

Aligning assessment tools for assessment-driven design

1. Assessment task
2. Rubric
3. Sample or real student artifacts

Do the artifacts allow you to diagnose proficiency on all aspects of the rubric? If not, would you adjust the rubric dimensions or quality definitions?

How could you adjust the assessment task to ensure that what it leads students to produce is aligned with the rubric?

Revisions needed to align goals, evidence, and ways to elicit evidence: Backward Design

1 Assessment Task

Provide a claim about what will happen in each scenario, give the evidence for your claim, and use your underlying knowledge of water potential to explain why your evidence supports your claim.

Dimensions of Concept	0	1-2	3
Claim	Does NOT make a discernable claim statement	Makes a claim that: does not specifically address the question	Elements in 2 and also qualifies claim
Evidence	Does NOT provide evidence or data OR Repeats data but does not use as evidence	Evidence provided: Accounts for and uses all relevant data as evidence	Accounts for and uses all relevant, actual data
Reasoning	Does NOT provide reasoning	Reasoning includes: repeat of evidence and/or claim, only implies principle	Includes statement of a general principle or concept

differing soil conditions (salty, dry soil vs. wet soil)? In your explanation, please provide a claim about what will happen in each scenario, give the evidence for your claim, and use your underlying knowledge of water potential to explain why your evidence supports your claim. Water moves to where ever it can have negative potential:

3. Dry soil would have less water than wet soil, and the water potential would be more negative. Moreover, an increase in solutes cause solute potential to decrease ↓ more negative. pressure potential stays the same. And the overall water potential becomes more negative and draws water into the cell.

2 Actual or Sample Student Artifact

3 Rubric

Sample Artifact Refines Rubric

Creating a sample learner artifact, either in response to your assessment task or as what you would define as an example of complete understanding, aids in clarifying what the quality definitions should be capturing. It may even identify a problem of the knowledge statements in your dimensions. You may have too big of a rubric or not capturing something important as a dimension.

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Dimensions of Concept

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1-2

3

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Makes a claim that does not specifically address the question

Elements in 2 and also qualifies claim

Evidence

Does NOT provide evidence or data OR Repeats data but does not use as evidence

Evidence provided: Accounts for and uses all relevant data as evidence

Accounts for and uses all relevant, actual data

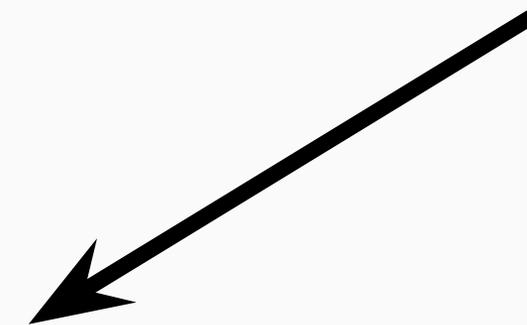
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Actual or Sample Student Artifact



Rubric

Aligning the Rubric and the Assessment Task

Closely examining how your prompt aligns with your rubric will help you in revising something specific in your assessment task. In this case, the green text was added in order to better prompt students to address the reasoning portion of the rubric. Not prompting to elicit understanding of your rubric may lead to a lack of evidence of student understanding or not understanding, which means you can't assess it either way.

*Provide a claim about what will happen in each scenario, give the evidence for your claim, **and use your underlying knowledge** of water potential to explain why your evidence supports your claim.*

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Those were just two examples. You can look to see how all three of these align with each other as a way to revise systematically!

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2 Actual or Sample Student Artifact

3 Rubric

Assessment Task has several pieces: Keep track of what elicits student response aligned with rubric

-Context that's related to course: IL's can and should help here

-Prompts that elicit student understanding of content, or other non-practice learning outcomes

-"Practice Prompt" that directly elicits student understanding of practice rubric. This can be mostly generalizable to other courses or contexts. We have been prioritizing this prompt!

BONUS (3pts) Rocsana is interested in understanding how a specific endangered species of flowering plant, the Golden bearpoppy (*Arctomecon californica*) will respond to drought stress from climate change impacts in areas of the western United States. She is particularly interested in understanding what may happen to water movement in the roots of these flowers during times of extreme physical stress. She has some hypotheses about whether water will tend to move into a root cell or out of a root cell depending on the soil conditions, but she wants to test her ideas. To begin her investigation, Rocsana poses the following question: Where is water likely to move in differing soil conditions (salty, dry soil vs. wet soil)?

She collects 100 samples of bearpoppy roots from the same general area, and she places 50 samples in a soil treatment that is very dry and salty. She places the other 50 samples in a different soil treatment where the soil has much more water. She collects the following averages in her data table. Please use this table and your knowledge of water potential to answer questions 1-2 below.

1. Using your knowledge of the water potential equation, fill in the missing data in column D and G for both the salty, dry soil and the wet soil.

$$\Psi = \Psi_{\text{solute}} + \Psi_{\text{pressure}}$$

2. Given the above evidence, do your best to answer Rocsana's research question: Where is water likely to move in differing soil conditions (salty, dry soil vs. wet soil)? In your explanation, please provide a claim about what will happen in each scenario, give the evidence for your claim, and use your underlying knowledge of water potential to explain why your evidence supports your claim. Water moves to where ever it can

"Authentic" Assessment

-Doing the task in much the same way that a scientist or engineer would be doing it

-Replicates or simulates realistic contexts

-We still acknowledge that we want to be clear in what we want students should do

-But we move away from directive questions that guide them to what they should address, specifically

-Allows good assessment: you have a range of responses for each dimension

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Revisions in order to:

-Require students to identify what hypothesis was that claim should be related to

-Requires students to apply that claim appropriately to different scenarios

-Directs them to use underlying knowledge, but doesn't tell them what knowledge specifically

2. Scientists make claims (conclusions or an argument about something) using evidence and underlying knowledge about that phenomena or system. Make a scientific claim based on Roczana's hypothesis and the data collected.

3 Tools Inform Task Req's & Teaching Interventions

Interventions

If your assessment tools make refer to “all data” in CER, you need to make sure there are multiple datasets

If your rubric elevates “multiple models” as a dimension, assessment task needs to require the use of more than one model

Beyond assessment task contexts, we hope that tools will be used to inform course design and activities, and guide specific feedback on practices that instructors can give students

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A Experimental treatment	B Solute potential of plant root cell before placing in soil (mPa)	C Pressure potential of plant root cell before placing in soil (mPa)	D Water potential of plant root cell before placing in soil (mPa)	E Solute potential of soil (mPa)	F Pressure potential of soil (mPa)	G Water potential of soil (mPa)
Salty, dry soil	-0.3	0.1	-0.2	-0.4	0	-0.4
Wet soil	-0.3	0.1	-0.2	-0.1	0	-0.1