THE ADVENTURES OF ARCHIE

VOL. 1 - BUILDING A COMMUNITY CENTER

INTRO
FOR YOUR PARENT(S)

This activity book is intended to teach kids about the fundamentals of design and being an architect. The activities range in complexity for kids ages 8-12, however, this makes for a great coloring book for kids of all ages!

Some exercises may be best supervised by an adult.

MEET ARCHIE
THE ARCHITECT

Archie is a local architect who is helping her friends build a new community center for their town.

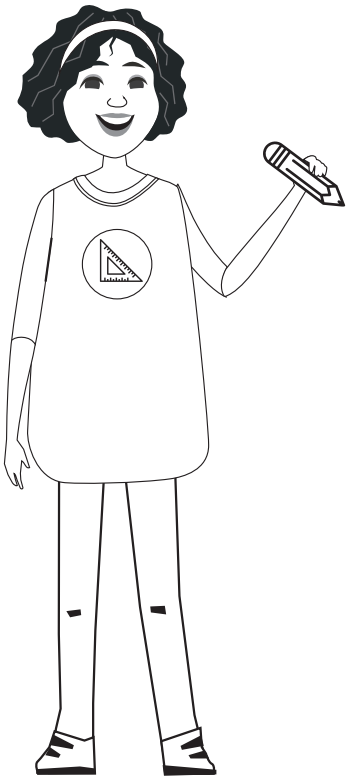
Archie needs your help to complete this project. You'll be traveling through different places and completing multiple challenges to gather tools and supplies to help your friends complete this project.

Ready? Let's go!

GETTING READY

SUPPLY LIST

You're going to need a few tools to help Archie and her friends build the new community center.



- ▫ pencil / pen
- ▫ scissors
- ▫ colored pencils / markers / crayons
- ▫ eraser
- ▫ ruler or straight edge
- ▫ construction paper or scrap paper
- ▫ paper towel rolls
- ▫ stapler
- ▫ glue or glue sticks
- ▫ cardboard
- ▫ scotch tape
- ▫ spaghetti noodles
- ▫ string
- ▫ rubber bands
- ▫ measuring tape
- ▫ clear plastic cup

You can find most of these items around your house but if you don't have one of the items... be creative!

You can substitute any of the items for things you already have!

EXPLORING YOUR SPACE
EXERCISE 1

Before you begin planning for the new community center, you'll need to make some key observations to think about the types of rooms you want in your new community center, but first let's look at the space around you for ideas! Explore the rooms in your home and figure out how each room is different to you.

Think about all the rooms in your home. **Pick 2 rooms and make notes on what you see**:

Room No. 1

- What do you do in this room?
- Does this room feel big or small? Is it a long room or a short one?
- How many windows can you see? Is it bright?
- How many lights do you see?
- Do you like this room? Why?
- What kind of furniture is in this room? Does it fit in the room or make it harder to use?

Room No. 2

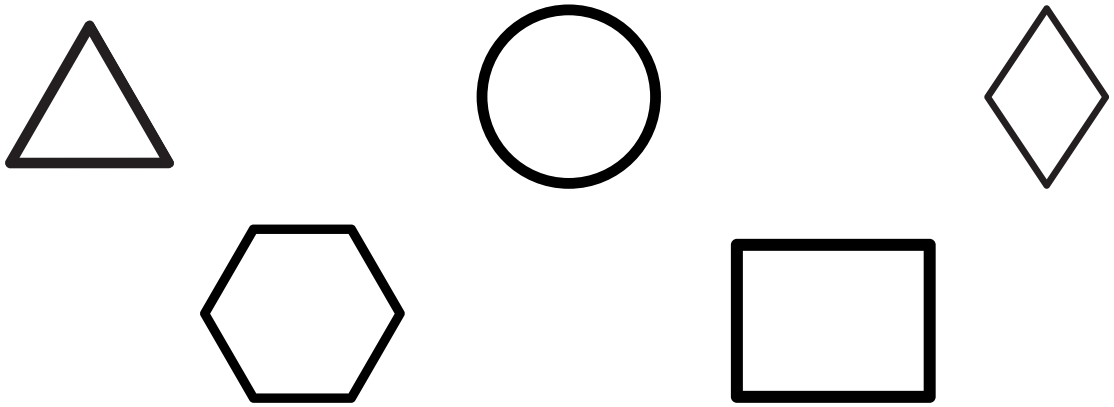
- What do you do in this room?
- Would you do the same things in this room as Room #1? Why or why not?
- Is this bigger or smaller than the one before? Longer or shorter?
- How many windows do you see in this one? Is it dark?
- What makes this room different than the other one? Is it too small? Does it have better light?

Explore your home

- What is the biggest room in your home? What is the smallest?
- Which one has the most windows?
- What room do you like the most?
- Do you wish one of the rooms was different? How would you change it?

CAN YOU FIND THESE SHAPES?

Look around your room to find these shapes. Write down what you found.



Programming a space means you are learning about the uses of a specific room so you can make the best use of it!

ROOM NO. 1

ROOM NO. 2

NOTES

11" RULER

PLAN THE LAYOUT
EXERCISE 2

In this exercise, you'll be planning the layout of the new community center by using the local building guidelines, suggestions from your community, and your own creativity to come up with a space plan! On the following page, you'll draw the perimeter of the building and then create rooms and hallways. Then sketch what will be inside each room.

COMMUNITY SUGGESTIONS

Amy
"I would love to have a gym with a basketball court!"

Carlos
"Can it have a daycare for the kids?"

Lisa
"I want a coffee & smoothie bar!"

Xavier
"I want to attend art classes there."

PLANNING YOUR BUILDING

Based on what you heard from your neighbors in the community, create a plan for what kinds of rooms and facilities your building will need.

# of rooms	# of bathrooms	# of floors	Activities
_____	_____	_____	_____
			_____
			_____
			_____
			_____

LOCAL BUILDING GUIDELINES

- Buildings can't be more than 3 stories tall.
- Public buildings must have a handicap accessible restroom on every floor.
- You must have a minimum of three fire exits. Mark these doors in red.
- Hallways must be at least 3 feet wide.

Fitting Your Furniture: How many square units?
Use your ruler or a measuring tape to measure these items in your house, then write down how many square units each item takes.


Desk
_____
units


Couch
_____
units

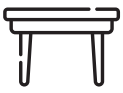


Table
_____
units


Toilet
_____
units

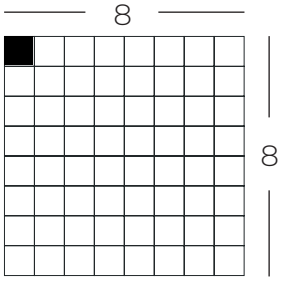

Sink
_____
units


Plant
_____
units


Chair
4
units

Example:
The chair is 2x2 feet which means it is 4 square units.

Using your ideas from the last page, draw the floor plan for your new community center!



HELPFUL HINTS

Each square unit in the grid is equal to 1 foot by 1 foot. This means that each mini-grid is 8x8 and that the entire grid area is 72x64.

ELEVATIONS
EXERCISE 3

Now that you know what your building will include on the inside, let's focus on how it will look from the outside. In this exercise you'll be drawing a wall elevation in your house as practice before creating the outside elevation for the community center!

PRACTICE SKETCH - WALL ELEVATION

1. Choose a wall in your house that you would like to draw. Make sure it has at least 1 window or 1 door.

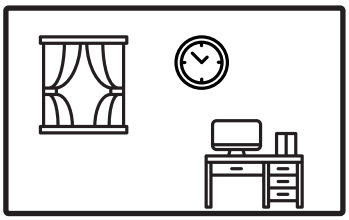
2. Draw the shape of the wall in the box below. Is it a rectangle? Square? Try to make the lines straight. You can use a ruler or a straight edge to trace a straight line.

3. Next, look where your door or window is located on the wall. Draw that shape on to your drawing in the same place. Label it "WINDOW" or "DOOR"

4. Next, follow the same step for any object you see on the wall. Only draw the shapes (Example: a picture frame? Poster? Clock? Shelve?)

5. Grab your crayons, pencils or markers and color in the drawing.

Example



COMMUNITY CENTER - OUTSIDE ELEVATION

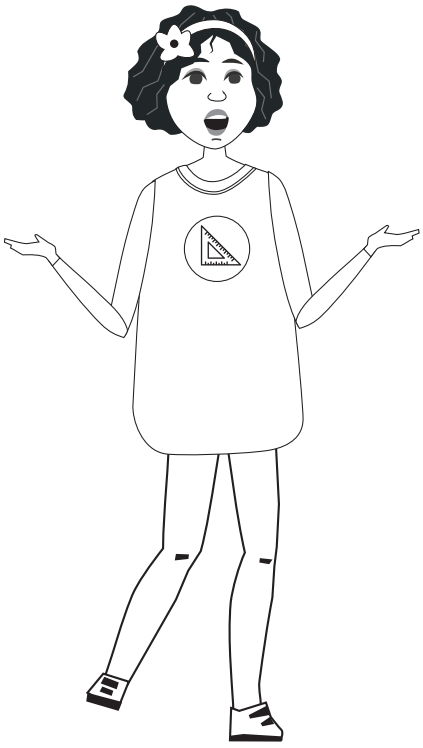
Think about what you want the outside of the building to look like and make a sketch of it below. How many doors does it have? How many windows? What is the building made of?

CHALLENGE

Grab another sheet of paper. Make a sketch from a different view of the building. For example, if your sketch above is of the front entrance to the building, make a sketch of what the back side of the building looks like.

COLOR THIS!

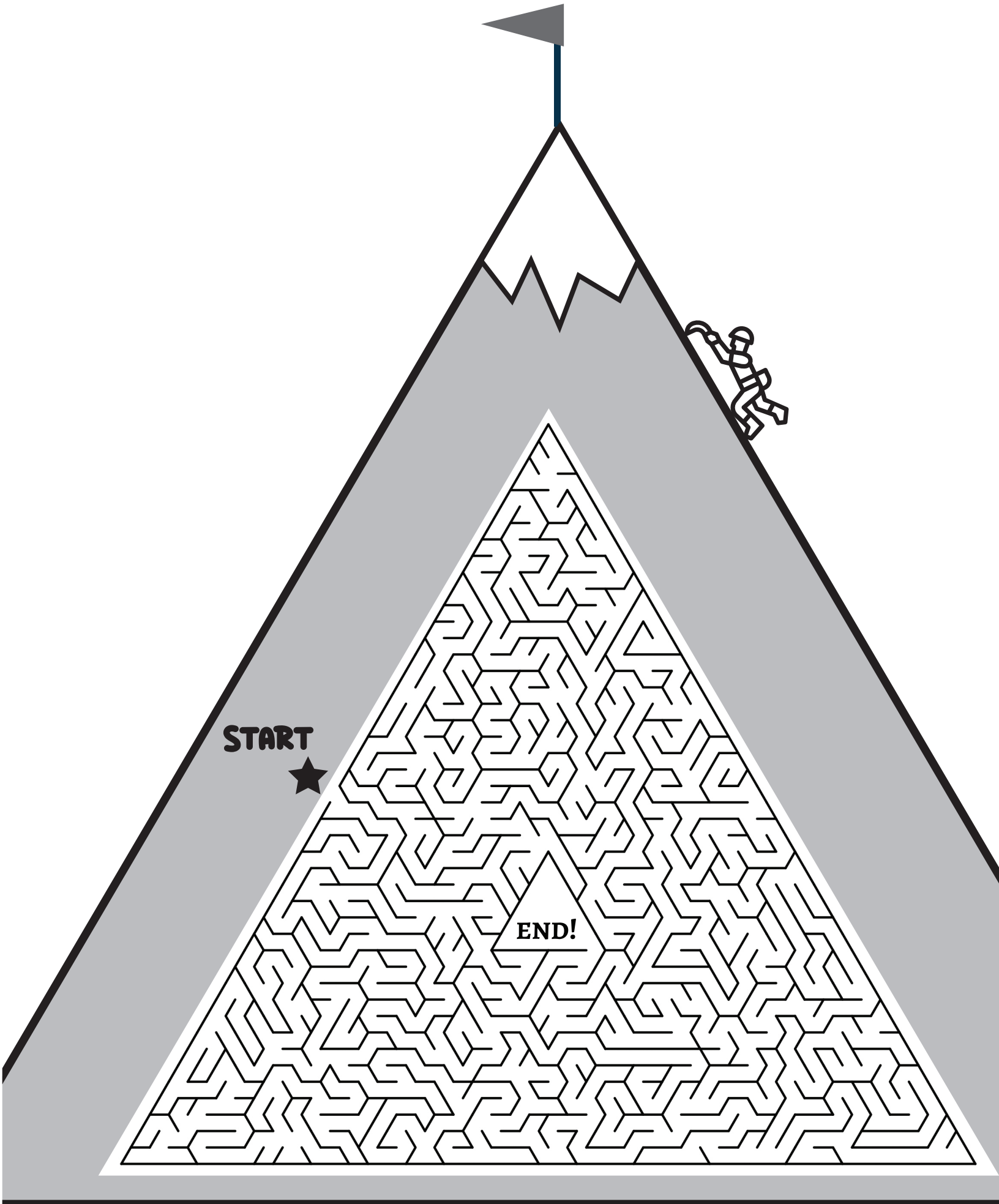
HELP ARCHIE GET TO THE PERMITTING OFFICE



Now that you have your plans for the community center, you must take it to the permit office to get approved!

Your local permit office is in a small town across the Majestic Mountain range. In order to get a permit to start building, you'll need to help Archie get through the Majestic Mountain Maze!

Using a pencil, trace your way through the maze starting at the star symbol. If you run into a dead end, turn around and try a different route!


START
END!

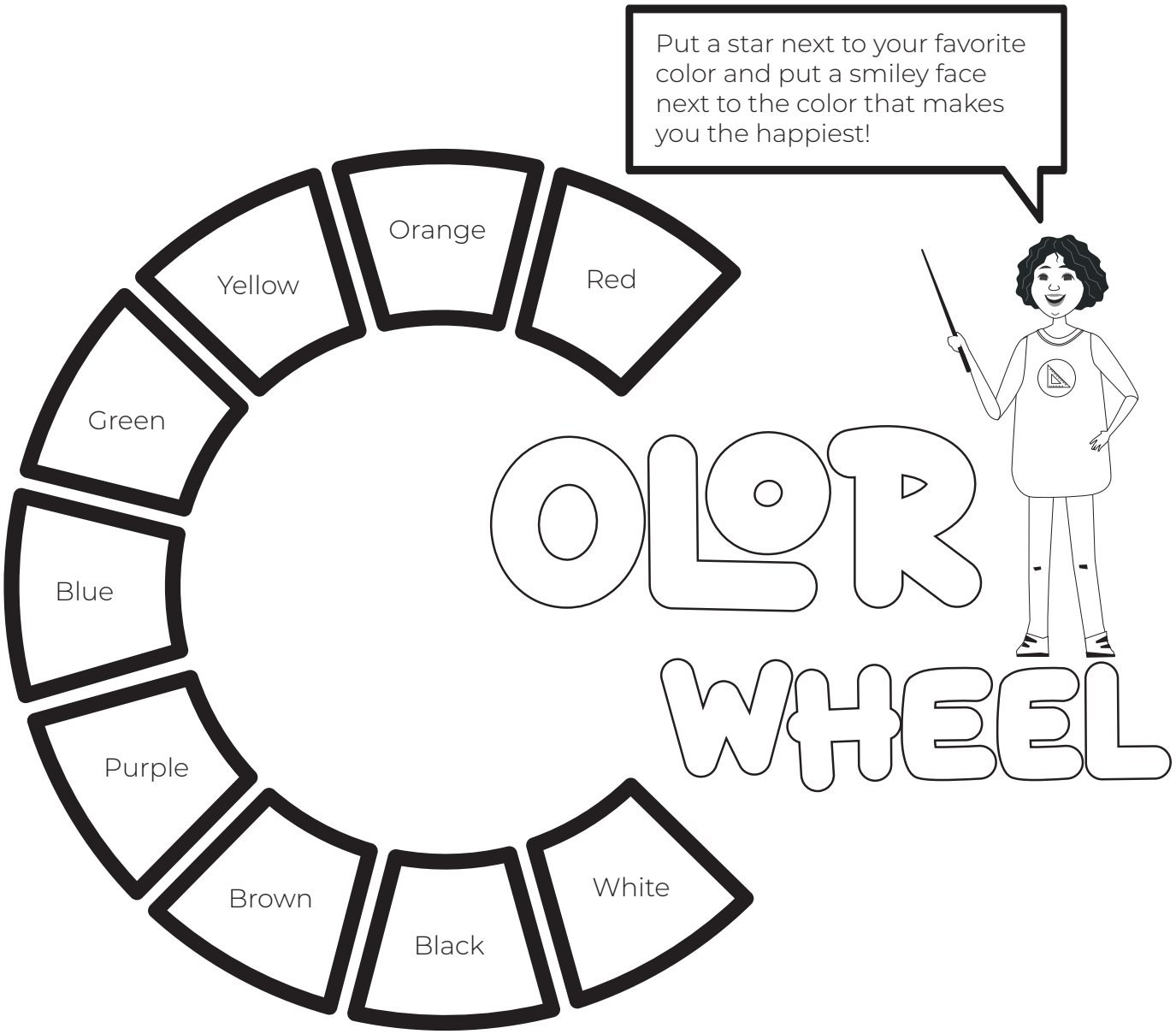
Congrats! You made it to the permitting office and got your new building permit!

Now it's time to start gathering your supplies to bring back to build the community center!

COLOR THEORY

EXERCISE 4

Archie needs help finding colorful items to put in the building. Maybe you have some items around your house you can use as inspiration! Using colored pencils or crayons, color in each piece of the color wheel below with the matching color.



CURATING FURNITURE

Now, explore your home and find objects that match each color shown on the color wheel that you could use in the community center. Once you have collected your items draw the object in the squares below.

RED
1795 C

ORANGE
715 C

YELLOW
012 C

GREEN
7739 C

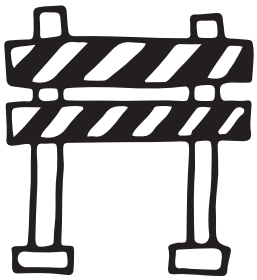
BLUE
300 C

PURPLE
2587 C

BROWN
477 C

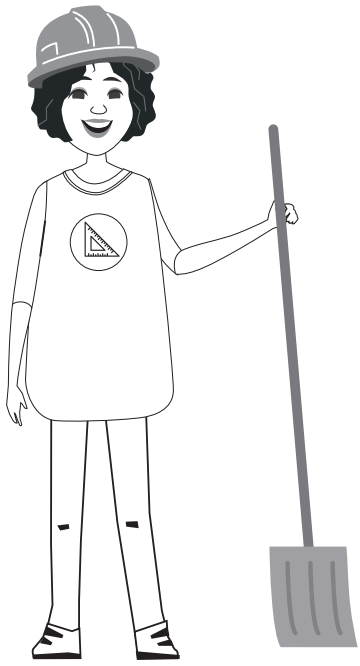
BLACK
432 C

WHITE
11-4001 TCX



WARNING!

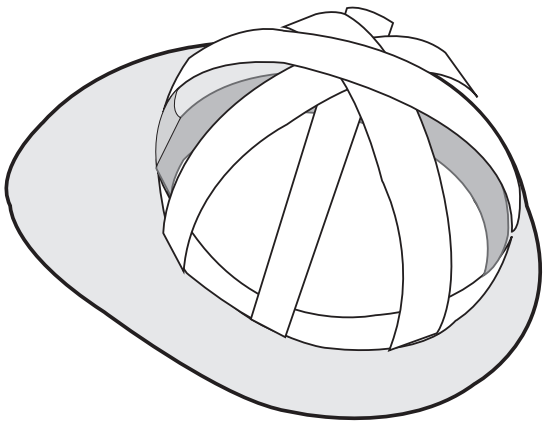
YOU ARE BEGINNING THE CONSTRUCTION PHASE!



Now that you've helped Archie with the design and you've got your permit, it's time to begin construction! The most important thing during construction is safety! For the next few exercises, ask your parents or an older sibling to help you out! Construction is a team effort and always remember, safety first!

SAFETY FIRST

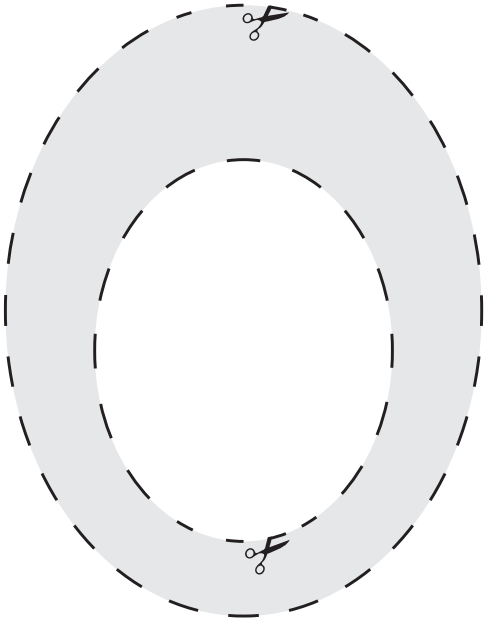
BUILD YOUR OWN HARD HAT EXERCISE 5



Supplies:

- Cardboard, poster board or thicker paper
- Scissors
- Glue or stapler
- Markers

Step 1:
Cut a large ring out of the cardboard (this is the base). Make sure the inside ring is big enough for your head.



Step 2:
Cut 1 strip of paper that fits around the inner ring of the base – stand upright and glue or staple

Step 3:
Cut (4) 1' wide strips – glue or staple them across the base, forming a dome. Glue or staple to the base.

Step 4:
Color or decorate the hard hat!

CONSTRUCTION WORD FIND

H E X K K S R Y G O L O N H C E T G N Q W K Y W
E G S R R C K E X B G N I K A E R B D N U O R G
R P F H O E U Y D I V Z U S D X G O A U Z H K E
U B E T A X Z R S E D I B R B L Q U T C Y C R R
T P F S H P W O T C V C A F O U O N I P S X O U
C Y E Z D X E H D P R E R D X T I F I L D D W T
U S A W M I L L U L M A L A U W C L F C R S E C
R I N D U S T R I A L U P O N C A A D A T R M U
T R A R E M O D E L N U D E P E T V R I C M A R
S O E T F I L K R O F O B M R M W J M T N S R T
A O B F N O I T N E V N I X F M E B Y V N G F S
R F U E U W X E Z O R D Q T Q N E N V P N O E Q
F S I T C R G M R D M E M M A R M J T R O E C T
N C L E M N B H V U J X P V A E O Y Y D I X O N
I A D R N W A I H R T T C E J O R P R J T C G E
V P E C Q L F N S G T C T S E Y Y C X X I A J M
B E R N O W N K E H K K E X T W V W Z W L V Y P
M K R O W D A O R T M G K T Q M S P U A O A Q O
W A L C X U E N G I N E E R I N G T G F M T B L
F N N S P E N A W T Q I N A I H E D E R E O F E
F M Y M M P O H J R C O A T Z T C M T E D R Z V
U C K A A K V D H N B J I M Y V B R G Y R M H E
H Y R X A D B H D E S I G N Q O F A A D M T W D
R X M W K A E F O U N D A T I O N C O I Y D S Y

Architecture
Builder
Building
Bulldozer
Concrete
Contractor
Crane
Creation
Demolition
Design
Development
Dumptruck
Engineering
Excavator
Forklift
Foundation
Framework
Groundbreaking
Industrial
Infrastructure
Invention
Maintenance
Manmade
Project
Redevelopment
Refurbishment
Remodel
Roadwork
Roofscape
Sawmill
Scaffold
Shape
Skyscraper
Street Sweeper
Structure
Technology
Timber
Viaduct

TESTING THE SOIL
EXERCISE 6

Ask an adult to help you before starting this one! Before construction can begin, it's important to know what kind of soil you will be building on. Different types of dirt require different things. Let's test the type of dirt in your yard!

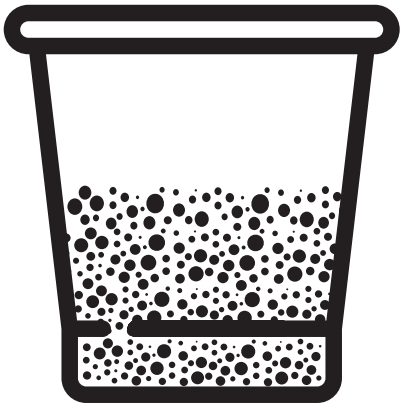
Soil experiment: Percolation Test

Material list:

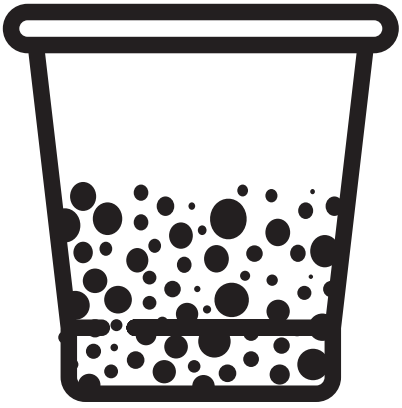
- Dirt / small particle soil
- Gravel / bigger rocks
- 2 clear plastic cups
- Enough water to fill both glasses divided into two equal portions

Procedure:

- Fill 1 glass halfway with dirt / smaller particle soil and press it down into the glass firmly
- Fill the other glass halfway with larger rocks / gravel
- You and a friend (or you individually) pour water over each glass and notice what happens
- Compacted smaller particles don't allow water to pass as easily as larger rocks / gravel



Small particle



Gravel/rocks

CHALLENGE

Identify and collect various soil types and test their performance as well:

- Clay
- Silt
- Sand
- Gravel

Why is this important?

- Different types of dirt / soil / gravel are used in the construction process
- Bad soil (clay, silt, high organic content) is usually removed and replaced with select fill to ensure buildings have a stable base that will allow water to drain properly
- Compacted gravel and certain types of sand are key to ensuring that rain water is able to drain properly and won't cause flooding OR affect the building structure by turning the ground to mud.

Water and buildings aren't friends! Proper drainage ensures water will not sit around buildings and lead to deterioration.

LANDSCAPE FACTS

DID YOU KNOW?

Cactuses, or cacti, are desert plants. They grow in dry places where other plants have trouble living. Their ability to store water keeps them alive. Cacti are also protected by sharp spines, or needles. These discourage animals from eating them.

There are about 1,650 species, or types, of cactus. These plants grow mainly in the dry areas of the United States, Mexico, Central America, and South America. Mexico has the greatest number and variety of cacti.

Cacti are succulent plants. This means that they have thick tissues that hold large amounts of water. The stored water keeps them alive during dry periods called droughts. Unlike many plants, cacti do not have deep roots. Instead they have roots that spread out near the surface of the soil. This is important to their survival. These roots absorb water from a wide area during the few times it rains.

WHAT TYPE OF SOIL DO YOU THINK CACTI GROW IN?

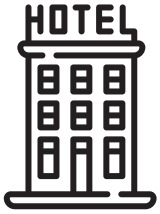
Answer on bottom of next page

A. Clay Soil
B. Sandy Soil
C. Silt Soil
D. Volcanic Soil

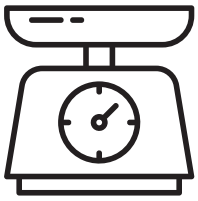
LATERAL LOADS
EXERCISE 1

This exercise simplifies the real-life conditions that affect structures and buildings.

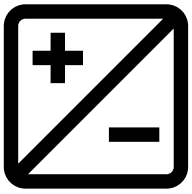
What is a "load"?
Forces that act on structures are called loads. All structures must withstand loads or they'll fall apart. In order to build a structure, you need to know what kinds of external forces will affect it.



Dead Load
The weight of the structure itself is called the dead load. Anything permanently attached to the structure is part of its dead load.

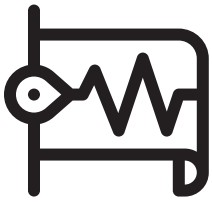


Live Load
The weight of the stuff on the structure is called the live load. Things that move around in or on a structure, like people, furniture, and cars, are all examples of live load.



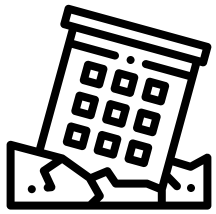
Dynamic Load
Loads that change over time are called dynamic loads. Dynamic loads -- from wind gusts to pounding objects -- create vibrations that can become bigger and more dangerous over time.

Thermal Load
When a structure expands or shrinks with the temperature,it is experiencing thermal load. The temperature causes the beams and columns to change shape and push and pull on other parts of the structure.



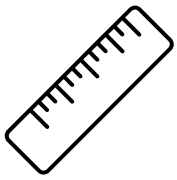
Seismic Load
When the ground beneath a structure jerks back and forth during an earthquake, the structure is experiencing an earthquake, or seismic load. Earthquake loads push and pull horizontally on a structure.

Wind Load
When wind blows on a structure, it is called wind load. Wind loads push horizontally on a structure.



Settlement Load
When the soil beneath a structure settles unevenly, it is called settlement load. Structures will sink and change shape when they experience settlement load.

Buckling
When a column fails by bending at some point in the height of the column, usually towards the midpoint caused by a vertical force.



Deflection
The amount a structure bends or moves from its "at rest" position.

Answer: B. Sandy soil

LOAD TESTING

What You'll Need:

- Paper towel rolls
- Scissors
- Scotch tape
- cardboard

Goal:
To design and construct model towers out of paper towel rolls. With the limited supplies paralleling the real-world limitations faced by engineers, such as economic restrictions as to how much material can be used in a structure. Explorers aim to build their towers for height and stability, as well as the strength to withstand a simulated load test.

CHALLENGE

Simulate other load tests by shaking the foundation or introducing the towers to weather elements.

Step 1: Design
Spend 20-25 minutes to identify the best design for a paper towel roll tower. Test a few different designs and get creative! Try to create the tallest structure with the materials you have while making sure it will withstand the tests! Once you've got a design that you're ready to test, move to Step 2.

Step 2: Testing
Measure and record the height of the final tower. Then step away from the tower so it is at arm's length and blow out a full breath to simulate a hurricane. A successful tower will not topple over. Make sure the tower is not secured to a table, the floor or any other piece of furniture or wall. Record your observations below:

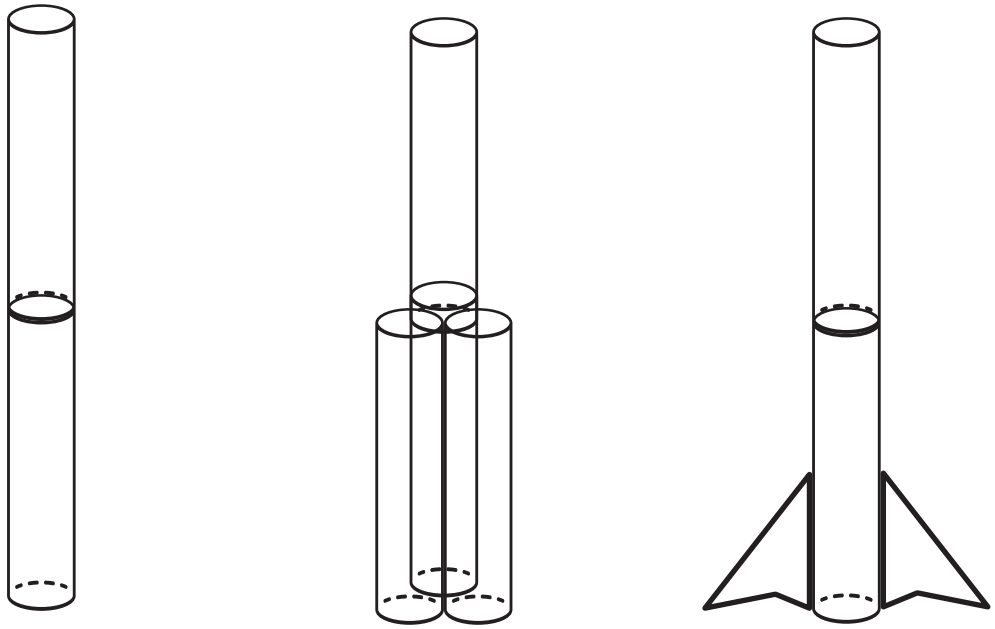
_____

_____

_____

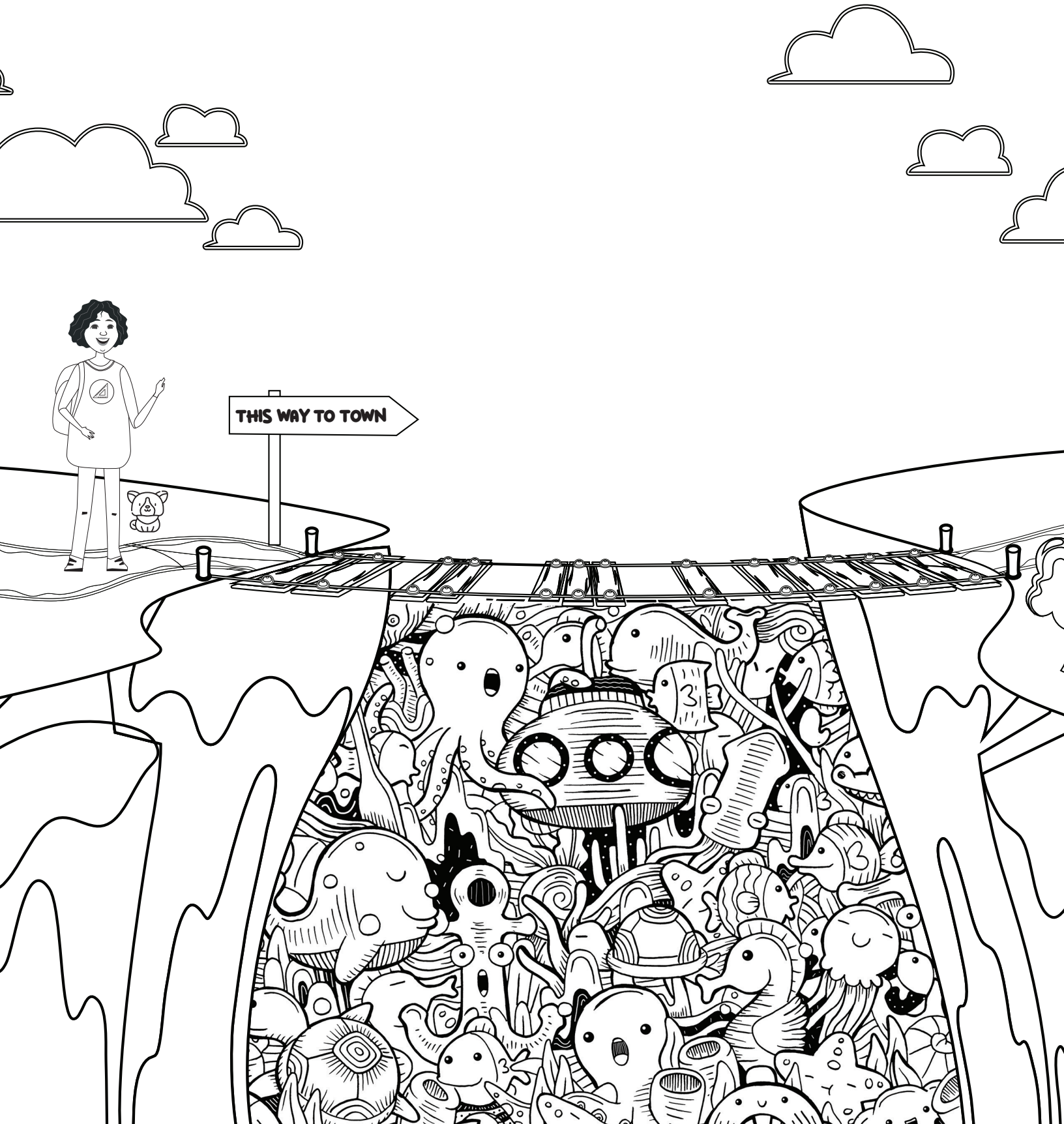
WHICH STRUCTURE DO YOU THINK WILL BE THE STRONGEST?

Here are a few ideas for tower design. Build a few different towers and test them out!



THE ROAD BACK TO TOWN

Oh no! It looks like the bridge back to town is in disrepair. In order to get all of the supplies back to town, you'll need to help Archie to build a new bridge!

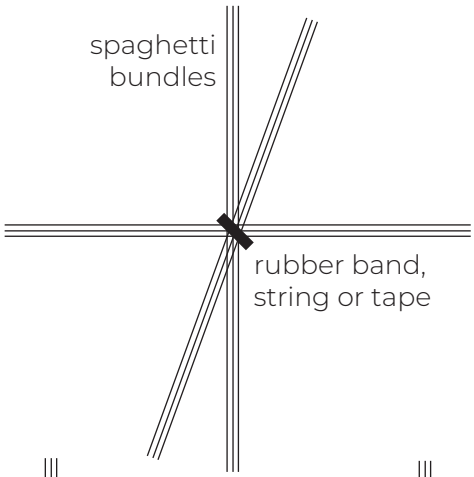


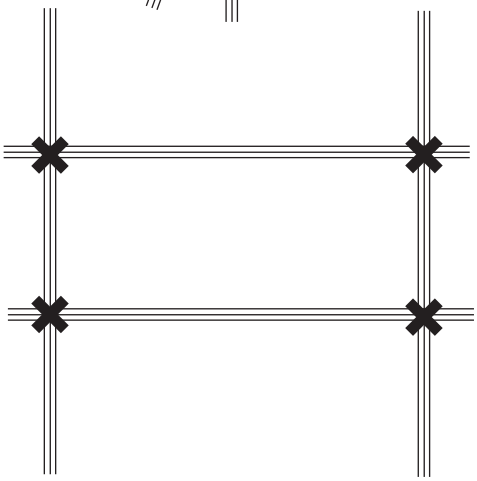
BUILD A BRIDGE
EXERCISE 8

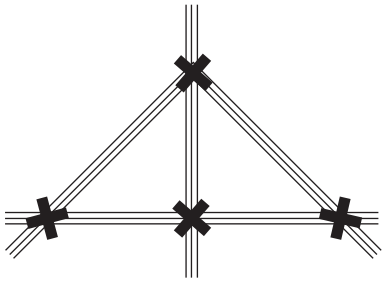
What You'll Need:

- spaghetti noodles
- paper
- pencil
- straws
- tape
- rubber bands
- string
- weights (toys or objects around your house)

Don't have spaghetti noodles? Grab some straws or sticks from outside!



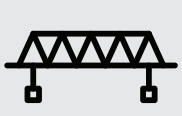




Goal:
Construct a bridge out of spaghetti that is strong enough to hold your chosen weights (the live load). Think about bundling strands together for strength. Some shapes are better at absorbing loads, for example, triangles are particularly strong. Rubber bands make for good junctions because they are flexible unlike tape, but test them both! You can also use string if you have it!

Step 1: Sketch out your design
Spend a few minutes planning what you want your bridge to look like and how it will work!

Iconic Bridge Designs
Take a look at some of these bridge designs for inspiration!

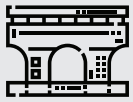


Truss Bridge

Suspension Bridge

Cantilever Bridge

Arch Bridge



Beam Bridge

Step 2: Build the Bridge
Using the bundles of spaghetti or straws, make a bridge between two raised surfaces (we recommend stacking books at equal heights). If you want to create a roadway, use a piece of cardboard. Then place items on the bridge to see how much weight it can hold!

Record what items your bridge was able to hold here:

_____

_____

_____

_____

_____

_____

CHALLENGE

Try to build a replica of a famous bridge like the Golden Gate or the Sydney Harbor Bridge!

PHOTOGRAPHY

EXERCISE 9

For architects, it's important that we document our work through photography. We also use many of the same design principles from photography in our building designs such as symmetry and the rule of thirds.

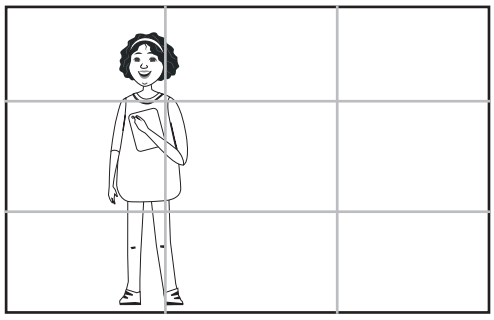
Practice

Find and take pictures of as many items from the list below and be creative with your composition and angles:

- Window
- Door
- Stair
- Column
- Foundation
- Beam
- Frame
- Roof
- Floor
- Insulation

Rule of Thirds

The rule of thirds involves mentally dividing your image using 2 horizontal lines and 2 vertical lines. The idea is that an off-center composition is more pleasing to the eye and looks more natural than one where the subject is in the middle of the frame.



Tips & Considerations:

- Think about how you are framing the object in the picture. Use the Rule of Thirds.
- Is there an interesting detail to look at?
- Don't be afraid to zoom in and be abstract! I bet that door handle could make a cool picture!
- Are you holding the camera in "landscape" or "portrait"? Why?
- What is the function of the item you are taking a picture of?
- Are you taking the photo from above or below your subject?

Exercise

Now, choose your favorite room in your house and take photos of it using the tips from above. Focus in on features of the room that make it unique!

What features did you choose?

_____

Why is this your favorite room?

_____

_____

CHALLENGE

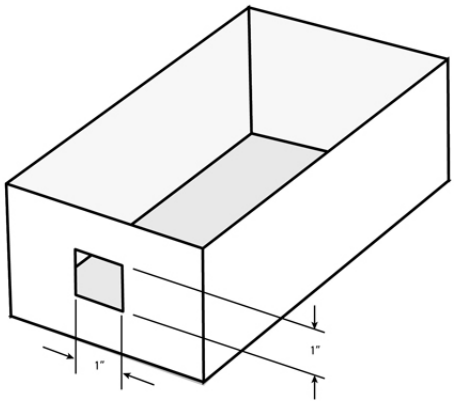
Using a photo collage app, create a picture collage of your photographs from this exercise!

BUILDING THE COMMUNITY CENTER

EXERCISE 10

What You'll Need:

- shoebox or cardboard box
- tape or glue
- markers
- scissors
- color paper



Goal:

Now, it's time to put everything you've learned together to build the new community center!

Directions:

Using the plans and designs from Exercises 2 and 3, make a 3D version of your community center design!

Using your floor plan sketch, trace out each room in the box, then measure and cut out walls. Glue or tape the walls in place.

Then start creating furniture. Use some of the sketches from Exercise 4 or create new items.

Color and decorate the outside of the box to look like your elevation sketch from Exercise 3!

Once you are finished, use the things you learned in exercise 9 about photography to take some photos of your new project!

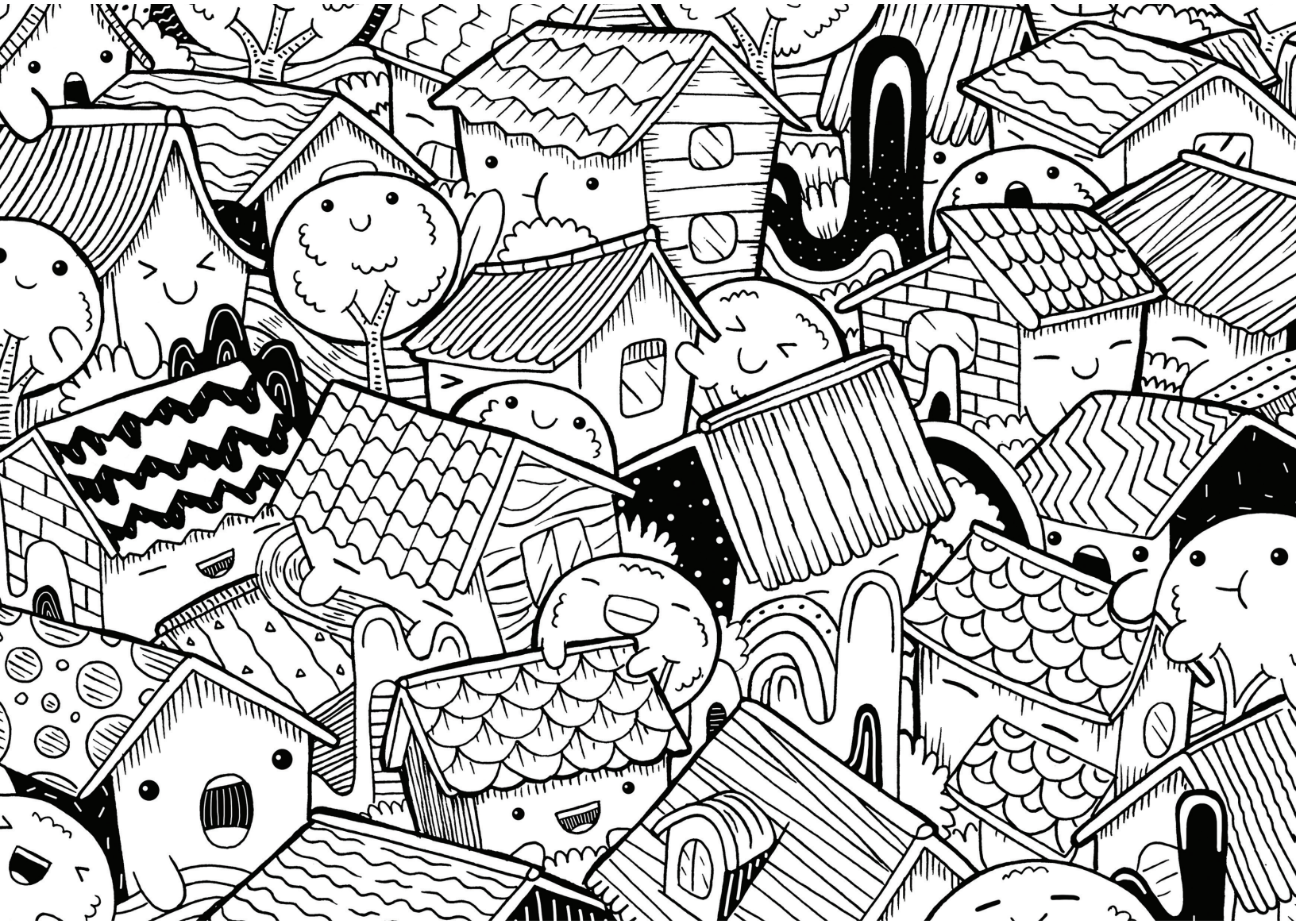
Thank you so much for helping me build the new community center! My friends and neighbors are going to love spending time here. Thanks for going on this adventure with me! -Archie

SHOW US YOUR CREATIONS!

We would love to see your creative community center designs!

Email photos to **social@methodarchitecture.com** or tag us on social media **@methodarchitecture.**

#AdventuresOfArchie



This activity book was created to spark creativity and interest for kids in the architecture, engineering, and construction fields. We hope you have fun on this adventure with Archie!

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