Algeblocks

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"All students should learn algebra."
(NCTM Principles and Standards, 2000 ed. P37)

A strong knowledge of algebra and the problem solving strategies used in algebra is essential to a student's success in future high school and college math courses as well as in life. As we all know, each student learns differently. For students who learn visually, abstract thinking involved in algebra can be extremely challenging.

Algeblocks provide a visual approach to learning procedures involving polynomials and integers. Learning how to combine like terms, add, subtract multiply, divide, and factor polynomials can be a tedious process for students when the procedures they encounter are taught using only a symbolic representation. Using Algeblocks allows many students, especially visual learners, to gain a better understanding of what algebraic procedures accomplish.

To make your introduction to Algeblocks a little less intimidating, here are some resources to help...

1. Elem Algeblocks → An introduction to assigning variables to quantities and representing basic operations with both integers and variables.

2. Algeblocks for grades 4-9 → An extension of Elem Algeblocks that includes multiplication of polynomials (esp. binomials and trinomials).

3. HS Algeblocks → An extension of both of the above. This packet focuses especially on the multiplication, division, and FACTORING of polynomials.

4. Algeblocks Cheat Sheet → A sheet formatted for a 5 x 8 notecard with "life-sized" blocks, their names, and some rules for working with blocks.

5. Multiplication/Factoring Workspace → A sheet designed as a paper version of the workspace designed by ETA for multiplying and factoring.\

6. Algeblocks Theory → Questions raised at previous Algeblock presentations regarding standards and pedagogy.

For further educational and purchasing information regarding Algeblocks, visit
http://www.etacuisenaire.com/
or call 1-800-445-5985
or visit booth **#327** at the NCTM Conference in Vegas, 2002
Special thanks to ETA/Cuisenaire for providing sample sets of Algeblocks!!

Learning to use Algeblocks

Before working with Algeblocks, we had better determine or DEFINE what we are working with.

1. Let's consider the green cubes to be 1 x 1 x 1 units. So any dimension of the cube is considered 1 unit.

   If each dimension of the cube is 1, what is the area of one face of the cube?

   Area for green cube = _____

2. Knowing what we know about the green blocks, let's see what we can figure out about the "yellow bars." Compare the length of one rectangular face of a yellow bar with green cubes. What can you conclude about the dimensions of this face?

   Considering the dimensions, what is the area of one rectangular face?

   Area for yellow bar = _____

3. Knowing about green squares and yellow bars, what can you conclude about the dimensions of the yellow square?

   Using those dimensions, what is the area of one of the square faces of this block?

   Area for yellow square = _____

4. Use the same process to decide on dimensions of the orange bar and orange square.

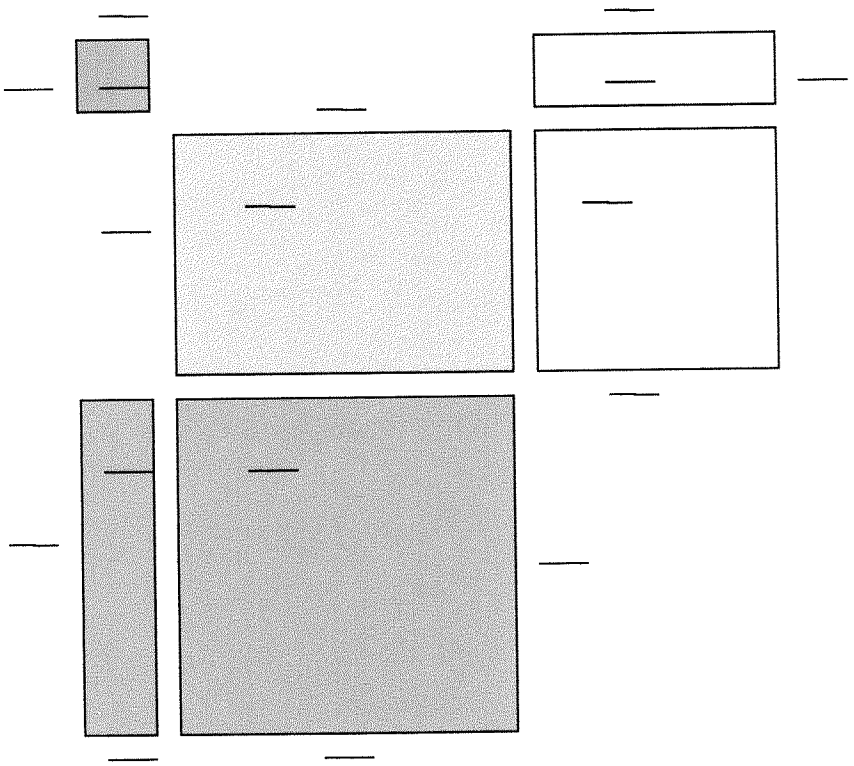
   Using those dimensions, give the area of the appropriate faces for each.

   Area for orange bar = _____ Area for orange square = _____

5. Use what you know to determine the area of the large rectangular faces of the pumpkin colored blocks.

   Area for pumpkin blocks = _____

algeblocks cheat-sheet



Each different colored block has different **dimensions** (side-lengths), which produce **faces** with different **areas**.

We will always name the blocks by the AREA of their largest face!

RULES:

ex.

1. Anything placed on the workspace is added (subtraction = add negative)

2. First factor in vertical track

etc

Combining Like Terms

Combining like terms can be a challenge for students who can't decide what "like" means. That is, "same variables to same powers" doesn't get the point across. SEEING like terms makes things significantly easier.

Simplify the following. (Be sure to include a sketch of your blocks.)

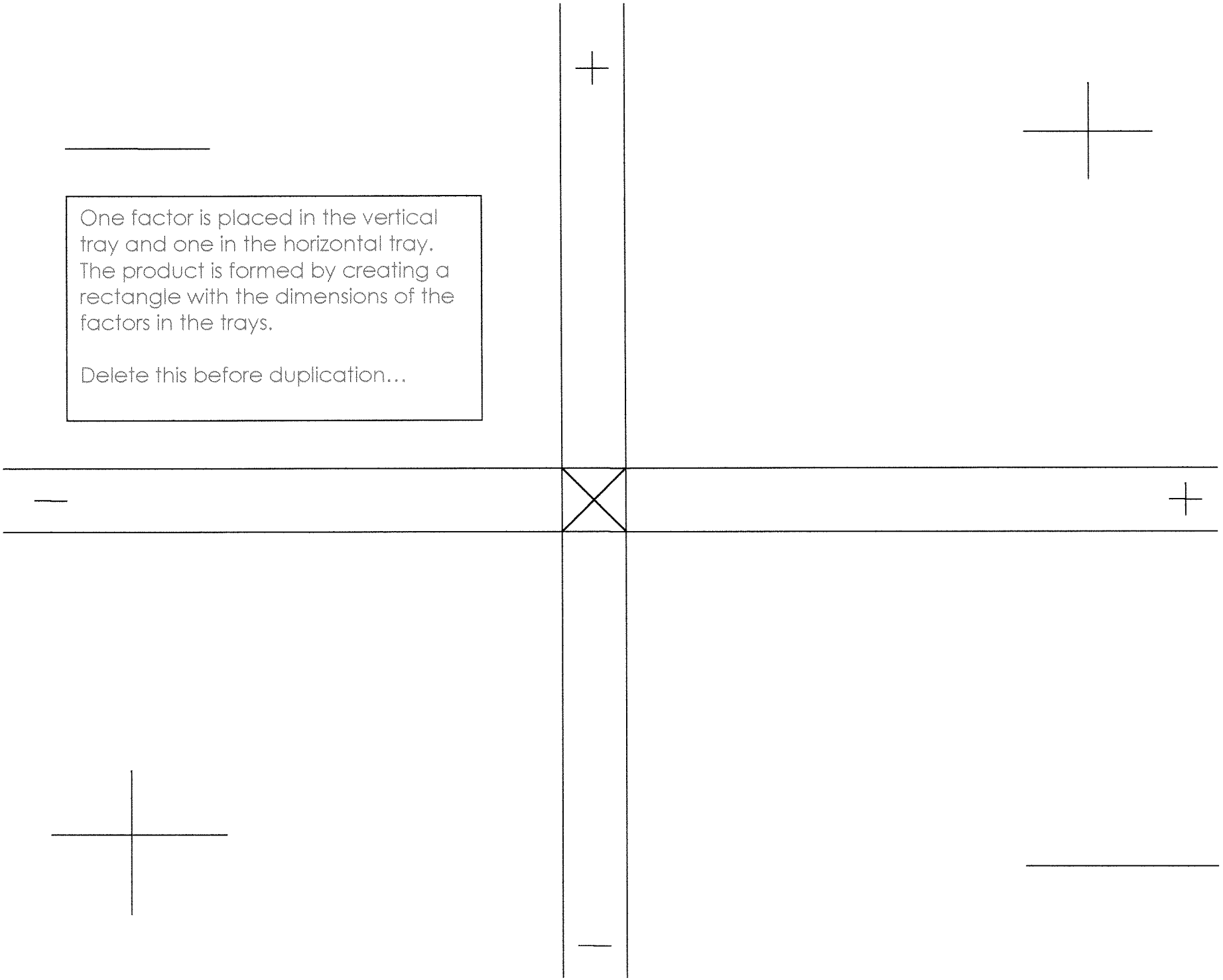
(a) $2x + 3x$

(b) $2x + 4 + 2y + 5 + xy$

(c) $2x^2 + x + 3y - x^2 + 3x + 8 - 6$

(d) $-3x^2 + y^2 - x^2 + 5 - 8 + 14y^2 - 13y^2 - 7$

(e) $4(x^2 + 2)$


One factor is placed in the vertical tray and one in the horizontal tray. The product is formed by creating a rectangle with the dimensions of the factors in the trays.
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