

## Formative Assessment of Modeling Practice Throughout a Physical Science Course for Prospective Elementary Teachers

## ASTE 2023

Phenomenon





How can we assess prospective elementary teachers' modeling practice as they investigate and make sense of a phenomenon?









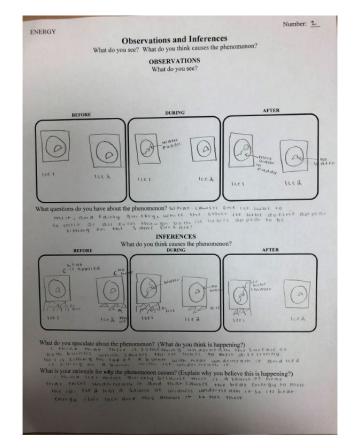


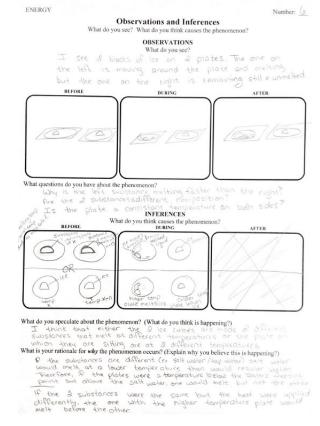
Why does one ice cube melt faster than the other?

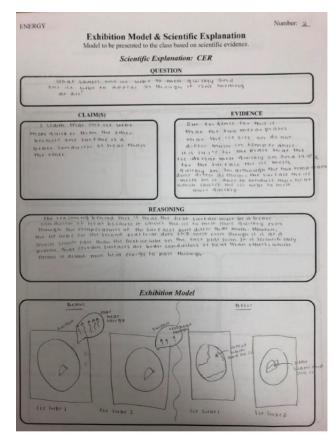
## Agree/Disagree w/ Features of Others' Models After We've Explored Models Initial Models Exhibition Model & Scientific Explanation OBSERVATIONS Provisional Model & Scientific Explanation Scientific Explanation: CER Agree and disagree based on scientific evidence, viewing other exhibition models, and peer discourse WRITE about what you see. Claim (Write out someone's claim). Claim (Write out someone's claim). What questions do you have about the phenomenon? CLAIM(S) This statement should answer the question. EVIDENCE This statement should include data as evidence of your cla Agree or Disagree? Explain. Agree or Disagree? Explain. DRAW what you see Claim (Write out someone's claim). Claim (Write out someone's claim). Agree or Disagree? Explain. Agree or Disagree? Explain. REASONING Connect the evidence to the claim. Use scientific concepts to reason about why the evidence supports the claim. VISUAL REPRESENTATIONS from other exhibition models. INFERENCES Representation 2: Representation 1: Exhibition Model Agree or Disagree? Explain. Agree or Disagree? Explain. DRAW to describe the mechanisms that cause the phenomenon to occur. (Draw what we can't see.) Representation 4: Agree or Disagree? Explain. Agree or Disagree? Explain. **EXAMPLES**

## Our Best Thinking Models

Provisional Model
Question
Claim
Evidence
Reasoning
#
Provisional Model
QUESTION
Provisional Model







Number: 2.  Tentific Explanation based on scientific evidence.	Exhibition Model & Scientific Explanation  Model to be presented to the class based on scientific evidence.  Scientific Explanation: CER			
ation: CER				
ON		QUESTION		
en quitty and	why does the substance on surface of melt at a different speed than the one on surface 2 (metal)			
EVIDENCE	CLAIM(S)	EVIDENCE THE Plant		
Our Evidence for this is that the time meroe place that the file sits and one of the time the file sits and one of the time the time the time time time the time time time time time time time tim	I claim that the ise will melt at a faster rate on surface of them surface it is made of some kind of metal and the other is some kind of food	When the temperature of was taken before the less cas applied the temp was 30°C, afterward themp of plate I was 11.6°C to plate 2 was 6.5°C. The ice of plate 2 melted, but not plate		
ING	REASONING			
first surface must be a bene, as it to me! more failing even failer that must, showever, still me even shough it is did a the first play form. It is seconifically distinct that the first play form. It is seconifically distinct to be call than others, which this up.	The fact that the temperature changed so much more an plate of than plate I shows that the metal plate conducts temperature changes at a much faster rate than the other substance. Therefore the ice cube metal faster on the metal plate because it was able to draw the heat energy out of the metal much faster than the foam plate			
Model	Exhibiti	ion Model		
Better  Description of the control o	ice melts ice melts  Slowly  Plate   Plate	4		

