

## Lesson 5

## Build a Sturdy Car: The Drop Test

*Suggested Time*

One 30-minute session

*Lesson Overview*

Students will determine the best structure for a sturdy car. Students do not have to attach motors, but the car must roll with wheels and skid plates. Each student pair will test their designs by the drop test. This involves dropping their car from a height of 4in.

- Predicting structurally sound building practices.
- Class discussion of different building methods.
- Building a sturdy car activity and drop testing.
- Recording design and test results in Engineering Journal.

*Learning Objectives*

***By the end of this lesson, students will be able to:***

- Determine the best design for a sturdy car.
- Define engineering design as the process of creating solutions to human problems through creativity and the application of math and science knowledge.

*Teacher Background****Structural Strength Introduction***

\* info & technical terms\*

***Engineering Design***

Engineers typically work together to solve the problems that face society. Engineering design is the process of creating solutions to human problems through creativity and the application of math and science knowledge. The basic steps within the design process include:

- i. Identifying a problem –**  
Observing a problem and seeing a need for a solution.
- ii. Researching possible solutions –**  
Coming up with ideas to address the problem.
- iii. Picking the best solution –**  
Determining which idea best addresses the problem. This decision may involve monetary, practicality, material, and property concerns.
- iv. Building a prototype –**  
Build a working model of the chosen design
- v. Testing the prototype –**  
Be sure the working model solves the problem and holds up to any important material property tests.
- vi. Repeating any steps needed to improve the design –**  
The engineering design process is not always a step-by-step

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process, as engineers often repeat steps or go back and forth between the other five steps.

**Vocabulary**

**Engineering** – the process of creating solutions to human problems through creativity and the application of math and science knowledge.  
**Material** – Any substance used for constructing or making an object. A material can be a solid, liquid or a gas.  
**Strength** –  
**\*more terms related to activity**

**Materials**

- For each student**
- Engineer’s Journal Part 1
- For each student pair**
- WeDo kit
- For the class**
- Pictures of different types of cars



**Preparation**

- Distribute Engineering Journals

**Instructions for Teachers**

**Building a Sturdy Car**



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**Activity Instructions:**

1. Begin with a class discussion on how cars are made. All cars have wheels, axels and a frame. Explain that they will be building structurally sound cars.
2. You can either have the students build along with you as you build the sample car in the building instructions or have them try to design their own. If they design their own cars, give them a few building tips as they build. Allow 10 minutes for building time.
3. Have students should test their cars by dropping them from a height of 4in. They sould redesign as necessary.
4. Gather the students and discuss the different building methods. Discuss any problems students encountered and how they modified the design.
5. Allow time for students to fill out the Engineering Journal.