

Students should be able to:

1. Describe the process of the hydrologic cycle including evaporation, condensation, precipitation, transpiration, and aquifer recharge. (Earth Sciences - Energy in the Earth System 5.a and Biochemical Cycles 7.a,b,c; Biology/Life Sciences - Ecology 6.d)
2. Describe water in its three states of matter, the structure of the water molecule and relate it to the ability of water to dissolve substances, cohesion characteristics, and capillary action. (Biology/Life Sciences - Ecology 6.e; Earth Sciences - Biochemical Cycles 7.a,b,c,d)
3. Understand and be able to discuss the various processes of contamination of well water and aquifers of the United States and California. (Chemistry - Acids and Bases 5.d)
4. Describe proper well construction practices. Know what well head protection is and what constitutes a wellhead protection program. (Earth Sciences - California Geology 9.a,b,c)
5. Discuss the Federal Clean Water Act, its importance and how drinking water is monitored under the Safe Drinking Water Act. (Biology/Life Sciences - Ecology 6.b)
6. Know and discuss the Federal and State agencies that provide oversight of water resources.
7. Define "use" as it applies to Water Quality Standards and special water resource classifications and how they relate to the level of planning required for resource protection.
8. Discuss coliform bacteria and explain why they are used as indicator organisms in drinking water or recreational water that might be ingested. (Biology/Life Sciences - Ecology 6.b,e)
9. Discuss what causes lead contamination in drinking water and what can be done to decrease it. (Investigation and Experimentation 1.a)
10. Discuss potential agricultural and urban impacts upon reservoirs, streams, rivers, lakes, and groundwater. (Investigation and Experimentation 1.a)
11. Describe how aquatic life (fish, insects, and plants) can be used to determine the water quality condition of a water body. (Biology/Life Sciences - Ecology 6.b,c)
12. Understand the ecology of wetlands such as marshes, bays, estuaries, lagoons, etc. (Biology/Life Sciences - Ecology 6.a,b,c,d,e,f,g,h)
13. Discuss the major viral, bacterial, and protozoal pollutants of water bodies, such as, chryptosporidium, giardia, etc. (Biology/Life Sciences - Ecology 6.a,b,c,d,e,f,g,h)
14. Understand the processes of primary, secondary, and tertiary water treatment plants. (Chemistry - Solutions 6.f and Reaction Rates 8.b)
15. Know and understand the National Environmental Policy Act of 1969, that defines the role of environmental impact or assessment statements, and reports (Environmental Impact Statement and Report or Environmental Analysis) as they relate to national water resources. (Investigation and Experimentation 1.m)

Bibliography/Web Sites

Field Techniques

- [An illustrated guide to field techniques](#)
[Environmental Statutes and Regulations](#)

Federal Clean Water Act

[Clean Water Act History](#)

[Introduction to the Clean Water Act](#)

[Definition of Terms used in the Clean Water Act](#)

[National Water Quality Inventory Report to Congress \(305\(b\) report\)](#)

Water Quality Standards

[Non-point Source Controls and Water Quality Standards](#)

[California State Water Resources Control Board Water Quality - Plans and Policies](#)

[California State Water Resources Control Board Water Quality - Water Quality](#)

[Water Quality and Implementation Standards](#)

[State of California Antidegradation Policy](#)

[National Guidance-Water Quality Standards for Wetlands](#)

[Water Quality Standards and Livestock](#)

[Biological Indicators of Watershed Health](#)

[Beneficial Uses](#)
[Benthic Macroinvertebrates](#)
[Amphibian Declines](#)

[Contaminants - California Amphibian Declines](#)
[How Land Use Affects Amphibians](#)

[Best Management Practices](#)
[Urban Stormwater Best Management Practices](#)
[Fact Sheet #4 - Control of Storm Water Runoff with Trees](#)
[Riparian Forest Buffers](#)
[Riparian Buffers in Forest Management: Establishment, Effectiveness and Recommendations](#)
[Wastewater Management USGS](#)
[Model Vegetative Buffer Ordinance](#)
[Developing Successful Runoff Control Programs for Urban Areas](#)
[Managing Urban Runoff - Non Point Source Pollution](#)

[Groundwater](#)
[Ground Water and Surface Water A Single Resource](#)
[Ground Water and Surface Water Interaction](#)
[Effects of Human Activities on Ground and Surface Water](#)
[Aquifers of the United States](#)
[Ground Water Atlas of the United States](#)
[Ground Water Atlas of the United States - California and Nevada](#)

[Drinking Water and Wells](#)
[Safe Drinking Water Act](#)
[EPA-Ground Water and Drinking Water](#)
[Pocket Guide to Protecting Your Drinking Water](#)
[Drinking Water Water Testing Advice for home buyers home owners home inspectors](#)
[Reducing Contamination by Improving Wellhead Management and Conditions](#)
[Wellhead Protection for Safe Drinking Water in Indiana](#)
[Wellhead Protection](#)
[Ground Water Contamination from Drinking Water Well Condition](#)

[Containments](#)
[Lead in Drinking Water](#)
[Is there led in my drinking water?](#)
[Consumer facts on Nitrates and Nitrites](#)
[Water Testing Giardia and Giardiasis in Drinking Water, Groundwater, Springs and Surface Water](#)
[Cryptosporidium Oocysts - Waterborne Pathogen](#)
[Fecal Coliform Bacteria Water Quality Information](#)
[Coliform Bacteria](#)
[Sources of Coliform Bacteria](#)
[Total Fecal Coliform Bacteria Testing](#)
[MTBE in Drinking Water](#)
[Nonindigenous Aquatic Species](#)

[Urban influence](#)
[Urban Climate Studies](#)
[Land Surface Temperature Retrievals](#)
[Learning From the past - Removal of Mayan Forests](#)
[Water Treatment Plants - Primary, Secondary, and Tertiary](#)
[Wastewater Treatment](#)

[Restoration](#)
[Protecting and Restoring Americas Watersheds - Status, Trends, and Initiatives in Watershed Management](#)

Stream Corridor Restoration

Wetlands

California Wetlands Information System

Wetland and Vernal Pool Issues

Water Resource Quality and Surrounding Land Use

Surrounding Land, Soil, and Geology for Water Resource Quality

Riparian Buffers on Agricultural Land

Water Quality and Land Use Patterns

Urbanization, Humans, and the Environment

Land Use Impacts on Water Quality

Rapid population Growth-A Threat to Land and Food Production

Aquatics, Hydrology and Hydrologic Processes

Stream Corridor Processes, Characteristics, and Function

Hydrologic Processes

Importance of Water Vapor Measurements

Precipitable Water

The Water Molecule

Water and Ice

Field Techniques

- An illustrated guide to field techniques

Environmental Statutes and Regulations

Federal Clean Water Act

Clean Water Act History

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Wastewater Management USGS

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Ground Water Atlas of the United States - California and Nevada