East EPO Course Overview for : Science 6

Disciplinary long-term transfer goals aligned with mission/vision:

Construct evidence-based explanations of how and why phenomena exist in the natural and designed world(s).	**Make, reconcile, and refine evidence-based arguments about phenomena in the natural and designed world(s).**	**Critically evaluate and persuasively communicate information in order to make informed decisions and solve problems in the natural world**

Pacing Guide:

Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

Unit --1-22 days	**Unit --2-44 days**	**Unit ---3-42 days**	**Unit-4-35 days**	**Unit 5- 30 days**

[Link to RCSD pacing guide]

Unit Overviews

Unit: 1 Light & Matter	**Understandings:**	**Essential Questions:**
	• U1: When light shines on an object, it is reflected, transmitted or absorbed. • U2: The eye detects light and sends images to the brain. • U3: Scientists carry out investigations to gather evidence to understand the natural world.	Why do we sometimes see different things when looking at the same object?
Transfer Goal: Construct evidence-based explanations of how and why phenomena exist in the natural and designed world(s).		
Performance Task: Scholars will apply knowledge gained about the one way mirror to a new situation involving scenarios about the McDonalds window and reflection across the street. **Criteria for Success:** Criteria to assess understanding: 1 a/b. Must include words sunlight, person, and reflection, model must include sunlight, arrows that reflect on window and trees. 2. Circle should be on trees, the square should be on the inside of the restaurant. 3. Explanation would include reference to 2 way mirrors and the amount of light on one side of the glass being darker than the other. Model would include title, objects, light path with arrows, color and explanation.		

Unit: 2 Thermal Energy	**Understandings:**	**Essential Questions:**
	U1 Changes in Thermal energy causes change between the 3 stages solid, liquid and gas. U2. Scientists collect data to gain an understanding of how energy changes density (of the molecules)based on its temperature and the temperature surrounding it. U3.In the process of designing a fair investigation, scientists develop models to demonstrate which materials should be use to convey their understanding of how systems work to minimize change in temperature or energy transfer. **Fair meaning follows the criteria and constraints.*	• How does **energy change density (of the molecules)based on temperatur**e and type of systems? (U1 &U2) • How do scientists **carry out investigations** to make sure to do a "fair" test? (to Answer questions or test solutions) U3 • **How can containers keep stuff from warming up or cooling down? U3**

Transfer Goal:

- Critically evaluate and persuasively communicate information in order to make informed decisions and solve problems in the natural world

Performance Task: Scholars will design a cup to contain energy with a given variable. They will then go back and construct to make improvements upon first results. Build a cup for Mr. Wingo's golf Gatorade to keep coldest. Scholars engage in the "Cold Cup Challenge." For more relevant application, scholars are given the context of an East specific "cup challenge." In this challenge, the scholars must design a cup that uses the best design features, applying their understanding of the relationship between the features and their functions. Scholars work through the design process knowing the purpose and the constraints for materials, variance allowed for temp change, etc. Scholars make a model and execute their first design attempt and complete 4 tests that require them to record data and make accurate observations. Scholars then make meaning of the data, get peer feedback, and plan for a re-design. Scholars explain their thinking throughout the redesign process including tying their thinking to evidence from tests. Scholars close with a summary of their results and make connections to prior learning. Models and written explanations must include use of precise scientific vocabulary.

"This challenge requires scholars to demonstrate their understanding to all 3 EQs.

Criteria for Success: Plan and carry out investigations to systematically test the different parts of the cup system, tracking the flow of matter and energy into or out of the cup system.

Product Design Success Criteria

- Use effective and efficient materials available and environmental safe
- Materials and design together limit the temp change/energy transfer to
  - Temperature change of less than 2℃ after 10 minutes in regular light.
  - Temperature change of less than 4℃ after 10 minutes in bright light.

Process Success Criteria

- Demonstrates clear understanding of the problem/challenge by drawing a model with the 3 features to minimize energy transfer included
- Clearly describes the design feature and explains how it minimizes energy transfer; makes clear connection between design and knowledge of energy transfer/function
- Completes all 4 tests with accurate measurements and observations
- *Thoughtfully evaluates/reflects on data from test results and peer feedback to revise design using engineering practices

- Explains how the ideas for design revision will improve performance
- Thoughtful analysis of pros/cons of design, demonstrates understanding of the relationship between materials and function

Unit: 3 Weathering and Water Cycling	**Understandings:**	**Essential Questions:**
	• U1: Some places have more or different types of **precipitation, depending on weather patterns**. • U2: Climate is different around the world due to latitude and longitude of a location, wind patterns, ocean currents, landforms, temperature, and humidity. • U3: Processes on Earth follow a natural cycle/pattern. *The role of water in Earth's surface processes*	Why does it hail, rain, or snow at some times and some places and not others? What causes climates around the world to be different? What processes on Earth's climate level pattern a natural Cycle? Or How do earth's processes impact weather and climate patterns?
Transfer Goal:Construct evidence-based explanations of how and why phenomena exist in the natural and designed world(s).		
Performance Task: Students will analyze data and discuss/explain main ideas as to why certain ecosystems exist in specific areas of the world. Using vocabulary and content knowledge based on geography, topography, kinetic energy transfer, water cycles and weathering scholars will be able to construct an understanding of weather patterns. **Criteria for Success:** As temperature changes the molecular density of the air changes as well. sort through multiple sources of data and information (e.g., large data sets on maps, cross-section graphs, text, tables, and labs) to construct models and explanations for processes that build up and wear down Earth's surface		

Unit: 4 Rock Cycling- Eversest	Understandings:	Essential Questions:
	U1:Processes on Earth follow a natural cycle/pattern. *U2: The Earth's composition and how the pieces work together in constant change.* *U3: The Earth is in constant change at varying time and spatial scales.*	• How do **earth's processes impact the earth's surface**? • What is the Earth **made of and how does it work together that results in changes**? • What **causes the earth's surface to change** quickly? Slowly?
Transfer Goal: Construct evidence-based explanations of how and why phenomena exist in the natural and designed world(s).		
Performance Task: The unit ends with students using what they have figured out about uplift and erosion to explain how a fossil was found at Mt. Everest without having to dig for it. Scholars use their science skills to draw models with an explanation of why a sea fossil was on the top of Mt Everest. 1) From what we figured out in our unit, we now know that Mt. Everest did not always exist. It seems odd and surprising that a fossil of a sea organism is at the top of the tallest mountain above sea level. Using the space below and all that you have figured out about the different causes and processes that affect changes to Earth's surface, you will develop three models to show: • what the area that created the mountain might have looked like as far back as 500 million years ago; • what happened to the area over time to create the Himalayan Mountains and Mt. Everest; and • what happened to cause a fossil to end up towards the top of Mt. Everest. Scholars apply their knowledge gained throughout the unit to answer these questions as well: 2) Every year, people on Mt. Everest discover new fossils that were not visible the year before. Some fossil fragments from other sea creatures are now visible that were not visible 100 years ago. What is causing new fossils to be exposed on Mt. Everest? 3) Do you think that these newly exposed fossils will be visible on the mountain range thousands or millions of years from now? **Criteria for Success:**		

Unit: 5 Cells & Systems- Healing	Understandings:	Essential Questions:
	• U1: Living organisms are composed of cells, which have similar structure and function differently to perform jobs within the system. • U2: Cells within animals and plants work together to heal itself. • U3: Scientists carry out investigations to gather evidence to understand the natural world.	• EQ 1: How do living things heal themselves? • EQ 2:How do different systems of the body function during the healing process?

Transfer Goal: Make, reconcile, and refine evidence-based arguments about phenomena in the natural and designed world(s).		
Performance Task: Provide a detailed evidence based explanation of what happened to the boy's foot following the accident in gym class, down to the molecular level. Part 1 Scholars will take what they have learned about healing and how the body systems work and apply it to a new scenario. They will use ideas as scientific evidence that they learned while participating in this unit. Together we go over X-rays taken of hands at several different ages in life. Noticings are made about the gaps in space between the bones. The term Growth Plate is shared to name something that is going to happen. Shared image of medically identified areas where young children would have growth plates. Independently the scholar will have to explain what they think happens to the structures of the bone at the growth plate as a child grows into an adult? Use words or pictures (or a combination) to explain your answer to this question. Think about what you have figured out about how the different parts and systems of the body work together. include the interactions between the different systems in our body that need to happen to support this. There is a second part that references plant growth from OpenSciEd. Due to pacing we will not use this because plant growth has not been a focus in this unit. Part 2 of this assessment requires an at home piece to be completed prior to this lesson. The Healing Interview will be sent home in the beginning of this unit along with the introductory letter to the unit. Scholars will develop a healing timeline using their Healing Interview information and supporting images and/or creating scientific models. This is an excellent opportunity to invite families to share their growth assessment piece and Healing Timeline with their family or community member(s). **Criteria for Success:**		