Paper Houses

Parent Guide

SUMMARY

Architects face the challenge of representing their plans for real-life buildings using paper. These three mini-activities will give you the opportunity to represent your home in paper.

WHY

Many tasks in school, work, or family life require interpretation. By exploring a single topic in three different formats, children can think about the different ways that information can be shared and interpreted.

TIME

- 10–60 minutes, depending on activities and options chosen

RECOMMENDED AGE GROUP

This activity will work best with children in kindergarten through 3rd grade.

GET READY

- Read *Julia Morgan Built a Castle* together. The book tells the story of Julia Morgan, one of America's earliest women architects. Morgan designed almost 800 buildings during her career, including William Randolph Hearst's castle in California. For tips on reading this book together, check out the *Guided Reading Activity* (*http://americanhistory.si.edu/ourstory/pdf/architect/architect_reading.pdf*).
- Read the *Step Back in Time* sheets.

YOU NEED

- *Directions* sheets *(attached)*
- *Step Back in Time* sheets *(attached)*
- *Graph Paper* sheet *(attached)*
- *Cube Pattern* sheet *(attached)*
- Measurement tool such as yardstick, measuring tape, or ruler
- Paper
- Pen, pencil, or drawing supplies
- Scissors
- Computer with Internet connection *(optional)*

More information at *http://americanhistory.si.edu/ourstory/activities/architect/*.

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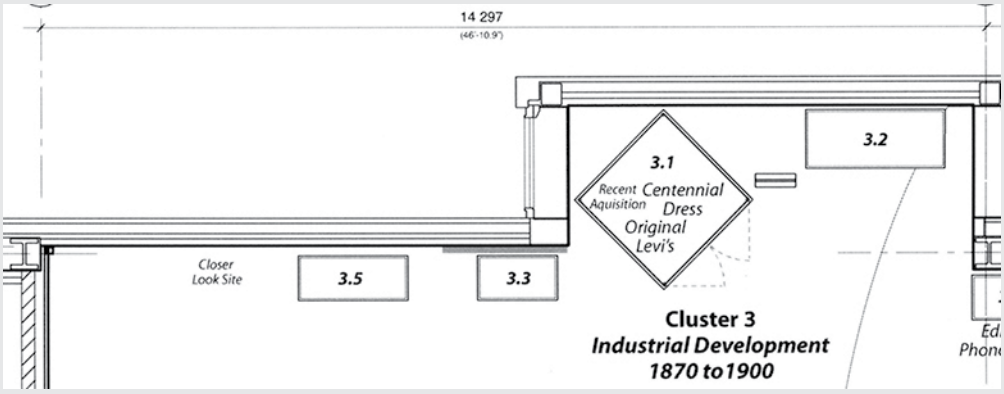

Exhibition designers in museums also create floorplans to show how the exhibit cases will fit into a room. You can see the measurement of this part of the room (14.297 meters) at the top of the drawing.

Floorplan: Represent your home in two-dimensions.

1. Measure each of the rooms of your house using a measuring tape or ruler. As you measure, write down the length and width of each room.
    - For the simplest version of the activity, use either a measuring tape or ruler to measure, and record your measurements to the nearest foot.
    - For less challenge, you can select only one part of your house. For example, you can choose to only measure the rooms on the first floor.

2. With each square on the graph paper representing one foot, use graph paper to draw out the length and width of each room.

3. Can you tell where one room meets another? Sometimes this can be difficult, so feel free to make your best guess.
    - For more challenge, measure how far the doorways are from the edge of each wall. This will make a very precise drawing.

4. Talk about your floorplan. Which wall was the longest? Did any of the measurements surprise you?

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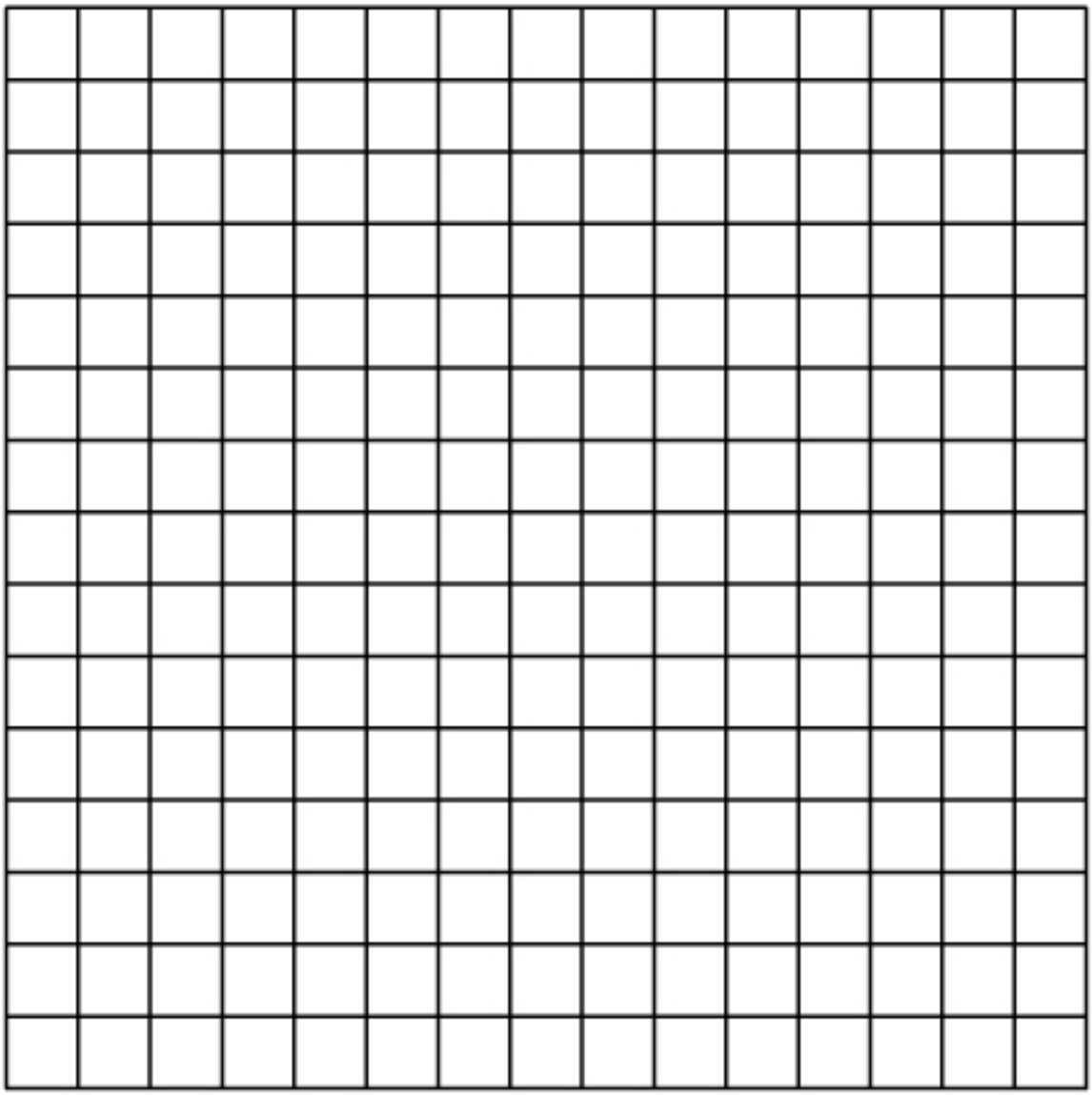
Created in the National Council for Teachers of Mathematics' *Dynamic Paper* (*http://illuminations.nctm.org/ActivityDetail.aspx?ID=205*)



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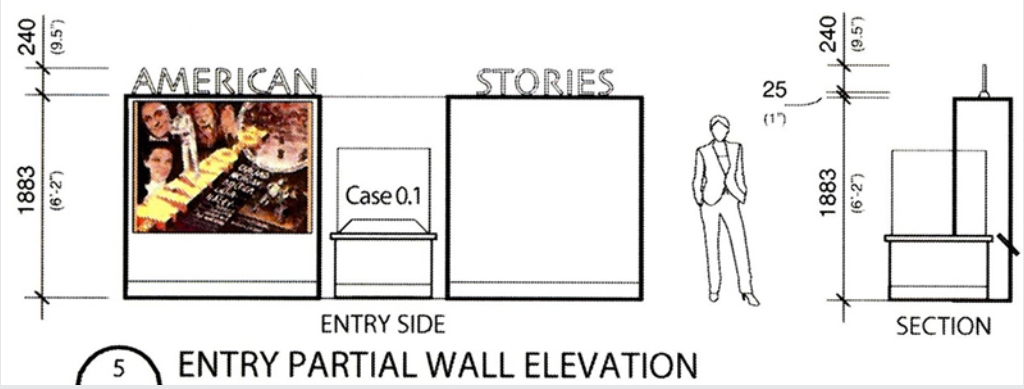

Exhibition designers in museums create elevation drawings to show how tall each part of the exhibit will be. In addition to showing the measurements of each case and wall, this elevation includes a drawing of a person to show scale.

From the Side: Another way of representing your home in two-dimensions.

An elevation is a drawing of a building or wall that shows how far from the ground each part of the building is.

1. Pick an interesting wall. Most walls in most homes are relatively plain. Pick a wall that has some decoration on it (either as part of the wall or hanging on the wall) or one that has a window or door interrupting the wall.

2. Write down each of the items that is a part of that wall, starting from the floor. Look carefully. Is there a wooden decoration or baseboard at the bottom of the wall? Is there a thin strip of wood that runs below the bottom of the door?

3. Measure the full height of the wall from floor to ceiling.

   Tip *Safety first! Ask for help from an adult for this step.*

4. Measure how far each item is from the ground and write that down. For extra challenge, find out how far each item is from the ceiling.

5. Make a drawing of the wall and include each measurement you recorded. Draw an arrow with two points, and then write the number in the middle.

6. Draw yourself into the picture. Try to make yourself the right height to fit into scale with your picture.

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Exhibition designers in museums sometimes create models to show the size and position of objects, cases, labels, and other graphics. This one even had clear plastic to show what part of each case was made of glass.

Making a Cube: Think about your home in three-dimensions.

Many homes are more or less shaped like cubes. In this activity, you'll make a cube out of paper and think about the different sides of your home.

1. Use the attached design of a cube or create your own (using whatever measurements you like) by using the National Council for Teachers of Mathematics' *Dynamic Paper* (*http://illuminations.nctm.org/ActivityDetail.aspx?ID=205*).

2. Cut out along the edges of your cube, and fold it to make a cube shape.

3. Imagine that you could fit inside the cube and you are inside your home. Think about each side of the cube. Write down which cubes are walls, which is the ceiling, and which is the floor.

4. Talk together about what materials make up the walls, ceiling, and floor. What colors are the walls, ceiling, and floor? Depending on the size of your house, you might need to walk from one room to another to determine how to describe each wall that is the outermost (on the edge) of your home. You can write these down on the cube or color the cube.

5. For extra challenge, also talk about the outside of your home. What materials and colors are on the outside of your home's walls, roof, and foundation? You can write or draw to represent these on the outside of your cube.

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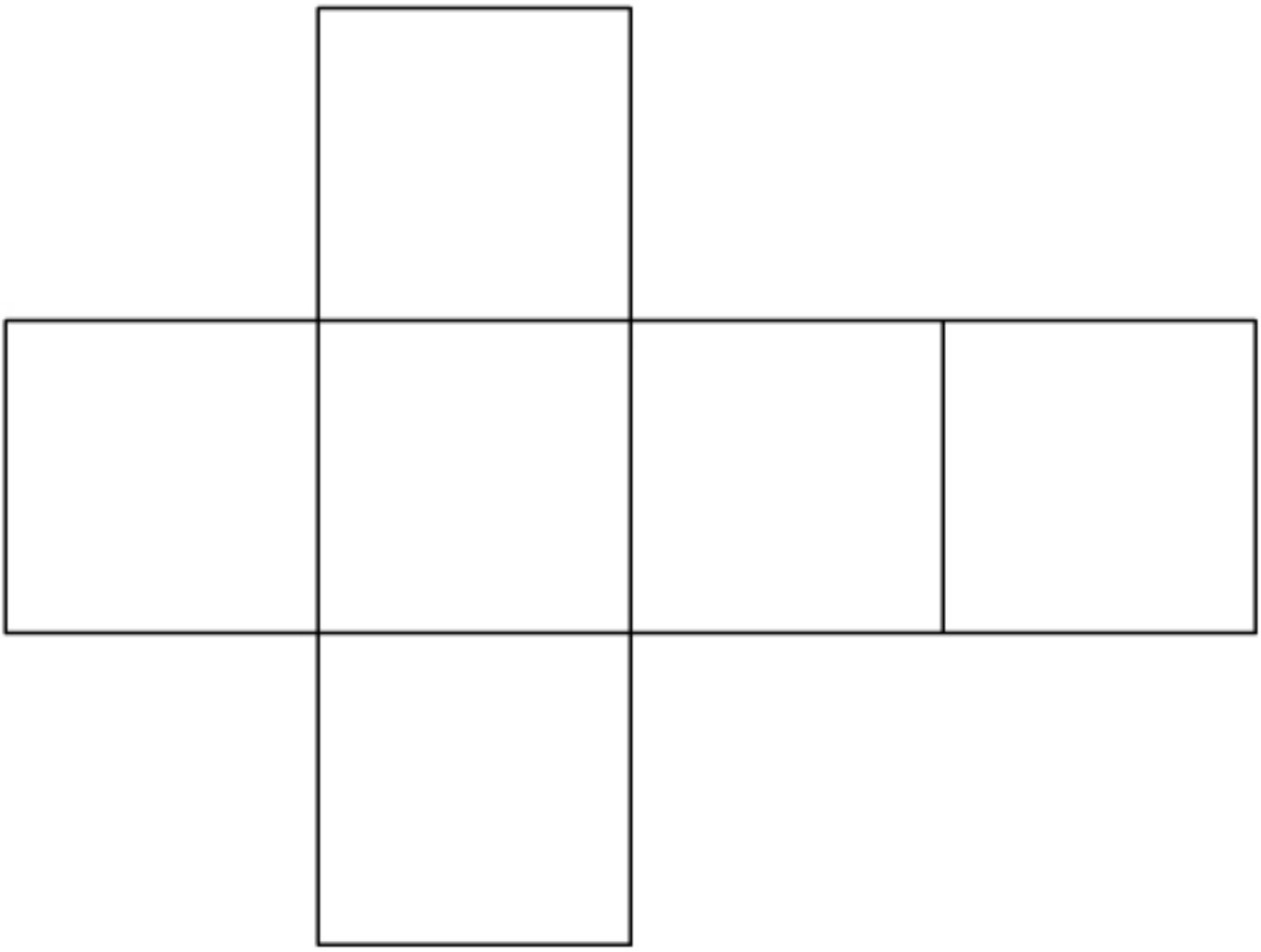

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Step Back in Time,

For more information, visit the National Museum of American History website *http://americanhistory.si.edu/ourstory/activities/architect.*

Architects are people who design buildings. They study math, science, and art to help them design buildings that are strong, useful, and beautiful.

An architect thinks about the place where the building will stand to make sure it will survive the weather and will be sturdy in the ground. The architect also decides the exact measurements for each part of the building to make sure everything will fit together correctly and to decide how much of each building material to buy.

A sketch of the Supreme Court of the United States, by its architect Cass Gilbert [Archives Center, National Museum of American History]

A strong building is only part of the challenge for an architect. He or she will also make sure that the building will be conveniently arranged for the people who will live or work there. To make the building beautiful, the architect will also think about decorations, patterns, and materials that will look beautiful to the people who use the building and see it from outside.

To share their plan for the building, architects make many drawings on paper and sometimes make small models out of cardboard. The architects will then show the papers and models to the people who will use the building. Sometimes architects redo their plans over and over again to make sure they are perfect, because construction workers use those paper plans to make the real building out of materials like stone, metal, wood, plaster, and glass.

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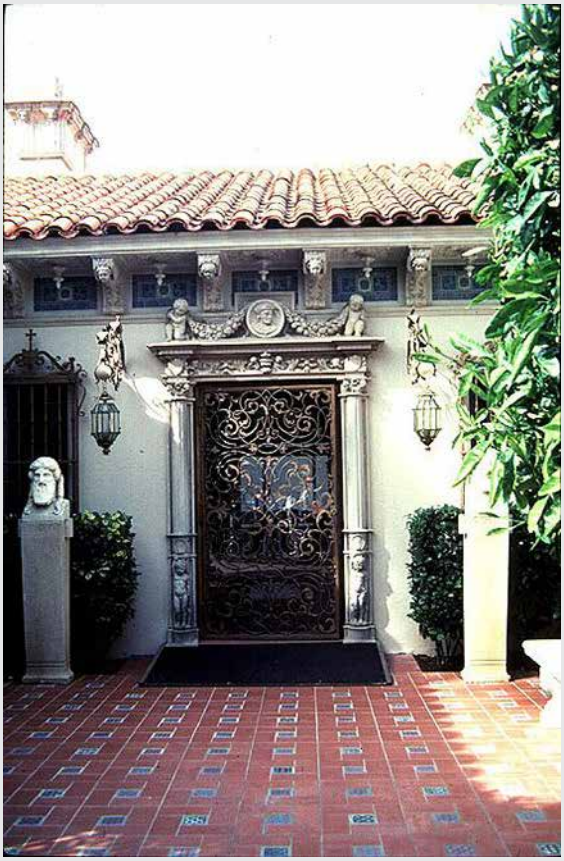
About Julia Morgan:

Until around 1900, almost all architects were men. Women were not admitted to architectural school. However, Julia Morgan and other great women architects have helped change this tradition and now both women and men can become architects.



Photograph of one of the entrances to Hearst Castle, by Eleanor C. Weller [Archives of American Gardens, Smithsonian Institution]

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Teacher Guide

OBJECTIVES

The students will be better able to:

- Use measuring tools.
- Represent measurements, objects, and descriptions.

STUDENT PERFORMANCE CRITERIA

- Accurately records details of the space(s).
- Accurately records and represents measurements.

STANDARDS

NCHS History Standards

K–4 Historical Thinking Standards

2H: Draw upon the visual data presented in photographs, paintings, cartoons, and architectural drawings.

Common Core Math Standards

CCSS.Math.Content.K.CC.B.5 Count to answer "how many?" questions

CCSS.Math.Content.K.G.A.1 Describe objects in the environment using names of shapes, and describe the relative positions of these objects

CCSS.Math.Content.2.MD.D.9 Generate measurement data

CCSS.Math.Content.2.MD.A.1 Measure the length of an object by selecting and using appropriate tools

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