses Dewey Creek.
Students should draw a V.

Teacher Page



Visualizing Topography—Answers -continued

PHOTO AND MAP 3

6. Describe the difference between the shape of the contour lines across the Nisqually River and Chinook Creek. Which letters of the alphabet do each contour resemble?

The Nisqually Valley has a much broader channel than Dewey Creek and is glacially eroded and partially filled with glacial sediment; hence it has a "U" shape rather than the "V" shape.

PHOTO AND MAP 2 AND 3

7. Examine and compare Photos 2 and 3. Make some additional observations about the size and shape of the streambeds. How are the differences represented on the corresponding maps?

As above, the streambed is much broader in the Nisqually, and the maps show the same thing. The Nisqually Valley is less vegetated.

PHOTO AND MAP 4

8. This picture shows the Nisqually River, looking downstream from the former Sunshine Point Campground. On the map, what does the red line represent? Explain why many buildings exist left of the line and not to its right.

The red line indicates the park boundary. Residential buildings are allowed on private land, but not within park boundaries. The dotted stipples represent sand, mud and gravel. The river is eroding forested land upstream.

PHOTO AND MAP 5

9. List the name and elevation of the highest feature you see on the map.

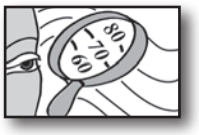
Pinnacle Peak should be described as a pyramid or horn. Pinnacle Peak; elevation 6,562 feet.

PHOTO AND MAP 6

10. What hydrologic (water) feature exists between Pinnacle Peak and The Castle? Explain how Pinnacle Peak might have influenced formation of this feature.

Snow from avalanches accumulated at the north-facing base of Pinnacle Peak. Shadows cast by Pinnacle Peak preserved the snow. The snow transformed to glacier ice.

Teacher Page



Visualizing Topography—Answers -continued

PHOTO AND MAP 6

11. On the photo, examine the cliffs below Unicorn Peak. Describe what additional information the map provides that might help you climb Unicorn Peak easily and safely.

The cliffs in view on the north side are too steep to climb. Slopes on the south side are less steep.

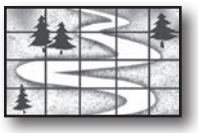
PHOTO AND MAP 7

12. Examine Map 7 that shows Nisqually Glacier. Now examine Photo 7. Name one difference between your perceptions of Nisqually Glacier when viewed on the photo and the map.

The area covered by Nisqually Glacier's surface is difficult to ascertain in the photo because the glacier is in large part rock covered. The glacier is shown in blue and within dashed lines on map. The glacier's debris cover is shown as stippled dots.

Student Page

Name _____



Topo Map Scavenger Hunt

Instructions: *Using the map provided by your teacher, answer the questions below as completely as you can. If math is involved, be sure to show your work. Credit will not be given for just the answer!*

1. Record the name, date and agency that made this map.

2. Record the map scale. Explain the meaning of map scale.

3. Record the contour interval of the map as noted in the map explanation.

4. The contour interval on a map can also be calculated by looking at the elevation numbers on the contour line. Do this by taking any two adjacent bold contour lines and finding the elevation numbers on each. Subtract the elevation numbers to find the difference and divide by the number of intervals (spaces) you would have to cross to go from one bold contour to the other (remember the last bold line that you will have to cross). Show your work.

5. Look at the edges of the map. You will notice that the contour lines end there. Does the landscape actually end at the edge of the map? Explain your answer.

6. Describe the appearance of map contour lines at a stream valley and a glacial valley.

Student Page

Name _____

Topo Map Scavenger Hunt-continued

7. Describe what the green represents on the map.

8. In the southern part of the map you will note about a dozen white angular shapes. Roads join these areas. Explain what these white angular areas represent.

9. How many kilometers (miles) would you drive from the Nisqually Entrance to Box Canyon? At the average park speed of 50 kilometers per hour (35 miles per hour), how long would it take you to travel this distance?

10. Explain why the glaciers are shown in blue. Do these contours remain the same from year to year? Explain your answer.

11. Explain the meaning of the term "BM 5,557" on the map.

12. Find the name of the highest mountain in the Tatoosh Range and record its elevation.

13. Describe how the mapmaker represents the boundary of Mount Rainier National Park.

14. What is the color of water features on the map?

Student Page

Name _____

Topo Map Scavenger Hunt-continued

15. The map displays numbered red squares. How big is each square?

16. Which glacier has the greatest length? What is its length?

17. Measure the round trip distance and vertical elevation gain of your hike to Pinnacle Peak. Assuming that a steep climb such as this would take you an average of 45 minutes per 1.6 kilometer (1 mile), what would be the duration of your hike?

Teacher Page

Topo Map Scavenger Hunt—Answers

1. Record the name, date, and agency that made the map.
Mt. Rainier National Park, Wash.; 1971; U.S. Department of Interior, U.S. Geological Survey (USGS).

2. Record the map scale. Explain the meaning of map scale.
(1:50,000); one inch (or centimeter, etc) on the map equals 50,000 inches (or centimeters) on the ground.

3. Record the contour interval of the map as noted in the map explanation.
Students should draw a "shaky" U.

4. The contour interval on a map can also be calculated by looking at the elevation numbers on the contour line. Do this by taking any two adjacent bold contour lines and finding the elevation numbers on each. Subtract the elevation numbers to find the difference and divide by the number of intervals (spaces) you would have to cross to go from one bold contour to the other (remember the last bold line that you will have to cross). Show your work below.
Example: 4000-3600 = 400 There are 5 intervals to cross, so 400/5 = 80

5. Look at the edges of the map. You will notice that the contour lines end there. Do they really just stop there? Why or why not?
No, they continue at that elevation on features shown on the adjacent map.

6. Describe the appearance of map contour lines at a stream valley and a glacial valley.
Contours in a stream valley are V-shaped at the valley bottom; contours in a glacial valley display a flattened U-shape.

7. Describe what the green represents on the map.
Vegetation

8. In the southern part of the map you will note about a dozen white angular shapes. Roads join these areas. Explain what these white angular areas represent.
These are areas that were clear cut at the time the map was made, therefore they do not have the normal vegetation pattern.

Teacher Page

Topo Map Scavenger Hunt—Answers -continued

9. How many kilometers (miles) would you drive from the Nisqually Entrance to Box Canyon,? At the average park speed of 50 kilometers per hour (35 miles per hour), how long would it take you?
Distance is approximately 23 miles. The trip would require about 40 minutes or .7 hours.

10. Explain why the glaciers are shown in blue. Do these contours remain the same from year to year? Explain your answers.
The glaciers consist of water, and thus are considered water features. No, contours do not remain the same from year to year, because the glacier's size is dependent on changeable climatic conditions.

11. Explain the meaning of the term "BM 5,557" on the map.
It tells us the elevation at that point is exactly 5,557 feet above sea level. Incidentally, BM stands for benchmark. If you go to Paradise, you can find this marker easily, since it sits on top of a foot high pole.

12. Find the name of the highest mountain in the Tatoosh Range and record its elevation.
Unicorn Peak at 6,817 feet is the tallest.

13. Describe how the mapmaker represents the boundary of Mount Rainier National Park.
By a thick red line.

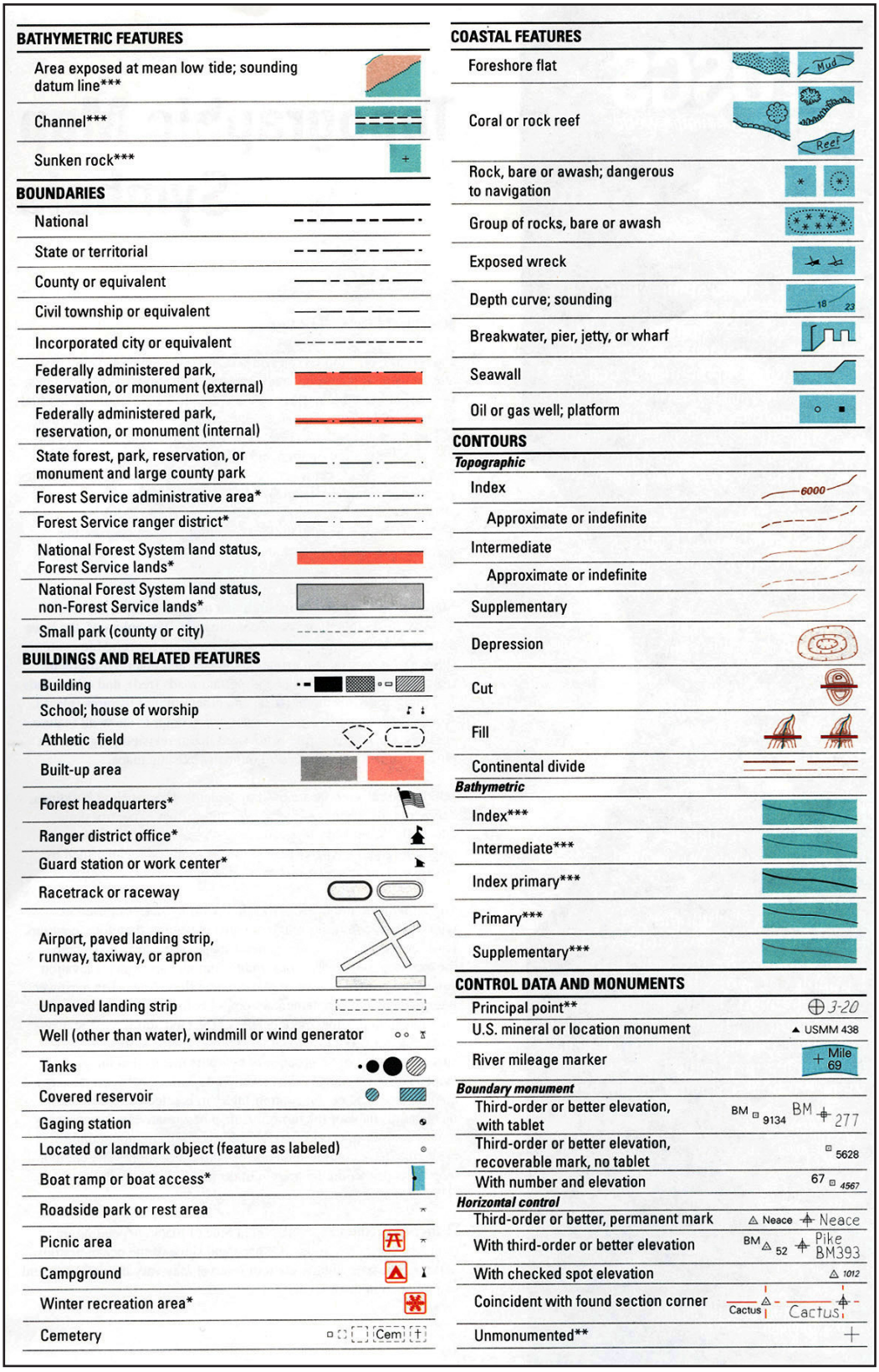
14. What is the color of water features on the map?
Blue

15. The map displays numbered red squares. How big is each square?
They are one-mile squares.

16. Which glacier has the greatest length? What is the length of it?
It seems to be a toss-up between Carbon and Winthrop Glaciers at about 5.2 miles.

17. Measure the round trip distance and vertical elevation gain of your hike to Pinnacle Peak. Assuming that a steep climb such as this would take you an average of 45 minutes per mile (1.6 kilometers), what would be the duration of your hike?
The trail is about 3 miles round trip (give credit for 2 miles, since there are a lot of switch-backs) and gains about 1,120 feet (6,000–4,880). This trail would require two and one quarter hours to hike.

Official USGS Topographic Map Symbols—Page 1



BATHYMETRIC FEATURES

- Area exposed at mean low tide; sounding datum line***
- Channel***
- Sunken rock***

BOUNDARIES

- National
- State or territorial
- County or equivalent
- Civil township or equivalent
- Incorporated city or equivalent
- Federally administered park, reservation, or monument (external)
- Federally administered park, reservation, or monument (internal)
- State forest, park, reservation, or monument and large county park
- Forest Service administrative area*
- Forest Service ranger district*
- National Forest System land status, Forest Service lands*
- National Forest System land status, non-Forest Service lands*
- Small park (county or city)

BUILDINGS AND RELATED FEATURES

- Building
- School; house of worship
- Athletic field
- Built-up area
- Forest headquarters*
- Ranger district office*
- Guard station or work center*
- Racetrack or raceway
- Airport, paved landing strip, runway, taxiway, or apron
- Unpaved landing strip
- Well (other than water), windmill or wind generator
- Tanks
- Covered reservoir
- Gaging station
- Located or landmark object (feature as labeled)
- Boat ramp or boat access*
- Roadside park or rest area
- Picnic area
- Campground
- Winter recreation area*
- Cemetery (Cem)

COASTAL FEATURES

- Foreshore flat (Mud)
- Coral or rock reef (Reef)
- Rock, bare or awash; dangerous to navigation
- Group of rocks, bare or awash
- Exposed wreck
- Depth curve; sounding (18, 23)
- Breakwater, pier, jetty, or wharf
- Seawall
- Oil or gas well; platform

CONTOURS

Topographic

- Index (6000)
- Approximate or indefinite
- Intermediate
- Approximate or indefinite
- Supplementary
- Depression
- Cut
- Fill
- Continental divide

Bathymetric

- Index***
- Intermediate***
- Index primary***
- Primary***
- Supplementary***

CONTROL DATA AND MONUMENTS

- Principal point** (3-20)
- U.S. mineral or location monument (▲ USMM 438)
- River mileage marker (+ Mile 69)

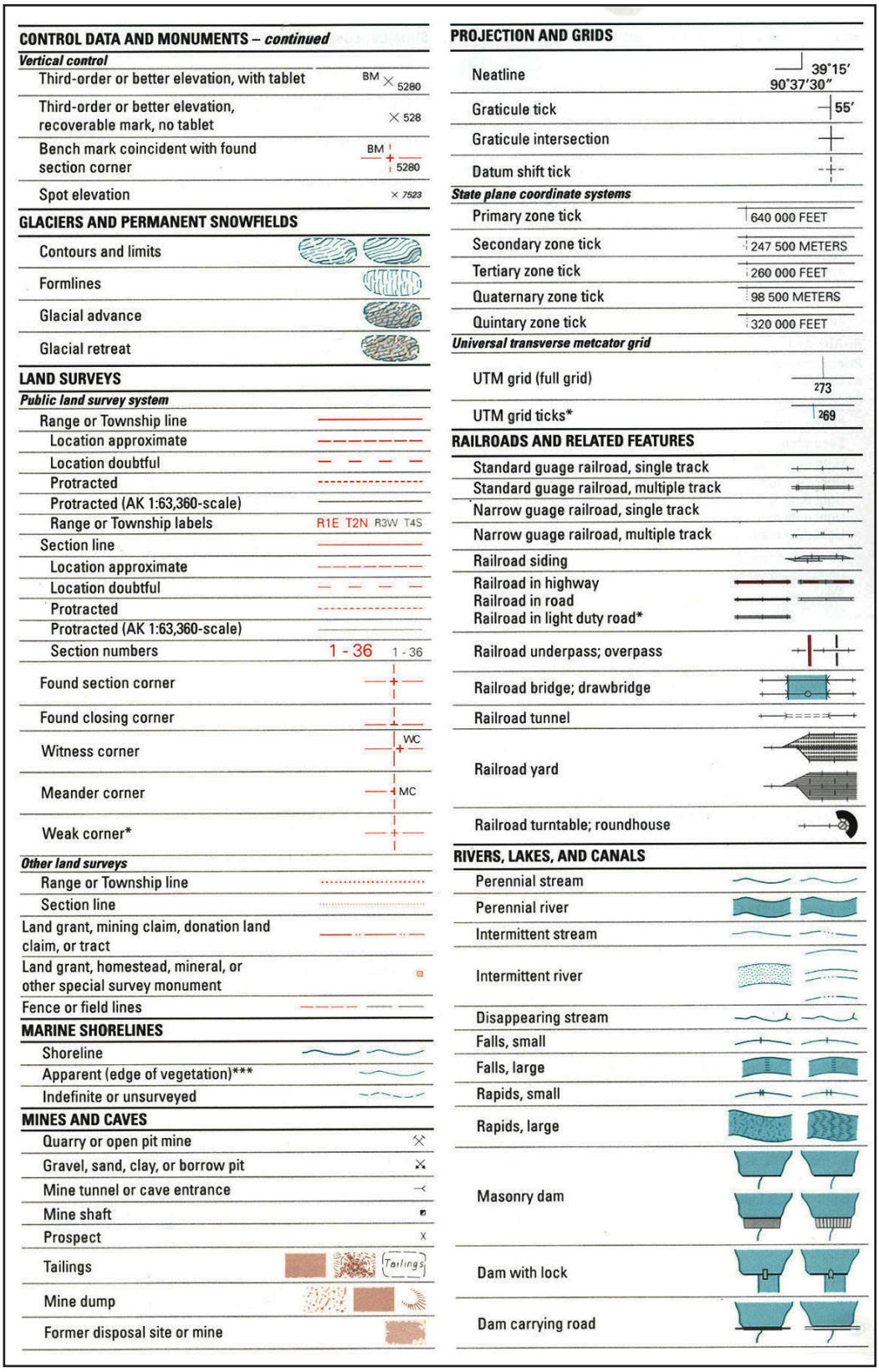
Boundary monument

- Third-order or better elevation, with tablet (BM ▫ 9134, BM ⊕ 277)
- Third-order or better elevation, recoverable mark, no tablet (▫ 5628)
- With number and elevation (67 ▫ 4567)

Horizontal control

- Third-order or better, permanent mark (△ Neace, ⊕ Neace)
- With third-order or better elevation (BM △ 52, ⊕ Pike BM393)
- With checked spot elevation (△ 1012)
- Coincident with found section corner (Cactus △ | ⊕ Cactus)
- Unmonumented**

Official USGS Topographic Map Symbols—Page 2



CONTROL DATA AND MONUMENTS – *continued*

Vertical control

- Third-order or better elevation, with tablet — BM × 5280
- Third-order or better elevation, recoverable mark, no tablet — × 528
- Bench mark coincident with found section corner — BM 5280
- Spot elevation — × 7523

GLACIERS AND PERMANENT SNOWFIELDS

- Contours and limits
- Formlines
- Glacial advance
- Glacial retreat

LAND SURVEYS

Public land survey system

- Range or Township line
  - Location approximate
  - Location doubtful
  - Protracted
  - Protracted (AK 1:63,360-scale)
  - Range or Township labels — R1E T2N R3W T4S
- Section line
  - Location approximate
  - Location doubtful
  - Protracted
  - Protracted (AK 1:63,360-scale)
  - Section numbers — 1 - 36 1 - 36
- Found section corner
- Found closing corner
- Witness corner — WC
- Meander corner — MC
- Weak corner*

Other land surveys

- Range or Township line
- Section line
- Land grant, mining claim, donation land claim, or tract
- Land grant, homestead, mineral, or other special survey monument
- Fence or field lines

MARINE SHORELINES

- Shoreline
- Apparent (edge of vegetation)***
- Indefinite or unsurveyed

MINES AND CAVES

- Quarry or open pit mine
- Gravel, sand, clay, or borrow pit
- Mine tunnel or cave entrance
- Mine shaft
- Prospect — X
- Tailings — Tailings
- Mine dump
- Former disposal site or mine

PROJECTION AND GRIDS

- Neatline — 39°15′ 90°37′30″
- Graticule tick — 55′
- Graticule intersection
- Datum shift tick

State plane coordinate systems

- Primary zone tick — 640 000 FEET
- Secondary zone tick — 247 500 METERS
- Tertiary zone tick — 260 000 FEET
- Quaternary zone tick — 98 500 METERS
- Quintary zone tick — 320 000 FEET

Universal transverse metcator grid

- UTM grid (full grid) — 273
- UTM grid ticks* — 269

RAILROADS AND RELATED FEATURES

- Standard guage railroad, single track
- Standard guage railroad, multiple track
- Narrow guage railroad, single track
- Narrow guage railroad, multiple track
- Railroad siding
- Railroad in highway
  Railroad in road
  Railroad in light duty road*
- Railroad underpass; overpass
- Railroad bridge; drawbridge
- Railroad tunnel
- Railroad yard
- Railroad turntable; roundhouse

RIVERS, LAKES, AND CANALS

- Perennial stream
- Perennial river
- Intermittent stream
- Intermittent river
- Disappearing stream
- Falls, small
- Falls, large
- Rapids, small
- Rapids, large
- Masonry dam
- Dam with lock
- Dam carrying road

Official USGS Topographic Map Symbols—Page 3

RIVERS, LAKES, AND CANALS – *continued*

- Perennial lake/pond
- Intermittent lake/pond
- Dry lake/pond
- Narrow wash
- Wide wash
- Canal, flume, or aqueduct with lock
- Elevated aqueduct, flume, or conduit
- Aqueduct tunnel
- Water well, geyser, fumarole, or mud pot
- Spring or seep

ROADS AND RELATED FEATURES

Please note: Roads on Provisional-edition maps are not classified as primary, secondary, or light duty. These roads are all classified as improved roads and are symbolized the same as light duty roads.

- Primary highway
- Secondary highway
- Light duty road
- Light duty road, paved*
- Light duty road, gravel*
- Light duty road, dirt*
- Light duty road, unspecified*
- Unimproved road
- Unimproved road*
- 4WD road
- 4WD road*
- Trail
- Highway or road with median strip
- Highway or road under construction
- Highway or road underpass; overpass
- Highway or road bridge; drawbridge
- Highway or road tunnel
- Road block, berm, or barrier*
- Gate on road*
- Trailhead*

SUBMERGED AREAS AND BOGS

- Marsh or swamp
- Submerged marsh or swamp
- Wooded marsh or swamp
- Submerged wooded marsh or swamp
- Land subject to inundation

SURFACE FEATURES

- Levee
- Sand or mud
- Disturbed surface
- Gravel beach or glacial moraine
- Tailings pond

TRANSMISSION LINES AND PIPELINES

- Power transmission line; pole; tower
- Telephone line
- Aboveground pipeline
- Underground pipeline

VEGETATION

- Woodland
- Shrubland
- Orchard
- Vineyard
- Mangrove

* USGS-USDA Forest Service Single-Edition Quadrangle maps only.
In August 1993, the U.S. Geological Survey and the U.S. Department of Agriculture's Forest Service signed an Interagency Agreement to begin a single-edition joint mapping program. This agreement established the coordination for producing and maintaining single-edition primary series topographic maps for quadrangles containing National Forest System lands. The joint mapping program eliminates duplication of effort by the agencies and results in a more frequent revision cycle for quadrangles containing National Forests. Maps are revised on the basis of jointly developed standards and contain normal features mapped by the USGS, as well as additional features required for efficient management of National Forest System lands. Single-edition maps look slightly different but meet the content, accuracy, and quality criteria of other USGS products.

** Provisional-Edition maps only.
Provisional-edition maps were established to expedite completion of the remaining large-scale topographic quadrangles of the conterminous United States. They contain essentially the same level of information as the standard series maps. This series can be easily recognized by the title "Provisional Edition" in the lower right-hand corner.

*** Topographic Bathymetric maps only.

Topographic Map Information
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