Students Interview protocol Evaporative cooling Phenomenon

Evaporative cooling unit

Interview protocol for chemistry students

Hi *X (state the student's name), my name is Emil Eidin and I’m a researcher at Michigan State University. I’m interested in your experiences of learning the “Evaporative cooling” unit, and I would like to ask you a few questions about it, if that’s ok (wait for their consent). Your feedback will help us improve the unit and the software and make it better. Please be honest and open in your responses, they will only be used for our evaluation of the unit and will not affect your grades in any way. Also, this interview is absolutely confidential and will be used only for research purposes.*

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| --- | --- | --- | --- |
|  | Category | Question | Reason |
| 1 | Familiarity with unit’s context | Tell me about the unit, what was the unit about?  Can you tell me about your experience? |  |
| 2 | What was the main question (driving question) you were trying to answer during the lessons? Did you find the driving question engaging? |  |
| 3 | Static model | Can you walk me through your static model,   1. What is the question you are trying to answer in your model? 2. How did you go about planning your model? 3. How do you think your model helps you to answer the driving question? 4. Why did you choose this variable? What did you hope to accomplish? 5. Can you tell me how and why you connected those variables together? 6. Did the model work as you wanted it to work? Why do you think so? | This question presumes interviewer reviews student models ahead of time.  Semi-structured? |
| 4 | Moving from static to dynamic | What were the reasons to build a dynamic model? |  |
| 5 | How is your dynamic model different from your static model in explaining the phenomena? |  |
| 6 | Did moving from dynamic to static models contributed to your understanding of the evaporative cooling phenomena?  How come? |  |
| 7 | Dynamic model | Can you walk me through your dynamic model,   1. What is the question you are trying to answer in your model? 2. How did you go about planning your model? 3. How do you think your model helps you to answer the driving question? 4. Why did you choose this variable? What did you hope to accomplish? 5. Can you tell me how and why you connected those variables together? 6. Did the model work as you wanted it to work? Why do you think so? |  |
| 8 |  | Can you tell me how intermolecular forces can predict the rate of reaction? Does your model show that? |  |
| 9 |  | Do the IMFs of a substance change during evaporation? Why do you think so? |  |
| 10 |  | Let’s say you want to test the evaporation rate of 3 substances, with the following boiling points: Substance A: -73 °C; Substance B: 23 °C; Substance C: 100 °C  How would you rank the average kinetic energy of each of the substances at room temperature (23 °C)? |  |
| 11 |  | Can you explain why steam burns more that hot air coming from a hair dryer? |  |
| 12 |  | Would you consider the next sentence as true: Particles with high kinetic energy,necessarily have low potential energy.?  Explain your answer. |  |
| 13 |  | Can you draw me a graph of change of temperature over time as substances evaporate.  Explain the behavior of the graph in a microscopic level. IsDoes this behavior  is represented in your model? |  |
| 14 |  | How do you understand the phenomena in a microscopic level, can you draw me a model that explains it.  Does it match your graphs in your model? How would you explain that?  How is the model you drew is similar or different to your output model graph?  Would you change something in your model? |  |
| 15 |  | Can you predict the outcome if you change one of the variables? Can you give an example? What would you change in your model to improve your prediction? |  |
| 16 |  | Can you tell us how the teacher supported you in building your model? |  |
| 17 |  | What did you think about the sharing feature in the activity?  Did sharing your model with your peers contributed to your understanding of the phenomena? If so can you explain how? |  |
| 18 |  | Tell me about your experience working with SageModeler. How was it in comparison to your previous experience? |  |