**Constructing Explanations and Designing Solutions (3 - 5)**

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| 1. **Constructing Explanations**
 | **0** | **1** | **2** |
| 1. **Explanation**

a. Students clearly explain an observable phenomenon, including a grade-appropriate level of the mechanism involved.b. When the explanation is given, students identify the explanation and any particular points that will be supported with evidence |  |  |  |
|  **2. Evidence to construct or support the explanation**a. Students identify the relevant evidence to support the explanation. Students use evidence that specifies variables that describe and predict phenomena. |  |  |  |
| **3**. **Reasoning to connect the evidence to construct or support the explanation**a. Students use reasoning to connect the evidence in order to construct the explanation of phenomena. b. When given the explanation and evidence, students use reasoning to describe which evidence specifically supports particular points within an explanation. |  |  |  |

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| 1. **Designing Solutions**
 | **0** | **1** | **2** |
| 1. **Using scientific knowledge to generate the design solution**

 - - - - - - - - - - - - - - - - - - a. Given a problem to solve, students collaboratively design a solution(s) to the problem. In the design, students: i. Identify the scientific information (e.g., observations, scientific knowledge, evidence) that is related to the problem. |  |  |  |
|  ii. Describe a solution(s) to the problem. |  |  |  |
|  iii. Specify how the design solution uses the scientific information to address the problem. |  |  |  |
| 1. **Describing criteria and constraints, including quantification when appropriate**

a. Students describe the given criteria (desirable features) and constraints (limits) for the solution, based on the factors presented in the problem and any resource considerations. b. Students design a solution that is intended to meet the criteria and constraints. |  |  |  |
| 1. **Evaluating potential solutions**

a. Students evaluate the design solution(s) systematically by analyzing whether the solution meets each criterion and constraint described. b. When appropriate, students compare design solutions to each other based on how well they meet the criteria and constraints described. |   |  |  |
| 1. **Refining the design solution**

a. Students modify the solution(s) based on the results from the evaluation to improve the design solution.b. When necessary, students make tradeoffs to optimize the solution based on the most important criteria. |  |  |  |
|  | **0** | **1** | **2** |