Table 1

DCI(s) depicted in model: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Student Names (or Group Name): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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|  | **4 Advanced** | **3 Proficient** | **2 Approaching** | **1 Emerging** |
| **Revisions Over Time** | Student model identifies previous misconceptions or gaps in understanding and demonstrates a stronger grasp of the DCI throughout the slides in the screencast.  Scientifically sound revisions may be based on results from tests of student predictions made in earlier slides (or versions) of the model. | Student model shows a change *or* deepening (if student has correct initial understanding) in scientific understanding over time, leading to a stronger grasp of the DCI. | Student model shows a change in understanding over time, but it strays from the accepted scientific understanding. | Student model does not show a change in understanding over time. |
| **Student Sentence Frames** | “*We used to think… but now we realize…. Our evidence is …”*  *“We learned this after predicting…”*  *“As a result of…., we now think…”*  *“Before we thought…, but after our investigations our thinking changed because…”* | *“We used to think…but now we think…”*  *“We changed/revised/added to our our thinking because…”* | “*We think…, but maybe also…”* | “*We think….”* |
| **Based on Evidence** | Model includes explanations, drawings, and labels based on evidence that students have collected through readings, discussions, observations, and investigations. The model’s explanation explicitly references *multiple pieces* of evidence from activities or readings. | Model includes explanations, drawings, and labels based on evidence that students have collected through readings, discussions, observations, and/or investigations. At least one those activities and/or readings is referenced in the model. | Model includes some explanations, drawings, or labels that are based in new learning from class, but the model does not explicitly reference those class activities. | Model is based only on students’ pre-conceptions, or initial observations, about the phenomenon or prototype. |
| **Student Sentence Frames** | “*One reason we think this is that when we read we learned…”*  *“Another reason we think this is that when we investigated… we found…”*  *“We also learned when discussing as a class that…”*  *“According to our data, ….This proves…”* | “*One reason we think this is that when we read we learned…”*  *“One reason we think this is that when we investigated…we found…”*  *“Our data shows…”* | “*We learned…”* | “*We think…”* |
| **Components of the Model: *Identify and Describe***  **Key components:**  **-**  **-**  **-**  **-**  **-** | Model includes drawings, labels, and explanations that clearly identify and *describe* the relevant visible and invisible (using arrows) components of the phenomenon or prototype, using scientifically appropriate vocabulary.  Model explanations *also* specify the limitations of the model, when appropriate.  **For prototypes:** Model uses drawings, labels, explanations, and/or videos to *clearly* demonstrate and describe what it is proposing. | Model includes drawings, labels, and explanations that clearly identify the relevant visible and invisible (using arrows) components of the phenomenon or prototype, using scientifically appropriate vocabulary.  **For prototypes:** Model uses drawings, labels, explanations, and/or videos to demonstrate what it is proposing. | Model includes drawings, labels, and explanations to identify some components of the model, using some scientifically appropriate vocabulary. One relevant, and essential, component may be missing across the model’s revisions. | Model includes drawings, and some labels/explanations, to identify basic components of the model, but is missing 2 or more relevant, and essential, components. |

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| **Relationships** | Relationships between the components of the model are described through drawings, explanations, and labels. The relationships may be cause and effect relationships between the components, or the interactions between components in a system. Relationships are clearly identified and scientifically sound by the ending slide(s) of the model screencast.  **For prototypes:** model depicts *why* and *how* the components and their relationships are important to solving a problem. | Relationships between the components of the model are described through drawings, explanations, and labels. The relationships may be cause and effect relationships between the components, or the interactions between components in a system.  **For prototypes:** model depicts *why* the components and their relationships are important to solving a problem. | The model not only identifies relevant components, but also begins to describe the components’ patterns, scales (e.g bigger, smaller), or relationships. The components may be described through drawings, explanations, and/or labels. Descriptions are in their early stages. | One simple relationship or connection between some of the model’s identified components is shown in drawings, labels or explanations. |
| **Student Sentence Frames** | *“If…then…because…”*  *“These work together by…because…”*  *“One of the effects of…is…”*  *“…causes…”* | *“If…then…”*  *“These work together by…”*  *“One of the effects of…is…”*  *“…causes…”* | *“There’s a pattern showing…”*  *“\_\_\_\_\_\_ are much smaller/bigger than…”* |  |
| **Connections *(includes predictions)*** | Model logically and clearly connects the phenomena described to its real-life counterpart, or the prototype to its real life application. Explanations demonstrate an understanding that the model *represents* something real in the world, and that students are trying to make sense of it.  Students use the model to make predictions about the real life phenomena. They may test their prediction and use it to revise their model. | Model logically connects the phenomena described to its real-life counterpart, or the prototype to its real life application. Explanations demonstrate an understanding that the model *represents* something real in the world, and that students are trying to make sense of it. | Drawings and explanations begin to describe the real-life phenomena or prototype.  The link between the model and the real life phenomena it’s meant to represent is not clearly distinguished. | The model has drawings and explanations, but does not connect to a real life phenomena or prototype. |
| **Student Sentence Frames** | *“This happens in real life when…”*  *“This is similar to…because…”*  *“We predict….would happen in real life because…”* | *“This happens in real life when…”*  *“This is like when…”*  *“This reminds me of …because…”* |  |  |
| **Technology used to Enhance the Model** | The model effectively and efficiently uses screencasting tools such as: audio recordings, photos, drawing tool, laser pointer, typing, and multiple slides. These tools support a clear, thoughtful model.  Editing has been done to make the screencast clear and concise without wasted time on tools (i.e. audio recording in which nothing is being said about the model; adding in unnecessary items with the drawing tool that are not needed to describe or enhance the model) | The model effectively uses screencasting tools such as: audio recordings, photos, drawing tool, laser pointer, typing, and/or multiple slides. These tools support a clear, thoughtful model. | The model uses some screencasting tools such as audio recordings, drawing tool, laser pointer and/or multiple slides. The model may use too many tools, getting in the way of showing student thinking. Or, it may not use enough tools to fully support student thinking. | The screencasting tools do not enhance the model beyond a paper and pencil model.  Or  The screencasting tools are not used effectively to show the model, making student thinking difficult to understand. |