SKYSCRAPER CHALLENGE!

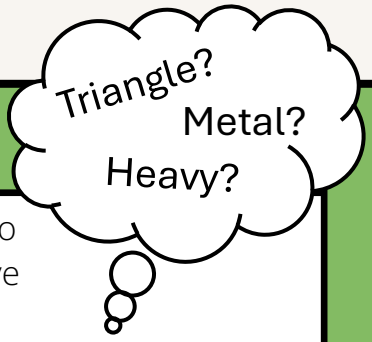
Name: _____

Materials Needed: Paper, Tape, and Books (used as weight)

Engineers design bases to help support the weight of houses and buildings. These bases make up the foundations of many structures in the world, including very tall skyscrapers. How do you think engineers design these bases in a way that they can support the weight of tall and heavy buildings?

Scenario: You've been contracted to build the strongest skyscraper in Las Vegas. This building will be very tall, and therefore heavy, so it must be strong enough to support the weight of humans and itself.

BRAINSTORM



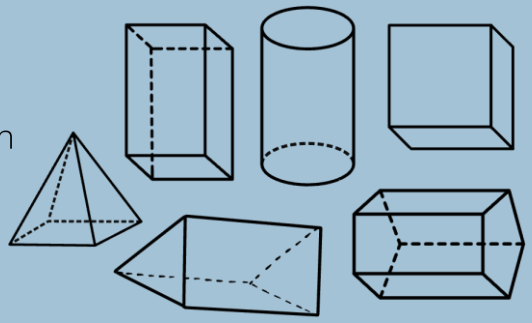
Think about the following questions: What kind of materials would be best to build a skyscraper? What types of shapes are possible? What structures have you seen in real life? **Write down your ideas in this box.**

LIMITATIONS AND CONSTRAINTS

You get a call from your client. They decided that they want you to use completely new materials for your structure because there is a new budget. You can only use a single sheet of paper, scissors, and tape. Keep in mind these limits and constraints for the following steps.

DESIGN

Draw and plan out the skyscraper that you are going to build. Come up with 3 different designs you believe will make your skyscraper the strongest it can be. Don't forget to include markings of where you will fold your paper and where you will put your tape. Also note the shapes you will use!



Design A:

Design B:

Design C:

BUILD

Now that you have designed a few different structures, choose the design you think is the best. It is time to bring your design to life. Have fun building it!

TEST AND EVALUATE

STEPS:

1. Place your skyscraper on a flat surface. Observe whether it stands up on its own.
2. One by one, add books on top of your skyscraper, and count them as you go.
3. Once your skyscraper collapses, write down your observations and results in the box to the right.

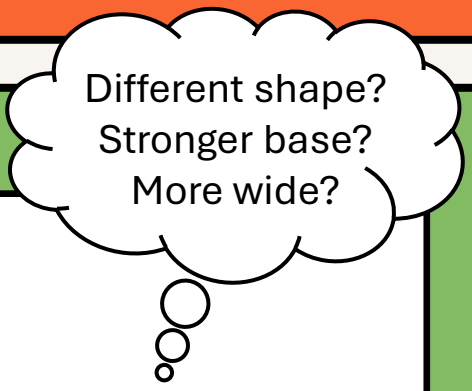
My skyscraper was able to hold _____ books before collapsing.

Explain what happened to your skyscraper when it finally collapsed:

SHARE SOLUTION

Time to share your results with your classmates! Think about why you think their designs were able to or were not able to hold a lot of weight. Additionally, think about which of your classmates made the best skyscrapers and about why their skyscrapers were the best.

REDESIGN



Think about the following questions: What were the issues with your design? How can you improve your skyscraper to make it stronger? **Draw and mark your new design in this box.**

REBUILD, RETEST AND REEVALUATE

Build your new and improved design and then test it with the same steps as before. Have fun!

Explain what you did differently for your redesign and retest:

My skyscraper was able to hold _____ books before collapsing.

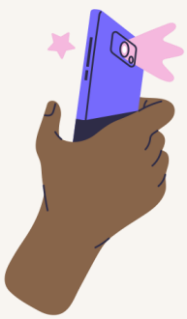
Explain what happened to your skyscraper when it finally collapsed:

SHARE SOLUTION

Once again, it's time to share your results with your classmates! This time, think about what your classmates did differently than before. Which classmates made the best designs, and why do you think these designs were the strongest?

COMMUNICATE SOLUTION

Write any final thoughts or notes in this box:



EXTENSION

Next time you see a skyscraper in real life, think about how it was designed so it could hold a lot of weight. Try to spot the differences in the different ones you see. Take a picture if you can!