

Sample Inquiry Task – Grade 8

Developing Extended Response (ER) Tasks as NON-Investigations

The purpose of this section is to provide a sample of what grade 8 NON-investigations might look like, using the NECAP Planning Guide for NON-Investigations as a model for ER task design.

Sample Grade 8 Investigation – “Data and Interpretation and Prediction”

In this extended response task, students are asked to graph data, interpret findings, and critique the experimental design and conclusions. Students are also asked to apply results to make predictions about real-world applications and explain phenomena related to heat transfer and differential heating.

Grade Level: 8

Extended Response Task: “Data and Interpretation and Prediction” **Assessment**

Item Types: SAs and 3-CRs

Testing Session: 3

Alignment to INQ Assessment Target(s):

FOCUS: PS2 (5-8) INQ+SAE+POC – 7

Use data to draw conclusions about how heat can be transferred (convection, conduction, or radiation)

RELATED CONTENT: ESS1 (5-8) SAE+ POC –4

Explain the role of differential heating or convection in ocean currents, winds, weather and weather patterns, atmosphere, or climate.

Depth of Knowledge: Levels 1, 2, and 3

Source: Adapted from *Science Scope*, January 2005 (page 37), “Data and Interpretation and Prediction”

Sample Middle School ER Task

“Data Interpretation and Prediction”

In this task, you will answer questions to show what you have learned about heat, heat transfer, and the interpretation of data. Read the questions carefully and answer them completely, using data or examples to support your responses.

Part 1:

You have learned that there are three methods of heat transfer: conduction, convection, and radiation.

1. If your teacher instructs you to heat a sample of soil using a heat lamp, which method of heat transfer will you be using?

Use what you know about energy to show or describe how the heat lamp will heat the soil sample. You may use descriptions and diagrams in your response.

Item type: SA (2 points)

Background Knowledge about Content

PS2 (5-8) INQ+SAE+POC – 7

Use data to draw conclusions about how heat can be transferred (convection, conduction, or radiation)

DOK 1 - Recall or recognize a fact, term, definition, simple procedure (such as one step), or property Represent in words or diagrams a scientific concept or relationship

DOK 2 - Specify and explain the relationship between facts, terms, properties, or variables

Questions 2 and 3 refer to an experiment your teacher asks you to perform. You are to compare the heating rate of soil to the heating rate of water. To do this, you are given the following materials:

- | | |
|-----------------------|--------------------------|
| 2 heat lamps | 1 sample of soil |
| 2 bins | 1 sample of water |
| 2 thermometers | 1 timer |

2. There are many experimental variables that must be controlled in order to perform this experiment accurately. Name three of these variables and explain how and why you would control each one.

Item type: 3-CR

Planning & Critiquing Investigations

4. Identify information/evidence that needs to be collected in order to answer the question, hypothesis, and prediction

#5. Develop an organized and logical approach to investigating the question, including controlling variables

6. Provide reasoning for appropriateness of materials, tools, procedures, and scale used in the investigation

DOK 2 – Make a decision as to how to approach the problem

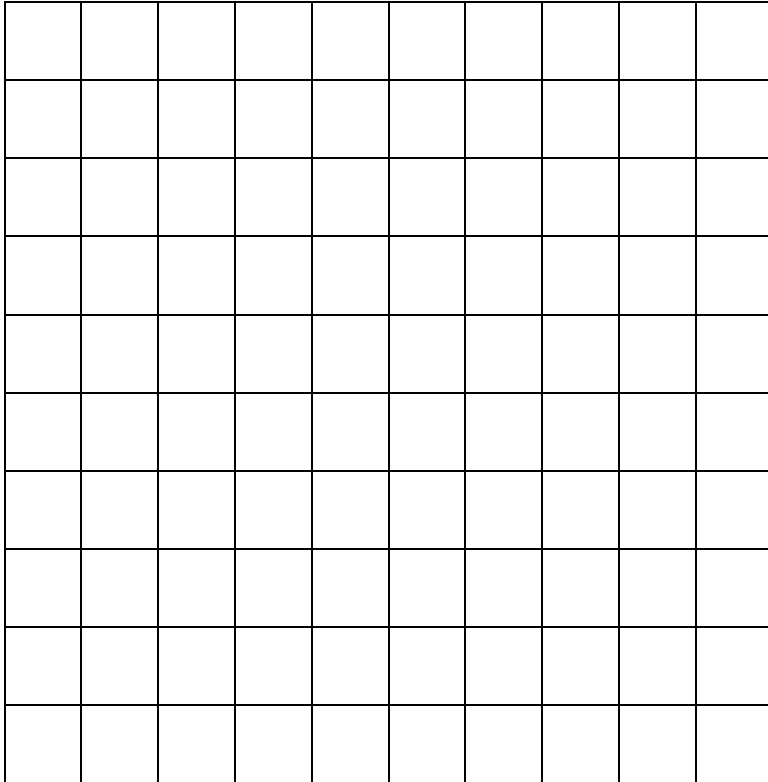
In this experiment, you are instructed to heat a sample of soil and a sample of water with heat lamps and then measure the temperature of each sample several times.

Your prediction was that the temperature of the water would rise at a faster rate than the rate that the temperature of the soil would rise.

Suppose that the experiment yielded the results shown in the table below.

| Time (min) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Soil Temp (°C) | 20 | 21 | 22.5 | 24 | 26 | 27.5 | 29.5 | 30.5 | 32 |
| Water Temp (°C) | 20 | 21.5 | 23 | 23.5 | 24 | 25.5 | 26 | 27.5 | 28.5 |

2. Use the grid to graph the data from the table. Then analyze the results to determine whether the data supports or refutes your prediction. Be sure to label each axis clearly.



Use evidence to explain whether the data supported or refuted your prediction.

Item type: 3-CR

Conducting Investigations
8. Use accepted methods for organizing, representing, and manipulating data

Developing Explanations
11. Analyze data, including determining if data are relevant, artifact, irrelevant, or anomalous
12. Use evidence to support and justify interpretations and conclusions or explain how the evidence refutes the hypothesis

DOK 1 - Perform a routine procedure (graphing data)
DOK 2 – compare data; display data; Interpret information from a simple graph
DOK 3 - Form conclusions from experimental or observational data; justify a response; Explain thinking (beyond a simple explanation or using only a word or two to respond)

Part 2

4. At a beach that has white sand, you measure the temperature of the sand and the temperature of the seawater at 9:00 a.m. You find that both have a measure of 16°C. If it is clear and sunny all morning, what do the data from the classroom experiment predict about the temperature of the white sand compared to the seawater at noon?

Explain your answer.

Item type: 3-CR

Formulating Questions & Hypothesizing

1. Analyze information for the purpose of formulating a question, prediction /hypothesis

2. Construct coherent argument in support of a question, hypothesis, and prediction

DOK 2 or 3 depending on complexity of argument

DOK 2 – Specify and explain the relationship between facts, terms, properties, or variables

DOK 3 – Form conclusions from experimental or observational data; justify a response; Explain thinking (beyond a simple explanation or using only a word or two to respond)

5. Summarize the results from the classroom data. Then explain why a prediction based on this data *might be* wrong.

Item type: 3-CR

Developing and Evaluating Explanations

Inquiry Construct:

10. Summarize results based on data

#12. Use evidence to support and justify interpretations and conclusions or explain how the evidence refutes the hypothesis

DOK 2 - Interpret information from a simple graph; Specify and explain the relationship between facts, terms, properties, or variables

DOK 3 – Form conclusions from experimental or observational data; justify a response; Explain thinking (beyond a simple explanation or using only a word or two to

6. Use what you know and what you have learned from this data analysis to explain how the differential heating of water can affect the climate near a large body of water.

Item type: 3-CR

Content Alignment: ESS1 (5-8) SAE+ POC –4
Explain the role of differential heating or convection in ocean currents, winds, weather and weather patterns, atmosphere, or climate.

DOK Level 3: Provide an explanation of a principle;
Explain phenomena in terms of concepts

