



Scale, Size, and Measurement

Teacher and mentor should discuss how scale will be approached in the classroom. Some choose to use the project to teach precise mathematical scale (the size and proportion of one object compared to a common reference i.e. $\frac{1}{4}$ " = 1 foot). Others are more interested in the students having a general sense of the overall size, shape, and proportion of buildings as they relate to the size of people. Decide which route is best for your students.

Grade Level

Grades 1-5

Subjects Math

Materials

Learning by Design
NY engineer scale
or
Pipe cleaners
or
Popsicle stick
engineer scale
or
Lot templates and
"That's About the
Size of It" sheet

Time

Considerations will
vary based on activity

Related Pages In Box City

Pace and Scale pg 44
The Scale of the
Buildings pg 119
Lot Size and Scale
pg 120
More on Scale
pg 121

Standards

Math Grade 4

Connect mathematical learning with other subjects, personal experiences, current events, and personal interests.

Recognize and describe measurable attributes and the appropriate units to measure them.

Read and interpret measuring instruments.

Doing the Activity

Proportional scale activity ideas:

1. Select items around the classroom and discuss whether items are "grown-up scale" or "student scale."
2. Find a photograph of a building that features the entrance somewhat prominently. Use a copier to make one at full size, one reduced and one enlarged image. You are creating 3 images representing different sizes of the entrance. Distribute to students and ask them to draw an appropriately sized figure for each of the three images.
3. Ask each student to bend a pipe cleaner in the shape of a stick person. Use it as a guide when you design your box buildings. Hold it up to entrances and rooflines to make sure your pipe cleaner human will fit appropriately.
4. Look at a photograph of the State Capitol. If students have visited, ask them to reflect on their experience. Is the building human-scaled? How did it feel inside the building? Why was the Capitol designed in that size and scale?

5. Walk around the outside of the school with students. Look at the size of the building. Can we measure it using something other than a ruler? Have students line up against a wall with their arms spread. How many student arm widths long is the wall? Explain how they used a different standard of measure: "student arm widths."

For precise scale:

Create a popsicle stick measuring tool. Make marks on it every $\frac{1}{2}$ inch and inch. When you decide on the scale of your buildings, label those marks in corresponding foot measurements. In a $\frac{1}{4}$ " scale, a mark representing an inch would be marked "4 feet".

For discussion of different lot sizes:

Ask students to gather around a spot on the floor or a tabletop surface. Present the Lot Templates and show how the lot size for a house would be very different in size than a football field.

That's About the Size of It....

Building or Place	Average Lot Size**
School	11.9 acres 521,000 sq ft
Camp Randall	11.1 acres 485,000 sq ft
Park	11.1 acres 484,000 sq ft
Big box store	6.5 acres 284,000 sq ft
Factory	4.4 acres 192,000 sq ft
Hotel or Office in business park	2.9 acres 126,000 sq ft
Hospital	2.7 acres 116,000 sq ft
City Hall or Courthouse	1.4 acres 63,000 sq ft
Fast food restaurant	1 acre 44,000 sq ft
Bus Terminal	1 acre 44,000 sq ft
House	6,400 sq ft
Main St retail store	6,100 sq ft

**data provided is average for City of Madison, resource: City of Madison Planning Department