

# Reclaimed Water and Wetlands

We just learned that water reclamation facilities clean wastewater to make something called **reclaimed water**...

## What is reclaimed water?

It is the water leftover after wastewater has been cleaned. Reclaimed water looks very clear and we can use it to water lawns and wash cars, but it is still too high in nutrients that we can't see with our eyes.

Under the "**Wastewater**" tab we learned that nutrients are good in small amounts and that plants and animals need them to grow. However, too much nutrients can make ecosystems sick.

To keep ecosystems from getting sick, the City of Orlando built the Orlando Wetlands to eat up the extra nutrients!

## What is a wetland?

A **wetland** is an area where the ground is sometimes or always full of water. It makes a great home for different water-loving plants (like those that can be seen at the bottom of this page), and they help to absorb extra nutrients from the water. All this water and all these plants make a great home for animals too!

The Orlando Wetlands is a large man-made wetland that takes in about 16 million gallons of reclaimed water everyday. It takes 30-40 days for the water to move through the wetlands where the plants work to eat up the extra nutrients. Then the water is clean enough to be released to the St. Johns River ecosystem.

Visit us at [orlando.gov/wetlands](http://orlando.gov/wetlands)!

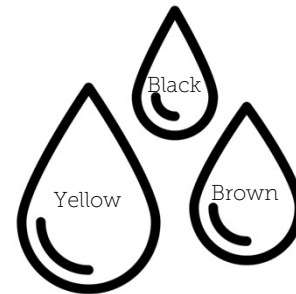


# Orlando Wetlands Pre-Visit Foldable

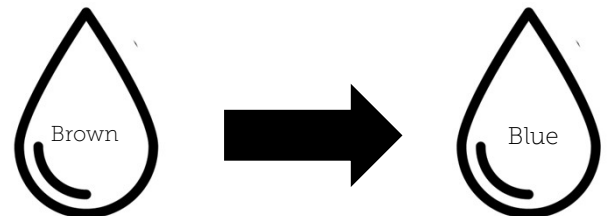
## Water Cycle Basics



## Wastewater



## Water Reclamation



### Start Here

1 Fold this paper in half long ways. The side that says "Orlando Wetlands Pre-Visit Foldable" is the front page as if it were a book.

2 Then using scissors, only cut along the dotted lines. Now you are ready to begin.

3 Open each flap one at a time, follow the instructions, color in the pictures, and learn how we keep freshwater clean!

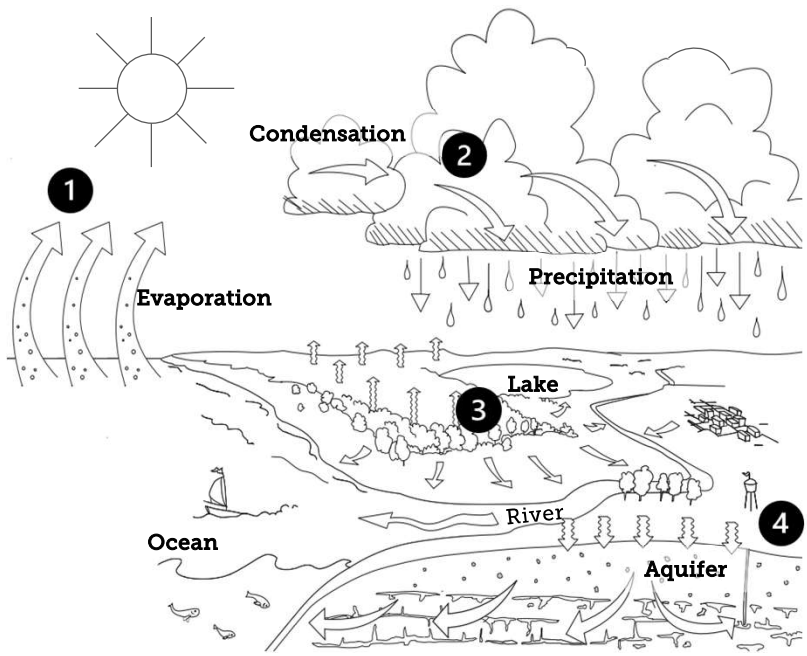
### Let's find out how water moves around Florida! Color the arrows for each step in the water cycle.

1 The sun heats water from the ocean until it changes from a liquid to a gas, and it becomes water vapor. This process is called **evaporation**.

2 Water vapor rises in the atmosphere cooling it down. The process of **condensation** turns water vapor into clouds. **Precipitation** is when the clouds become liquid water again and fall back to Earth as rain or snow.

3 After the rain hits the ground, some of it will flow across the ground's surface into rivers, lakes, or oceans, and then evaporate again.

4 Some of the rain will flow into the ground and eventually enter the aquifer. The **aquifer** is an area far underground that is made of limestone rock caves. These caves store water until it gets pumped out for people to drink.



### What happens to the water after it gets pumped out of the aquifer?

The water gets used in our homes and businesses for drinking, doing the dishes, flushing the toilet, and much more. **Draw two ways that you use water at home:**

Anytime we use clean water, and it goes down the drain, it becomes **wastewater**. This wastewater can be cleaned and recycled back into the environment without harming the ecosystem. An **ecosystem** is an area where living things like plants and animals interact with the nonliving things in their environment like water, soil, and air.

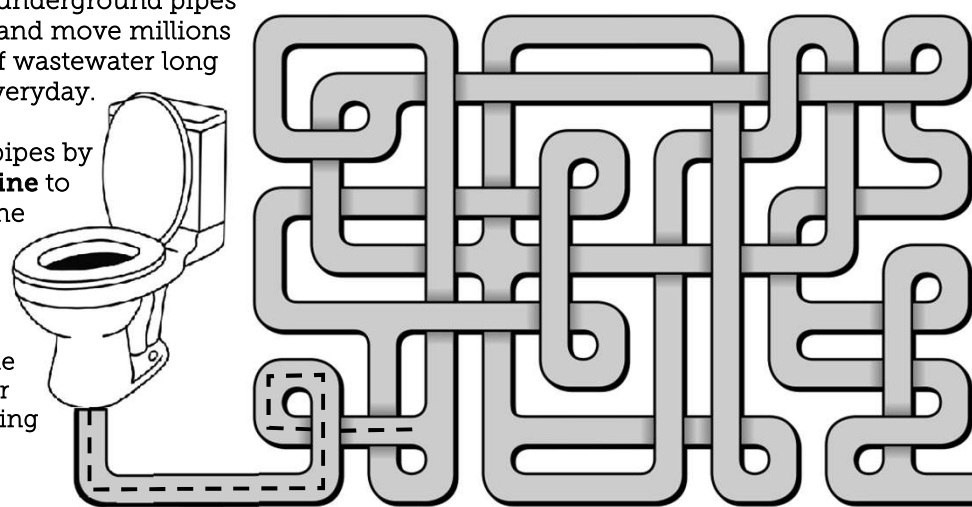
Wastewater is high in **nutrients**, which are important substances that help plants and animals grow. However, too much nutrients in the environment is a form of **pollution** and can make plants and animals sick. Therefore, we must clean and remove extra nutrients from wastewater.

### Let's find out how wastewater gets cleaned!

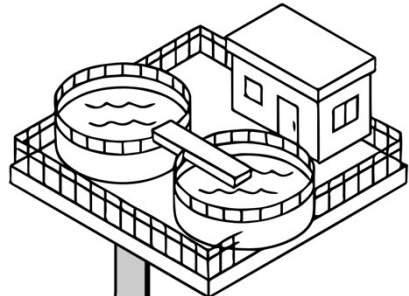
**Sewers** are underground pipes that collect and move millions of gallons of wastewater long distances everyday.

Follow the pipes by **drawing a line** to see where the wastewater goes next.

**Tip:** Your line can go under the overlapping pipes.



The wastewater reaches a **water reclamation facility** where it cleans wastewater and turns it into **reclaimed water**! Flip the page to learn more about reclaimed water...



# Orlando Wetlands Pre-Visit Foldable: Lesson Plan

**Recommended Grade Level:** 4-5

**Keywords:** water cycle, wastewater, water reclamation, wetlands, ecosystem, pollution, nutrients

**Materials:** Orlando Wetlands Pre-Visit Foldable, scissors, writing and colored pencils (at least blue, brown, black, yellow, and green).

**Estimated Duration:** 30 minutes or at your own pace. Could do a section at a time on different days.

## State Standards:

**SC.4.P.8.2** - Identify properties and common uses of water in each of its states.

**SC.4.L.17.4** - Recognize ways plants and animals, including humans, can impact the environment.

**SC.5.E.7.1** - Create a model to explain the parts of the water cycle. Water can be a gas, a liquid, or a solid and can go back and forth from one state to another.

**SC.5.E.7.2** - Recognize that the ocean is an integral part of the water cycle and is connected to all of Earth's water reservoirs via evaporation and precipitation processes.

**See next page for key vocabulary and definitions.**

## Objective:

Students will be able to:

- Understand the basic stages of the water cycle including the Floridan aquifer.
- Identify sources of wastewater and what happens to it after we are done with it.
- Understand that humans use and produce wastewater everyday and that it can be harmful to the environment if that water is not cleaned.

## Background:

The Orlando Wetlands is a man-made wetland designed to provide advanced treatment for reclaimed water from the City of Orlando and other local cities. The facility is 1650 acres in size and located in Christmas, Florida. This Pre-Visit Foldable aims to get students introduced to some of the key vocabulary and systems that help the Orlando Wetlands operate.

## Preparation:

1. Gather and distribute all materials.
2. Give each student one foldable, or students can form small groups of 2 to collaborate.
3. Decide whether the activity will be done as a class or independently.

## Procedure:

Modify this procedure to meet the needs of your class. If completing as a group, guide students through the folding and cutting steps and elaborate on each topic as it relates to other lessons the students are learning in class. If completing individually, students can follow the directions on the foldable to complete the activity themselves.

1. Print pages 1 and 2 double-sided. Flip on long edge.
2. Fold the paper in half long ways. The side that says "Orlando Wetlands Pre-Visit Foldable" is the front page as if it were a book.
3. Then using scissors, only cut along the dotted lines. These will be the flaps the students will use to view each topic.
4. Open each flap one at a time; each section provides basic instructions.

**5. Water Cycle Basics:** Students should color the arrows after reading through each step in this simplified Florida focused water cycle. We want students to understand that water does not get destroyed, it is constantly changing what state it is in, and that people get their water from the environment.

# Orlando Wetlands Pre-Visit Foldable: Lesson Plan

## Vocabulary:

(Expand or simplify definitions based on your students needs.)

**evaporation:** the sun heats water from the ocean until it changes from a liquid to a gas, and it becomes water vapor.

**condensation:** cool air in the atmosphere turns water vapor into clouds or water droplets.

**precipitation:** the clouds become liquid water again and fall back to Earth as rain or snow.

**aquifer:** is an area far underground that is made of limestone rock caves. These caves store water until it gets pumped out for people to drink

**wastewater:** water that has been made dirty often related to washing during everyday chores.

**ecosystem:** an area where living things like plants and animals interact with the nonliving things in their environment like water, soil, and air.

**nutrients:** important substances that help plants and animals grow but that can be harmful in high quantities.

**pollution:** usually something that is out of place like trash or chemicals that can make plants and animals sick.

**sewer:** underground pipes that transport wastewater.

**water reclamation facility:** the place where wastewater gets cleaned and turned into reclaimed water

**reclaimed water:** wastewater that was cleaned and treated and is now clear and ready for reuse but still contains high levels of nutrients.

**wetland:** an area where the ground is sometimes or always full of water; often home to special organisms and soil types.

6. **Wastewater:** Start with the section on the left allowing students time to draw two ways that they use water at home. Some examples could include washing their hands, taking a shower, doing laundry, brushing their teeth, etc. Then read through the right side and help to explain the definitions of the keywords wastewater, ecosystem, nutrients, and pollution especially as these may be new words for many students.

We want students to build on the fact that people get water from the environment and that the activities we do everyday to keep ourselves clean makes the water dirty. Even though these activities make the water dirty, it is still a valuable resource that is worth cleaning to keep the environment clean.

7. **Water Reclamation:** Students will complete a sewer pipe themed maze to show that dirty wastewater must travel underground in sewer pipes to reach the water reclamation facility to get cleaned. There, the water is turned into reclaimed water which is still high in nutrients. **Background info:** the Water Reclamation Division for the City of Orlando owns and operates the Orlando Wetlands as well as several other water reclamation facilities across Orlando. Water reclamation facilities can go by other names such as "wastewater treatment plant".

8. **Reclaimed Water and Wetlands:** Students should read through this section and learn about how reclaimed water can be used to water lawns and wash cars. Then, learn that the Orlando Wetlands was built by the City of Orlando to clean the high nutrients found in reclaimed water by using wetland plants. They can then color the image at the bottom of the page introducing them to various wetland plants and animals.

## Follow-up and Additional Material:

There are various educational opportunities for teachers and students located at the Orlando Wetlands and we are working to increase the number of educational opportunities available online as well. Please consider filling out our **exit survey** on the next page regarding this activity.

To learn more about what you can do at the Orlando Wetlands and for information on setting up a reserved tour, please see our website at: [orlando.gov/wetlands](http://orlando.gov/wetlands)

# Orlando Wetlands Pre-Visit Foldable Exit Survey

The Orlando Wetlands is in the process of making more publicly available educational resources for students and teachers. Please help us improve our materials by providing us with feedback on this activity. Responses to this survey can be emailed to **orlandowetlands@orlando.gov**. Thank you!

1. What grade level(s) do you teach?
2. Would this activity be age appropriate for your students? Why or why not?
3. Would this activity align with standards that you teach in your class? Would it support any standards that we have not already listed?
4. How long do you think this activity might take your students, and would you try to do it all in one session?
5. Would you be willing to continue working with us on improving our education materials at the Orlando Wetlands? If so, please let us know the best way to contact you so we may send you emails regarding new educational materials.

Interested

Not interested

Best contact info: