

Using evidence to make a claim

Claim Evidence Reasoning (CER)

Directions: Using the data collected in 2017 from Oak Creek and Picture Canyon, you will make a claim about water quality and use evidence to back up your claim. Final typed paragraph must be created in Google Docs and uploaded to Google Classroom. *The question being asked is does Oak Creek or Picture Canyon have the better water quality?*

Attached is data from 2017 comparing Oak Creek and Picture Canyon (Rio de Flag). Which water source has better quality and WHY (this is where you need to use evidence to back up your claim). What is your reasoning?

Hint: Look at the total number of organisms (what kinds are most prevalent) and the total number of overall species (how many different types of organisms are you finding). Which source is richer (has more diversity)? What types of invertebrates are you finding – tolerant, somewhat tolerant or sensitive? Find the Water Quality Rating for Oak Creek and Picture Canyon (this is last column in the data sheet. Follow the instructions given on the data sheet to find the score for each water type).

Due: Thursday November 15th by 3:15

Points: 20 points

MAKE SURE TO ADDRESS ALL THREE PARTS – CLAIM, EVIDENCE AND REASONING.

Use the attached graphic organizer to help.

2017 data

MACROINVERTEBRATE DATA SHEET

Please check the box next to the "Site #" if this is a new site and please be sure to attach a map. (PLEASE PRINT)

Site # _____ Stream _____ County _____

Site Location _____

Date ____/____/____ Time (military time) _____ Rainfall (inches in last 7 days) _____ Water Temp. (°C) _____

Trained Data Submitter (responsible volunteer) _____ Stream Team Number _____

Participants 30 Pks 30 Pks

Invertebrate Type	Net Set #1	Net Set #2	Net Set #3	Score
Habitat type →	<u>Oak Creek</u> <u>Picture Canyon</u>			After entering the number (#) of organisms collected, circle the number below for every type of organism collected. Add the numbers circled and record the totals as your Water Quality Rating.
Net Type (circle type) →	Kick Net or D-Net			
Time Spent Picking (Minutes picking x number of people picking)	min. picking _____ × # people _____ = total min. _____	min. picking _____ × # people _____ = total min. _____	min. picking _____ × # people _____ = total min. _____	
Sensitive	# of Organisms	# of Organisms	# of Organisms	
Caddisfly Larvae	<u>33</u>			3
	<u>61</u>			3
Mayfly Nymphs	<u>23</u>			3
Gilled Snails (right)				3
Riffle Beetles	<u>1</u>			3
Stonefly Nymphs	<u>7</u>			3
Water Penny Larvae				3
Somewhat Tolerant	# of Organisms	# of Organisms	# of Organisms	Circle Types Present
Other Beetle Larvae		<u>3</u>		2
Clams/Mussels				2
Crane Fly Larvae	<u>1</u>			2
Crayfish				2
Dragonfly Nymphs	<u>2</u>	<u>33</u>		2
Damselfly Nymphs		<u>330</u>		2
Scuds	<u>1</u>			2
Sowbugs				2
Fishfly Larvae		<u>2</u>		2
Alderfly Larvae				2
Watersnipe Fly				2
Tolerant	# of Organisms	# of Organisms	# of Organisms	Circle Types Present
Aquatic Worms	<u>41</u>	<u>435</u>		1
Black Fly Larvae	<u>2</u>			1
Leeches	<u>7</u>	<u>33</u>		1
Midge Larvae	<u>12</u>	<u>1</u>		1
Pouch Snails (left)	<u>12</u>	<u>171</u>		1
Other Snails (flat)				1
< 12 = Poor 12-17 = Fair 18-23 = Good >23 = Excellent				Water Quality Rating

DO THIS 77

←

Comments (mention any changes from your usual readings)			
Overall # organisms	<u>203</u>	<u>1068</u>	
# families (Richness)	<u>13</u>	<u>8</u>	
Fish Present (Please Mark) Yes <input type="checkbox"/> or No <input type="checkbox"/>			

Oak Cr. Picture Cyn

Practice

Select a writing prompt from the OAS sample items that is most relevant to your subject area. Then use the Q-CER graphic organizer to analyze both an extended-response test item.

Question:	
Claim:	Evidence:
Reasoning: The evidence shows: I know (relevant disciplinary ideas – i.e., scientific facts and concepts that help answer the question): I can apply (relevant crosscutting concepts – i.e., big ideas that connect the concepts and evidence): Therefore, I can conclude that:	



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Sample Argument: Light & Plant Growth

Two biology students, Christina and Andrew, set up an experiment to help them determine how light affects plant growth. The students placed bean seedlings in three locations with their classroom and measured the growth of the bean seedlings over the next five days. Bean seedlings that were placed in a dark closet grew 5 cm in 3 days, but then stopped growing. Bean seedlings that were placed on a countertop away from the window grew 10 cm in 5 days. Bean seedlings that were placed on a windowsill with full sunlight grew 15 cm in 5 days when. Andrew and Christina discussed the results of their experiment.



Christina: “Well, light helps plant grow. The plants on the countertop got some light and were able to grow. The plants in the window got more light, and that’s why those plants grew the most.”

Andrew: “That’s true, but the plants in the closet did grow. So, plants must not always need light to grow.”

Christina: “Well I remember learning in class that light gives plants energy, and they need the energy to grow. The plants in the closet must have had some energy stored up. But without light, they ran out of energy and stopped growing.”

Question: How does light affect plant growth?

Claim:

- Light provides energy that plants need to grow

Evidence:

- No light: initial growth, then death
 - 5 cm / 3 d, then died
- Moderate light: moderate growth
 - 10 cm / 5 d
- Full light: highest growth
 - 15 cm / 5 d

Reasoning:

The evidence shows:

- The evidence shows that increasing amounts of light produced increasing amounts of growth in the seedlings. The evidence also shows that seedlings were able to survive only for a short time without light.

I know (relevant disciplinary ideas – i.e., scientific facts and concepts that help answer the question):

- Sunlight is a form of energy
- Plants need light to make their own food through to survive (photosynthesis)
- Seeds can store energy

I can apply (relevant crosscutting concepts – i.e., big ideas that connect the concepts and evidence):

- Energy is required for all processes in living organisms
- Energy can be converted from one form to another (light → chemical)

Therefore, I can conclude that:

From the evidence, we can infer that plants can grow from seeds for a short time without light, but they need light to continue growing. Brighter light causes plants to grow faster than dimmer light. We know that light provides energy to plants. Therefore, seeds must have some way of storing energy for the new plant. Once that energy is used up, the plant can no longer grow unless it has light. Plants must have light because it provides energy for photosynthesis, which allows plants to make food.



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Claims, Evidence and Reasoning – Scientific Explanations Rubric Linked to SBAC Argumentative Writing

	4	3	2	1	0
<p>Claim – a conclusion that answers the original question</p>	<ul style="list-style-type: none"> Scientifically accurate Completely answers the question Common inaccurate claim(s) are clearly addressed. 	<ul style="list-style-type: none"> Scientifically accurate Nearly completely answers the question Inaccurate claim(s) are only generally addressed, no specifics 	<ul style="list-style-type: none"> Partially scientifically accurate Partially answers the question Inaccurate claim(s) are not addressed 	<ul style="list-style-type: none"> Is not scientifically accurate overall Does not adequately answer the question 	No claim
<p>Evidence – scientific data that supports the claim</p>	<ul style="list-style-type: none"> The data are scientifically appropriate to support the claim. The data are thorough and convincing – enough details and evidence provided. Proper units are used in data Shows with evidence why alternate claims do not work 	<ul style="list-style-type: none"> The data are scientifically appropriate to support the claim The data are basically sufficient and convincing, but tend to be more general and not as specific and in depth Does not address why alternate claims do not work Evidence may be repetitive 	<ul style="list-style-type: none"> The data relate to the claim, but are not entirely scientifically appropriate The data are not sufficient, though generally support the claim 	<ul style="list-style-type: none"> There is some evidence provided, but it is not logically linked to the claim or scientifically appropriate 	No evidence provided
<p>Reasoning – a justification that links the claim and evidence</p>	<ul style="list-style-type: none"> Reasoning clearly links evidence to claim Shows why the data count as evidence by using appropriate scientific principles There are sufficient scientific principles to make links clear between claim and evidence 	<ul style="list-style-type: none"> Reasoning adequately links claim to evidence Includes related scientific principles, but only passably clarifies why this data count as evidence Reasoning tends to be more general and shows only partial depth of content understanding 	<ul style="list-style-type: none"> Reasoning does not adequately link claim to evidence, or clarify why data count as evidence Includes related and non-related scientific principles, and shows little depth of content understanding 	<ul style="list-style-type: none"> Reasoning is clearly insufficient and relates only tangentially to question and claim at hand Scientific understanding is very limited 	Does not provide reasoning
<p>Language and Vocabulary</p>	<ul style="list-style-type: none"> Response clearly and effectively expresses ideas using precise, scientifically appropriate descriptions and vocabulary 	<ul style="list-style-type: none"> Response adequately expresses ideas and scientifically appropriate descriptions and vocabulary, but they are more general than specific 	<ul style="list-style-type: none"> Response inconsistently and sometimes inappropriately expresses ideas or scientific descriptions and vocabulary 	<ul style="list-style-type: none"> Focus not at all consistent Progression of ideas not logical Have an unclear claim that is not maintained 	Not understandable
<p>Focus and Organization</p>	<ul style="list-style-type: none"> Focus only on question at hand Logical progression of ideas Clearly stated and focused claim that is strongly maintained 	<ul style="list-style-type: none"> Focus mainly on question at hand, some loosely connected material present Logical progression of ideas Clearly stated and focused claim that is adequately maintained 	<ul style="list-style-type: none"> Focus not consistent on question at hand Progression of ideas not entirely logical Have a claim, but it's not entirely clear or maintained 	<ul style="list-style-type: none"> Focus not at all consistent Progression of ideas not logical Have an unclear claim that is not maintained 	No clear focus or organization