

**Rubrics****Level 4**

- Students can describe at least three reasons why water quality is important and at least two different ways to use bioindicators to assess the health of a waterway.
- Students can describe what aquatic macroinvertebrates are, understands that some species are pollution tolerant and some are pollution intolerant, and can describe how biodiversity of the aquatic macroinvertebrates can be used to assess stream health.
- Students can describe where in the stream you would find suitable habitat for macroinvertebrates and can list three different ways that macroinvertebrates and their habitats can be negatively impacted by urbanization.

**Level 3**

- Students can describe at least two reasons why water quality is important and at least one way to use bioindicators to assess the health of a waterway.
- Students can describe what aquatic macroinvertebrates are, understands that some are pollution tolerant and some are pollution intolerant species, but cannot describe how biodiversity of the aquatic macroinvertebrates can be used to assess stream health.
- Students can describe where in the stream you would find suitable habitat for macroinvertebrates and can list two different ways that macroinvertebrates and their habitats can be negatively impacted by urbanization.

**Level 2**

- Students can describe at least one reason why water quality is important but cannot describe how bioindicators are used to assess the health of a waterway.
- Students can describe what aquatic macroinvertebrates are, but does not understand that some are pollution tolerant and some are pollution intolerant species, and cannot describe how biodiversity of the aquatic macroinvertebrates can be used to assess stream health.
- Students can describe where in the stream you would find suitable habitat for macroinvertebrates and can list only one way that macroinvertebrates and their habitats can be negatively impacted by urbanization.

**Level 1**

- Students cannot describe why water quality is important and cannot describe how bioindicators are used to assess the health of a waterway.
- Students cannot describe what aquatic macroinvertebrates are, does not understand that some are pollution tolerant and some are pollution intolerant species, and cannot describe how biodiversity of the aquatic macroinvertebrates can be used to assess stream health.
- Students cannot describe where in the stream you would find suitable habitat for macroinvertebrates and does not understand how macroinvertebrates and their habitats can be negatively impacted by urbanization.

# Ecology of a Landfill

# Phinizy Center for Water Sciences

## Rubrics

### Level 4

- Students understand that a landfill is a municipal facility and it requires a large amount of resources from the community to operate and maintain.
- Students can list at least 4 ways that their purchasing and disposal choices can lessen solid waste impacts in their homes, local communities, regions, or global environment.
- Students understand that there are both harmful and beneficial microorganisms, and that microorganisms are crucial to the operation of a landfill.
- Students can list at least 3 impacts that landfills can have on the environment and describe how proper landfill engineering and maintenance lessens those impacts.

### Level 3

- Students do not have a clear understanding that a landfill is a municipal facility, but understands that it requires a large amount of resources to operate and maintain.
- Students can list at least 3 ways that their purchasing and disposal choices can lessen solid waste impacts in their homes, local communities, regions, or global environment.
- Students understand that microorganisms are crucial to the operation of a landfill, but have a hard time understanding that there are both harmful and beneficial microorganisms.
- Students can list at least 2 impacts that landfills can have on the environment and describe how proper landfill engineering and maintenance lessens those impacts.

### Level 2

- Students do not have a clear understanding that a landfill is a municipal facility or that it requires a large amount of resources to operate and maintain a landfill.
- Students have a hard time listing ways that their purchasing and disposal choices can lessen solid waste impacts in their homes, local communities, regions, or global environment.
- Students cannot differentiate between harmful and beneficial microorganisms.
- Students have a hard time listing impacts that landfills can have on the environment and describe how proper landfill engineering and maintenance lessens that impact.

### Level 1

- Students do not know who pays for a landfill.
- Students do not understand that their purchasing and disposal choices can lessen solid waste impacts in their homes, local communities, regions, or global environment.
- Students do not understand the roll of microorganisms in the operation of a landfill.
- Students can list 1 impacts that landfills can have on the environment, but cannot explain how engineering a landfill will reduce the impact.

## Rubrics

### Level 4

- Student can list and accurately describe at least six basic procedures for measuring the chemical, physical, and biological aspects of stream health.
- Student can describe what aquatic macroinvertebrates are, understands that some are pollution tolerant and some are pollution intolerant species, and can describe how biodiversity of the aquatic macroinvertebrates can be used to assess stream health.
- Student understands the importance of DO and pH levels in a healthy stream and can name more than three variables that influence these levels.
- Student can describe more than five reasons why stream health is important.

### Level 3

- Student can list and accurately describe at least four basic procedures for measuring the chemical, physical, and biological aspects of stream health.
- Student can describe what aquatic macroinvertebrates are and understands that diversity of these organisms is an indicator of stream health (without necessarily knowing why).
- Student understands the importance of DO and pH levels in a healthy stream and can name more than two variables that influence these levels.
- Student can describe less than five reasons why stream health is important.

### Level 2

- Student can list at least two variables for measuring the chemical, physical, and biological aspects of stream health, but has difficulty describing the procedures of any testing method.
- Student has a slightly inaccurate definition for aquatic macroinvertebrates and does not list biodiversity of these organisms as an indicator of stream health.
- Student understands the importance of DO and pH levels in a healthy stream but can not name any variables that influence these levels.
- Student can describe less than three reasons why stream health is important.

### Level 1

- Student can only list one variable for measuring the chemical, physical, and biological aspects of stream health and cannot describe procedures for this method.
- Student has an inaccurate definition for aquatic macroinvertebrates and does not understand at all how their assessment can relate to stream health.
- Student does not understand the importance of DO and pH to stream health and has difficulty describing one reason why stream health is important.

# Understanding DO

# Phinzy Center for Water Sciences

## Rubrics

### Level 4

- Students can describe how oxygen becomes dissolved in water, how much DO to expect in healthy aquatic habitats, and can describe at least six chemical and physical factors that can limit or increase the levels of DO.
- Students can take the data collected in the lab and use it to calculate net productivity, respiration, and gross productivity and have an understanding of BOD and TMDL.
- Students can compare different water bodies and make educated predictions about DO, temperature, and pH levels.

### Level 3

- Students can describe how oxygen becomes dissolved in water, how much DO to expect in healthy aquatic habitats, and can describe at least four chemical and physical factors that can limit or increase the levels of DO.
- Students can take the data collected in the lab and use it to calculate net productivity, respiration, and gross productivity and somewhat understand BOD and TMDL.
- Students can compare different water bodies and make educated predictions about DO, temperature, and pH levels.

### Level 2

- Students understand the importance of oxygen in healthy aquatic habitats but have trouble understanding how it becomes dissolved in water and can only describe 3 or 4 chemical and physical factors that can limit or increase the levels of DO.
- Students have trouble using the data collected in the lab to calculate net productivity, respiration, and gross productivity and do not understand BOD and TMDL.
- Students have trouble comparing different water bodies and making educated predictions about DO, temperature, and pH levels.

### Level 1

- Students have trouble understanding the concepts of dissolved oxygen in water and can only mention 1 or 2 chemical and physical factors that affect the levels of DO.
- Students have trouble using the data collected in the lab to calculate net productivity, respiration, and gross productivity and do not understand BOD and TMDL.
- Students have trouble comparing different water bodies and making educated predictions about DO, temperature, and pH levels.

# Urban Watershed – Wastewater & Drinking Water (HS One-Day Option)

## Phinizy Center for Water Sciences

### Rubrics

#### Level 4

- Student understands the source of our drinking water and can explain Augusta’s process of taking raw water through chemical and physical treatment to become potable water.
- Student can accurately define the term “wastewater” and give more than five examples of what contributes to city wastewater.
- Student can describe the processes of preliminary treatment, primary treatment, and secondary treatment at Augusta’s wastewater treatment plant.
- Student understands that there are both harmful and beneficial bacteria and understand the role of bacteria in wastewater treatment as well as the need to treat for pathogens.
- Student understands the significance of the Clean Water Act in setting standards for discharge to our rivers and the importance of a healthy watershed.

#### Level 3

- Student understands the source of our drinking water and can explain most of Augusta’s process of taking raw water through chemical and physical treatment to become potable water.
- Student can define the term “wastewater” and give more than three examples of what contributes to city wastewater.
- Student can describe most of the processes of preliminary treatment, primary treatment, and secondary treatment at Augusta’s wastewater treatment plant.
- Student understands that there are both harmful and beneficial bacteria and the need to treat for pathogens, but are unsure of the role of bacteria in wastewater treatment.
- Student understands the importance of a healthy watershed but not the significance of the Clean Water Act.

#### Level 2

- Student is unsure of the source of our drinking water and can only partially explain Augusta’s process of taking raw water through chemical and physical treatment to become potable water.
- Student has a minimal understanding of the term “wastewater” and can only give one or two examples of what contributes to city wastewater.
- Student can describe some of the processes that occur during preliminary treatment, primary treatment, and secondary treatment at Augusta’s wastewater treatment plant, but they may be inaccurate in what they remember.
- Student understands what bacteria are but not that there are both harmful and beneficial bacteria.
- Student understands the importance of a healthy watershed but not the significance of the Clean Water Act.

#### Level 1

- Student is unsure of the source of our drinking water and can not explain Augusta’s process of taking raw water through chemical and physical treatment to become potable water.
- Student has an inaccurate definition of the term “wastewater” and can only give one or two examples of what contributes to city wastewater.
- Student has no knowledge of the processes that occur during preliminary treatment, primary treatment, and secondary treatment at Augusta’s wastewater treatment plant.
- Student understands what bacteria are but not that there are both harmful and beneficial bacteria.
- Student does not understand the importance of a healthy watershed or the significance of the Clean Water Act.

## Rubrics

### Level 3

- Students can accurately list and give descriptions of all three characteristics that delineate a wetland.
- Students can identify the 3 categories of wetland herbaceous plants and list at least 5 hydrophytic adaptations.
- Students can list detailed characteristics of hydric soils and understands the processes that create these characteristics.
- Students can describe multiple values of wetlands and understand the vital role that wetlands play in the health of all ecological habitats.

### Level 2

- Students can accurately list all three characteristics of a wetland, but may have difficulty when asked to give detailed descriptions of each.
- Students can identify the 3 categories of wetland herbaceous plants and list at least 3 hydrophytic adaptations.
- Students can list detailed characteristics of hydric soils but are unsure about the processes that create these characteristics.
- Students understand that wetlands play a vital role in the health of ecosystems, & know that wetlands have value, but can only explain one or two values as they relate to the roles of ecosystems.

### Level 1

- Students can accurately list one or two of the characteristics of a wetland but have little understanding of the details of each
- Students can identify the 3 categories of wetland herbaceous plants but are unsure of any hydrophytic adaptations.
- Students can only list a few characteristics of hydric soils and are unsure about the processes that create these characteristics.
- Students know that wetlands have value, but cannot describe any specific values or correlate these values in any contextual manner.