

STEP Information Handout

Northeast Ohio Regional Sewer District Orientation & Tour - September 16th, 2017

<https://www.epa.gov/careers/science-careers-epa>

<http://epa.ohio.gov/oes/home.aspx>

Summary



The **Northeast Ohio Regional Sewer District, NEORS**D was created in 1972 by the Cuyahoga County Common Pleas Court. NEORS D manages and treats wastewater and stormwater throughout the Greater Cleveland area. The Sewer District owns and operates three wastewater treatment plants: Easterly, Westerly, and Southerly. These treatment plants clean tens of billions of gallons of wastewater every year, reducing pollution and improving water quality. The Sewer District also addresses problems related to stormwater runoff from hard surfaces in our *watershed*. Runoff contributes to regional stream flooding, erosion, and water-quality issues. Let's take a closer look at how water flows throughout our community.

The Urban Water Cycle?

The Cleveland Division of Water takes water from Lake Erie and treats it before you use it for drinking, bathing, washing, and so on. The District cleans the water after you use it. After you use the water, it is considered wastewater. From the pipes in your home, wastewater travels through your local sewer system into one of our large interceptor sewers and then to one of our three treatment plants. Once we treat and clean the wastewater, it is transported back into the Cuyahoga River and Lake Erie, re-entering our water supply.

How dirty water gets clean?

It takes many steps to clean our water. **Preliminary** treatment removes large debris like cans, leaves, and rocks from the water. Neighborhood clean-ups help to keep trash from entering our sewers and creeks.

Primary treatment slows the water down to let solid waste sink to the bottom and grease float to the surface where it can be removed. Did you know that pouring grease down the drain can possibly clog pipes in your home? Fats, oils, and grease should be disposed of in the trash. During **secondary**

treatment, microorganisms eat waste that has been dissolved in the water. Microorganisms are too small to be seen with the naked eye, like bacteria, viruses, and fungi. **Disinfection** removes harmful bacteria right before the water goes back to the Cuyahoga River and Lake Erie.



Careers in Water



You can begin exploring careers in water as a high school student by applying for paid internships at the Northeast Ohio Regional Sewer District. The B-STEM (referring to Business Support, Science, Technology, Engineering, and Math) internship requires advanced placement high school courses or Associate/Bachelor degree coursework.

This internship allows you to apply knowledge to practical work in a professional setting. However, careers in water speak to only a fraction of opportunities available in STEM. There are many professions to explore including: Educators, Software Developers, Civil Engineers, Stormwater Inspection & Maintenance Operators, and Health Services Managers, to name a few. Take time to explore your interest and ask mentors for shadowing prospects.



STEP

Student Technical Enrichment Program

Name: _____

Grade: _____

Date: _____

Northeast Ohio Regional Sewer District – Open House *September 16, 2017
This homework is due on October 16th, 2017

1. In what year was the sewer district created? _____

2. What is the Sewer District's primary function? _____

3. How many treatment plants does the Sewer District operate? _____

Name them:

4. What type of problems arise from stormwater runoff?

5. In your own words, describe the Urban Water Cycle?

6. How does wastewater end up at the Sewer District?

7. In which two bodies of water is clean wastewater returned?

8. List and describe the major steps used to clean wastewater:

A. _____

B. _____

- C. _____

- D. _____

9. Is it possible to work at the Sewer District in high school? If so, paid or unpaid?

10. What are the requirements of a B-STEM internship at NEORS?

11. What can you do today to begin to learn about careers?

What is a watershed and why is stormwater management important?



A watershed is the area of land that drains into a body of water. The largest watershed in Northeast Ohio is Lake Erie. To the left is a simple illustration of a typical watershed. Rainwater and melted snow, (often called stormwater) flows downhill through the watershed to streams, rivers, and the lake, carrying any pollutants (motor oil, animal waste, fertilizers) and debris it picks up along the way. Healthy watersheds provide us with drinking water, as well as water for irrigation, industry, and recreation. Our wildlife depends on healthy watersheds for food and shelter. Everything that is done in our watershed affects the entire ecosystem. The Sewer District works to improve the

ecological footprint in our environment by managing stormwater issues. The inability to effectively deal with stormwater results in flooded homes and streets, more pollutants entering our waterways, and erosion problems. When it rains, the ground and bodies of water, (ponds and streams) take in as much stormwater as they can. But in cities,

pavement has replaced the natural green spaces that slow the pace of water runoff. Roads, parking lots, driveways, and sidewalks can't absorb water, so it moves quickly over these paved surfaces into nearby streams or storm sewers, which can become overloaded. In addition, the scouring effect of fast-moving stormwater impacts the stability of riverbanks and the fish, insects, and plants that live in area streams.

12. In your own words, describe what a watershed is:

13. How do urban environments, (cities) contribute to stormwater issues?

14. Name at least 2 benefits of a healthy watershed:

- a. _____
- b. _____

15. The loss of natural green spaces can yield detrimental outcomes in our environment. Describe at least 3 negative impacts

16. Bonus: Lake Erie has many tributaries. What watershed do you live in?



**Northeast Ohio
Regional Sewer District**

Program Sponsors:

City of Cleveland, Division of Water | 1201 Lakeside Avenue, Cleveland, Ohio 44114

Northeast Ohio Regional Sewer District | 3900 Euclid Avenue, Cleveland, Ohio 44115

www.ncorsd.org/neo_step_program



Name: _____
Grade: _____
Date: _____

This Journal is due at the end of TODAY – September 16th, 2017
Please use the sheet below to write your journal. Use the back of this sheet if you need more room.

NOTE: You must write in **COMPLETE SENTENCES**. Each response must be **5 sentences long**.

Questions to think about while writing:

- ✓ What is one thing that you learned today that you did not know before today's tour?
- ✓ What careers discussed today did you find most interesting?
- ✓ After today's tour is there anything that you will do differently to **promote STEM Education**?

Northeast Ohio Regional Sewer District Open House
