<table>
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<th>Level 1:</th>
<th>Project Background – Rationale</th>
<th>Hypothesis – Research Question</th>
<th>Experimentation Design – Materials and Methods</th>
<th>Results – Data Analysis</th>
<th>Conclusions – Discussion of Findings</th>
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</table>
| BEGINNING RESEARCH | • May use textbook, encyclopedias or internet for references  
• Sources not cited in the body of the paper  
• Content driven (or tied to the curriculum)  
• Rationale not stated or unclear | • May formulate hypothesis, but it is not based on observation or research  
• May stem from teacher-guided class activity. | • Experiment does not test hypothesis  
• Short term - may be completed within one class period  
• May not have control  
• Methods are not original  
• May be experiment from lab manual  
• May be repeat of classic experiment (e.g. Mendel’s tall/short pea plants) | • No data – research plan only  
• An answer (outcome driven) – might already be known  
• No representations of data (e.g. graphs)  
• Limited analysis of data.  
• No statistical analysis  
• No discussion of significance of findings | • Results are restated  
• May be reference to hypothesis, but no discussion of why it was or wasn’t supported  
• No discussion of implications or significance of the findings  
• No indication of problems that arose, and how to solve them  
• No indication of areas for further research  
• No indication of next steps |

| Level 2: INTERMEDIATE RESEARCH | • May use some journal articles and/or recent literature  
• Sources may be cited in the body of the paper  
• Content usually based on curriculum  
• Rationale presented superficially | • Able to formulate a hypothesis (research question) based on observation  
• Experiment does test hypothesis  
• Short or long term  
• Has control  
• Methods may be modification of previously published materials | • Answer (research driven) is not already known  
• One or two representations of data  
• Limited data analysis  
• Statistics may be used  
• Little discussion of significance | • Contains reference to hypothesis, and limited discussion of why it was or wasn’t supported  
• May be limited discussion of implications or significance  
• May be some indication of problems  
• May provide limited plans for future research and next steps |

| Level 3: ADVANCED RESEARCH | • Uses recent scientific journals and/or other primary sources  
• Sources are cited in the body of the paper  
• There is a significance or purpose to the rationale  
• Usually original research/new research (fringe science)  
• Derived from background research or current research studies. | • Experiment tests hypothesis  
• Open ended  
• Long term  
• Methods are original, or are a modification of previously published materials  
• Results are reproducible (more than 1 trial) | • Answer (research driven) is not already known  
• Multiple representations of data are shown  
• Statistics are used as part of the data analysis  
• Extensive discussion of significance of the findings | • Contains reference to hypothesis, and discussion of why it was or wasn’t supported  
• Discussion of implications or significance of the findings  
• Discussion of problems that arose, and how they could be solved  
• Discusses areas for further research and next steps |