

TITLE OF LESSON

Algebra 1 Unit 1 Lesson 2 – Assessment, Part 2  
*You Do Speak Math: Creation of the Individual*

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TIME ESTIMATE FOR THIS LESSON

One class period

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ALIGNMENT WITH STANDARDS

California – Algebra 1:

**1.0** Students identify and use the arithmetic properties of subsets of integers and rational, irrational, and real numbers, including closure properties for the four basic arithmetic operations where applicable:

**1.1** Students use properties of numbers to demonstrate whether assertions are true or false.

**2.0** Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. They understand and use the rules of exponents.

**3.0** Students solve equations and inequalities involving absolute values.

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MATERIALS

slips of paper with shapes written on them  
pens  
paper  
CD/tape player (Computer with CD drive)

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LESSON OBJECTIVES

- To determine how well students know the math required to start learning algebra
  - To determine who likes math and who doesn't like math
  - To determine what methods of learning are used best for each student
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EXPLANATION OF LESSON

Before class, write some shape names on pieces of paper: rectangle, triangle, right triangle, etc. Do not draw the shapes. Because students will be working in groups to form themselves into these shapes, use shapes the students can easily form using themselves as points in the perimeter. For example, unless you have a very large class, you can't do an octagon, a hexagon, a decagon, a rectangle, a triangle, and a polygon all in one class.

In this lesson, you want to begin to assess learning styles. You also have to assess students' awareness of mathematical concepts including arithmetic, fractions, real numbers and logical reasoning skills, while determining which students seem to fear or dislike math. The main objective is to make this determination without dividing the students into groups based on this distinction. Most people who claim to dislike math dislike it because of some reason other than their own ability. It is likely that many of those who like math happen to be those whom we commonly categorize as Logical-Mathematical learners. This, in some sense, begs the question. We want to provide an atmosphere that allows those who do not fit into the L-M learner category to thrive in the world of mathematics. If we fall into the trap of distinguishing the L-M learners as "good" in math and the others as "not good" in math we will encourage students to fail.

We must work hard to not make this assessment one of the reasons that students fear math. We want to make it enjoyable and inclusive. The objective is to draw the students into the world of mathematics by bringing out where they already know math. We can assess arithmetic abilities by asking questions about money. Money probably holds some interest for the students. We can also ask questions about musical progressions or

movements or artwork that can be interpreted in a numerical way.

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#### FOCUS AND MOTIVATE STUDENTS – WARM-UP ACTIVITY

- 1) **Agenda** – Create an agenda, an outline of the steps for the lesson on the front board. Ask students to copy the agenda and place it in the front of their folders. They will do this every day when they walk in the door. If they are absent, they can ask a friend for the agenda in order to make up missed work.
  - 2) **Homework Check** – While students are writing their agenda, collect syllabi.
  - 3) **Favorite Numbers Presentation** – Have students present their favorite numbers, the homework assignment. Each student should only take a minute, at most, so try to move them through quickly. It helps, this early in the year, to call them up according to the attendance sheet or seating arrangement, rather than to ask who wants to go when. You don't have much time, so you really have to be in control here.
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#### ACTIVITIES – INDIVIDUAL AND GROUP

1. **Student Assessment** – Start the assessment with a discussion of what one would do if they won the lottery. This will draw certain students in immediately. Focus the conversation on ways of dividing up the money. Change the amount of the prize. Vary the price of the lottery ticket (e.g. “If the lottery were for \$XXXXX how much would the tickets have to be before you would refuse to buy one?”). Elicit discussion on the meaning of the ticket price in terms of return on the purchase price and in terms of probability.
2. **Math in Music Discussion** – Play some music, either from a CD or actually play an instrument or a drum, or ask students to play something. Ask questions about the beat, tempo or loudness. Ask what the beat of the song is. Ask a student to play the beat on a desk. What does *beat* mean? You're not looking for definitions here; you're looking for **ideas**. This is an important distinction. What you're not trying to do is get right and wrong. You are trying to generate discussion about math and music. If the students are willing to discuss beat, they are discussing math, even if they don't see it yet. In fact, students may think they're getting away with not doing math (but most see the connection between math and music more clearly than many of their teachers!). Ask students to play different beats. What is it that makes the different beats different? (For non music-oriented teachers, think of poetry – iambic pentameter, etc...) They may bring up the ideas of stress, pressure, timing, etc. Ask for their ideas about what these things have to do with math. Let them discuss. Don't worry about what you think they have to do with math. You are getting students to think and talk about math here. These are the skills. Don't worry about getting everything they're saying. If they're discussing, even arguing, among themselves, you've succeeded. If they, or some, don't seem to have any ideas yet, or won't share them, they may just be building self-confidence. Give them time and encourage discussion.

Remember, you are not just teaching algebra concepts in this class, you are teaching students how to think independently. This frequently means introducing a question or an idea and letting the students wrestle with it. At the same time, students are not just learning math concepts (which they may be reluctant to do anyway), but for many, the more foreign and daunting challenge is to learn to think. What? You don't just want to write things on the board for them to copy, practice, and memorize?? What do you think, they came here to work? They don't know algebra yet, how can they think about it unless you tell them what to think and what to think about? Aye, there's the rub! Time for them to start using what they do know, putting it in context, thinking on their own and figuring things out for themselves.

3. **Qualifying Volume Discussion** – Ask them about the volume. (This will be a good foundation for you and for them for introducing variables in Lesson 4.) They can say pretty easily if one student is playing a beat more loudly than another student or if you turn the volume up on the CD player. Ask them to guess the volume of the CD you're playing. They should guess between 1 and 10, based on the volume knobs of most CD players. Say you're playing the CD at 3. Can a student play a beat on a desk at 3? What does that mean? 3 in relation to what? They may come up with the idea that the value 3 is applied based on a spectrum of values, 1 – 10, with 3 being on the quieter side of the spectrum. Ask if they can think of other situations in which they apply a value to something separate from that thing. Explain that this is something they'll be doing throughout algebra and geometry.

4. Fractions Discussion – You can use this discussion to ask quickly about fractions. If you have the volume set at 5, it's half way up. What if you have it set at 2 or 2.5? At 3? At 6 or 7? See if they come up with *quarter* of the way up, *one-third*, *three-quarters*, and so on. Make it clear that you're looking for estimates – e.g. *2 is about one-quarter of the total possible volume*. Because you're doing an assessment, you are not teaching these concepts now; you're just getting a sense of the students' math foundations coming into this class. You'll use this information throughout the year.
  5. Group Shapes – They've been sitting for a while now, so as a quick break, tell them to remain seated while you divide them into a few groups, depending on the number of students you have. Once divided, they have one minute to form themselves into the shapes you hand them on a piece of paper. It'll make them try even harder if the first group to finish gets a prize. If you do this, you have to allow for degree of difficulty – those with more difficult shapes have to get some credit for that. In case anyone asks, this might be a good place to mention that algebra and geometry are interconnected. When you have them do this activity, do not assign or define roles. Instead, watch how students interact and the roles they seem to take on naturally. This is part of your assessment – how students behave in small groups.
  6. Problem Solving – If you have any time left, put some fraction and percentage (addition, subtraction, multiplication, division, and conversion) problems on the board and have the students do them at their tables or desks. Then have students volunteer to do them on the board.
  7. Homework Review.
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#### HOMEWORK

Get syllabus signed, if you did not already.

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#### GROUP ROLES

Students will be working individually during this class period, except during the geometric shape activity.

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#### DOCUMENTATION FOR PORTFOLIO

None