

Universal Design of College Algebra
 Demonstration Lesson Plan

Lesson Overview	
Unit	Factors: finding factors of numbers, prime factorization, finding the Greatest Common Factor (GCF)
Subject	Developmental Math
Lesson Description for Day	Find the factors and prime factors of numbers
Standards: NCTM	<p>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p> <ul style="list-style-type: none"> ▪ Use factors, multiples, prime factors, and relatively prime numbers to solve problems
Goals	
Unit Goals	<p>Reinforce properties of multiplication and division:</p> <ul style="list-style-type: none"> ▪ The order property (or commutative property) of multiplication ▪ The distributive property <p>Learn strategies to find the factors and prime factors of up to four digit numbers, and the greatest common factor of a pair of numbers.</p>
Lesson Goals	<p>Students will understand:</p> <ul style="list-style-type: none"> ▪ A factor is an integer that divides evenly into another integer without leaving a remainder ▪ A composite number has more than 2 factors ▪ A prime factor can only be divided by itself and 1 ▪ Students will use strategies for finding factors of a whole number
Methods	
Anticipatory Set	<p>Give each student 36 tiles or cubes.</p> <p>Ask: If you have 36 cubes, how many ways can you arrange these tiles to make a rectangle?</p> <p>Students should find 4 ways to arrange the tiles: 36x1, 18x2, 9x4, 6x6</p> <p>Ask: Is there any way to make a rectangle with 8 rows of tiles?</p>
Introduce and Model New Knowledge	<p>Draw the connection between the multiple ways to arrange the tiles into a rectangle to the concept of factors.</p>

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	<ol style="list-style-type: none"> 1. A factor is an integer (whole number) that exactly divides another integer. Ex: 12 has 6 factors. Can 5 be a factor? Why or why not? 2. A prime number only has 2 factors: itself and 1. Ex: 7, 5, 3, 11, etc. 3. Go back to 12: What are the prime factors of 12? 4. What is prime factorization? Any integer can be expressed as the product of its prime factors. So, 12 has prime factors of 2 and 3. How can you write an equation using only these factors that will equal 12? 5. Find the prime factors of a larger number: 126. $126 = 2 \times 63$, or $2 \times 9 \times 7$, or $2 \times 3 \times 3 \times 7$ 6. Introduce the factor tree. Note that a factor tree has a lot in common with a family tree. Discuss the features of a family tree, illustrating a family tree on the board or computer projected onto a screen. Conclude that a family tree gives information about what people you come from, or what people combined to make you who you are. A factor tree gives information about what number combinations make up a larger number. 7. Steps to making a factor tree: <ul style="list-style-type: none"> ▪ If a number is divisible by 2 (ends in an even number), then divide by 2 (ex: 126, factors 2 and 63). ▪ Evaluate the factors (2 and 63) to see if either can be further broken down. 2 is prime, but 63 is the product of 7×9. ▪ Evaluate the factors again. The number 7 is prime, but 9 is the product of 3×3. ▪ The factors are 2, 3, and 7. All are prime numbers. <p>Note: Useful visual aids to this software include Inspiration software factoring template, or an animated PowerPoint to demonstrate the steps to making a factor tree.</p> <p>Extension: What do we do with a large number like 1500? We can't just count out 1500 tiles and see how many rectangles we can make with them. What strategies can we use to find all the factors of 1500? Elicit answers and discuss.</p>
Provide Guided Practice	Divide students into groups of 4. Assign them to create factor trees for several numbers. Include larger numbers.
Provide Independent Practice	Assign homework from text. Direct students to use the website http://usablealgebra.landmark.edu as a reference and a place where they can have more guided practice.

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Assessment	
Formative/Ongoing Assessment	<ol style="list-style-type: none"> 1. Quizzes to assess learning of factoring, prime factorization, and greatest common factor. 2. Assign students in groups to write a step-by step guide to finding the prime factors of a number. 3. Assign students to find the prime factors of a number using no words – only pictures, symbols, and numbers.
Summative/End Of Lesson Assessment:	<ol style="list-style-type: none"> 1. Unit test 2. Assign students to solve problems such as this: The number 50 wants to marry the number 120. 50's mom thinks that her daughter has nothing in common with that crazy boy, number 120. They all go on Oprah to work it out. You are there to help. <i>What do they have in common?</i>
Materials	
Algebra tiles or unifix cubes — 36 per student	
Course text	
Optional: computer and digital projector to demonstrate UD Algebra website	
Optional: Animated presentation (e.g. PowerPoint) to demonstrate how to make a factor tree	
Optional: Inspiration software factor tree template to demonstrate how to create a factor tree.	

Lesson plan format adapted from <http://lessonbuilder.cast.org>