

# SCIENCE TASK ANNOTATION

## ANNOTATION KEY

### EQUITY

Supporting a wide range of diverse students.

### SCENARIOS

Information provided to elicit performances.

### SEPs

Opportunities to demonstrate science and engineering practices.

### DCIs

Opportunities to demonstrate understanding of disciplinary core ideas.

### CCCs

Opportunities to demonstrate understanding of crosscutting concepts.

### SENSE-MAKING

Opportunities for reasoning about phenomena and problems.

### ASSESSMENT PURPOSE

Highlights how the task features connect to intended assessment use.

## WATER WISE STUDENT INSTRUCTIONS

Overall: because this is an embedded formative assessment, additional annotations are included on the student work sheet and stakeholder information cards.

### INTRODUCTION

#### Stakeholder Role Play — What will be the future of California City

California City is a beautiful town in central California. Many people move there every year. The city has a beautiful river and lake, called City River and City Lake. Many different groups use the water from the river and lake. Families use the water in their homes. The local farmers water their crops to grow food for the city. The local factories use water to make products. The power plant needs to use water to make electricity to power the city. All of the people who use water in their homes or businesses are called *stakeholders* because they all have different reasons to care about how water is used in the city.

This contextual information helps give students a reason to engage with the task. By providing students with information about the community, and why the water sources are important to a range of stakeholders, the task provides an opportunity for students to find a point of relevance and meaning in the task.

Additionally, the definition of "stakeholder" scaffolds the reading load by providing a definition for unfamiliar terms without interfering with student sense-making.

SCENARIOS

EQUITY



Picture of City Lake in California City

## WATER WISE STUDENT INSTRUCTIONS (CONTINUED)

### Current Situation:

There has been less rain and snow than usual for many years in California City, which has caused a drought. The drought means that the river and lake have less water in them, so the water level of the lake is getting lower and lower. Also, since 1950 more and more people have been moving to California City, which means more people and businesses are using the water.

This contextual information is building toward an intriguing and problematized scenario that can drive sense-making. It could be improved by providing a little more real data and keying in on real, specific problems facing the stakeholders in California City.

SCENARIOS

By describing the implications of a drought, this scenario provides support for students who might not be familiar with the language.

EQUITY

The need for water has become a more important issue because the drought has caused the state of California to require all cities to use significantly less water than last year. California City needs to find a way to help the large number of stakeholders that now live and work there to use less water.

This has the potential to be an intriguing, comprehensible problem; it would be improved with a clearer connection to some specific aspects of the problem and some disciplinary ideas; however, the ambiguity allows for customization within the classroom, making it flexible enough to respond to a range of student interests and ideas.

SCENARIOS

EQUITY

To help solve this problem, your class will hold a mock City Council meeting. Groups will be responsible for studying the water use of one stakeholder group, and brainstorming solutions they might use to reduce water use. Each group will act as a stakeholder and give a presentation to the City Council. In the City Council meeting, your class will discuss the different water use of the stakeholders as well as the potential solutions available. Then, you will write a letter to the mayor that combines all the scientific information you have heard to make a suggestion for a citywide water-saving plan.

This will likely be an engaging activity for 5th grade students. However, it should be noted that this is rather contrived. This task set up could be improved with the inclusion of some real external stakeholders participating in the city council meeting; reading the letter to the mayor; or other approaches to increase the authenticity of the task, which might help more students engage deeply with the task.

SCENARIOS

EQUITY

It might be difficult for some 5th grade students to "imagine" or put themselves in the situation of a particular stakeholder group. It might be helpful if there were modifications or particular next steps for teacher to engage students having difficulty with this aspect of the task.

EQUITY

## WATER WISE STUDENT INSTRUCTIONS (CONTINUED)

### KNOWLEDGE AND SCIENCE PRACTICES BEING ASSESSED

In this assessment, you will demonstrate your ability to:

- Obtain and combine information using text, diagrams and charts.
- Describe the amount of water used by different stakeholders.
- Describe solutions to reduce water use by different stakeholders.
- Explain how changing the water use of some stakeholders impacts the city's water use as a whole.
- Communicate scientific information orally and in writing.
- Describe a citywide water-saving plan that combines multiple sources of scientific information.

Student products to be assessed:

- 1) Stakeholder presentation (group)
- 2) Letter to the Mayor (individual)

This task includes both group and individual artifacts, supporting a wider range of interpretation of student thinking as well as multiple ways for students to make their thinking visible.

**EQUITY**

**CONNECTION TO ASSESSMENT PURPOSE**

## WATER WISE STUDENT INSTRUCTIONS (CONTINUED)

### INSTRUCTIONS

**Part A: Study information about Stakeholder water use (in your stakeholder group):**

- Read the **Stakeholder Information Card** with your group and answer the questions together.
- As a group, decide how much any water-reducing solutions made by this stakeholder will impact the city's total water use as a system and why.

**Overall: this task provides students with a variety of options for including their ideas as an important part of the task and for making their thinking visible, including written reports, group discourse, group presentations, and written notes.**

#### EQUITY

Responding to this prompt requires students to work collaboratively to analyze and interpret information from the stakeholder information card to serve as evidence, and respectfully argue with that evidence to come up with an evidence- and reasoning-supported claim.

This allows students to demonstrate facets of their understanding of the SEPs "analyzing and interpreting data" as well as "engaging in argument from evidence" in service of sense-making related to the problem, with the possibility of showing a wide range of sophistication (including grade-appropriate elements). Because of the performance-based nature of the task, it is also possible students will demonstrate other SEPs as well.

SEPs

SENSE-MAKING

## WATER WISE STUDENT INSTRUCTIONS (CONTINUED)

**Part B: Prepare — Stakeholder presentation (in your stakeholder group):**

- Use your Stakeholder Information Card to help you write a presentation that your group will give to the city council. The presentation should be about 5 minutes long.

This produces an initial formative artifact of student thinking to provide students with feedback as the task progresses.

### CONNECTION TO ASSESSMENT PURPOSE

• Your presentation needs to:

- Describe how your stakeholder uses water to support the community
- Describe how much water your stakeholder uses in relation to other stakeholders
- Describe any solutions your stakeholder can take for reducing water use
- Use evidence (information, graphs and data) to support your reasoning about how much the solution could reduce your water use.

By developing this presentation, students continue to build on the SEPs identified earlier, as well as demonstrate their ability to engage in the SEP “obtain, evaluate, and communicate information” and at range of sophistication (see stakeholder card document for more information).

It should be noted that during this group aspect of the task, students are given information that helps them build the understanding described in 5-ESS3.C “human activities in agriculture, industry, and every day life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments.” This provides 1) opportunities to develop this idea, and 2) formative assessment opportunities to monitor students’ growing understanding of the DCI, rather than asking students to bring a previously-developed understanding to the table to respond to this part of the task.

SEPs

DCIs

SENSE-MAKING

- Show your presentation to your teacher for feedback. Make revisions based on the feedback you receive.

This is a nice formative check for both students and teachers.

### CONNECTION TO ASSESSMENT PURPOSE

## WATER WISE STUDENT INSTRUCTIONS (CONTINUED)

### Part C: Presentation — City Council Meeting (whole class in groups):

- City Council procedure:

#### 1) Introductions

- Mayor (Teacher) reviews the reason for the meeting

#### 2) Community Forum

- Stakeholder groups make their presentations

When students make their presentations, they are demonstrating part of the SEP Obtaining, Evaluating, and Communicating Information element “communicate scientific information orally and/or in written formats...”

SEPs

- Take notes about other stakeholders’ water use and solutions because you will need them later.

A data table to be complete could be a useful scaffold for students that struggle with note taking

It might be helpful to scaffold this by providing options for ways to take notes, to support learners who may struggle with writing, or are still developing an understanding of how to take effective notes.

EQUITY

#### 3) Community Discussion

- Summarize the stakeholders’ water needs, noting which stakeholders are using the most water and the least water
- Which stakeholder solution should reduce water use the most? Why?
- Which stakeholder solution should reduce water use the least? Why?

This approach allows students to also bring their ideas and experiences to the table as meaningful components of the task.

EQUITY

When students make supported claims about which stakeholders should reduce water use the most and least, they are sense-making with the SEPs and CCCs while developing their understanding of the DCIs.

When students evaluate the information provided by multiple stakeholder groups to form claims and engage in community discussion, they have the opportunity to demonstrate their understanding and ability to use several SEP elements of engaging in argument from evidence at a range of sophistication. When they connect the activities of a single stakeholder group to the city-wide needs, they have the opportunity to demonstrate their understanding of and ability to use the Systems and System models elements at a range of sophistication, particularly the 3-5 element “a system can be described in terms of its components and interactions.”

SEPs

CCCs

SENSE-MAKING

## WATER WISE STUDENT INSTRUCTIONS (CONTINUED)

### Part D: Write - A Letter to the Mayor (individually):

- Review your notes about how all of the different stakeholders use water and each of the solutions being considered by the City Council.
- Write a Letter to the Mayor that combines information from multiple stakeholders to make a suggestion for a citywide water-saving plan.
- Your Letter to the Mayor needs to:
  - Explain why all stakeholders will need to change their water use, but some will need to do so more than others.
    - Explain how changing the water use of some major stakeholders impacts the city's water use as a whole system.
  - Identify which stakeholders you think should change their water use the most in order to reduce all of California City's water use.
    - Explain why these stakeholders are the best options for reducing water use in California City.
    - Support your explanation with evidence, including text, charts or graphs that show how much water different stakeholders use and why.
  - Make recommendations for how these stakeholders might reduce their water use. Support your recommendations with evidence, including text, charts or graphs.

The individual component of the assessment allows students to individually show what they know and can do, based on the group activities preceding it. This allows teachers and students to focus on feedback for each student, while ensuring the group work and interactions were a meaningful part of the assessment.

### CONNECTION TO ASSESSMENT PURPOSE

The emphasis of the individual task is written, which may obscure some students' ability to show what they know. See the student worksheet annotation for more information.

### EQUITY

Without the prior group work, this would be a rich assessment of students ability to use the SEPs and CCCs in service of sense-making to propose a solution to the problem identified as well as to build understanding of the targeted DCI. Because the group work so closely mirrors what is asked of individual students:

- 1) this part of the task enables all students to show what they learned and understood during the group work, and
- 2) it limits how much new sense-making/student thinking is being demonstrated here.

If the community discussion students had left many options on the table, this can be a rich opportunity for students to show their thinking connected to multiple dimensions; but it is also possible that students individual work might be a recitation of the discourse shared during the community discussion. Interpretation of student responses will need to be highly contextual, based both of the responses of students as well as teacher understanding of the classroom dynamics during the group work.

Regardless, students will demonstrate their ability to write claims supported by evidence and communicate their thinking, demonstrating parts of the SEPs engaging in argument from evidence and obtaining, evaluating, and communicating information.

SEPs

CCCs

SENSE-MAKING

### CONNECTION TO ASSESSMENT PURPOSE