

GEOL 101c - Answer Keys for Selected Labs (not in lab manual)

MAPS LAB - Answer Key

- 1 USGS, 1957 (or 1961), revised 1990 & 1994
2 Olalla / Vashon / Des Moines / Gig Harbor / Poverty Bay / Steilacoom / Tacoma South / Puyallup
3,4 Latitude: 47° 15' 00" N to 47° 22' 30" N // Longitude: 122° 22' 30" W to 122° 30' 00" W
5 International Date Line, because 122° W is closer to 180° than to 0°
6 Because it covers both 7.5' latitude and 7.5' longitude (area is 7.5' x 7.5')
7 East / 19.5° / Hiking or navigation, so you don't get lost (compass points to magnetic N but maps are oriented with geographic N at top)
8 Kilometers, meters, miles, feet
9,10,11 24,000 in / 2,000 ft // 0.38 mi / 240 m / 0.24 km // 20 ft
12 ~47° 16' N, ~122° 29' W, ~360 ft // ~47° 18' N, ~122° 24' W, ~540 ft // (*answers vary*)
12(*typo*) 140 ft
13 ~5 mi / ~460 ft / ~0.38 mi / ~1210 ft/mi
14 (*answers will vary*) / All are young sediments, glacial and nonglacial, natural and human-made
15 (*answers will vary, depending on map segment*)
16,17,18 (*answers will vary*)

QUAKES LAB - Answer Key

- 1,2 NW or NNW / ~40° SW / 5 / 0 // 45° / E / 90
3 *Second* / Dotted / White / "Plus" / Dotted // *Second* / Black / White / "Circle" / White
4,5 *Up* / Reverse / Convergent // *Down* relative to FW / Normal / Divergent
6,7,8 (*sketches*) // P / slower / "more tightly linked" // (*earthquake certificate*)
9,10 7.8 sec, 4:04:30.5, 50 km // 10.0 sec, 4:04:32.7, 65 km // 11.5 sec, 4:04:34.2, 75 km (*±0.3 sec, ±3 km*)
11,12 35+/-5 km NE of Seattle // (*2 reasons; answers may vary*)
13 Magnitude same; Number decreased
14 6 quakes / ~16.6 yrs / 2/28/2001 / 2017 // (*answers may vary: there are different types of quakes here; it could happen today;...*)
14 (*geologic evidence appropriate for 1700 AD in Pacific Northwest, such as tsunami deposits and landslides of correct age, etc.*)
15 100x amplitude, 900x energy (or 1024x energy)

MASS WASTING LAB - Answer Key

- 1,2,3 (*Answers may vary - the key is WHY.*)
4,5 Red dots // Steep slopes (near the coast and river valley walls)
6 Inches / Jan-April / Late Feb - early March / Yes
7 (*2 bar graphs*) / 92.5 cm/yr / 5.5 landslides/yr
8a,b Yes / Yes - 1965, 1949 more than expected; 1971, 1969 - less than expected, etc.
8c 1965 quake (*other reasonable hypotheses OK*)
9 Large individual storms - much better correlation on that graph. WHY? One big rainstorm can overwhelm the ground, lots of drizzle can add up to a lot of rain but has more time to seep into the ground (and is dispersed over a greater period of time).
10 14° (or 22°) to 90°
11a Steepest slopes occur along the coast (and along rivers/streams)
11b Coastal erosion by waves (and/or undercutting by rivers)
12 3 classes / Steepness of slopes & type (&/or arrangement) of material (sediment) present
13 (*Lots of possibilities; list 3.*) - 1: steep; 2: layers parallel to slope; 3: rock weakened by hydrothermal activity; 4: covered in snow and ice (which melts during eruption); 5: often no/little vegetation; 6: shakes during eruption, etc.
14,15 It follows river valleys / 90-110 km // 10-12 meters / They are full of water...
16 85-105 km / G: ~35 km = 50 minutes; A: ~75 km = 1 hr 50 min (*+/- 5 km, +/-10 min*)

FLOODS LAB - Answer Key

- 1,2,3,4 (*should plot as a relatively straight line on semi-log paper; do not draw best-fit through origin*)
5,6 ~300-400 cfs and ~1200-1300 cfs // It has increased dramatically!

- 7 *(answers will vary - development, for example)*
- 8 1% probability in any given year
- 9 ~1-2 years
- 10 ~70-90%
- 11 False sense of security (similar to “earthquake recurrence interval”): It sounds like it should happen only once every 100 years, whereas it is an annual probability of 1%. Also, it can change significantly through time, as demonstrated in this exercise (due to more years of data and/or changes in development or climate): Are maps and land-use policies up to date?...