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 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 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 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 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 has difficulty describing one reason why stream health is important.

Rubrics

Level 4
- Student can list at least seven places where water can be found in the water cycle and which of the 3 states of water would be at that location as well as list at least four processes that move water from one location to another.
- Student understands that an urban setting changes the water cycle, can list at least five places water can be found in an urban setting, and describe how these urban locations affect our water supply.
- Student can describe approximately how much of the Earth's surface is covered in water, list at least four places where water is not readily available as drinking water, and understands that even with this large amount of water our available fresh water is in limited supply.
- Student can accurately describe a watershed, define point source verses non-point source pollution within the watershed, give more than four examples of non-point source pollution, and list at least five solutions to watershed pollution.

Level 3

- Student can list at least five places where water can be found in the water cycle and which of the 3 states of water would be at that location as well as list at least two processes that move water from one location to another.
- Student understands that an urban setting changes the water cycle, can list at least three places water can be found in an urban setting, and describe how some of these urban locations affect our water supply.
- Student can describe approximately how much of the Earth's surface is covered in water, list at least two places were water is not readily available as drinking water, and understands that even with this large amount of water our available fresh water is in limited supply.
- Student can accurately describe a watershed, define point source verses non-point source pollution within the watershed, give more than two examples of non-point source pollution, and list at least three solutions to watershed pollution.

Level 2

- Student can list at least two places where water can be found in the water cycle and which of the 3 states of water would be at that location, but has trouble listing the processes that move water from one location to another.
- Student begins to understands that an urban setting changes the water cycle, can list at least one place water can be found in an urban setting, but has trouble describing how some of these urban locations affect our water supply.
- Student understands that much of the Earth's surface is covered in water but is unsure how much and can only list two places were water is not readily available as drinking water.
- Student can start to describe a watershed, mention two sources of pollution as point source and non-point source pollution, but is unable to give an example of non-point source pollution and can only list at least one or two solutions to watershed pollution.

Level 1

- Student can list at least two places where water can be found in the water cycle and which of the 3 states of water would be at that location, but has trouble listing the processes that move water from one location to another.
- Student has trouble understanding that an urban setting can change the water cycle, can list only one or two places water can be found in an urban setting, and can not understand how some of these urban locations affect our water supply.
- Student understands that much of the Earth's surface is covered in water but is unsure how much and can only list one place where water is not readily available as drinking water.
- Student does not understand the watershed concept and can not describe the difference between point source and non-point source pollution, or list any solutions to watershed pollution.

Phinizy Down Under   Phinizy Center for Water Sciences

Rubrics

Level 4

- Students understand that mineral soils are classified by texture and can accurately list the 3 different soil textures.
- Students understand that soils have different permeability rates and can list 4 factors that affect permeability.
- Students can describe how igneous, metamorphic, and sedimentary rocks are formed and can use a dichotomous key to identify the three different types of rocks.
- Students understand the importance of groundwater as a source of drinking water, as well as a recharge reservoir for rivers and streams.

Level 3

- Students understand that soils are classified by texture and can accurately list 2 different soil textures.
- Students understand that soils have different permeability rates and can accurately list 3 factors that affect permeability.
- Students can list the three different types of rocks but are unsure of how they are formed.
- Students understand the importance of groundwater as a source of drinking water.

Level 2

- Students understand that soils are classified by texture and can list 1 soil texture.
- Students understand that soils have different permeability rates and can list 2 factors affecting permeability.
- Students understand that there are different types of rocks, but cannot list them and don't understand how they are formed.
- Students understand that groundwater is important, but cannot explain why it is important.

Level 1

- Students know that soils have different textures, but cannot identify these by name.
- Students know that water can move through soils, but do not know that a variety of factors can affect permeability rates.
- Students cannot name any of the three types of rocks.
- Students understand that water under the soil's surface is called groundwater, but do not know its significance.

Science at 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.

Swamp Math   **Phinizy Center for Water Sciences**

Rubrics

Level 4

- Student understands that math is a useful and vital tool in the scientific world.
- Student understands the terms compass and pacing, and can utilize both to get from point A to point B.
- Student understands what population sampling, population density, and diversity are and why they are important.
- Student understands that volume is a cubic measurement and to calculate volume all measurements must be in the same units.

Level 3

- Student understands that math is a useful and vital tool in the scientific world.
- Student understands the terms compass and pacing, but may have trouble with one of them in getting from point A to point B.
- Student knows the term population sampling, population density, and diversity, but may not be able to say why they are important.
- Student understands that volume is a cubic measurement but may not be able to calculate volume or understand units.

Level 2

- Student knows that math is useful in science.
- Student knows what a compass is but cannot use it to navigate and has trouble determining number of paces.
- Student can define diversity and density but is not sure why it is important or what population sampling involves.
- Student understands what volume is but does not understand cubic measurement.

Level 1

- Student thinks math is useful but is not sure why.
- Student has seen a compass but is unsure how to use it
- Student knows what a population is but has problems understanding diversity and density.

Rubrics

Level 4

- Student can accurately list and give descriptions of all three characteristics of a wetland.
- Student can list detailed characteristics of hydric soil and hydrophytic vegetation that a delineator would look for to define a wetland.
- Student can describe at least five values of wetlands.

Level 3

- Student can accurately list all three characteristics of a wetland, but may have difficulty when asked to give detailed descriptions of each characteristic.
- Student can only give some characteristics of hydric soil and hydrophytic vegetation that a delineator might use to define a wetland.
- Student can describe at least four values of wetlands.

Level 2

- Student can accurately list only two of the three characteristics of a wetland, and has little understanding of the details of each.
- Student has difficulty listing characteristics of hydric soil and hydrophytic vegetation that a delineator would use.
- Student can describe only two or three values of wetlands.

Level 1

- Student only lists "wet" as a characteristic of a wetland.
- Student has very little knowledge of the characteristics of hydric soil or hydrophytic vegetation.
- Student can barely describe one value of wetlands.

Rubrics

Level 4
- Student understands the scientific method (including order of steps) and feels confident producing a science project on their own.
- Student understands the purpose of a hypothesis and can express it as an "if, then" statement.
- Student understands experimental design including replication, control, and variables, and can draw appropriate conclusions based on data.
- Student can accurately construct the appropriate type of graph (bar graph, line graph, or pie chart) to best represent the data.

Level 3

- Student understands the scientific method (including order of steps) but does not feel confident producing a science project on their own.
- Student understands the purpose of a hypothesis but may have difficulty expressing it as an "if, then" statement.
- Student understands experimental design including replication, control, and variables, but has difficulty drawing appropriate conclusions based on data.
- Student can accurately construct a graph but may select the wrong type of graph to represent the data.

Level 2

- Student understands the scientific method but is unsure of the order of steps and does not feel confident producing a science project on their own.
- Student understands the purpose of a hypothesis but does not understand that it is properly expressed as an "if, then" statement.
- Student understands replication, control, and variables, but has difficulty designing an experiment and drawing appropriate conclusions based on data.
- Student can construct one type of graph but has difficulty making other types.

Level 1

- Student does not understand the scientific method
- Student does not know what a hypothesis is and cannot properly construct a hypothesis statement.
- Student does not understand experimental design.
- Student cannot properly construct a basic graph.

Rubrics

Level 4
- 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 can list more than 5 human activities that contribute to water pollution in an urban watershed, and up to 4 solutions to these problems.

Level 3
- 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 can list more than 3 human activities that contribute to water pollution in an urban watershed, and up to 3 solutions to these problems.

Level 2
- 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 can list at least 2 human activities that contribute to water pollution in an urban watershed, and at least 2 solutions to these problems.

Level 1
- 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 has difficulty listing human activities that contribute to water pollution in an urban watershed, and cannot name any solutions to these problems.