Watershed Monitoring Network
City of Vancouver

Alignment of Current Program to
2005 OSPI K-10 Grade Level Expectations (GLE's)

Developed September 2005

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Document Overview

This document was created in an attempt to help teachers connect their participation in the Watershed Monitoring Network with the numbers, standards and complicated language of the Science GLE's provided by OSPI. The following document details a few of the most applicable state standards the Watershed Monitoring Network could support if you and your students participate.

The document is broken down into three sections organized by the science WASL assessment years: 5th, 8th and 10th grades. The state's suggested displays of "Evidence of Learning" for each grade level are included in parenthesis (e.g. 1,2,3…). Included in bold with the state's "Evidence of Learning" are our own ideas about how your students in these grades may benefit from a field-based experience. This list is not exhaustive and can be utilized and augmented any way you see fit. The following are suggestions to ignite your own creativity and engage your prior experience to use the local environment and support we provide to its fullest potential, benefiting students as eager learners and yourself as a professional educator.

GLE's - 5th grade level

5th Science:

1.1.4 - Understand that energy comes in many forms.

Energy is found in different forms throughout our daily lives. Taking students down to a water body affords the opportunity to study many of these forms concurrently. Nature is a complex network of different energies woven together; in the classroom often we try to separate out the energies to study. While sometimes it is useful to study energy in this manner, by taking students outside they can observe and describe the way these energies interact in our world and understand GLE 1.1.4.

- (4) Describe the forms of energy present in a system (i.e., energy of motion [kinetic], heat energy, sound energy, light energy, electrical energy, chemical energy, and food energy). **Different forms of energy are easy to compare and contrast during regular trips to an aquatic system. The kinetic energy of the water body (if a creek, stream or river) is evident by looking at erosion, deposition, measuring water speed and other changes in the stream bed, heat energy is obviously present, sound energy, light energy as well as chemical energy and food energy are also present for your students to experience and examine.**

1.1.5 - Understand physical properties of Earth materials including rocks, soil, water, and air.

If we are to examine the Earth materials rock, soil, water and air what better place to do it than next to a local creek or stream where all of these are present? There are many rocks to examine in this environment, soils are varied and easily accessible, we should assume water is present if we are studying water as well, and air is a constant in our environment. The added advantage of taking students outside to study these Earth materials is that they can observe the interactions between the living and non-living factors in the environment. Not only can they understand physical properties, but they can begin to describe their purpose in the environment and extend their understanding of GLE 1.1.5.

- (K) Sort rocks based on size, shape, and other physical properties (e.g., color, texture). **Plenty of rocks both in and out of the creek for your students to examine and classify! Make sure you and your students return them to where you found them when you are done!**
- (2) Explain how some Earth materials are used by living things (e.g., water and soil for growing plants). **There are many Earth materials present creek-side to examine their support of living things. Water and soil for growing plants, water and rocks for macroinvertebrates, etc.**

2.1.1 - Understand how to ask a question about objects, organisms, and events in the environment.

- (K, 1, 2) Wonder and ask questions about objects, organisms, and events based on observations of the natural world. **Students question and wonder endlessly when they are exposed to a stimulus-rich environment such as a stream or creek.**
- (3, 4, 5) Identify the question being answered in an investigation. **From a simple procedure composed for any number of parameters students can experience first-hand the process and easily identify the question being answered.**
- (3, 4, 5) Ask questions about objects, organisms, and events based on observations of the natural world. **Again, student questions are generated freely and harnessed easily when exposed to an outside, field-based experience such as water testing creek-side.**
- (5) Develop a new question that can be investigated with the same materials and/or data as a given investigation. **After experiencing one investigation for dissolved oxygen, turbidity, or phosphate for example students can then use the same materials or data to investigate a new question.**

5th Science continued:

2.2.3 - Understand why similar investigations may not produce similar results.

Conducting scientific investigations in the classroom or in the field often produce varied results. After repeated study of the same area of a creek, not only can your students identify sources of error, but they can begin to see trends in data that may suggest conclusions despite the different results found month-to-month forming a solid understanding of GLE 2.2.3.

- (3, 4, 5) Describe reasons why two similar investigations can produce different results (e.g., identify possible sources of error). **Have one student or teacher perform a test, then have another student or adult repeat the test with the class observing. Was the entire procedure identical? How does that affect the results? Students should be able to identify and communicate the subtle differences between the two procedures.**
- (4, 5) Explain whether sufficient information has been obtained to make a conclusion. **After one pH test, can a student conclusively state the pH for the body of water? Why or why not? If a student conducts a long-term pH study of the creek, how does the variation in results impact their conclusions? When have they recorded enough data to make a strong conclusion?**

3.1.2 – Understand how the scientific design process is used to develop and implement solutions to human problems.

- (2) Propose, construct, and test a solution to a problem:
  - give examples of possible solutions to the problem
  - select and construct a solution to the problem
  - test a solution to the problem

  Your students will learn effective solution designs first hand as they work with the stream-side environment, learning what professionals have tried to solve problems and testing those solutions.
- (3, 4, 5) Propose, implement, and document the scientific design process used to solve a problem or challenge:
  - define the problem
  - scientifically gather information and collect measurable data
  - explore ideas
  - make a plan
  - list steps to do the plan
  - scientifically test solutions
  - document the scientific design process

  When students are challenged to design a procedure to answer a question, they will have to properly use all parts of the scientific method including those pieces listed above.
- (3, 4, 5) Describe possible solutions to a problem (e.g., preventing an injury on the playground by creating a softer landing at the bottom of a slide). **What could reduce the fecal coliform readings in a stream? Public awareness of septic systems? Reduction of pet waste?**
- (3, 4, 5) Describe the reason(s) for the effectiveness of a solution to a problem or challenge. **What has worked and what has not as humans have tried to design solutions to problems found around your creek or stream? By looking at research conducted in your watershed and talking with water quality professionals students can evaluate the effectiveness of past solutions to problems.**

5th Science continued:

3.2.4. – Understand how humans depend on the natural environment and can cause changes in the environment that affect humans' ability to survive.

- (3, 5) Describe the effects of humans on the health of an ecosystem. **Research causes of high parameter measurements to their possible sources. Are humans the cause of any of these effects? If so, what are those effects? Your students will work on describing the effects of humans using their own data collected by the stream.**

- (3, 5) Describe how humans can cause changes in the environment that affect the livability of the environment for humans. **Do humans cause changes such as**: **amount of water in water body for recreation, fecal coliform too high to recreate, algal blooms caused by high nitrate and phosphate levels, etc.? If so, these clearly affect the livability of the environment for humans.**
- (3, 5) Describe the limited resources humans depend on and how changes in these resources affect the livability of the environment for humans. **Is water a limited resource? Potable (or water useable by humans) water? If so, what has happened in other environments and what might happen in our local environment to limit the availability of useable water for human consumption?**

5th Communication:

1.1.2 – Applies a variety of listening and observation skills/ strategies to interpret information.

- Arranges ideas using a variety of organizing methods to interpret information with teacher guidance (e.g., drawings, graphic organizers, note taking, etc.). **Using field journals, notes, data tables and graphs students organize data to interpret information.**
- Explains visual information gained through observation required in content areas. **Using graphs and data tables to explain phenomena and conclude answers to problems are strategies used throughout the Watershed Monitoring Network.**

2.1.1 – Uses language that adapts to the needs of the audience, situation and setting.

- Uses persuasive language to influence others. (e.g., to persuade). **During Watershed Congress and in class discussions students will use persuasive language to sway those to their point of view.**

3.1.1 Understands how to plan for effective oral communication and presentation.

All of the following skills are directly applicable to students preparing presentations for Watershed Congress and other community outreach opportunities using their experiences in the field.

- Plans a presentation for a specific purpose (e.g., to entertain, inform, explain, persuade).
- Selects the most relevant information from multiple resources to appeal to the interest and background knowledge of the audience.
- When selecting information, gives credit to the source.
- Uses tools (e.g., template for a simple outline, graphic organizers, notecards) to organize information in a logical sequence (e.g., in order of importance) using smooth transitions.

5th Mathematics:

1.1.8 – Understand and apply estimation strategies to determine the reasonableness of answers in situations involving addition and subtraction on non-negative decimals and like-denominator fractions.

- Use estimation to determine the reasonableness of answers in situations. **Are student predictions for parameters reasonable based on past results? Are they outside the realm of reason?**
- Determine reasonableness of estimated answers for a given situation. **Based on their field experiences, are estimates of expected values reasonable? Why or why not? How is this situation different from other situations you may use estimation?**

1.2.3 – Understand how measurement units of capacity, weight, and length are organized in the metric system.

- Explain and give examples of the metric system standard units for capacity, weight, and length. **Students are given ample opportunity to explore the metric system standards and measurement during water quality monitoring especially capacity of the stream bed, and length of reach or width of stream.**

GLE's - 8th grade level

8th Science:

1.1.6 – Understand how to classify organisms by their external and internal structures.

- (6) Describe how organisms can be classified using similarities and differences in physical and functional characteristics (both internal and external). **Looking at the macroinvertebrate life in the water body and the surrounding plants your class can begin to infer relationships between groups of organisms based on their external characteristics.**
- (8) Explain an inference about whether organisms have a biological relationship or common ancestry based on given characteristics. **Why would two or three of the macroinvertebrates or plants possibly be related? Based on their observations, students can explain their inferences by sketching or writing out their reasoning.**

1.3.10 - Understand how organisms in ecosystems interact with and respond to their environment and other organisms.

- (7) Describe how energy flows through a food chain or web. **Looking at the available information on stream ecology students can follow a food chain through their study environment from source: sun to termination: top end predator.**
- (7) Explain the role of an organism in an ecosystem (e.g., predator, prey, consumer, producer, decomposer, scavenger, carnivore, herbivore, and omnivore). **There are so many organisms in and around creeks and streams for students to observe and classify based on their role in the ecosystem. Students can begin to build their own food webs as a class based on their field experiences.**
- (7) Describe how a population of an organism responds to a change in its environment. **Looking at data from past classes, students can describe populations respond due to changes in their environment whether it be a class of macroinvertebrates or stream-side plants.**

2.1.3 - Apply understanding of how to construct a scientific explanation using evidence and inferential logic.

- (6, 7, 8) Generate a scientific conclusion including supporting data from an investigation using inferential logic. **Looking at data gathered from past classes, what are the long-term changes happening at your site? What conclusions can we draw based on years of data collected at the same site?**
- (6, 7, 8) Describe a reason for a given conclusion using evidence from an investigation. **Why would last year's class conclude that fecal coliform was on the rise because of increased pet walking along the creek? Is there data or evidence to back this up? What was their reasoning for drawing this conclusion?**
- (6, 7, 8) Generate a scientific explanation of an observed phenomenon using given data. **Why does the creek seem to be higher this month? By documenting weather changes and precipitation (or conducting background research) throughout the month students have the data in hand to generate a scientific explanation for a personally-observed phenomenon.**
- (6) Predict what logically might occur if an investigation lasted longer or changed. **Your class will get to see the continuation of a long-term monitoring project. Will the nitrate levels continue to rise as they did throughout the school year last year? Why or why not? What if you changed the number or timing of trips to the creek; would data be affected?**

8th Science continued:

2.1.5 - Apply understanding of how to report investigations and explanations of objects, events, systems, and processes.

- (6, 7, 8) Report observations of scientific investigations without making inferences. **Differences between observations and inferences are easily detailed using creek-side experiences with students. The opportunity for making meaningful observations are numerous as well as moving past observations to inferences and eventually testable questions!**
- (6, 7, 8) Summarize an investigation by describing:

- reasons for selecting the investigative plan
- materials used in the investigation
- observations, data, results
- explanations and conclusions in written, mathematical, oral, and information technology presentation formats
- ramifications of investigations
- safety procedures used

In preparing for Watershed Congress, student will examine how to best communicate a summary of their water monitoring investigation.

- (6, 7, 8) Describe the difference between an objective summary of data and an inference made from data. **Reporting of data comes first, then inferences to draw conclusions from that data. Students will use this process when reporting and disseminating the class' information.**

3.1.1 – Analyze common problems or challenges in which scientific design can be or has been used to design solutions.

- (6, 7, 8) Describe how science and technology could be used to solve all or part of a human problem and vice versa (e.g., understanding erosion can be used to solve some flooding problems). **What are the current solutions to erosion prevention during development? What are current solutions to high fecal coliform and low dissolved oxygen in our local creeks and streams? How does science and technology intersect with these solutions?**
- (6, 7, 8) Explain how to scientifically gather information to develop a solution (e.g., collect data by measuring all the factors and establish which are the most important to solve the problem). **How do you isolate one variable in a outdoor study? Is it possible? What procedure should we use to answer a problem? Which variables do we test?**

3.2.4 - Analyze how human societies' use of natural resources affects the quality of life and the health of ecosystems.

- (6, 7, 8) Explain the effects that the conservation of natural resources has on the quality of life and the health of ecosystems. **How will the conservation of certain resources affect your students' water quality testing? If we use less water in our school and in the surrounding community will there be more water running down our creeks and streams? If we reduce, reuse and recycle will measure the same stream flow? Does more water make an impact on human quality of life and the health of the ecosystem?**
- (6, 7, 8) Explain the effects of various human activities on the health of an ecosystem and/or the ability of organisms to survive in that ecosystem (e.g., consumption of natural resources; waste management; urban growth; land use decisions; pesticide, herbicide, or fertilizer use). **Which macroinvertebrates are sensitive to pollution? Which plants are sensitive to disturbance? These are just two human effects that can be assessed in a stream-side environmental study by your students.**

8th Communication:

2.2.2 – Applies skills to contribute responsibly in a group setting.

All of the following opportunities are numerous during a water study as students are divided into working groups of 4 – 6 to complete a given set of tasks creek-side. All of the following skills are bolstered during the year and in preparation for Watershed Congress.

- Contributes relevant ideas with support/evidence by clarifying, illustrating or expanding as needed (e.g., contributes topics related to ideas with support and talks in turn with consideration for others in the conversation).
- Expands upon and clarifies others' ideas.
- Critiques group members' and own interactions/work and adjusts to ensure group success.

3.1.1 – Applies skills to plan for effective oral communication and presentation.

The following opportunities and skills are required and augmented as students prepare to present their data for Watershed Congress.

- Determines the occasion and the audience, selects a purpose (e.g., variety show, news broadcast, science experiment, data presentation, speech, interview).
- Matches verbal and nonverbal messages (e.g., voice modulation, expression, tone, body language, gestures, attire).
- Identifies logical argument and unintended use of fallacies to determine necessary revisions presentation (e.g., generalization/principle, pro/con, definition, false causality, overgeneralization).
- Uses techniques to enhance the message (e.g., rhetorical questions, parallelism, concrete images, figurative language, and characterization).

8th Mathematics:

1.1.4 – Apply ratio, percent, and direct proportion in situations.

- Solve problems involving percentages (e.g., percent increase/decrease, tax, commission, discount). **What percentage increase/decrease takes place from month to month? What is the best means to represent this change? % or graphically?**
- Determine an unknown value for a dimension or a number of events or objects using ratio or proportion. **Make precise scale reach maps then determine stream width using student reach maps. Then, students can check their accuracy by doing the real measurement!**

GLE's – 10th grade level

10th Science:

1.3.6 - Analyze the factors that influence weather and climate.

- (9) Explain how energy transfers and transformations among the atmosphere, hydrosphere, and landforms affect climate and weather patterns. **How does atmospheric oxygen affect dissolved oxygen? What weather or climate processes (wind, warmer temperatures, sunny weather) affect dissolved oxygen? What affect do large bodies of water have on atmospheric temperature and humidity? All these questions are ideal to examine using a water quality study.**
- (9) Explain how greenhouse gases in the atmosphere affect climate (e.g., global warming). **What affect does water vapor (or higher humidity) have on warming the atmosphere?**

1.3.10 - Analyze the living and nonliving factors that affect organisms in ecosystems.

- (9) Describe how matter and energy are transferred and cycled through ecosystems (i.e., matter and energy move from plants to herbivores/omnivores to carnivores and decomposers). **How does nitrogen cycle through the stream ecosystem? What transformations does it undergo during the process? Follow a water molecule through the ecosystem; what stops does it make along the way? Using their experiences by the creek students will have first-hand experience with matter and energy moving through the ecosystem.**
- (9) Compare different ecosystems in terms of the cycling of matter and flow of energy. **How is the stream ecosystem similar or different from a dessert ecosystem? Starting with a solid foundation with one ecosystem (stream) allows students to easily compare and contrast between ecosystems.**
- (9) Describe the living and nonliving factors that limit the size and affect the health of a population in an ecosystem. **What is the limiting factor of an example organism such as algae in the stream ecosystem? What causes increase or decrease in the algae population of a water body? Based on their own observations, students can wrestle with the difficult concept of limiting factors.**

10th Science continued:

2.1.2 - Understand how to plan and conduct systematic and complex scientific investigations.

- (9, 10) Make a hypothesis about the results of an investigation that includes a prediction with a cause-effect reason. **Using the Water WASLs students' experiences in the field will be evaluated in a WASL-style assessment both raising their awareness of WASL expectations as well as many opportunities to hypothesize.**
- (9, 10) Generate a logical plan for, and conduct, a systematic and complex scientific controlled investigation with the following attributes:
  - hypothesis (prediction with cause-effect reason)
  - appropriate materials, tools, and available computer technology
  - controlled variables
  - one manipulated variable
  - responding (dependent) variable
  - gather, record, and organize data using appropriate units, charts, and/or graphs
  - multiple trials
  - experimental control condition when appropriate
  - additional validity measures

  Students have the opportunity to design and test their own hypothesis to answer their own questions in the Watershed Monitoring Network using the materials provided and following the above mentioned specifications for an investigation.
- (9, 10) Identify and explain safety requirements that would be needed in an investigation. **Working outside in the environment using chemical test kits offers some safety hazards. How do your students deal with these challenges while still having fun and gathering quality data?**

2.1.3 – Synthesize a revised scientific explanation using evidence, data, and inferential logic.

- (9, 10) Generate a scientific conclusion, including supporting data from an investigation, using inferential logic. **What effect does higher nitrate levels have on plant growth around the creek? What effect does increased turbidity have on the ability of salmon to feed? Using data gathered creek-side, students can infer answers to these questions.**
- (9, 10) Generate a scientific explanation of an observed phenomenon using given data. **Looking at data gathered from past classes, what are the long-term changes happening at your site? What conclusions can we draw based on years of data collected at the same site?**
- (9, 10) Predict and explain what logically might occur if an investigation lasted longer or changed. **Your class will get to see the continuation of a long-term monitoring project. Will the nitrate levels continue to rise as they did throughout the school year last year? Why or why not? What if you changed the number or timing of trips to the creek; would data be affected?**

10th Science continued:

3.1.1 - Analyze local, regional, national, or global problems or challenges in which scientific design can be or has been used to design a solution.

- (9, 10) Explain how science and technology could be used to solve all or part of a human problem and vice versa (e.g., understanding the composition of an Earth material can be useful to humans, such as copper ore being used to make copper wire). **What are the current solutions to erosion prevention during development? What are current solutions to high fecal coliform and low dissolved oxygen in our local creeks and streams? How does science and technology intersect with these solutions?**
- (9, 10) Explain how to scientifically gather information to develop a solution (e.g., perform a scientific investigation and collect data to establish the best materials to use in a solution to the problem). **How do you isolate one variable in a outdoor study? Is it possible? What procedure should we use to answer a problem? Which variables do we test?**
- (9, 10) Describe a change that could improve a tool or a technology. **Students devise their own solutions to human problems using their experiences gained through the watershed monitoring network.**

3.1.3 - Evaluate consequences, constraints, and applications of solutions to a problem or challenge.

After studying the creek for a lengthy period of time your students will be able to analyze and evaluate varied solutions to water quality problems in their neighborhoods and community. How best to address specific water-quality problems? What are local agencies and scientists already doing to solve problems in our creeks and streams? Are these solutions feasible?

- (9, 10) Explain the criteria to evaluate the solution(s) to a problem or challenge. **Cause-effect relationship, money, commitment, man-power, time, administrative (government, school board) approval, etc.**
- (9, 10) Explain the effectiveness of the solution to the problem or challenge using scientific principles and concepts. **Is planting trees a feasible solution to consistently high fecal coliform levels? What would help to reduce the fecal coliform population?**

10th Communications:

2.2.2 – Applies skills to contribute responsibly in a group setting.

All of the following opportunities are numerous during a water study as students are divided into working groups of 4 – 6 to complete a given set of tasks creek-side. All of the following skills are bolstered during the year and in preparation for Watershed Congress.

- Contributes relevant ideas with support/evidence by clarifying, illustrating or expanding as needed (e.g., contributes topics related to ideas with support and talks in turn with consideration for others in the conversation).
- Critiques group members' and own interactions/work and adjusts to ensure group success.

10th Communications continued:

3.1.1 – Applies skills to plan for effective oral communication and presentation.

The following opportunities and skills are required and augmented as students prepare to present their data for Watershed Congress.

- Determines the occasion and the audience, selects a purpose (e.g., monologue, debate, historical reenactment, speech, mock job/academic interview).
- Matches verbal and nonverbal messages (e.g., voice modulation, expression, tone, body language, gestures, attire).
- Distinguishes among and uses various forms of classical and contemporary logical argument (deductive and inductive reasoning, syllogisms, analogies).
- Uses techniques to enhance the message (e.g., irony and dialogue to achieve clarity, force, and aesthetic effect; technical language).
- Uses logical, ethical, and emotional appeals to support the purpose.

4.1.2 – Analyzes and evaluates strengths and weaknesses of others' formal and informal communication using own or established criteria.

Once again, the opportunity to analyze and evaluate others presentation strengths and weaknesses is offered during Watershed Congress. Students can use this experience to improve their own presentation skills for future use.

- Examines accuracy of content and terminology for specific content areas in others' communication (e.g., compares texts using correct literary terminology).
- Critiques others' communication and/or delivery independently and in groups according to detailed scoring criteria.
- Offers feedback to peers in support of improving both formal and informal communication.

10th Mathematics:

1.1.8 Apply estimation strategies to determine the reasonableness of results in situations involving multi-step computations with rational numbers including whole number powers and square and cube roots.

- Explain situations involving real numbers where estimates are sufficient and others for which exact value is required. **When are predictions or estimations of data relevant and when is exact data needed in the process of evaluating a water bodies' health?**
- Justify why an estimate would be used rather than an exact answer in a given situation. **Can we make conclusions based on estimates and predictions; or is hard data actually required? Justify your answer as a student.**
- Use estimation to predict or to verify the reasonableness of calculated results. **Are our results reasonable or do we have an equipment procedure problem? Quality control and quality assurance is part of any good study.**

1.2.6 – Understand and apply strategies to obtain reasonable measurements at an appropriate level of precision.

- Identify situations in which approximate measurements are sufficient. **Can we make conclusions based on estimates and predictions; or is hard data actually required? Justify your answer as a student.**
- Estimate a reasonable measurement at an appropriate level of precision. **How wide is the stream or creek? How high is the pH? Past experience and data provides the opportunity to make strong predictions during a water study.**

10th Mathematics, continued:

1.4.6 Apply understanding of statistics to make, analyze, or evaluate a statistical argument.

- Identify trends in a set of data in order to make a prediction based on the information. **Where does the data suggest our trends are moving for dissolved oxygen, turbidity, fecal coliform, etc.?**

- Justify a prediction or an inference based on a set of data. **Where is the evidence for your prediction? Does the data support your inference or prediction? How?**
- State possible factors that may influence a trend but not be reflected in the data (e.g., population growth of deer vs. availability of natural resources or hunting permits). **Students will critically analyze their data to consider possible error.**
- Analyze a set of statistics to develop a logical point of view. **Interpreting graphs and data tables they generate students will develop a logical point of view.**

Science Grade Level Expectations Summary

EALR 1 SYSTEMS	Level	K	Elementary School					Middle School					High School		
	Grade	K	1	2	3	4	5	6	7	8			9	10	
Nature & Properties of Earth Materials	1.1.5 a	☒	☒												
	1.1.5 b	☒	☒												
	1.1.5 c	☒	☒												
	1.1.5 d	☒	☒												
Characteristics of Living Matter	1.1.6 a							☒	☒	☒					
	1.1.6 b							☒	☒	☒					
	1.1.6 c							☒	☒	☒					
Hydrosphere & Atmosphere	1.3.6 a												☒	☒	
	1.3.6 b												☒	☒	
	1.3.6 c												☒	☒	
	1.3.6 d												☒	☒	
Intredependence of Life	1.3.10 a							☒	☒	☒			☒	☒	
	1.3.10 b							☒	☒	☒			☒	☒	
	1.3.10 c							☒	☒	☒			☒	☒	
	1.3.10 d							☒	☒	☒			☒	☒	

EARL 2 INQUIRY

Questioning	2.1.1 a	☒	☒	☒	☒	☒	☒								
	2.1.1 b	☒	☒	☒	☒	☒	☒								
	2.1.1 c	☒	☒	☒	☒	☒	☒								
Planning & Conducting Safe Investigations	2.1.2 a												☒	☒	
	2.1.2 b												☒	☒	
	2.1.2 c												☒	☒	
	2.1.2 d												☒	☒	
	2.1.2 e												☒	☒	
Explaining	2.1.3 a							☒	☒	☒			☒	☒	
	2.1.3 b							☒	☒	☒			☒	☒	
	2.1.3 c							☒	☒	☒			☒	☒	
	2.1.3 d							☒	☒	☒			☒	☒	
	2.1.3 e							☒	☒	☒			☒	☒	
	2.1.3 f							☒	☒	☒			☒	☒	
	2.1.3 g							☒	☒	☒			☒	☒	
Communicating	2.1.5 a							☒	☒	☒					
	2.1.5 b							☒	☒	☒					
	2.1.5 c							☒	☒	☒					
	2.1.5 d							☒	☒	☒					
	2.1.5 e							☒	☒	☒					
Evaluating Inconsistent Results	2.2.3 a				☒	☒	☒								
	2.2.3 b				☒	☒	☒								
	2.2.3 c				☒	☒	☒								

EARL 3 APPLICATION

Identifying Problems	3.1.1 a							☒	☒	☒			☒	☒	
	3.1.1 b							☒	☒	☒			☒	☒	
	3.1.1 c							☒	☒	☒			☒	☒	
	3.1.1 d							☒	☒	☒			☒	☒	
	3.1.1 e							☒	☒	☒			☒	☒	
Designing & Testing Solutions	3.1.2 a			☒	☒	☒	☒								
	3.1.2 b			☒	☒	☒	☒								
	3.1.2 c			☒	☒	☒	☒								
Evaluating Potential Solutions	3.1.3 a												☒	☒	
	3.1.3 b												☒	☒	
	3.1.3 c												☒	☒	
	3.1.3 d												☒	☒	
	3.1.3 e												☒	☒	
Environmental & Resource Issues	3.2.4 a				☒	☒	☒	☒	☒	☒					
	3.2.4 b				☒	☒	☒	☒	☒	☒					
	3.2.4 c				☒	☒	☒	☒	☒	☒					
	3.2.4 d				☒	☒	☒	☒	☒	☒					
	3.2.4 e				☒	☒	☒	☒	☒	☒					