

Name:

Date:

Class:

CER Teacher Rubric

1. Evaluation Rubric

- **Claim:** Student identifies that layering materials by pore size (largest pores on top, smallest on bottom) creates the most effective filter.
- **Evidence:** Student explicitly states the change in clarity (e.g., "went from opaque brown to translucent yellow") and notes the pH change (e.g., "pH moved closer to neutral 7").
- **Reasoning:** Student explains that the "dirty water" is a heterogeneous mixture. They correctly identify that gravel/grass catches large debris, while sand/coffee filters catch small particles.

2. Connection to Standards (NGSS)

- **HS-PS1-3:** Relates the bulk properties of matter (size, state) to the filtration method.
- **HS-ETS1-3:** Evaluates the solution based on criteria (cleanliness) and trade-offs (lost water volume/cost).

3. Common Student Misconceptions to Watch For:

- *Misconception:* "The filter made the dirty stuff disappear." -> *Correction:* Matter was not destroyed; it was separated. The solids are trapped in the filter media.
- *Misconception:* "More materials always equals better water." -> *Correction:* Too many materials might absorb all the water, leaving zero volume recovered (a poor engineering result).

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Total Score: _____ / 16

Criteria	4 Exceeds Expectations (Advanced)	3 Meets Expectations (Proficient)	2 Approaching Expectations (Developing)	1 Below Expectations (Beginning)
CLAIM (<i>The Answer</i>)	Makes a precise, accurate statement linking the specific arrangement of materials (e.g., pore size gradient) to both water clarity and volume recovered.	Makes a clear statement linking the arrangement of materials to the cleanliness of the water. Answers the guiding question directly.	Makes a vague claim (e.g., "the filter cleaned the water") but does not mention material arrangement or specific design choices.	Claim is missing, incorrect, or does not answer the guiding question.
EVIDENCE (<i>The Data</i>)	Cites specific quantitative data (exact mL recovered, pH values) AND detailed qualitative observations (e.g., "opaque brown to translucent yellow"); comparisons are explicit.	Includes both qualitative observations and quantitative measurements but may lack specific units or detailed comparison.	Includes only one type of data (only observation OR only measurement), or data is vague (e.g., "it looked cleaner").	Evidence is missing, irrelevant, or invented (not based on the actual lab).
REASONING (<i>Scientific Principles</i>)	Expertly applies scientific vocabulary (<i>heterogeneous mixture, solute, solvent, suspension</i>). Explains how filtration works physically (separation by particle size) with no misconceptions.	Correctly uses key vocabulary (<i>mixture, filtration, particle size</i>); explains that the filter separated solids from liquids based on size.	Uses some vocabulary, but definitions may be imprecise; explanation of filtration is generic (e.g., "it caught the dirt") rather than scientific.	Reasoning is missing or contains major misconceptions (e.g., "the sand ate the dirt," or "the water disappeared").
REASONING (<i>Engineering Analysis</i>)	Insightfully analyzes trade-offs (e.g., "the sand cleaned best but absorbed too much water, reducing yield"). Identifying constraints and proposing why specific layers failed/succeeded.	Discusses the function of the layers (top vs. bottom) and mentions the results of their specific design.	Describes what the filter did but fails to link the design choices to the results; no mention of trade-offs or design logic.	No engineering analysis provided.

BROUGHT TO YOU BY

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Quick-Score Checklist (Optional)

If you prefer a faster grading method than the grid above, use this checklist for grading the CER.

Claim (2 pts)

- ☐ Answers the prompt directly.
- ☐ Links design structure to the outcome.

Evidence (2 pts)

- ☐ Includes pH or volume numbers.
- ☐ Includes descriptive observations.

Reasoning (4 pts)

- ☐ Uses vocabulary (mixture, particle size, etc.).
- ☐ Explains *why* coarse materials go on top (mechanical separation).
- ☐ Explains *why* fine materials go on bottom.
- ☐ Mentions trade-offs (speed vs. quality).

Mechanics (2 pts)

- ☐ Complete sentences.
- ☐ Legible and organized.

Total: _____ / 10

Teacher's Feedback: