# Above and Beyond Project Application
# Unit 02 Science and Engineering Practices

The purpose of A&B is to provide a supplemental way for you to show what you know on summative test day. It is meant to provide a means for taking the required unit content one step higher and to help study for the test by applying the target to a topic beyond what is discussed in class. It is not a method for getting "make up" points for a poor test score.

- ☐ Must be submitted ***before*** taking the written summative test.
- ☐ Content is thorough and researched and applied beyond regular classroom practice and teacher provided materials.
- ☐ Citations for all researched material are present.
- ☐ Professional appearance - neat, pleasing to the eye.
- ☐ Cannot be used to increase a summative score beyond 100%.

Target # _____

Describe your idea. How does it apply to the target? How is your idea above and beyond regular classwork?

_____

_____

_____

Teacher signature for permission to proceed: _____

| Exceeds Expectations - A | Meets All Expectations - B | Meets Most Expectations - C | Does not meet expectations - although sincere effort and research shown - D |
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Ideas:

Target 02-01 I can explain the difference between scientific models, scientific theories, scientific laws, and scientific facts.

A. In today's political climate there are a lot of conspiracy "theories" presented on social media and television commercials. Many of these ideas aren't completely accurate or are totally fabricated with the intent of raising emotions or making money. Websites have been developed to debunk the falsehoods and help people to discern which of these ideas is evidence backed and which are imaginative ideas with little or no evidence or only testimonials to support the claim. Check out "Baloney Detectors".
    a. One of the commonly discussed "theories" revolves around childhood vaccinations. Investigate one "theory" from the CLAIM side and then locate EVIDENCE that either

debunks or supports this claim. Present your findings in an argument, then summarize your research and state your conclusion.

Target 02-02 I can use the science and engineering practices to design and conduct **controlled** experiments.

Ideas:

A. Design and conduct a controlled experiment. Present your experiment in the Lab Report Format. Some possible ideas for experimental problems:
    a. Are all pennies the same? Get a sample set of pennies from Mrs. Byrne (Have her help you with determining accurate measurements)
    b. How does surface area affect the amount of drops of water a coin can hold?
    c. How does the acidity (pH) level of various household liquids compare to that of lemon juice? (pH papers are available from Mrs. Byrne - liquids must be tested at home.)
    d. Are all common medicines acids? Use litmus testing to determine whether several **medicines** found at home (ie. aspirin, Maalox, Rolaids, Tums, acetaminophen, Milk of Magnesia, Peptobismal, toothpaste and mouthwash, laxatives) are acids or not. Vinegar is a known acid for comparison. (Mrs. Byrne has litmus papers for testing)
B. Science fair projects are presented in poster board display format. Conduct a Science Fair type project and build a poster board display of all the parts of the Scientific Process as outlined in a lab report. Be sure to include your experimental design and data analysis.
C. Complete an engineering design project. Present your ***engineering design notebook*** including:
    - ☐ evidence of prior design research (citations),
    - ☐ your design "blueprint" plan for construction (materials list and design measurements),
    - ☐ evidence of prototype construction and testing (pictures and data measurements),
    - ☐ redesign "blueprints" (may be multiple iterations presented)
    - ☐ evidence of final construction and testing (pictures and data measurements),
    - ☐ and summary of the project with recommendations for future design modifications.

    Some possible ideas for engineering design projects:
    a. Rube Goldberg Energy Transformation Machine to perform a task.
    b. Mouse Trap Car using the energy of a mouse trap spring to power forward motion.(Mrs. Byrne has mousetraps)

Target 02-04 Write using a style appropriate for science

A. Locate a professionally published report submitted to the scientific community for peer review. Analyse the report for the parts of a controlled experiment.