

Building Setbacks

A Practice Understanding Task

Purpose: In this activity students will act as a developer and make sure they are maximizing the number of apartments provided while complying with the city's municipal code and the protected areas nearby.

Career Field:

Architecture
Moseley Architects

WTCC Associate Program of Study and Contact Person:

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NC Math 4 Standards:

AF.2.2: Implement Law of Sines and Law of Cosines to solve problems.

Unit Alignment:

NC Math 4 - Unit 4: Law of Sines and Cosines

Common Core State Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
5. Use appropriate tools strategically.
7. Look for and make use of structure.

Prerequisite Skills

- Using right triangle trig and the Laws of Sine and Cosine to solve triangle problems.

Time Required

The time required to complete this activity is approximately 90 minutes.

Materials Needed

- Desmos or calculator

The Teaching Cycle

Launch: Desmos activity <https://teacher.desmos.com/activitybuilder/custom/60fd87f524792ae9294bf03d> and Launch Video

Explore:

Before passing out the student activity sheet, ask the students why they think building setbacks are necessary. Possible answers include:

Better services – having space between buildings and streets, etc., ensures that in the case of a fire or other emergencies, a first responder vehicle can get to you in a pinch. This is also true of maintenance vehicles like sewer, utilities, and cable.

Better ventilation – Bet you never thought about it, but not having a building squished up against another building or roadways gives you cleaner air. That means you and your home won't be breathing in toxic exhaust or your neighbor's smoking habit.

Better lighting – A no brainer, but property setbacks ensure that you have plenty of space around your dwelling to bring in natural light and better visual access. What good is a window if it's touching your neighbor's fence?

Better sound insulation – If you've ever lived right next to a hwy. or train station, then you know how intrusive sound can be. Building setbacks help ensure we get better sound insulation by building away from busy intersections and other noisy environments.

Better landscape – Even on big city buildings, you'll see a green space with some shrubbery or even a fountain in front of your doctor's office. This is to make the space more inviting and give a sense of ease. So the next time you admire the beautiful landscape in front of that office building, thank a property setback for that.

Better general health – Building setbacks help ensure buildings don't fall over each other in the case of a natural disaster, like an earthquake or fire. They encourage outdoor activities in public areas, and help keep the sanity of society by giving people enough room to roam.

Pass out the student activity sheet and mention the code requires a 44 degree angle at 40 ft height.

Students should work through the activity in small groups without being teacher led. Encourage struggling students to draw the triangle they are using to solve the problem with a colored pencil on their activity sheet.

Discuss:

Possible answers for Task 1a include space for HVAC, structural components (floor joists), and plumbing. Teachers can elaborate with, "In building construction, a plenum is a separate space provided for air circulation for heating, ventilation, and air-conditioning (sometimes referred to as HVAC) and typically provided in the space between floors. Allow another 1 to 2 inches for the combined thickness of the finish materials on the ceiling, usually drywall, and the floor -- such as carpet and pad, hardwood or vinyl and underlayment. Put it all together, and you're in the range of about 12 to 14 inches. An interstitial space is an intermediate space located between regular-use floors, commonly located in hospitals and laboratory-type buildings to allow space for the mechanical systems of the building. In the United States the standard ceiling height is 8 feet. Although 8 foot ceilings can still be found in entry-level homes, most new custom home builders incorporate 9

ft ceilings on the first floor, and 8 ft ceilings on the second floor. Many popular floor plans also include at least one raised, vaulted or two story room.”

Exit Ticket:

[Student Activity Sheet](#)

[Answer Key](#), [Calculations](#)