

# From Tetrahedral Concept to Creation

## Overview

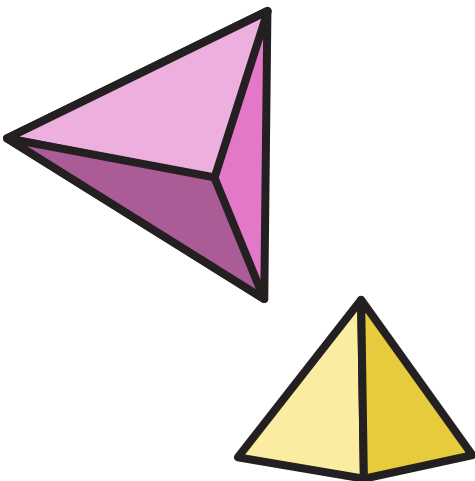
An architect has asked you to design a building using tetrahedral structures. Students will demonstrate their understanding of tetrahedrons and the strength they provide to structures.

## Scenario

For your science fair project this year, you have chosen to display tetrahedral structures in a variety of ways to demonstrate their cohesiveness and strength. Triangles are generally considered the strongest shape, making the tetrahedron a strong structural element in everything from atomic bonding to electrical components. An architect sees your project and finds it interesting. She asks that you design a building using the same structure combinations you have used in your project and explain the concept of tetrahedral strength in a presentation to her firm.

## Driving questions

The driving questions were developed to encourage you to explore the current realities of communities and individuals to be served. The questions will aid you in developing empathy to understand how others might be feeling about a problem, circumstance, or situation.



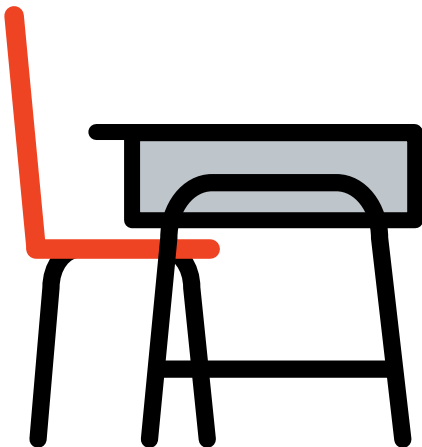
1. Where does the strength of a tetrahedron come from?
2. Is the tetrahedron only functional, or does it have aesthetic value as well?
3. How do tetrahedral shapes fit together?
4. Are there multiple ways they can go together?
5. How can you prove their strength?
6. What part(s) of the building would need these shape structures?
7. How will you present your concepts to the firm?
8. Why would the firm be interested in your science fair project?

Understanding,  
Research, Define,  
and Ideation  
(U-RDI)

**Understanding**

Understanding is the process of gathering information to inform what you need to know about a topic. The use of a graphic organizer can help you analyze two aspects of a problem. We are suggesting a T-Chart to explore your “know” and “need to know”.

<b>Know</b>	<b>Need to know</b>
<ul style="list-style-type: none"> <li>• You have chosen to display tetrahedral structures at this year’s science fair.</li> <li>• Your science fair project demonstrates the strength and cohesiveness of tetrahedral structures.</li> <li>• Triangles are considered a strong shape.</li> <li>• The tetrahedral is a strong structural element in everything from atomic bonding to electrical components.</li> <li>• And architect finds your project interesting.</li> <li>• The architect has asked you to design a building using tetrahedral structures.</li> <li>• The architect would like you to explain the concept of tetrahedral strength in a presentation to her firm.</li> </ul>	



## Research

Research is the process of examining as much data as possible to have an informed idea for your problem.

## Problem specific resources

- [AIA - Designing for Equitable Communities](#)
- [10 Key Components for Building Healthy, Equitable Communities](#)
- [EPA - Creating Equitable, Healthy, and Sustainable Communities](#)
- [Tips for Connecting Learners to their Community](#)
- [The 7 Universal Design Principles](#)
- [Engaging Everyone](#)
- [Designing More Equitable Cities](#)
- [Simple Machines Article](#)

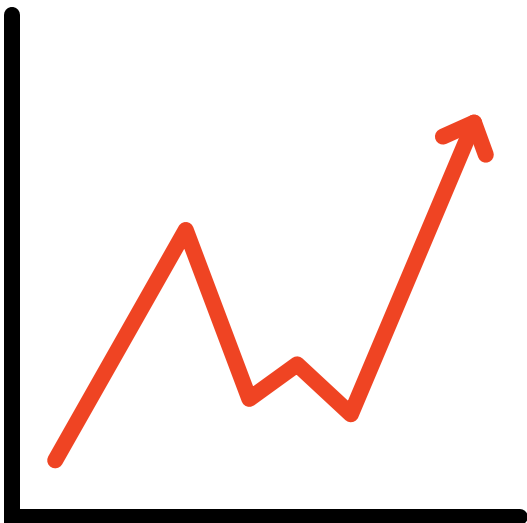
## Hands-on activity

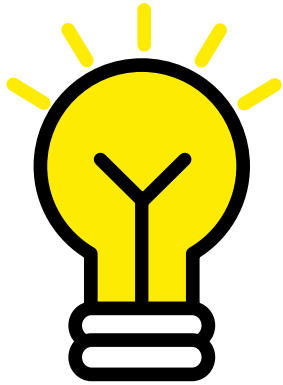
- [Simple Machines Activities](#)

## Define your problem using empathy

Architects work to define problems before coming up with a solution. They use empathy in defining a problem. This allows them to define a problem using multiple perspectives.

Now that your research is done, define your problem!





### Ideation

During ideation you will develop as many possible solutions as possible to the problem base on your defined problem. Do not limit your solutions!

Once you have listed all your possible solutions in the box below, cross out those that are extreme or refine them to be more practical.

**Possible solutions:**