 

**MIDDLE SCHOOL**

**Math & Engineering**

**Drafting Bubbles**

**Teacher Background Information:**To generate ideas and to determine realistic space allocations inside structures Architects and Designers frequently create multiple plans that last about as long as bubbles on a windy day.

**Goals:** To develop a series of potential house plans, estimating square footage of rooms, and applying spatial relations

**Objectives:** Students will…..

* Measure
* Draw to scale
* Calculate percent
* Estimate
* Determine spatial relations

**Standards met:**

Geometry:

* Specify locations and describe spatial relationships using coordinate geometry and other representational systems
* Use visualization, spatial reasoning, and geometric modeling to solve problems

ITEA STL’s 1, 2, 8, &11

**Time required:** 1 - 45 Min. Class Period

**Materials:**

* 30 sheets 11” x 17” graph paper
* 30 copies Small Draft Diagram student worksheet
* 30 copies Estimating Area student worksheet
* 30 copies Large Draft Diagram student worksheet

**Prep:**

* One sheet of 11” x 17” for each student (or 2 sheets of 8 ½” x 11” taped together)

**Procedure:**

* Explain to the students that their house will be a maximum of 1200 Sq. ft.
* Pass out the 11” x 17” graph paper and ask the student to experiment with area by drawing different shapes, which have a maximum of 1200 Sq. ft. Remind students that the final shape they come up with should be a feasible shape for their house.
  + Students may conclude that a rectangular, 30’ x 40’, shape will accommodate most of their plans well
* Architects and Designers generate ideas with their customers to determine realistic space allocations. This is known as brainstorming. They create numerous drafts of the various spaces within the house. Each shape represents one area with the sum of the areas equaling 100%, or in this case 1200 Sq. ft. or less.
* Pass out the 8 ½” x 11” Small Draft Diagram Student Worksheet and ask the students to experiment with different size shapes for each room representing at least each space listed under house specifications.
  + Remind students that they should consider flow from one room into the next; for example, do they really want to enter a bedroom through a bathroom?
* Each student should generate at least three different diagrams.
* Students need to choose the draft diagram that meets all the specifications and is most appealing to them.
* Then they should estimate the area of each room and for the total area of their house.
* Once the students have completed the “Estimating Area” student worksheet, they should draw a large bubble diagram using the “Large Bubble Diagram Student Worksheet”.
* If the Total Area of their house is less than 1,200 sq. ft. they may choose to increase the area of some or all spaces.
  + Remind them that hallways and entryways take up square footage; for example, a 36” door takes 9 Sq. ft. when it swings open.
* Pass out the 8 ½” x 11” Large Draft Diagram Student Worksheet and ask the student to redraw their top choice small draft with any changes they have made.
* (Example Draft)

**SOCIAL AREA**

**EATING AREA**

**KITCHEN**

**BEDROOM**

**BEDROOM**

**BATHROOM**

**Drafting Bubbles: Small Draft Diagrams**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Drafting Bubbles: Estimating Area**

**Student Worksheet**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Choose the draft that meets all the specifications and is most appealing to you; then estimate the area of each room and total area of your house.**

**1. Social Area: \_\_\_\_\_\_x\_\_\_\_\_=\_\_\_\_\_\_Sq.ft.**

**2. Bedroom: \_\_\_\_\_\_x\_\_\_\_\_=\_\_\_\_\_\_Sq.ft.**

**3. Bedroom: \_\_\_\_\_\_x\_\_\_\_\_=\_\_\_\_\_\_Sq.ft.**

**4. Bathroom: \_\_\_\_\_\_x\_\_\_\_\_=\_\_\_\_\_\_Sq.ft.**

**5. Kitchen: \_\_\_\_\_\_x\_\_\_\_\_=\_\_\_\_\_\_Sq.ft.**

**6. Eating Area: \_\_\_\_\_\_x\_\_\_\_\_=\_\_\_\_\_\_Sq.ft.**

**7. \_\_\_\_\_\_\_ Area: \_\_\_\_\_\_x\_\_\_\_\_=\_\_\_\_\_\_Sq.ft.**

**8. \_\_\_\_\_\_\_ Area: \_\_\_\_\_\_x\_\_\_\_\_=\_\_\_\_\_\_Sq.ft.**

**9. \_\_\_\_\_\_\_ Area: \_\_\_\_\_\_x\_\_\_\_\_=\_\_\_\_\_\_Sq.ft.**

**10. \_\_\_\_\_\_\_ Area: \_\_\_\_\_\_x\_\_\_\_\_=\_\_\_\_\_\_Sq.ft.**

**11. Total Area of your house = \_\_\_\_\_\_\_\_\_\_\_****Sq.ft.**

If the Total Area of your house is less than 1,200 Sq.ft. you may choose to increase the area of some or all of your spaces. Keep in mind that hallways and entryways take up square footage!

**Large Draft Student Worksheet**