

## Portfolio: Application to Architecture

Now that you have learned the various area formulas and how they are related to each other, it is time to apply this knowledge to solve some real life problems. During the next week, you will be completing some activities related to the field of architecture. You will then compile evidence of your knowledge on the application of area into a portfolio. Creating your portfolio will require problem solving, organization, and self reflection. Listed below are the required contents of your portfolio.

- ✓ Unit Test on Area with summary statement
- ✓ Activity 1: Working with a Floor plan and Journal 1
- ✓ Activity 2: Median Cost per Square Foot
- ✓ Activity 3: Building Inspector and journal 2
- ✓ Activity 4: Flooring Estimate and journal 3
- ✓ Activity 5: Roofing Contractor
- ✓ Journal: Overall reflections

The portfolio should include all work completed during class as well as all homework assignments for each activity.

- **Activity 1: Working with the Floor plan.** Here students learn the basic symbols of floor plans and learn how to use an architect's scale to measure lengths on a floor plan. Students measure the dimensions of each room on a small apartment plan, convert these measurements to actual size, and calculate the area of each room.
- **Journal #1:** Why does using an architect's scale make it easier to convert from drawing size to actual size? Does the sum of all the areas of all the rooms equal the total area of the apartment? Why or why not?
- **Activity 2: Median Cost per Square Foot.** Here students are asked to bring in real estate ads that show the cost of various homes and their total square footage. Students compile this data in to a chart to arrive at the median cost per square foot to build a house.  
At this time students are shown through modeling (appearance, display, gestures, volume, explanation of data) how to present information to a floor plan dealing with square footage and cost per foot for room(s). Students practice taking turns on why they believe their group's information is the best cost per foot and how they calculated square footage for the room(s). Later after the short presentations the class decides on one number for this cost that will be used in calculations later on in the unit.  
Homework is a worksheet on comparing the median cost per square foot.
- **Activity 3: Building Inspector (2 days).** Here the students work cooperatively (in small groups of 3-4) to examine a blueprint. During this

time the students will focus on group skills-reaching consensus. We will use a T-chart to discuss/direct what it looks and sounds like when you ask other members of a group to plan out loud. We will do this as a class using the white board and writing notes. Examples will be given and discussed in how it fits in with the group work of assessments. They are asked to find the (measurements) dimensions and area of each room, as well as inspect the plan. Students are provided with a list of building codes that are to be met. They then complete an inspection record of the plan. The plan they are given does contain flaws. Finally, each group presents to the class by providing a summary of the flaws they found and the rating they gave the plan. Homework is to calculate the total area and building cost of cabin 1.

- **Journal #2:** Students are to summarize the errors they found with the plan and include ideas for how to fix them.
- **Activity 4: Flooring Estimate (2 days).** Again students are working cooperatively to estimate the cost of flooring the plan they worked on in the previous activity. Each group is given a packet of flooring choices and prices. The group then needs to come to a consensus and decide on which type of flooring to use for each room and estimates the cost. **Journal #3:** What things were important to consider as you and your group picked out flooring for Plan A? Was there anything that your group had trouble coming to agreement on?
- **Activity 5: Roofing Contractor (1 day).** Here students learn about the different types of roofs that a house could have: gable, gambrel, hip, and shed. They then apply their knowledge of the Pythagorean Theorem and area to find the area of each roof.
- **CAD Lab: computer-assisted-drafting.** Students will work in their groups to formulate different floor plans with the technology of the computer. Calculations are converted on the computer, and the design and structure is formulated to the different dimensions given. A final product will be printed and turned in.

**Culminating Project: Eye on Design.** Congratulations. You have been selected to be a part of an architectural design team to design the new subdivision next to the high school. The local township has just sold the property to a land developer who is going to put up single-family houses. Your firm has been hired to design a variety of floor plans (for 3-bedroom, 2-bath single-story homes) to offer to customers. Each home must meet local building codes and developer guidelines, and must be under budget. All houses should be designed to fit on a level building lot 80 feet wide by 112 feet deep. There must be side yards that are a minimum of 8 feet wide. The house must set back from the front lot

by 20 feet and a standard 2-car garage that measures 20 feet by 24 feet must be used in the plan.

As stated, each house must have at least 3 bedrooms, 2 full bathrooms, a full kitchen, a dining area, and a living room. There must be adequate closets and storage space for a family of four. Remember to include space for the hot water heater and the washer and dryer.

The total cost for the house, including garage, must be under \$200,000, raw construction. The floor plan must depict the criteria given. The quality of construction to be used by the builder will cost \$100 per square foot. The project submission deadline is 5/20/03 in order to be presented to the supervisors for inspection. Then all design groups will make a presentation to the clients.

**Wrap Up:** Students will be given a day to wrap things up and assemble their portfolio. Students can spend time discussing requirements, writing their overall reflection, organizing contents, and completing the rubric themselves. This serves as self-assessment as they evaluate their own performance. Questions regarding the portfolio and its requirements should also be answered.

### **Other Portfolio considerations**

In order to help make this assessment more feasible for my students, I plan to set up an area in my classroom where students will be allowed to leave their portfolios. This will help avoid students not having their materials with them in class. One of the goals of the assignment is to make my students more organized, but I would like to help them by allowing them to store at least part of their portfolio in the classroom. In order to keep the portfolio assignment authentic I am providing my students with choices. They will be given the opportunity to make choices during the activities throughout the unit as well as on what is turned in as part of their portfolio. For example, one of the activities asks them to make choices about the type of flooring they plan to purchase for their new home. Part of the portfolio assessment asks them to make reflections on the activities completed in class. They will be given a choice as to which questions they would like to answer for their overall reflection statements.

## Rubrics

### Journal

Two journal entries over course of the unit will ask students to explain, interpret, and apply concepts. Journals will also provide opportunity for self-knowledge.

- 5 The journal entry thoroughly addresses the questions presented. Students have a clear and complete understanding of concepts discussed in class.
- 2 The journal addresses some of the questions presented. Students have a clear understanding of some but not all concepts.
- 1 The journal entry barely addresses questions presented. Students have no understanding of concepts discussed in class

Your overall reflection statement in the journal should sum up what you have learned about how the ability to calculate area can be used to calculate many real-life problems. For this statement choose to answer *at least two* of the questions listed below with each of the two entries:

What was your favorite architecture activity and why?

What have you learned about how area can be used to solve problems?

Why is computing area important for design?

What are the three most important things you learned during this unit?

How does measurement and architecture create structure and design?

What other problems related to building/buying a house might arise? How could you use your knowledge of area to solve them?

Reread your summary statement from the area test and reflect on how your knowledge and understanding of area (specifically applications related to area) has grown? What have you learned that you did not know before? Have you achieved your goals

## Portfolio/Journal and Reflections

Criteria	4	3	2	1
Required elements _____x 3	Portfolio includes all required contents and journals/reflections.	Portfolio includes 5 out of the 6 required contents. All journals and reflections included.	Portfolio includes 3 or 4 of the 6 required contents and is missing one or two journals.	Portfolio includes 1,2, or 3 of the required contents and only 1 or 2 journals.
Problem response _____x 3	Approaches the problem accurately, arrives at a correct response.	Approaches the problems accurately, but arrives at an incorrect response due to minor errors in computation or the miscopying of a number.	Approaches the problems accurately, but arrives at an incorrect response due to major errors in computation or arrives at a correct response to the wrong element of the problem.	Attempts the problem but fails to complete it accurately, may show major errors in computations and/or problem solving strategy, attempts the wrong problem.
Organization, format, and structure _____x 2	All items are in the correct order and clearly labeled and dated. A title page and table of contents is included. Papers are assembled neatly in a folder, binder, or report cover.	All items are in the correct order and most are clearly labeled and dated. A title page is included. Papers are assembled neatly in a folder, binder, or report cover.	Most items are in the correct order and some are labeled and dated. Papers are assembled in a folder, binder, or report cover.	Some items are in the correct order. Most or all of the following are missing: labels, title page, table of contents, folder/cover.

Journals _____	All required journals are included. Each one shows evidence of understanding.	All but one of the required journals are included. Each one shows evidence of understanding.	Two journals are missing. Some may be brief and show little evidence of understanding.	Two journals are missing. No evidence of reflection/understanding.
Overall reflection _____	Overall reflection addresses at least 2 of the required questions. Responses are thorough and relate to the material learned during the unit.	Overall reflection addresses at least 2 of the required questions. Responses are brief and only partially relate to the material learned.	Overall reflection only addresses 1 of the required questions. Responses are brief and only partially relate to the material learned.	Overall reflection does not address the required questions. Responses are brief and do not relate to the material learned.

**Total Score:** \_\_\_\_\_/36

# Floor Plan Rubric

Name \_\_\_\_\_

<b>Criteria</b>	<b>5</b>	<b>3</b>	<b>1</b>
<b>Blueprint</b>  _____x 3	<ul style="list-style-type: none"> <li>*Blueprint is neatly done</li> <li>*All dimensions of doors, windows, &amp; living areas are clearly marked</li> <li>*Everything is labeled correctly with units</li> <li>*All 10 building codes are followed</li> </ul>	<ul style="list-style-type: none"> <li>*Blueprint is somewhat neat</li> <li>*Most dimensions of doors, windows, &amp; living areas are clearly marked</li> <li>*Most things are labeled correctly with units</li> <li>*6-8 building codes are followed</li> </ul>	<ul style="list-style-type: none"> <li>*Blueprint is messy</li> <li>*Some dimensions of doors, windows, &amp; living areas are clearly marked</li> <li>*Some things are labeled correctly with units</li> <li>*1-3 building codes are followed</li> </ul>
<b>Design</b>  _____x 3	<ul style="list-style-type: none"> <li>*Design includes 5 developer's guidelines/criteria</li> <li>*Computing area of each room is accurate</li> <li>*Flow of traffic is reasonable</li> <li>*Met deadline</li> <li>*Met \$200,000 budget</li> </ul>	<ul style="list-style-type: none"> <li>*Design includes 3 developer's guidelines/criteria</li> <li>*Computing area of each room is somewhat accurate</li> <li>*Flow of traffic is fair</li> <li>*Met deadline</li> <li>*Met \$200,000 budget</li> </ul>	<ul style="list-style-type: none"> <li>*Design only includes 1 developer's guideline/criteria</li> <li>*Computing area of each room is not accurate</li> <li>*Flow of traffic is unreasonable</li> <li>*Missed deadline</li> <li>*Over \$200,000 budget</li> </ul>
<b>Oral Presentation</b>  _____	<ul style="list-style-type: none"> <li>* Oral explanation of design shows a full understanding of measurement of rooms</li> <li>* All 3 students contributed to speaking</li> </ul>	<ul style="list-style-type: none"> <li>* Oral explanation of design shows an understanding of measurement of rooms</li> <li>* 2 students contributed to speaking</li> </ul>	<ul style="list-style-type: none"> <li>* Vague or no oral explanation of design</li> <li>* 1 student contributed to speaking</li> </ul>

Total Score: \_\_\_\_\_/35