

2025 Kentucky Envirothon

Aquatics Learning Objectives

1. Define the processes and phases for each part of the hydrologic (water) cycle, including groundwater, and describe the function of watersheds in the hydrologic cycle.
2. Assess the effects of competing uses on water resources such as reservoirs and aquifers.
3. Know the [meaning of water conservation](#), understand why it is important to think about saving water every time you turn on the faucet, and [list several ways everyone can help conserve water](#).
4. Explain how climate change may affect the hydrologic cycle and water resources.
(see <https://www.usgs.gov/special-topics/water-science-school/science/water-cycle> and <https://www.epa.gov/watershedacademy/understanding-climate-change-impacts-water-resources>).
5. Compare the effects of increased temperature, longer summer droughts, and more extreme rain events on Kentucky's waterways.
(see <https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-ky.pdf>).
6. Identify common native, invasive, threatened, and endangered riparian species in Kentucky.
7. Identify aquatic macroinvertebrates, and fishes, by their common names. See the following websites for helpful guidance:
 - a. <https://stroudcenter.org/macros/>
 - b. <https://www.macroinvertebrates.org/>
 - c. <https://dnr.maryland.gov/education/Documents/Aquatic%20Insect%20Ecology.pdf>
 - d. [https://fw.ky.gov/Fish/Documents/kyfishid\[1\].pdf](https://fw.ky.gov/Fish/Documents/kyfishid[1].pdf)
8. Describe the role that freshwater mussels play in their environment and identify some of the positive impacts of reestablishing mussel populations in Kentucky.
9. Currently, how many mussel species are native to Kentucky? How many are considered threatened and endangered (T&E)? (<https://fw.ky.gov/Wildlife/Pages/Freshwater-Mussels-and-Aquatic-Snails.aspx>) Identify T&E mussel species by their common names. See the following websites for helpful guidance:
 - a. <https://app.fw.ky.gov/kyswap/search?cat=mussels>
 - b. [mussel fieldguide.pdf](#)
10. Use results of biological water quality monitoring [to assess stream health](#).
11. Know the criteria for defining a wetland and the different types of wetlands. See the following websites for helpful guidance:
 - a. <https://www.epa.gov/wetlands/what-wetland>
 - b. <https://eec.ky.gov/Environmental-Protection/Water/Protection/Pages/Wetlands.aspx>
 - c. <https://www.nawm.org/>
12. Interpret biological and chemical water quality test parameters, consider causes of unhealthy waters, and [identify potential solutions](#).
13. Understand the interdependence of all organisms, including being able to define and create food webs, trophic levels, and impacts of population changes.
14. Identify stream orders and watershed boundaries (see <https://wikiwatershed.org/model/>).
15. Describe the features of a [healthy watershed](#) and an unhealthy watershed.
16. Analyze the effects of [increased impervious surfaces and various land uses](#) on watershed health.
17. Locate [the seven major river basins in Kentucky](#) and identify [major rivers that flow into the Mississippi-Missouri drainage basin](#).
18. Identify local and global sources of point and nonpoint source pollution.

19. Specify best management practices for protecting water health from common sources of nonpoint source pollution.
20. Know what [hypoxia](https://www.epa.gov/ms-htf) means, the causes of hypoxia, and how it is currently affecting the Gulf of Mexico (see <https://www.epa.gov/ms-htf>).
21. Understand what [Per and Polyfluoroalkyl Substances \(PFAS\)](#) are and where the “forever chemicals” can be found.

Additional Resources:

[Envirothon Resources - YouTube](#)



<http://www.youtube.com/@StroudCenter>