



Science Assessment System Through Course Task

Manny's Trip

Grade Level:

3

Phenomena:

Climate Not Determined Only by Latitude

Science & Engineering Practices:

Analyzing and Interpreting Data
Engaging in Argument from Evidence

Crosscutting Concepts:

Patterns

Designed and revised by Kentucky Department of Education staff
in collaboration with teachers from Kentucky schools and districts.



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Preparing to implement Through Course Tasks in the Classroom

What is a TCT?

- TCTs are 3-dimensional tasks specifically designed to get evidence of student competency in two dimensions, Science and Engineering Processes (SEPs) and Crosscutting Concepts (CCC), untethered from Performance Expectations (PEs)/standards. Tasks are sense-making experiences.
- Tasks are to be used formatively. The goal is for both students and teachers to understand areas of strength and improvement for the SEP(s) and CCC assessed within the task.

How do I facilitate a Through Course Task (TCT)?

- TCT facilitation is a collaborative process in which teacher teams calibrate understanding of the expectations of the task and refine strategies to be used during task facilitation.

Before the task:

1. Complete the TCT as a learner – compare understanding of task through the lens of success criteria (identified in the task) in order to understand expectations.
Success criteria include:
 - What is this task designed to get evidence of?
 - What is the task asking the students to do?
 - What might a student response look like?
2. Identify the phenomenon within the task. Consult resources to assure teacher teams have a deep understanding of associated science concepts.
3. Collaborate to generate, review and refine feedback questions during facilitation.
4. Identify potential “trouble spots” and plan for possible misconceptions.

During the task:

5. Collect defensible evidence of each student’s competencies in 3-dimensional sense-making for the task.
6. Ask appropriate feedback questions to support student access and engagement with the task in order to elicit accurate evidence of student capacities.

After the task:

7. Reflect on the task as a collaborative team.
8. Review student work samples to identify areas of strength and areas of need.
9. Determine/plan next steps to move 3-D sense making forward through the strengthening of the use of SEPs and CCCs.

Using the materials included in this packet:

- **Task Annotation:**
 - The task annotation is a teacher guide for using the task in the classroom. Additionally, the annotation gives insight into the thinking of developers and the task overall.

- Each task has science and engineering practices, disciplinary core ideas, and crosscutting concepts designated with both color and text style:
 - **Science and Engineering Practices**
 - *Disciplinary Core Ideas*
 - Crosscutting Concepts
- **Student Task:** The materials to be used by students to complete the TCT.

Manny's Trip Task Annotation

Task Template: After **analyzing and interpreting data** *about yearly temperature and precipitation of four South American cities*, **use evidence to develop an argument** *supporting whether Antofagasta, Chile is or is not a tropical climate* using the patterns in the data as evidence.

Overall intent

This task is get evidence of students' ability to develop an argument supported with evidence from their data analysis.

Phenomenon within the task

Manny is going on a trip to Chile in South America. Since the city is located near the equator, he thinks it will have a tropical climate. He has collected some data about 4 cities located in South America and has asked you to analyze the data to determine if this city in South America has a tropical climate. The phenomenon is that a region's climate is not solely determined by its location on the Earth. Even though energy from the Sun to the outside of the atmosphere is the same for a given latitude, other factors also determine a region's climate.

List components of the task/resources used with the task.

- Page 1: Storyline: Manny's problem and tropical climate information
- Page 2: Task and table with information for the four South American cities
- Page 3: Bar graphs with information for the four South American cities
- Page 4: Map of South America

Ideas for setting up the task with students

- Before completing the task, students need to understand that weather is a combination of sunlight, wind, precipitation, and temperature in a particular region and time and that climate describes typical weather conditions for a region over time. Students need to know that climates are usually warmer near the equator. Completing a unit on the various climate zones (especially the tropical climate) would be very helpful for student background knowledge.

- Some background in reading tables and graphs would be helpful.
- Citing evidence to support a claim will have been taught in reading and science as well. This TCT should elicit evidence of students' ability to cite evidence using data.
- Before implementation of this TCT you could facilitate a discussion about a different type of climate and create a graph or table of different cities' temperature and precipitation. In small groups students could analyze the temperatures and precipitation amounts to determine a city's climate. Have each group share out their claim and the evidence from the data that supports that claim. Be careful not to scaffold too much so that when students are engaging with the data in this or any task, they can transfer the skill of analyzing and interpreting data to a different phenomenon.

Intent of the Task for Assessment

This task was designed to get evidence of students' ability to develop an argument supported with evidence from their data analysis. The student should construct an argument that states Antofagasta, Chile is NOT a tropical climate. The student will use the available resources to support their argument that Antofagasta, Chile doesn't have enough rainfall to be a tropical climate.

Success Criteria

Evidence of Learning Desired based on Progression from Appendices

Analyzing and Interpreting Data

- Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or computation.

Engaging in Argument from Evidence

- Construct and/or support an argument with evidence, data, and/or a model.

Patterns

- Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena and designed products.

Success Criteria

- The student will construct an argument stating whether Antofagasta, Chile is or is not a tropical climate.
- The student will use the available resources and patterns to support their argument by citing evidence from patterns they identify in the data.

Possible Student Responses

Any correct response will state that Antofagasta, Chile is NOT tropical and will use the data showing the lack of rainfall as evidence. Students may also use the temperature data to support their claim.

- “Antofagasta, Chile is not tropical because it receives hardly any rainfall throughout the whole year.
- The table and the graph show the average rainfall for Antofagasta is 0 inches. Since tropical climates have lots of rain (at least 25 inches per year), this data proves Antofagasta, Chile cannot have a tropical climate.”

Extensions and/or other uses after the task is implemented

- Students could use a climate map or other resource to check their claim.
- Students could develop questions based on the information given using the Question Formulation Technique. The questions students asked could lead to lessons for a science unit on weather and climate.
- Students could research their own cities to determine the climate.

Through Course Task – Manny’s Trip

Storyline

Your friend, Manny, is confused. Manny’s dad has explained to their family they would be traveling to the city Antofagasta in Chile. Manny hurried to find a South America map to locate this city. To his delight Antofagasta was just south of the equator. Manny’s class had been studying the equator in 3rd grade, and he remembered that most climates near the equator were tropical. He couldn’t wait! Manny had always wanted to visit a tropical climate. Manny knows a lot about the characteristics of a tropical climate.

Much of the area around the equator within the tropical climate zone has hot and humid weather. There is much rainfall there, at least 25 inches each year. During certain periods, thunderstorms can occur every day. This area still receives considerable sunshine, and with the extreme rainfall, provides ideal growing conditions for rich vegetation.

Because much of the sun’s heat is used up in evaporation and rain formation, temperatures in the tropics rarely exceed 95°F; a daytime maximum of 90°F is more common. At night the abundant cloud cover limits heat loss, and minimum temperatures fall no lower than about 72°F. These temperatures stay consistent throughout the year. The seasons are not very noticeable, and are distinguished not as warm and cold periods but by rainfall and cloudiness. Manny gathered some data to help him decide if Antofagasta had a tropical climate. He then gathered data from three other countries along to the same latitude. Manny has asked you to help him analyze some data he compiled of the four South American cities.

Task:

- A. Construct an argument that states whether Antofagasta, Chile is or is not a tropical climate.
- B. Use the evidence from the data to support your argument.

You have the following resources –

- Yearly temperature and precipitation data for each city (*The same data has been presented in two different ways – in a table and in graphs.*)
- South America map with Antofagasta and the other cities.

SOUTH AMERICAN CITIES	AVERAGE TEMPERATURE (Degrees in Fahrenheit)	AVERAGE PRECIPITATION (Inches)
Antofagasta, Chile	63	$\frac{1}{10}$
Asuncion, Paraguay	73	53
Sao Paulo, Brazil	67	57
Rio de Janeiro, Brazil	75	46



