

Watch the [Secrets of New York: The Sewers](#) videos to complete this worksheet.

Part 1: New York's First Sewer System

(11:49 minutes)

1. How many years ago was the NYC sewer system created?
2. Scientists revealed the connection between bacteria and waterborne _____.
3. Where was the site of NYC's first sewer?

Describe the first sewer.

4. Water supply contaminated by bacteria from fecal matter caused diseases such as _____.
5. The _____ Aqueduct carried NYC's first clean and reliable supply of fresh water – water that was consumed and used to flush the sewage system.
6. What was one of the major issues associated with having this new supply of water?
7. In what year did the second cholera epidemic occur, causing NYC officials to begin building the first sewer system?
8. Between 1850 and 1855, engineers constructed more than _____ of sewer tunnels underground.
9. Instead of relying on pumps, _____ keeps sewage moving through the sewers.
10. Remote-controlled _____ are used to monitor sewers for leaks and clogged pipes.
11. In 1935, the New York Times documented the urban myth claiming that _____ live in NYC sewers.

Part 2: The Wastewater Treatment Process

(8:28 minutes)

1. Where did wastewater go prior to the 1986 opening of the North River Wastewater Treatment Plant?
2. Buried under Manhattan's West Side, how long is the sewer tunnel that carries waste to the North River Wastewater Treatment Plant?
3. What is the diameter of the West Side Sewer Tunnel? What is its daily interception capacity?
4. What force moves wastewater through the sewers before it needs to be pumped from underground pipes up to the wastewater treatment plant?
5. What is the main difference between NYC's wastewater treatment process and the cleansing process that occurs in nature?
6. What is wastewater called when it first flows into a wastewater treatment plant?
7. Name and describe three processes wastewater undergoes during its treatment.
 - a.
 - b.
 - c.
8. During secondary treatment, what is introduced? How does this help to clean wastewater?
9. To deal with the remaining bacteria, sodium hypochlorite is introduced into the wastewater. It is the same chemical found in _____.
10. By the end of the treatment process, what percentage of the contaminants have been removed from the wastewater?

11. When treated wastewater is released back into the local waterways, what is it called?
12. What are the remaining solids called? How are they processed?
13. What gas is generated during the anaerobic digestion of sludge? How is the gas used?
14. How is sludge transported from one wastewater treatment plant to another for additional processing?

Part 3: The Combined Sewer System

(8:24 minutes)

1. What two substances do combined sewers collect?
 - a.
 - b.
2. What happens when too much rainwater enters the sewers and combines with the sewage flow?
3. The NYC sewer system generally handles about _____ billion gallons of wastewater each day but during wet weather, this can increase 10-15 times.
4. To prevent raw sewage from backing up into homes and onto the streets during precipitation events, wastewater is released directly into _____ without treatment.
5. _____ are built to reduce the amount of untreated wastewater entering water bodies.
6. With less untreated wastewater entering Jamaica Bay, its water quality will improve. There will be a reduction of _____ and an increase in _____.

Part 4: Protecting the Waterways

(7:08 minutes)

1. The invention of the _____ dramatically increased water use and wastewater.
2. When were sludge boats first utilized? What did they do?
3. What impact did the ocean dumping of sludge have on water quality?
4. When was ocean dumping of sludge outlawed?
5. How many sludge boats are there in NYC today?

What can you do to help keep NYC's water bodies clean?