Squarea

Digital Lesson.com

Project
Note: All answers should include appropriate units such as square inches (in.\(^2\)) or cubic feet (ft.\(^3\)).

I. SQUARE FOOT
   1. Cut out a square foot.
   2. Draw square inches on your square foot.
   3. How many square inches are in a square foot? _________________

II. AREA TRACING/DRAWING
   1. Trace or draw at least five objects on your square foot and color them.
   2. Label each object and write its estimated area on your square foot.

<table>
<thead>
<tr>
<th>Object</th>
<th>Area</th>
<th>Object</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>A)</td>
<td></td>
<td>D)</td>
<td></td>
</tr>
<tr>
<td>B)</td>
<td></td>
<td>E)</td>
<td></td>
</tr>
<tr>
<td>C)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

III. WHITE BOARD/CHALK BOARD
   1. Use your square foot to estimate the area of one white board in square feet.
      \[ L = \text{__________} \quad W = \text{__________} \quad A = \text{__________} \]
   2. Estimate the area of the white board in square inches.
      Equation: \[ \text{__________} \quad A = \text{__________} \]

IV. CLASSROOM FLOOR
   1. Use your square foot to estimate the area of the classroom floor in square feet.
      \[ L = \text{__________} \quad W = \text{__________} \quad A = \text{__________} \]
   2. Estimate the area of the classroom floor in square yards.
      Equation: \[ \text{__________} \quad A = \text{__________} \]
   3. What would be the cost of carpeting the classroom at $25 per square yard?
      Equation: \[ \text{__________} \quad C = \text{__________} \]
Answer Key

Note: All answers should include appropriate units such as square inches (in.²) or cubic feet (ft.³).

I. SQUARE FOOT
1. Cut out a square foot.
2. Draw square inches on your square foot.
3. How many square inches are in a square foot? _____144 in.²_____

II. AREA TRACING/DRAWING
1. Trace or draw at least five objects on your square foot and color them.
2. Label each object and write its estimated area on your square foot.

<table>
<thead>
<tr>
<th>Object</th>
<th>Area</th>
<th>Object</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>A)</td>
<td>Answers will vary</td>
<td>D)</td>
<td>book</td>
</tr>
<tr>
<td>B)</td>
<td></td>
<td>E)</td>
<td></td>
</tr>
<tr>
<td>C)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

III. WHITE BOARD/CHALK BOARD (Answers will vary with board size.)
1. Use your square foot to estimate the area of one white board in square feet.
   \[L = \underline{12 \text{ ft.}}\]   \[W = \underline{3.5 \text{ ft.}}\]   \[A = \underline{42 \text{ ft.}^2}\]
2. Estimate the area of the white board in square inches.
   Equation: \[42 \text{ ft.}^2 \times 144 \text{ in.}^2 = A\]   \[A = 6,048 \text{ in.}^2\]

IV. CLASSROOM FLOOR (Answers will vary with room size.)
1. Use your square foot to estimate the area of the classroom floor in square feet.
   \[L = \underline{30 \text{ ft.}}\]   \[W = \underline{29 \text{ ft.}}\]   \[A = \underline{870 \text{ ft.}^2}\]
2. Estimate the area of the classroom floor in square yards.
   Equation: \[870 \text{ ft.}^2 \div 9 = A\]   \[A = 96.7 \text{ yd.}^2\]
3. What would be the cost of carpeting the classroom at $25 per square yard?
   Equation: \[96.7 \text{ yd.}^2 \times $25 = C\]   \[C = $2417.50\]

Copyright Digital Lesson.com
V. SQUAREA CONVERSIONS

1. How many square feet are in a square yard? _________________________________
2. How many square inches are in a square yard? _______________________________
3. How many square feet are in a square mile? _________________________________
4. How many square yards are in a square mile? ________________________________

VI. VOLUME

1. Take your square foot and tape it together with 5 other people to create a cubic foot.
2. Use your cubic foot to estimate the volume of the classroom in cubic feet.
   
   \[ L = \underline{\quad} \quad W = \underline{\quad} \quad H = \underline{\quad} \quad V = \underline{\quad} \]

3. Use the cubic feet of the students in the classroom to construct a cubic yard.
4. How many cubic feet are in a cubic yard? ________________________________

VII. SURFACE AREA

1. What is surface area? ___________________________________________________
2. Find the surface area of your cubic foot in square feet and square inches.

   Area in square feet: \underline{\quad} \quad Area in square inches: \underline{\quad}

3. Find the surface area of the cubic yard in square feet and square inches.

   Area in square feet: \underline{\quad} \quad Area in square inches: \underline{\quad}

Copyright Digital Lesson.com
V. SQUAREA CONVERSIONS

1. How many square feet are in a square yard? __________ __________ 9 ft.² __________

2. How many square inches are in a square yard? __________ __________ 1,296 in.² __________

3. How many square feet are in a square mile? __________ __________ 27,878,400 ft.² __________

4. How many square yards are in a square mile? __________ __________ 3,097,600 yd.² __________

VI. VOLUME

1. Take your square foot and tape it together with 5 other people to create a cubic foot.

2. Use your cubic foot to estimate the volume of the classroom in cubic feet. Answers will vary.

   \[ L = \underline{30}\ \text{ft.}\quad W = \underline{29}\ \text{ft.}\quad H = \underline{9}\ \text{ft.}\quad V = \underline{7,830}\ \text{ft.}^3\]

3. Use your cubic foot, along with others in the classroom, to construct a cubic yard.

4. How many cubic feet are in a cubic yard? __________ __________ 27 ft.³ (3 ft. x 3 ft. x 3 ft.) __________

VII. SURFACE AREA

1. What is surface area? __Surface area is the sum of the areas of the faces of a figure. __

2. Find the surface area of your cubic foot in square feet and square inches.

   Area in square feet: __6\ \text{ft.}^2__ Area in square inches: __864\ \text{in.}^2__

3. Find the surface area of the cubic yard in square feet and square inches.

   Area in square feet: __54\ \text{ft.}^2__ Area in square inches: __7,776\ \text{in.}^2__
**SQUAREA** (Area and Volume)

**TEACHER TIPS**

**Lesson Description:** SQUAREA (a hybrid word I created which stands for “Square Area”) is a hands on math project that helps students to discover area, volume, and surface area in a very concrete, visual manner. Students measure objects in a classroom, create square feet, draw square inches, construct cubic feet, construct square yards and cubic yards, and investigate the surface area of a cube.

**Math Content:** Area, Volume, and Surface Area

**Time Required:** about 2 class periods

**The SQUAREA Project includes:**
* 2 SQUAREA Project worksheets
* 2 SQUAREA Project worksheet answer keys
* 1 SQUAREA Teacher Tips page

**Materials Needed:** Construction paper, tape

**Suggested Grade Level:** 5th - 8th

**Teacher Tips:**
* Construction paper should be used for this project. Students need to carefully measure the paper, draw guide lines, and cut off enough in order to create their square.
* When students draw their square inches on their square feet I usually have them do this lightly in pencil first, using a ruler. Many later outline their square inches with a black marker and ruler.
* Have the students draw and color the objects on their square feet over the square inch markings. This contrast makes it easier for the students to count the square inches.
* Teach students to estimate the area of objects that include partial squares. I encourage students to draw or trace objects that are irregular in shape.
* I find it easier to collect and grade page 1 and the square foot before completing page 2.
* It will take 162 square feet in order to create 27 stackable cubic feet that can be used to create your cubic yard. If you do not have this many students you can either cut out extra square feet (that have not been divided into square inches) or just model the answer for the class.
* Use a lot of clear tape to tape the six square feet together to create your cubic feet. Have students put their names on the front of their square feet since they will be taped together.
* Stack 27 cubic feet together to create a cubic yard. You can place them on tables in the center of the room for a nice Open House visual.

**Testimonial:**
Since I developed this project I have used it several times with 6th and 7th grade students. The way in which it allows them to actively learn the concepts of area, volume, and surface area is truly remarkable. The students are able to visualize the concepts of a square inch, a square foot, and a square yard. They work cooperatively with others to incorporate their personal square foot with others to create a cubic foot. Then they combine these with the cubic feet from other classes to construct a cubic yard. I often have this cubic yard on display at Open House for the parents to see.

Copyright Digital Lesson.com