Drawing to Learn about Science Teacher Thinking

*Science and Art Research for Creativity and Inclusion*
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Drawing as a method for accessing information about professional identity

www.drawntoscience.org
Draw yourself teaching science and your students learning science
Sample Drawings
Scoring Rubric

To what extent, if any, do drawings show evidence of teacher thinking related to the following goals?

• Experience excitement, interest and motivation to learn about phenomena in the natural and physical world [affective] (Goal 1)
• Come to generate, understand, remember and use concepts, explanations, arguments, models and facts related to science [cognitive] (Goal 2)
• Manipulate, test, explore, predict, question, observe and make sense of the natural and physical world [implementation](Goal 3)
• Participate in scientific activities and learning practices with others, using scientific language and tools [social] (Goal 5)

Example from the rubric

Manipulate, test, explore, predict, question, observe and make sense of the natural and physical world [implementation](Goal 3)

4 - Evidence in thought bubbles, comments, or activities of manipulating, testing, exploring, predicting, questioning, observing, or sense-making (4 or more present)
3 - Evidence in thought bubbles, comments, or activities of manipulating, testing, exploring, predicting, questioning, observing, or sense-making (3 present)
2 - Evidence in thought bubbles, comments, or activities of manipulating, testing, exploring, predicting, questioning, observing, or sense-making (2 present)
1 - Evidence in thought bubbles, comments, or activities of manipulating, testing, exploring, predicting, questioning, observing, or sense-making (1 present)
0 - No evidence of manipulating, testing, exploring, predicting, questioning, observing, or sense-making
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Drawing as a method for accessing information about teachers’ climate change ideas

Maryland and Delaware Climate Change Education, Assessment, and Research (MADE CLEAR)

NSF Phase I & II Climate Change Education Partnership (CCEP) grant
Draw all that you know about the causes and effects of climate change.
Sample Drawings from Teacher Candidates

- Hole in the ozone layer
- Sun
  \[ \text{CO}_2 \]
  \[ \text{temperatures are increasing} \]
- Earth
  \[ \text{resources are diminishing} \]
  - deforestation
  - fossil fuels
- Global warming
- Ocean levels are rising
- Too many cars!
“With a lot of the solutions to [climate change], …we know what the solutions could be, but there are political and economic reasons why we don’t do those things” (Melissa, interview data).
Analysis

Phase 1: Open coding – “Salience” (i.e., What aspects of climate change were salient to teacher candidates in their drawings and accompanying written explanations?)

Phase 2: Categorizing salient elements into “affective” (feelings of good/bad; optimism/pessimism; empathy) and “behavioral” (actions impacting environment positively or negatively) dimensions