Ocklawaha River Backyard Science: Foil River

Project: To build a model of the Middle and Lower Ocklawaha River from Silver Springs to the St. Johns River.

Subject Areas: Geography, Map Reading, Earth Sciences, Physical Science – Motion of Fluids

Materials:

Map of the Ocklawaha River: Provided with these instructions.

River: Wide roll of Aluminum Foil,

Boats: Ice cube tray, water, toothpicks, colored paper, food coloring optional. 1 hour timer.

Sloping yard: If there is no natural slope, blankets can be used to create a slope.

Hose connected to water, or buckets of water.

Difficulty Level: **Moderate,** adult help needed for children under 12

Time: Ice cube boats need 3 hours to freeze (night before is good)

Construction of River - 1 hour

Other Variations of the Exercise: Create a sidewalk chalk, a stick or a clay river.

Construction of Boats: In a small pitcher add several drops of food coloring to 1 and ½ cups of water. Pour the colored water into a standard ice cube tray, fill the molds ¾ full. Cover the ice cube tray with clear plastic wrap and insert one toothpick through the plastic wrap into each ice cube. The toothpicks will be the masts for your boats. Carefully place the ice cube tray in the freezer to fully harden. (You may want to check your masts after one hour to make sure they are standing straight up. Adjust any toothpicks that are leaning over.)

Cut sails out of paper, glossy paper from magazines being recycled or junk mail stand up well to the water, but any paper will do. Sails can be squares or triangles, but only about one inch, to fit on the toothpicks.

Once hard, pop your ice cubes out of the tray and poke the toothpick through your sail. Keep your boats in the freezer until your river is constructed.

Construct the river:

First, study the Map of the Ocklawaha River included with this material. The Ocklawaha River has 3 sections or reaches. The first reach is not shown on this map but starts in the Ocklawaha Chain of Lakes near Orlando and goes north to where the Silver River flows into the Ocklawaha River near Silver Springs. This first reach is called the Upper Reach because it has the highest elevation. The second and third reaches are shown on the Map. In the bottom left corner of the map you will see Silver Springs. The water from Silver Springs flows into the Ocklawaha in the Silver River. The Silver River is a tributary of the Ocklawaha River. Where Silver River meets the Ocklawaha is the beginning of the second reach or middle reach of the Ocklawaha. Eureka is the end of the middle reach. The third and last reach flows from Eureka to the St. Johns River. This is the lower reach of the Ocklawaha River, as it has the lowest elevation. The Ocklawaha River is a tributary of the St. Johns River. Remember, water always flows downhill, from the upper reaches to the lower reaches. In its lower reach, the St. Johns River flows into the Atlantic Ocean at Jacksonville.

Our project is to construct the Middle and Lower Reaches of the Ocklawaha River. Look at the map to see the shape of the river in those reaches. It is sort of a lop-sided S, with the Silver River and middle reach of the Ocklawaha very narrow. The river grows wider as it flows north, especially after Eureka. Look at how the river connects to the St. Johns River. It has two connections. One is the curved river strands that come out of the dam. The other is the long straight canal, called the Old Cross Florida Barge Canal.

Next, locate a gently sloping area of land for construction of the river. If you have a very flat parcel, or if your land is too steep, after you have constructed your river, you will need to prop your river up with some blankets or other material to make it a gently sloping area.

Standing on the high ground, unroll a large amount of foil. It is best to leave the foil connected to the roll in the box until you are constructing the wide part of the river at Rodman Pool, as it is difficult to join pieces of foil and keep a watertight connection.

Beginning with the loose end of the foil roll, shape the foil into a round basin leading into a narrow river channel. This will be Silver Springs, the starting point for our project. Continue molding the foil into a narrow river channel. Make it wide enough for your ice cube boats to float along, but not much wider. Your river will stay narrow until you get to Eureka (the beginning of the lower reach of the river), where it will become about twice as wide.

Curve your river in the lop-sided S shape you saw on the maps, making the river channel wider as you go past Eureka until it is very wide at the Rodman Pool. Make the river as wide as you can with your roll of foil at the Rodman Pool. Later, you will need to add extra pieces of foil along the sides of Rodman Pool to make the sides strong enough to hold the water in the pool. At the dam, fold the aluminum foil up to make a sturdy dam at the Rodman Pool. You can tear off the foil from the roll at this point. You can now tear off three foot sections of foil from the roll and crumple them to be supports for the sides of Rodman Pool. Fortify any weak sections of the river with more foil.

Now you can build the two outlets connecting to the Rodman Pool to the St. Johns River. One is the historic riverbed that appears as strands coming out from the dam. This will be a narrow riverbed about the size of the river near Silver Springs. This will curve to make the top of the S shape. The second outlet is a narrow straight canal. You can use the foil box as a mold for your straight canal. Near the top of your dam make a small indentation to allow

some water to pass over the dam into the natural river channel going to the St. Johns River. Similarly, on the edge of the Rodman Pool make a small indentation to allow some of the water to pass into the Old Cross Florida Barge Canal. You can construct a portion of the St. Johns River that these 2 outfalls flow into using more foil. Your 2 outfalls will form a Y at the end of the Ocklawaha River and will join the St Johns River in 2 places.

Once you have your curved river constructed, make sure the beginning of the river is on higher ground and the outfalls to the St. Johns River are lower. If you need to prop up the beginning part of the river, now is the time to insert blankets, or other material to make a gentle slope. Elevation is very important for rivers, as water always moves from higher elevations to lower elevations.

If your land is too steep, you may need to prop up the lower reaches of your river to be able to keep water in your riverbanks.

Take a hose, and gently flow water into your Silver Springs starting point and see if it flows down to the Rodman pool and then out the 2 outfalls. Make adjustments with more foil as needed. Once you have your river flowing well you can get your boats and set them sailing down your river to Rodman Pool.

Have fun!!!!

Recycling Water and Materials: You can catch the water flowing down your river by placing cake pans at the place where your water exits the river, and emptying them into a bucket to be used over again. Your river can provide you many days of fun. When you are done playing with it, be sure to recycle the aluminum foil.

Words to Learn: Springs; Ocklawaha River: Upper Reach of a river; Lower Reach of a river; dam; elevation; outfall; tributary.