|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Categories** | **Level 0**  **0 – 49%** | **Level 1**  **50 – 59%** | **Level 2**  **60 – 69%** | **Level 3**  **70 – 79%** | **Level 4**  **80 – 100%** |
| **Asks relevant questions, and formulates hypotheses that are appropriate to topic** | Questions and hypotheses do not demonstrate an adequate level of relevance and appropriateness | Questions and hypotheses demonstrate limited relevance and appropriateness | Questions and hypotheses are somewhat relevant and appropriate | Questions and hypotheses are considerably relevant and appropriate | Questions and hypotheses are highly relevant and appropriate |
| **Thinks critically about the data; determines whether evidence supports or refutes previous hypotheses** | Does not demonstrate an adequate use of critical thinking skills | Uses critical thinking skills with limited effectiveness | Uses critical thinking skills with some effectiveness | Uses critical thinking skills with considerable effectiveness | Uses critical thinking skills with a high degree of effectiveness |
| **Identifies sources of bias or error, suggests improvements; re-evaluates the approach and hypotheses when appropriate** | Does not identify sources of error, suggest improvements or re-evaluate to an adequate level | Identifies sources of error, suggests improvements and re-evaluates with limited effectiveness | Identifies sources of error, suggests improvements and re-evaluates with some effectiveness | Identifies sources of error, suggests improvements and re-evaluates with considerable effectiveness | Identifies sources of error, suggests improvements and re-evaluates with a high degree of effectiveness |
| **Draws conclusions based on the results and can justify them mathematically and using the concepts** | Does not draw conclusions and cannot justify them to an adequate level | Draws conclusions and can justify them with limited effectiveness | Draws conclusions and can justify them with some effectiveness | Draws conclusions and can justify them with considerable effectiveness | Draws conclusions and can justify them with a high degree of effectiveness |
| **Communicates orally and in writing, using language and format appropriate to the concept** | Does not communicate using language and format appropriate to the concept at an adequate level | Communicates using language and format appropriate to the concept with limited effectiveness | Communicates using language and format appropriate to the concept with some effectiveness | Communicates using language and format appropriate to the concept with considerable effectiveness | Communicates using language and format appropriate to the concept with a high degree of effectiveness |
| **Uses unit appropriate numeric, symbolic and graphic modes of representation (including significant figures, units, vector diagrams, free-body diagrams, equations)** | Does not use unit appropriate representations to an adequate level of effectiveness | Uses unit appropriate representations with limited effectiveness | Uses unit appropriate representations with some effectiveness | Uses unit appropriate representations with considerable effectiveness | Uses unit appropriate representations with a high degree of effectiveness |

The Collaborative Problem-Solving Rubric will be completed using the following evidence:

* Observations of the problem-solving process, including referring to the recorded version
* Watching/reading each student’s final solution
* Peer and Self evaluation

**PEER AND SELF EVALUATION**

Complete the following chart for yourself and the other members of your group, using Levels 0 through 4:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Names** | **Relevant questions and appropriate hypotheses** | **Critical thinking** | **Identifies sources of error, improvements and is willing to re-evaluate** | **Overall Contribution** | **Comments** |
| **YOUR NAME HERE:** |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |