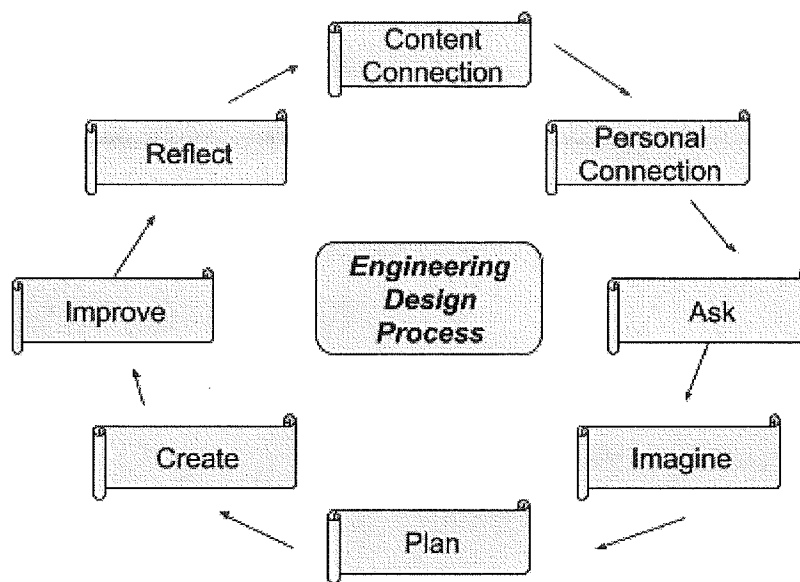


# Design Thinking



**Directions:** *Imagine you are an engineer and have just been given a problem to solve. Work in your group to design, test, and improve your product. You are to use this document to track your thinking as you progress through the engineering design process. Keep in mind as you design, create, and test your model, you will be required to explain both your thinking and how the design challenge and your model connects to the science content.*

## Content Connection

1. What content are we currently studying in class?

chemistry (matter)

2. How does the problem connect to the content?

matter is made up of smaller particles.

3. How does the content connect to the real world? Give a specific example.

matter = anything that has mass and takes up space.

## Personal Connection

Draw or write a personal connection you may share with the content. Explain how this connection also relates to a social justice issue/concern.



This is a xbox controller.  
I connect to it because  
I play videogames on  
the control and it is  
matter.

## Ask

1. What is the problem? (In your OWN WORDS)

Build a structure that is 3cm off the table and will hold  
a textbook

2. What are the constraints?

3cm off table  
10 gumdrops  
20 toothpicks

3. What materials are available for our use? How can you use them?

gumdrops, toothpicks, book

4. Information/Ideas gained through research:

strongest shape is a triangle

## Imagine

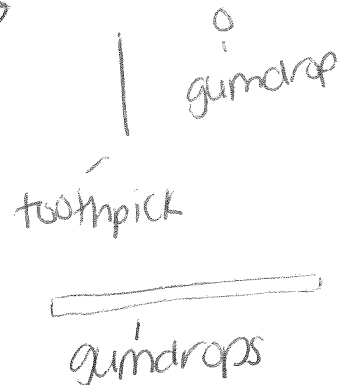
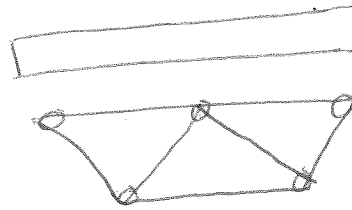
Possible Solutions	Pros	Cons
1. cut the gum drops in 1/2	double the amount	weaker
2. use two toothpicks	stronger	Run out of toothpicks
3.		
4.		

## Plan

**Description of blueprint (drawing)**

Four triangles connected at the bottom with a platform on top holding the book.

**Blueprint (INCLUDE LABELS)**



**Materials to be used**

Toothpick, gumdrop, book

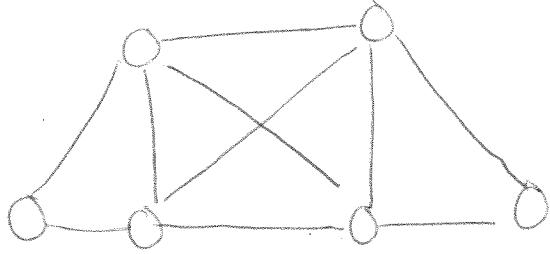


**Create**

Sketch of your model prototype with labels

Results after test

It keeps falling  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



What needs to improve? Explain why.

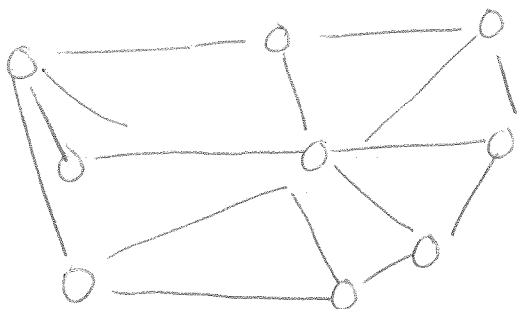
give it more strength  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Improve (Redesign/Modify)**

Improvements Made	Results	What Still Needs to be Improved
move closer	fall	more drop
use two pick	fall	more sticks

## Final Results

Sketch



Results

The structure keep falling

Were you successful (Circle one)?

YES

or

NO

## Reflection

1. If you had the opportunity to repeat this challenge, what would you do differently and why?

I would use two toothpick for strengths.

2. Identify how your thinking has changed as a result from the beginning of this activity to now.

How many time the structure fell.

3. Describe any challenges you faced while completing this design challenge. How will you account for them during your next design challenge? If you didn't have any, why do you think that is?

We didn't have enough materials to make our structure stay.  
We will plan better with the few materials.

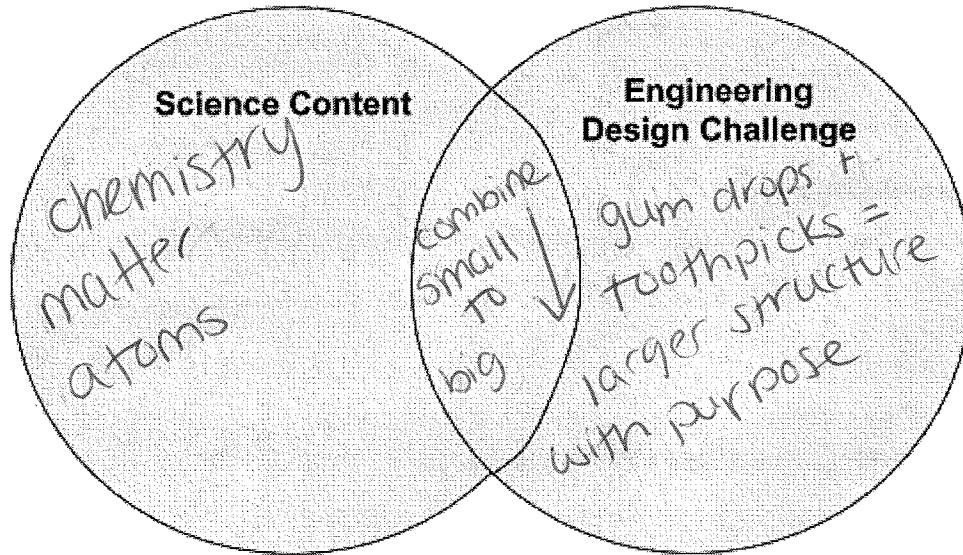
4. How can you use what you learned during this design in the future?

I can use my materials more carefully.

## Content Connection

### Venn Diagram:

Complete the Venn diagram below to demonstrate how the science content relates to the engineering design challenge.



### CER Explanation of Engineering Design Challenge and the Science Content

**Claim:** How does the engineering design challenge you just completed relate to the science content you are currently learning?

content is chemistry = matter made up of atoms. This relates to the challenge because we used smaller items (atoms) and combined them with toothpicks (bonds) to form matter.

**Evidence:** Use evidence from both the engineering design you just completed and what you have learned in class.

from class - Atoms are made up of protons, neutrons, and electrons. when atoms combine together they form matter.

From challenge - we used the gum drops and toothpicks to create a larger structure that had a job.

**Reasoning:** Support your evidence with reasoning.

The challenge relates to the stuff we learn in class because both involve smaller things combining to make bigger things.