**Home Design (7th-8th grade)**

**Overview:**
Each team of students will design and create a small home. They will be focused on square footage and shape in conjunction to home layout.

\*\*\*\*This lesson has an optional 2nd day\*\*\*\*

 **Purpose (Objective):**
Students will apply concepts of geometry as they design a home of 1200 sq ft (They may use any dimensions and shape for this design). As part of this design they will work with scale drawings as well as calculating square feet.

**Materials:**
graph paper

**Activity (Explore):**

 1: As groups, students will decide on the dimensions of the outside wall of their homes. The home sq footage must be 1200. They groups will each make a to scale model on graph paper. Students and groups must decide on the scale they will use (how much one box on the graph paper will represent, ex. 2 boxes= 1ft, so if my home is a 30ft x 40ft home then my scale drawing would be 60 boxes by 80 boxes).

 2: Once students have decided on and drawn their outside dimensions they will then start layingout the interior of their homes. Students should refer to the informational sheet for typical dimensions of walls, rooms, etc.

 3. As a group students add walls, rooms, halls, entries, doors etc. to their design. As they are doing this they must calculate the square footage for each area of the home. This can become difficult as they take out the space occupied by walls.

 4. Students will then present in front of the class their design. They will discuss the following questions (If time does not allow for every group to present to the entire class, you may have 3 groups present to each other. Teacher(s) should move around the room to get an idea of how each group is doing.

5. Have students do peer evaluations of the presentations based on the following questions: 1: Why did you choose these specific dimensions?

 2: How many bedrooms and bathrooms did you add?

 3: What do you love about your design?

 4: What would you change about it if you were to do it again?

**Closure:**

After the presentations, bring the entire class back together and discuss what they enjoyed about the project. The following questions may be used to guide discussion:

 1: What was your favorite part about today’s activity?

 2: How many of you would want to design a bigger home?

 3: What did you learn from today’s activity?

**Assessment:**

Students will be assessed on three items. 1: They will receive points for their design and their use of correct calculations of sq footage. 2: They will be assessed upon their presentation of the design. 3: they will be assessed on their participation in their group. This can be done by teacher observation and grading, but student peer evaluations may also be included.

**OPTIONAL DAY 2 (1.5 hours)**

**Materials:**
blue prints from day 1, masking tape, chalk, measuring tapes

**Activity (Explore):**

1: In the same teams student’s created their blueprints, they will create a life-size layout of their tiny houses. If space does not allow, have students select the best design or couple of designs to produce at full scale.

2: The teacher should take a moment to explain that the Pythagorean theorem will be needed to make the house square, and to discuss wall thickness (one piece of masking tape does not represent the thickness of a wall.

3: Give the students 45 minutes to produce full-scale/lifesize layouts of their homes. This can be done with

* Chalk on a playground
* Tape or yarn with small pieces of tape, in a large open space or in a gym
* Yarn or string with tent stakes on a grassy area

4: Students will present their designs to their classmates and each team member needs to take part (presents) in the presentation.

5: Students clean up the materials used.

**Closure/Conclusion:**

After the presentations, bring the entire class back together and discuss what they enjoyed about the project. The following questions may be used to guide discussion:

 1: What was your favorite part about today’s activity?

 2: What was the most difficult part of the activity?

 3: What did you learn from today’s activity?

 4: Did their design work at full scale?

**Assessment:**

Students are assessed based on two things. First the teacher should assess their presentation and appropriate design. Second students should do peer evaluations of the other group’s presentation & design.

Home design Handout

You will be designing a 1200 sq ft home. You will draw a scale drawing on the graph paper provided for you. First you will need to decide on your outside wall dimensions. Remember that to calculate sq footage you must take Length times the Width (LxW=A). After you have decided on you basic dimensions you will need to decide on how much each square on your graph paper will represent. For example is each square a 1 ft by 1 ft representation, or is it a 2 ft by 2 ft representation, or some other measurement?

Now that you have your outer walls, you will need to know a few general building dimensions. Refer to the list below as you begin your designs.

 Walls need to be at 6in thick.

 Hallways need to be 3 feet wide

 Interior doors are 2 ½ feet wide

 Outside doors are 3 feet wide

 A typical small bathroom is 5ft by 8ft (master bathrooms are usually larger)

A typical small bedroom is at least 10ft x 10ft (master bedrooms are usually larger)

Discuss as a group what you want in your house. How many bedrooms, bathrooms, closets, entry ways, kitchen, hallways, etc. Decide where you will walk in and if there will be a back door. Discuss and decide where you want your rooms and how large you want them to be.

Once you have made some decisions, you can start adding walls and doorways to your home. Remember to make them to scale and label the length and width of everything.

Now calculate the square footage of each room, remember to not count the wall space in your area calculations. Label each room, hallway, bathroom or closet with the sq footage.

Prepare to give a 3-5 min presentation on your design according to the following questions:

1: Why did you choose these specific dimensions?

 2: How many bedrooms and bathrooms did you add?

 3: What do you love about your design?

 4: What would you change about it if you were to do it again?

 5: What was the hardest part of the project?

\*\*Hint: you will be graded on participation, your presentation, as well as calculations on your model

Peer evaluation forms

Evaluate each of your group members on a scale of 1-5.

5=Helped on all aspects of the project, had a positive attitude and contributed. 3=Peer helped about half of the times, they weren’t always engaged in what was going on and didn’t contribute as much as they could have. 1=Peer didn’t help on the project, or the presentation. They had a poor attitude.

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| --- | --- | --- | --- |
| Students Names | How much did this student contribute to the groups design? | How much did this student contribute to the groups presentation | What would you give this student as an overall grade? |
| 1. |  |  |  |
| 2. |  |  |  |
| 3. |  |  |  |
| 4. |  |  |  |
| 5. |  |  |  |