



STEM Committee  
Michigan Crossroads Council

Name:

Supernova Activity Topic: Engineering  
**Design and Redesign: Egg Drop Contest**

Troop:

Date:

## Supernova Activity Topic: Engineering

Have you ever studied how your bicycle works? To learn how a bicycle is put together (or engineered), here is a project for disassembling one. Or what about making a high-performance paper glider? Or having a contest to see who can drop a raw egg without breaking it? Choose any one of these activities to learn more about engineering.

### Design and Redesign: Egg Drop Contest

This is a group activity and requires at least two youth. Your task is to design a container in which to place a raw egg, so that when the container with the egg is dropped, the egg survives the impact without breaking.

#### Part 1: Research, Design, and Contest Set-Up

Research and describe to your mentor:

1. The physical forces affecting the outcome of an egg drop test

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2. Desirable characteristics of container materials

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3. Rules for other egg drop contests. (With your parent's or guardian's permission, search online.)

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4. As a group, come to a consensus about the constraints and rules for your egg drop contest. Adopt, adapt, or make up your own rules. You might want to break into divisions, each with its own rules. (Youth with stronger STEM backgrounds should adopt more challenging constraints and rules.) Here are some guidelines. You must:

- A. Agree on constraints that the egg container must meet, such as dimensions, weight, allowable materials, disallowed elements, and so on.

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- B. Agree on rules to ensure fairness, such as judging decisions, conditions for elimination, scoring system, how to win, and so on. You may wish to have several different ways to win.

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- C. Communicate the constraints and competition rules to all participants.

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- D. Design and build your container.

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E. Have fun—conduct the contest!

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### **Part 2: Analysis, Redesign, and Report**

Analyze how your container performed, and discuss with your mentor your design strategy and how well the container you designed performed. Then do the following:

1. Given your container's performance, your knowledge of the physical forces acting on it during a test drop, and your observations of other participants' containers and results, redesign your container. Your redesigned container should still fit within the contest constraints but offer improved performance.

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2. Consider whether you would alter the constraints, how, and why. Create a report that communicates your understanding of the experience and addresses the following points.

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- A. Describe your original egg container, your original design strategy, and your analysis of its performance.

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- B. Describe your redesigned container and the reasoning that led to your new model.

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### **Resources**


Leonardo Da Vinci Egg Drop Devices

Website: <http://www.niemworks.com/else/eggdrop.html>  (This site shows beautiful devices designed to look like Leonardo Da Vinci built them.)

3-Egg Drop Challenge

Website: <http://teachertech.rice.edu/Participants/pschweig/eggdrop.html>  (Look here for rules that offer a more challenging contest.)

Winston-Salem/Forsythe County Egg Drop Competition

Website: <http://wsfeggdrop.com>  (This site includes a nice set of rules that utilizes a mathematical formula to determine a winner, based on several design and performance factors.)