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| Learning Objectives |
| Objectives  1. Understand the role error analysis plays in experimental science 2. Identify possible sources of errors in an experiment 3. Propagate estimate of error/uncertainty through calculations. |
| How to Complete This Module: (Instructions for students)  1. Engage in a class group activity introducing you to error analysis: the M&M game 2. Follow the instructor’s “textbook" method for determining uncertainty 3. Complete a homework assignment to practice the skills you learned |

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| Teaching Strategies - How will you be teaching the students? |
| Lecture and Content (How you will present module content to students)  1. Class group activity: [M&M game](https://docs.google.com/document/d/1kTd9aOEW5Uyg3rjt97wGfGBMRwc6R1eKW1Z_LaDSDsM/edit?usp=sharing)   Supplies: Empty bag of M&Ms, Full bag of M&M, 5 loose M&Ms per group   1. Follow the “Textbook” method of error calculations you can use M2\_Error analysis.pdf as a possible resource. 2. Apply the “textbook” method to the M&M game. Follow the procedure outlined in the article   Siegel, Peter. (2007). Having Fun with Error Analysis. The Physics Teacher. 45. 232-234. 10.1119/1.2715421. [Here is a link](https://www.researchgate.net/publication/243715004_Having_Fun_with_Error_Analysis/citation/download)   1. After all calculations are done, count the M&M’s in front of the class and determined the winner(s). |

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| Assignments and Assessments |
| HW or in class assignment:  Using a scale, and a pair of calipers, determine whether a penny is made out of pure cooper Literature value for cooper: (8.94 ±0.05)grams/cm3 |