

Quadratic Equations and Algebra Tiles

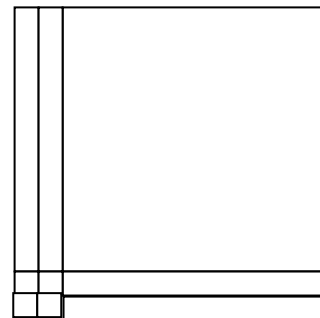
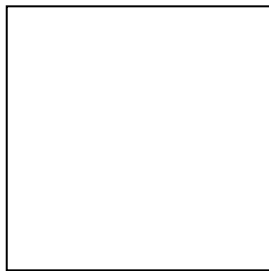
The block models for algebra tiles have been around for several decades and are still available from supplementary materials catalogs. These blocks are similar to the Base Ten blocks, formerly known as Dienes' Blocks, but do not have the ten identifications.



The tiles can be arranged into areas that represent quadratic equations.

An example of how the Quadratic Equation cards can work with the algebra tiles is described here using the Equation and Factor cards from deck a and the large square, several rectangle lengths, and several unit squares from an algebra tile set.

Algebra Tiles



Square is x^2 Long is x^1 ones

Sides or
Factors

Area as product
Equation

These are the blocks from an algebra tiles set. Use one large square, eight long rectangles, and 16 small unit squares to make the area shown on the right.

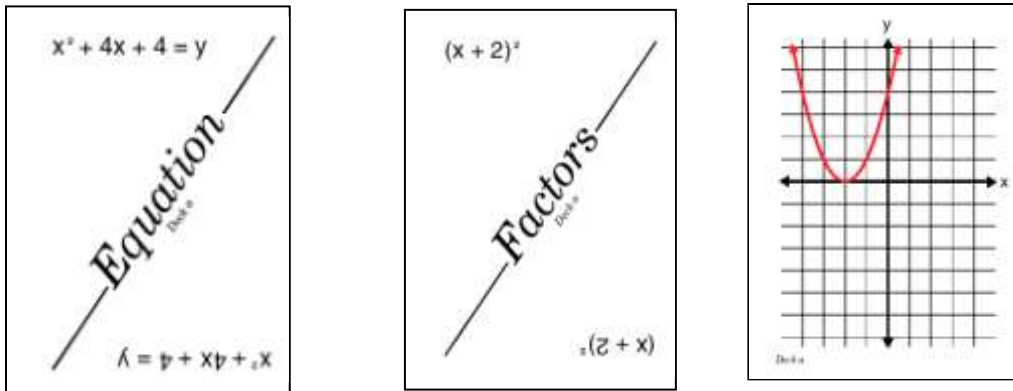
$$(x + 2)(x + 2)$$

$$x^2 + 2x + 2x + 4$$

$$x^2 + 4x + 4$$

Quadratic Equation cards from the Algebra Game deck

The Equation, Factor, and Graph cards from the Quadratic Equation deck a set that would match this are represented in this arrangement



We recommend that you begin by using only the quadratic equations that have all positive signs so that students can get used to the arrangements for areas. As students become familiar with how the symbols and blocks are represented, you can try incorporating the negative signs in the equations. Some algebra tiles or models allow the negative sign to be represented with a different color tile; other models allow the negative sign to be represented by placing the block on top of the other blocks. Use the directions for your particular algebra tiles set.

This relationship can be used in a classroom either as a class contest or as an activity for cooperative groups. We have described one example for both types of classroom arrangement. Teachers are encouraged to use their own imaginations to improve on these suggestions.

Class Contest

Give all students one card - either a Graph, an Equation, or a Factor card - from a selected deck (or choose these types of cards from all of the decks making sure that each Factor card has an Equation and Graph card that matches). All students in your class should have one card, either an Equation, Factor, or Graph card. Show an algebra tile arrangement on an overhead projector after you have demonstrated what the different blocks represent. Students must decide if their card matches the arrangement. Only three students will have a card that matches your arrangement. You must make sure ahead of time that your algebra tile arrangements agree with the cards that you have selected to give to the students.

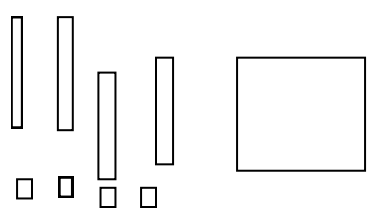
Cooperative Groups

Give each cooperative group a collection of algebra tiles and selected cards from the Quadratic Equation Topic Set making sure that the number of tiles could be arranged into quadratic areas that correspond to the Equation and/or Factor cards that you provide. Students can have the same assignment or each have a different arrangement, depending on teacher preference. If the groups are different then when the group reports their finished result to the class then each result will be different providing more opportunity for students to ask questions of each other. For example:

Use group assignment cards like this:

Algebra Tiles

Use all of the blocks to arrange a rectangular area.



The diagram shows a collection of algebra tiles: two tall vertical rectangles, two shorter vertical rectangles, and four small squares. To the right of these tiles is a square outline representing the target area to be filled.

With Quadratic Equation cards like this:

$x^2 + 4x + 4 = y$

Equation

$y = x^2 + 4x + 4$

$(x + 2)^2$

Factors

$(x + 2)^2$