

# Lesson One: RIVER BASINS

*This lesson provides students with an opportunity to examine their local river basin and develop basic mapping skills. By studying a specific type of land form, students will gain an appreciation of how water connects them to other places.*

## Part I. LESSON OVERVIEW

### A. Learning Objectives

Upon completion of this lesson students will be able to:

- Interpret different types of maps.
- Describe the river basin where they live.
- Apply basic mapping skills to create a local map..

### B. Correlation to State and National Standards and Guidelines

- [See chart](#)

### C. Textbook Compatibility

- [See chart](#)

### D. Materials

- Eyedroppers-1 per group
- State map of river basins (laminated)-1 per group
- Relief map of the US-1 per group
- Relief maps specific to region-1 per group
- Student journals

### E. Advance Preparation

On each relief map specific to your region, you may wish to mark the location of the schools where you teach with a permanent marker.

### F. Key Vocabulary

**(Insert river name) RIVER BASIN**      The land surrounding the (insert river name). Any precipitation (rain, snow, sleet) that falls on this land will flow

to the (insert river name).

**RIVER BASIN**

The land that water flows across on its way to a river.

**G. References**

North Carolina Office of Environmental Education. *Discover North Carolina's River Basins.*

North Carolina Office of Environmental Education. *What is Your Ecological Address?*

**PHASE II: LEARNING CYCLE APPLICATION**

**Phase One: Exploration (E)**

1. Introduce the lesson. Allow the students to share what they already know about maps.
2. Discuss relief maps and how they are unique.
3. Ask the students how they are able to identify cities, roads, and water on maps.
4. Explain the exploration activity to the class.

*The class will be divided into four groups. In groups, you will explore three different maps. The first map is a relief map of the US. As a group, find where you live on this map and record your observations in your journals. The second map you will look at is a map of your state's river basins. As a group, you will identify where you live on this map. Again, you will record your observations in your journals. Finally, your group will look at another relief map. This is a very special map. Of the three maps that you will look at today, it has the most detail. On this map, find where your school is located. Remember to be careful with the maps and do not lean or mark on them.*

5. Pass out a US relief map to each group. If necessary, remind the students to find where they live on this map and record relevant information in their journals.
6. Pass out the state river basin maps to each group. If necessary, remind the students to find where they live on the map, identify the river basin they live in, and finally answer record relevant information in their journals.
7. Finally, pass out the relief maps specific to the region. If necessary, remind students to find their school on the map and answer the relevant questions in their journals.
8. Still in their groups, ask the students to close their eyes and pretend that they are a drop of water. Read the following guided imagery:

*You are a drop of water. You are swirling in a cloud high above the Earth. You are being surrounded by more and more, and then more drops of water. Finally, the cloud that you are part of can hold no more water. The droplets of water begin to fall. You see the Earth below you. (Facilitator can add to the imagery to make it regionally*

*relevant. Describe the landforms, flora and fauna of your area.) Suddenly you land on the roof of (insert name of school). Splash! You begin to roll down the roof, until you fall into the gutter. You and the rest of raindrops that have landed on the roof continue to slide down to the ground. Once on the ground you begin to flow down, down. Now you are flowing over the soil, through the grass, over the roots of trees, then across a road and under a car. Finally you flow into a stream. You and the many other drops of water around you begin to flow down the stream together. You flow over fallen logs, over rocks, faster. You begin to flow faster. The stream is moving faster and faster. You flow alongside fish and insects. The stream connects with other stream and this stream with another. Some streams flow down the mountainsides, other flow past houses and factories and next to roads. Other streams flow past farms. (Facilitator should add relevant human-made structure such as housing developments, roads, or factories specific to your locality). Up ahead you can see a mighty river. Humans call this river the (insert river name). Splash! You merge with the (insert river name) River and begin floating...*

7. Tell the students that they may open their eyes. They should describe what they saw and experienced on their journey from their school to the roof of their school to their merging with the River in the space provided in their journals.
8. Ask the students to return to their seats. Instruct the groups to place five droplets of water on the map where their school is located with the eyedropper. Keeping in mind the guided imagery, the students are to trace the water's path to the river.

## Phase Two: Concept Introduction (CI)

1. Discuss the exploration activity with the class. Begin by reviewing the observations and responses the students recorded in their journals.
2. Define **river basin**. A river basin is all the land that water flows across on its way to a river.
3. In this area, we live in the **(insert name of local river basin)** The (insert name) River Basin is the area of land that water flows across on its way to the (insert name) River Basin.
4. Ask the students if any of them have spent time on, near, or even in the (insert name) River. Allow the students to share their experiences.
5. Using the state river basin map as a visual discuss how our river basin connects us to other places. Discuss how separate cities and states are different and distinct in many ways, but also the same because they are connected by water. You may also wish to discuss how humans have borders and boundaries around their cities and states. The natural world also creates borders and boundaries. These borders and boundaries connect us to different places in ways that we may have never thought about before.
6. Explain to the students that they will be practicing their mapping skills.

*In your journals, you will map connectedness through water in our region. You need to label the (insert local river) and the flow of the (insert local river). Use arrows to show the direction of flow. You will also color the different parts of the map and create a key for your map.*

7. Instruct students to open their journals to the appropriate page and begin the mapping exercise.
8. Circulate through the classroom to answer question or help guide the reflection activity if necessary.

## Optional Outdoor Activity

If time and weather permit, you may wish to take the class on a short natural history walk in their school yard. Have students observe the features, natural and human-made, that influence water or are influenced by water. Students may create maps of their school-yard or expand their writings about the path that water takes from their school to the River central to your river basin.

## Phase Three: Concept Application (CA)

*EcoTeam Application Lesson* and *Roots & Shoots Service-Learning Project*, please see corresponding sections of website.

# PART III. BACKGROUND INFORMATION FOR FACILITATOR

## A. General

*Watersheds* are areas of land in which all water, *dissolved materials*, and *sediments* drain from the land into a common body of water, such as a lake, river or an ocean. Watersheds include water and the surrounding land from which the water drains and guides all precipitation and runoff into a specific river system. They vary in size from as large as the Mississippi River to as small as a puddle. A *river basin* is a large scale watershed in which all water flows into a single major river. There are many smaller watersheds within a river basin.

The characteristics of a river basin largely determine how water flows through the river basin. In areas where the terrain is steep, streams flow rapidly. In flatter areas, streams tend to be more spread out and flow more slowly. Changes in grade create different habitats that determine *biodiversity*. Stream response to rainfall events may also vary in different river basins, some being more prone to flooding than others. Lower relief river basins tend to have slower moving, less oxygenated water, and often lower biodiversity.

In North Carolina, there are seventeen river basins. In Buncombe County, we specifically live in the *French Broad river basin*. Fast moving streams in the mountains of Western North Carolina tend to be cool and well aerated, giving oxygen rich conditions for trout and many other aquatic animals.

To learn more about your river basin:

- Contact your department of energy and natural resources or your local soil and water conservation district.

## B. Humans & River Basins

An understanding of one's local river basin is important for the human communities living there. Location and availability of drinking water, flooding potential, outdoor recreational opportunities, sewer system design, and sustainable development alternatives are all dependent on local watershed and river basin conditions.

People sometimes drastically alter their river basin. Dams create impoundments of water, draining wetlands removes important habitats. Channelizing streams seriously alters ecological characteristics. Clearing land at the edge of streams increases erosion and the potential for flooding, and impermeable surfaces increase runoff. In mountainous terrain, agricultural fields, construction, and roads are often prone to serious erosion.

### C. Environmental Citizenship

River basins are connected to other river basins. One of the most important lessons we can learn from studying river basins is that any impact in one area will effect areas downstream. Everyone lives within a river basin. Communities within river basins are intimately linked even when they are miles apart. Even if we don't live near water, we live on land where water drains to a lake or river, and eventually to an estuary or ocean. Our actions on the land within our river basin affect water quality and quantity far downstream.

The river basin we live in is part of our *ecological address*. An ecological address describes our place in the natural world. According to the North Carolina Office of Environmental Education, an ecological address is made up of eight components: (1) river basin, (2) topography, (3) wetlands, (4) groundwater, (5) biodiversity, (6) soil, (7) air, and (8) climate.<sup>1</sup> The more we understand our ecological address, the better we understand our place in the natural world and the ecological and environmental impacts of how we live.