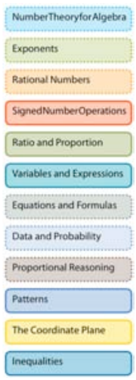


Aim for Algebra

Not business as usual.

Presentation by Mardi Gale
mgale@wested.org

Interactive Format

Quick polling

Open responses

Breaks for responding to chat questions & comments

Participants on just the teleconference can email questions to: eventquestion@wested.org

Handout

Throughout the presentation, we will be referring to a handout that can be downloaded from the SchoolsMovingUp website.

This handout will provide improved images of slides included in the Power Point presentation.

Who is in this webinar?

Site or district administrator

Teacher (classroom or resource)

Secondary mathematics teacher

EL coordinator

Community member

Higher education staff

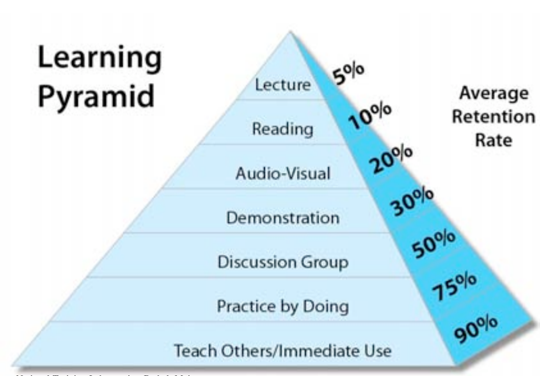
SEA staff

Other (type in the chat area)

"Frank was never any good at arithmetic. He left a third of his money to me, a third to you, a third to Cindy, and a third to Matt."

High achieving students spend more time on concepts and applications and cover more topics.

Students working below grade level receive curriculum heavy on review and drill with a minimum amount of new content.



National Training Laboratories, Bethel, Maine

Effective Universal Access Strategies

Connect to prior knowledge
- Graphic organizers
- Concept webs
- Show-and-tell
- Asking questions
- K-W-L (what you know, what you want to know, what you have learned)

Hands-on experiences
- Manipulatives
- Body language — pantomime, role play
- TPR (Total Physical Response)

Visuals
- Graphic organizer
- Modeling and demonstration
- Using physical models
- Tableau (students interpret from text)

Preview new vocabulary
- Word Wall
- Picture Dictionary

Comprehensible input
- Linking to familiar contexts
- Instructing in small groups
- Using language effectively: intonation, pauses, rephrases, repetition, simplified vocabulary, familiar vocabulary
- Use consistent language when writing word problems

Small group interaction
- Pairs/groups cooperative activities
- Peer questioning
- Jigsaw activities

Low anxiety environment
- Positive reinforcement
- Students use L1 (primary language)

Which way?

Poll: Intervention Curriculum

Does your school have an algebra intervention curriculum?

Yes or No?

Essential Elements

- Targeted, not comprehensive CURRICULUM
- CONCEPTUALLY based and standards ALIGNED
- FLEXIBLE format and structure
- Embedded INSTRUCTION
- Purposeful task DEVELOPMENT
- Precise, academic LANGUAGE and concrete MODELS
- ASSESSMENT, pre/post and embedded
- Facilitator guides for instructor SUPPORT

Aim for Algebra was developed at **WestEd** by experts in the field of mathematics education.

The program is a **coherent** set of materials, **conceptual** in nature, rather than a collection of individual worksheets on isolated topics.

Our curriculum focuses on **key "trouble spots" in algebra** that typically cause difficulty because:

- students lack prerequisites,
- students have misconceptions about the content, or
- the material is complex and students need more time and practice with the topic.

Aim for Algebra is a standards-aligned, concept-based support curriculum developed by WestEd with funding from the **U.S. Department of Education's Institute of Education Sciences** under PR/Award #R305K040003.

Essential Elements

- Targeted, not comprehensive CURRICULUM

Modules

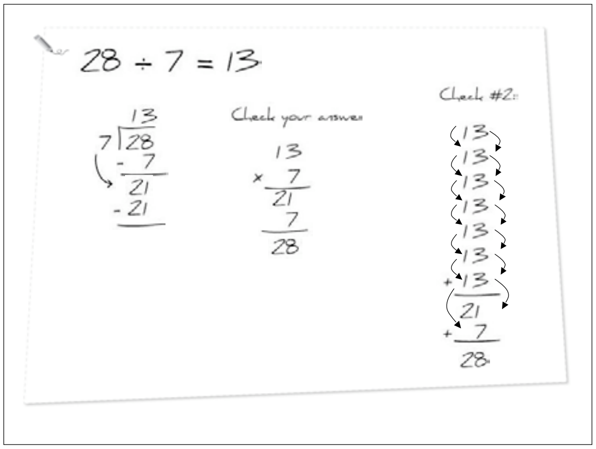
Available Now	Available Soon
SignedNumberOperations	NumberTheoryforAlgebra
Variables and Expressions	Exponents
Ratio and Proportion	Rational Numbers
Patterns	Equations and Formulas
The Coordinate Plane	Proportional Reasoning
Inequalities	Data and Probability

Essential Elements

- Targeted, not comprehensive CURRICULUM
- CONCEPTUALLY based and standards ALIGNED

Think about what a student might do to find this result:

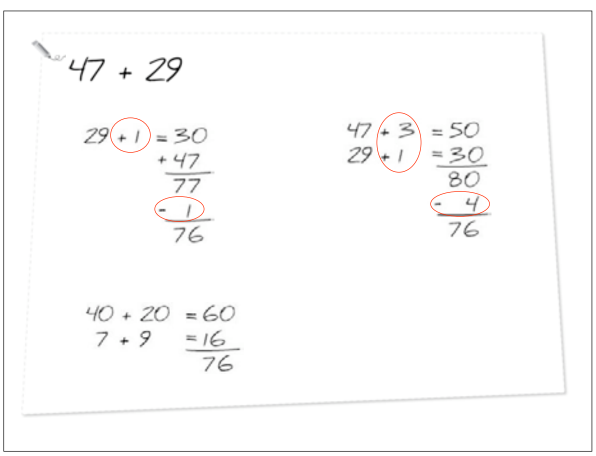
$$28 \div 7 = 13$$

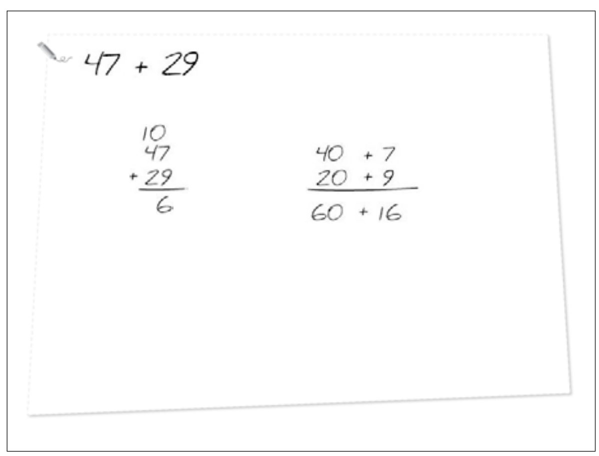


47 + 29

Add 47 and 29 mentally
(no paper and pencil).

Think about what strategy you use.

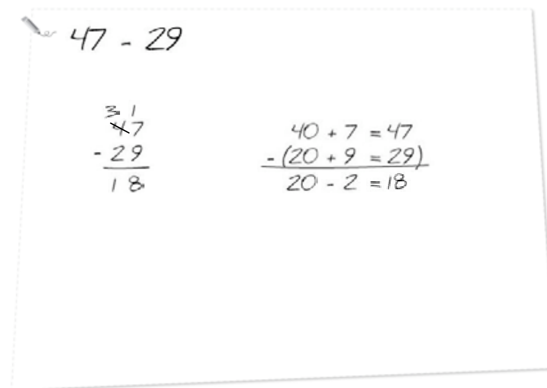




47 – 29

Subtract 29 from 47 mentally.

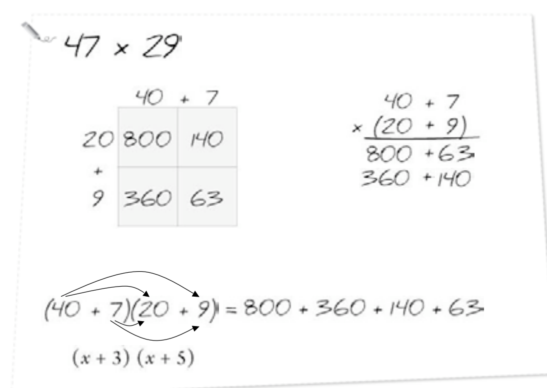
Think about what strategy you use.



47 x 29

Multiply 47 and 29 mentally.

Think about what strategy you use.



Poll

Do you have any questions or comments about the information presented so far?


SIGNED NUMBER OPERATIONS

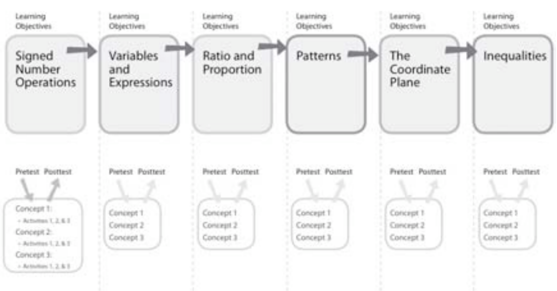
Essential Elements

- Targeted, not comprehensive CURRICULUM
- CONCEPTUALLY based and standards ALIGNED
- FLEXIBLE format and structure

Poll: Challenges

What are some of the challenges as you consider implementing an algebra intervention program?

Aim for Algebra



Essential Elements

- Targeted, not comprehensive CURRICULUM
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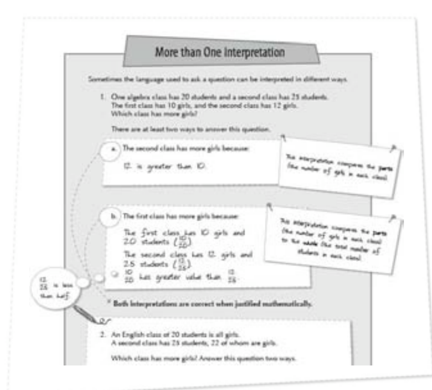
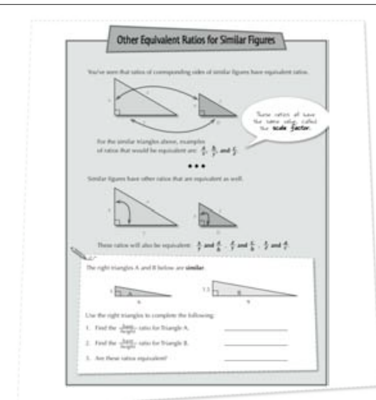
- Embedded INSTRUCTION

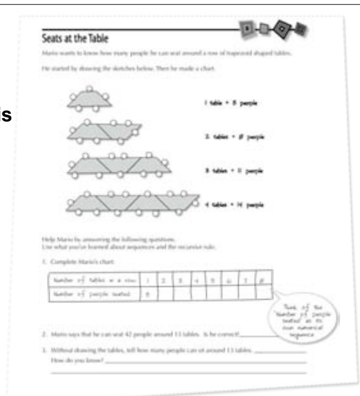




Essential Elements

- Targeted, not comprehensive CURRICULUM
- CONCEPTUALLY based and standards ALIGNED
- FLEXIBLE format and structure
- Embedded INSTRUCTION
- Purposeful task DEVELOPMENT

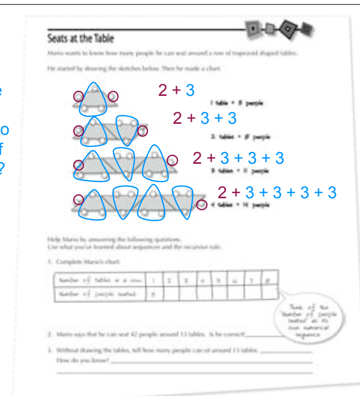
Take a few minutes to work on this activity sheet in your handout packet.



How does the number of tables relate to the number of addends of 3?

2 + 3t

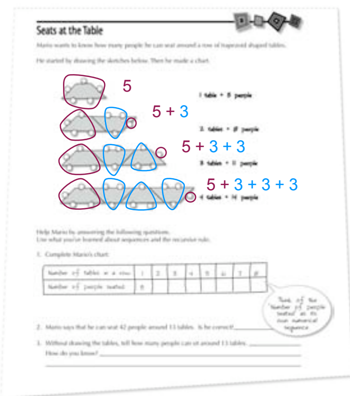
Number of tables



Now how does the number of tables relate to the number of addends of 3?

5 + 3(t – 1)

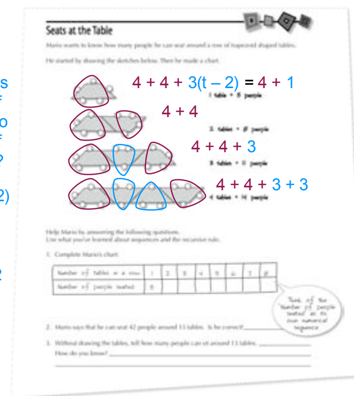
Number of tables less 1



Now how does the number of tables relate to the number of addends of 3?

4 + 4 + 3(t – 2)

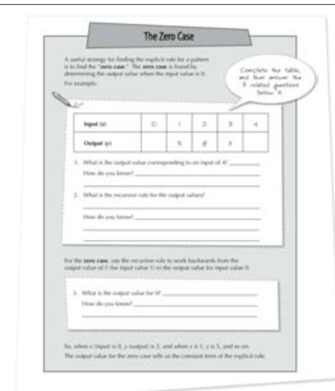
Number of tables less 2

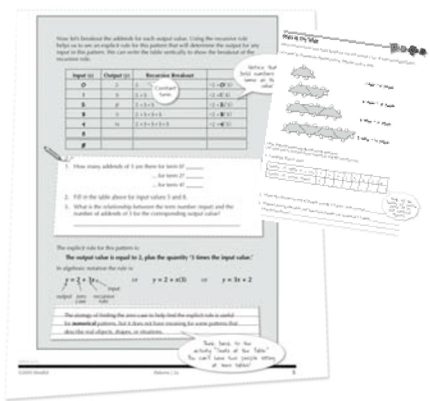


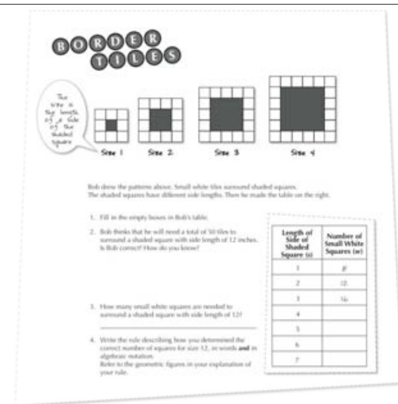
Different ways students describe how the pattern grows:

2 + 3t	4 + 4 + 3(t – 2)
3t + 2	8 + 3(t – 2)
5 + 3(t – 1)	5t – 2(t – 1)

Reconcile







Essential Elements

- Targeted, not comprehensive CURRICULUM
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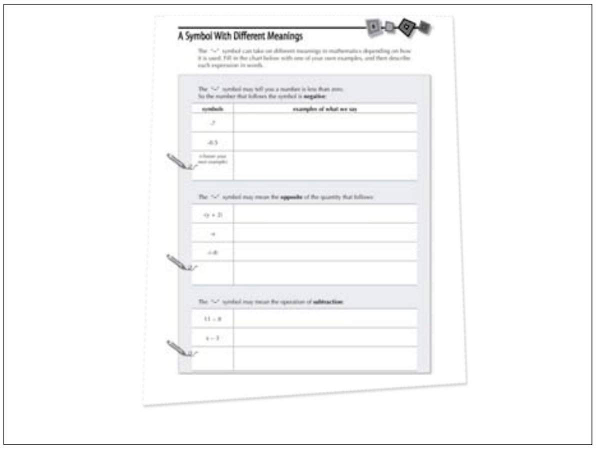
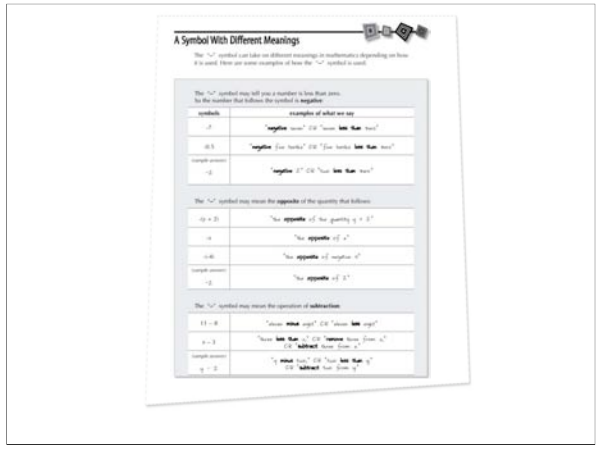
- Purposeful task DEVELOPMENT
- Precise, academic LANGUAGE and concrete MODELS

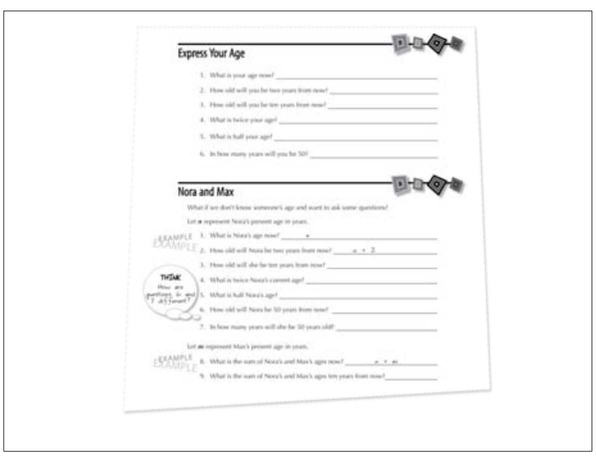
Poll:

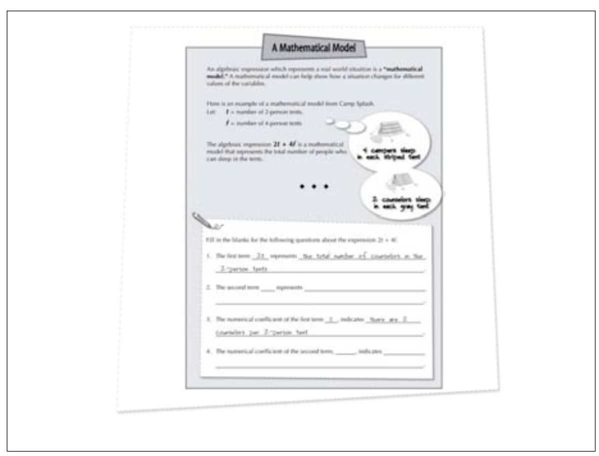
Which is the largest number?

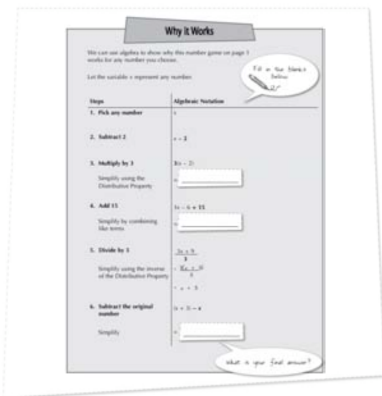
4   -7


A Symbol With Different Meanings


A Symbol With Different Meanings


Express Your Age
Nora and Max


A Mathematical Model



Poll:
Precise Language

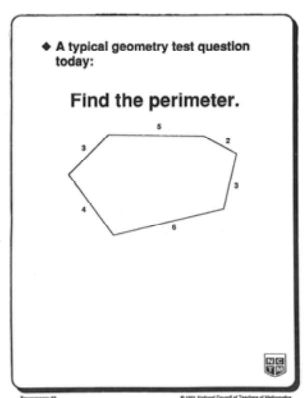
How do you see precise language and modeling reflected in the programs in your mathematics classrooms?

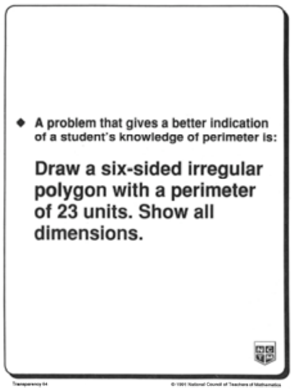
Essential Elements

- Targeted, not comprehensive CURRICULUM
- CONCEPTUALLY based and standards ALIGNED
- FLEXIBLE format and structure
- Embedded INSTRUCTION
- Purposeful task DEVELOPMENT
- Precise, academic LANGUAGE and concrete MODELS
- ASSESSMENT, pre/post and embedded

Poll:

How could you correctly answer this question without knowing what perimeter is?





Sources of Assessment Items

- Linked directly to instruction
- Includes items from national exams, such as NAEP and TIMSS
- Includes items adapted from state standard exams and state exit exams

Essential Elements

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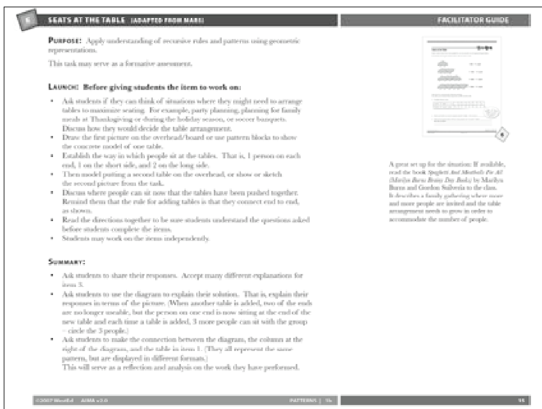


SEATS AT THE TABLE (ADAPTED FROM MARS) | FACILITATOR GUIDE

PURPOSE: Apply understanding of recursive rules and patterns using geometric representations.

This task may serve as a formative assessment.

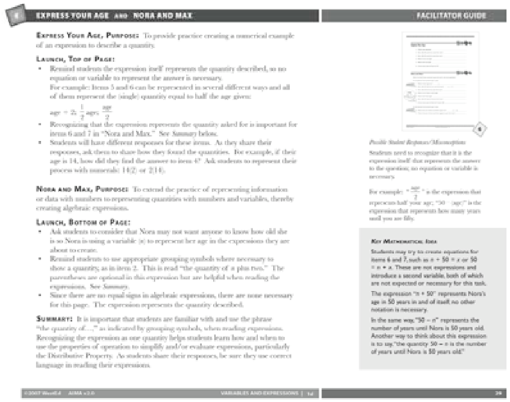
LAUNCH: Before giving students the item to work on:

- Ask students if they can think of situations where they might need to arrange tables to maximize seating. For example, party planning, planning for family meals at Thanksgiving or during the holiday season, or soccer banquets. Discuss how they would decide the table arrangement.
- Draw the first picture on the overhead/board or use pattern blocks to show the concrete model of one table.
- Establish the way in which people sit at the tables. That is, 1 person on each end, 1 on the short side, and 2 on the long side.
- Then model putting a second table on the overhead, or show or sketch the second picture from the task.
- Discuss where people can sit now that the tables have been pushed together. Remind them that the rule for adding tables is that they connect end to end, as shown.
- Read the directions together to be sure students understand the questions asked before students complete the items.
- Students may work on the items independently.

SUMMARY:

- Ask students to share their responses. Accept many different explanations for item 3.
- Ask students to use the diagram to explain their solution. That is, explain their responses in terms of the picture. (When another table is added, two of the ends are no longer useable, but the person on one end is now sitting at the end of the new table and each time a table is added, 3 more people can sit with the group – circle the 3 people.)
- Ask students to make the connection between the diagram, the column at the right of the diagram, and the table in item 1. (They all represent the same pattern, but are displayed in different formats.) This will serve as a reflection and analysis on the work they have performed.

A great set up for the situation: If available, read the book *Spaghetti And Meatballs For All (Marilyn Burns Brainy Day Books)* by Marilyn Burns and Gordon Silveria to the class. It describes a family gathering where more and more people are invited and the table arrangement needs to grow in order to accommodate the number of people.



EXPRESS YOUR AGE and NORA AND MAX — FACILITATOR GUIDE

Express Your Age, Purpose: To provide practice creating a numerical example of an expression to describe a quantity.

Launch, Top of Page:

- Remind students the expression itself represents the quantity described, so no equation or variable to represent the answer is necessary.
  For example: Items 5 and 6 can be represented in several different ways and all of them represent the (single) quantity equal to half the age given:
  $age \div 2;\ \frac{1}{2}\,age;\ \frac{age}{2}$
- Recognizing that the expression represents the quantity asked for is important for items 6 and 7 in "Nora and Max." See Summary below.
- Students will have different responses for these items. As they share their responses, ask them to share how they found the quantities. For example, if their age is 14, how did they find the answer to item 6? Ask students to represent their process with numerals: 14/2 or 2(14).

Nora and Max, Purpose: To extend the practice of representing information or data with numbers to representing quantities with numbers and variables, thereby creating algebraic expressions.

Launch, Bottom of Page:

- Ask students to consider that Nora may not want anyone to know how old she is so Nora is using a variable (n) to represent her age in the expressions they are about to create.
- Remind students to use appropriate grouping symbols where necessary to show a quantity, as in item 2. This is read "the quantity of n plus two." The parentheses are optional in this expression but are helpful when reading the expressions. See Summary.
- Since there are no equal signs in algebraic expressions, there are none necessary for this page. The expression represents the quantity described.

Summary: It is important that students are familiar with and use the phrase "the quantity of…," as indicated by grouping symbols, when reading expressions. Recognizing the expression as one quantity helps students learn how and when to use the properties of operation to simplify and/or evaluate expressions, particularly the Distributive Property. As students share their responses, be sure they use correct language in reading their expressions.

Possible Student Responses/Misconceptions

Students need to recognize that it is the expression itself that represents the answer to the question; no equation or variable is necessary.

For example: "$\frac{age}{2}$" is the expression that represents half your age; "50 − (age)" is the expression that represents how many years until you are fifty.

Key Mathematical Idea

Students may try to create equations for items 6 and 7, such as n + 50 = x or 50 = n + x. These are not expressions and introduce a second variable, both of which are not expected or necessary for this task.

The expression "n + 50" represents Nora's age in 50 years in and of itself; no other notation is necessary.

In the same way, "50 − n" represents the number of years until Nora is 50 years old. Another way to think about this expression is to say, "the quantity 50 − n is the number of years until Nora is 50 years old."

©2007 WestEd AIMA v2.0 — VARIABLES AND EXPRESSIONS | 14 — 29

Poll:

For your student population, how might you prioritize these essential elements as you search for an intervention curriculum?

Presentation by Mardi Gale

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For more information:

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Its About Time
www.its-about-time.com/aim/aim.html

Aim for Algebra

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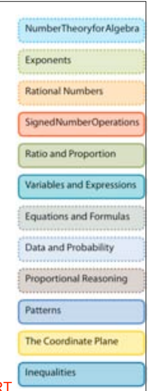

Next Steps

Archive:
http://www.schoolsmovingup.net/webinars/algebra

Feedback:
http://www.surveymonkey.com/s.aspx?sm=X4tPDEM9WgL_2fShZwpf7epQ_3d_3d