**ES202 Cyber Friday Video Assignment Due Date: Monday Feb. 29**

**Watch the Youtube video links below and answer the following review questions.**

**Video Lesson 1 - Groundwater and Surface Water Resources**

National Groundwater Association <https://www.youtube.com/watch?v=5lK_fs3p7yc> (~20 min)

1. Compare the concept of gaining and losing streams. How do each compare to groundwater conditions.
2. What are the approximate precipitation and evapotranspiration rates in a humid river basin? What about an arid river basin?
3. What are the groundwater pumping/extraction conditions that lead to significant decrease in stream discharge over time? Which climatic environments are most impacted and why?
4. Draw and label a sketch of shallow unconfined aquifer.
5. Draw and label a sketch of a deep confined aquifer.
6. What types of unconsolidated sediments form aquifer materials? What types of materials form aquicludes?
7. True or False: unconfined aquifers are important for contributing water to river channels.
8. True or False: deep confined aquifers are not important with respect to contributing water to river channels.
9. What is the surface area of a basin that is 10 mi wide and 20 mi long?
10. In arid basins, what percentage of water evaporates from river basins?
11. Show a sketch map of groundwater contours and flow of ground water in the subsurface.
12. True or False: population densities of 3000 people per square mile is low with respect to water resource extraction.
13. Describe strategies for recharging aquifers and supporting river flow in arid environments.
14. List the steps necessary for estimating the potential for ground water resources in a river basin.
15. List the strategies used to manage groundwater and surface water resources in semi-arid environments.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Video Lesson 2 – Case Study: Groundwater Drought Management in California** <https://www.youtube.com/watch?v=lsf6Y4zzUXI> (~29 minutes)

1. Discuss the temporal disconnect between water usage and precipitation patterns in Mediterranean Climates such as California and Oregon.
2. Describe the difference between granular porosity in sediments and fracture porosity in bedrock. Draw a sketch.
3. What percentage of water supplies in California is derived from groundwater basins.
4. Where the greatest volumes of groundwater contained? In mountain systems or in the valley systems? Explain your answer.
5. How do the California groundwater basins compare to that of the Willamette Valley. Similar or different?
6. List and describe the benefits of hydraulic connectivity between groundwater and surface water streams.
7. True or False: aquitard and aquifer layers are very homogeneous and continuous in the subsurface over large areas.
8. Draw a profile sketch of a water well; show all parts including geologic materials, casing, riser, screen and packing material.
9. What is the purpose of wells? What circumstances lead to cones of depression.
10. How many wells are contained in the central valley of California. What are they used for primarily
11. What geomorphic regions are commonly associated with seasonal groundwater recharge.
12. How do drought cycles affect groundwater and surface water use in California.
13. What are the predominant uses of groundwater in central California; during what months seasonally?
14. Explain and list the drawbacks of long term groundwater decline and overdraft of resources.
15. Define and describe aquifer storage recovery (ASR).
16. What conditions lead to land subsidence in groundwater basins? How much subsidence has been recorded in the central valley of California?
17. How are groundwater rights controlled in California, describe the challenges associated with the legacy of these policies.
18. What actions can be taken to manage long term groundwater resources.
19. Why are California drought-water resource issues highly relevant to Oregonians? What potential problems could occur across the western region of the U.S. if long term climate change leads to persistent drought.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Video Lesson 3 – National Geographic Glaciers on the Run** <https://www.youtube.com/watch?v=1hWp5Qaapi4> (~15 minutes)

1. What is a glacier? Define and describe.
2. What are glaciers and why are they important to humans.
3. True or False: global glaciers are growing and advancing presently.
4. True or False: when global glaciers melt, sea level rises in response.
5. List the important ecosystem services provided by glaciers around the world.
6. Defined and describe “floating ice shelves”. Where are they commonly found on planet Earth?
7. Describe the climatic changes taking place on the Antarctic Peninsula.
8. How much sea level rise is associated with collapse of the Antarctic Ice Shelf since 2002?
9. Describe the process of glacial calving. What is the relationship between climate conditions and glacial ice advance vs. retreat.