Obje	ctive	S									T	ime	fra	me	to (Corr	ple	te					
Students will solve equations and simplify expressions in order to extend patterns and solve puzzles.								20 - 30 minutes															
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art. on		kills		vays					-		sing	Healthcare Admin	ç										
Stackable Cert. Documentation	ogy	Study / Life skills	S	Career Pathways		dic	ene	Asst	EKG / Cardio	ymo	Practical Nursing	are A	Pharmacy Tech										
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Use M								te															
Benc		• •																					
	M.4.6. Evaluate simple exponent and radical expressions. M.4.15 Identify, extend and construct arithmetic/geometric patterns and sequences that are one-step and linear or								or														
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M.4.29							•••	•					nt) ar	nd sy	mbo	ols (f	or ex	amp	ole, (), ·	, n ,).	
M.4.30 M.4.32		-	-	-			-		-			ng.											
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-			Puzzles				how	, oho	ito b	ttp://		mot	adal		m/								
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Basic	•	etry an	d alge	bra, e	specia	ally s	quar	e ro	ots a	ind e	xpon	ents	•										
Activ	ities																						
<u>Step 1</u> to corr			lents, ns and		•		rns.	Intro	oduc	e the	activ	vity a	as a	chall	enge	e for	them	n to i	use	their	math	ski	lls
<u>Step 2</u> comple	-		comp of the				•			•		•		g he	lp as	s nee	ded.	Be	fore	stud	ents		
<u>Step 3</u> with a			comp ptiona					eeki	ng h	elp a	s nee	eded	. 01	nce f	inish	ied, t	hey	can	che	ck th	eir ar	ISWE	ers

<u>Step 4</u> Completed *Patterns and Puzzles* worksheet may be used as documentation for the Basic Skills Stackable Certificate.

Assessment/Evidence

Completed Patterns and Puzzles worksheet

Adaptations for Beginning Students

Beginning students could work with a partner or use a calculator to complete the assignment.

Adaptations for Advanced Students

More advanced students could complete more difficult KenKen puzzles; free, printable ones are available online at http://www.mathdoku.com/

Teacher Reflection/Lesson Evaluation

This lesson was created by Middletown ABLE.

Patterns

Patterns surround us, whether in fabrics, art, nature, music, or mathematics. The ability to identify, extend, or create patterns can be used in a variety of ways. Several examples include solving puzzles, designing spaces, or analyzing trends in the stock market.

Using your knowledge of algebra and geometry, complete the following patterns and explain your solutions.

- Pattern 1: 2, 4, 6, 8, _____ What is the pattern? What would the 37th number in the pattern be?
- Pattern 2: 1, 2, 4, 8, 16, ____, 64 What is the pattern?
- Pattern 3: 1, $\sqrt{2}$, $\sqrt{3}$, 2, ____, $\sqrt{6}$, $\sqrt{7}$, $\sqrt{8}$, ____ Explain the pattern.
- Pattern 4: 3, 9, 27, 81, _____ Write a formula that could be used to extend this sequence.



Pattern 6: 0, 1, 3, 6, 10, 15, _____ Explain the pattern of these numbers.

Pattern 7: Create a new sequence and explain how one would extend it to 10 places.

Puzzles

Math can be used to solve a number of puzzles, particularly logic puzzles and KenKen or Sudoku.

Directions:

Fill-in the table with the appropriate numbers where:

- 4x4 tables use only numbers 1-4; 6x6 tables use only 1-5; 8x8 tables use only 1-8.
- Each row contains exactly **one** of each digit with no repeats
- Each column contains exactly one of each digit with no repeats
- Each bold-outlined group of cells contains a clue with a number and symbol. The symbol represents the mathematical operation and the number represents the result.
- For example, if the clue for a group of 2 blocks is "7+", some possible answers could be 1+6, 3+4, or 2+5

12*		4+	
2/	1-	1-	
			9+
3-			

Directions and puzzle from: www.mathdoku.com

Patterns

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Using your knowledge of algebra and geometry, complete the following patterns and explain your solutions.

Pattern 1:	2, 4, 6, 8,		(10)
	What is the pattern?		(even)
	What would the 37th number in	the pattern be?	(74)
Pattern 2:	1, 2, 4, 8, 16,, 64		(32)
	What is the pattern?		(doubling)
Pattern 3:	1, $\sqrt{2}$, $\sqrt{3}$, 2,, $\sqrt{6}$, $\sqrt{7}$,	√8 ,	($\sqrt{5}$, 3)
	Explain the pattern.		(square roots)
Pattern 4:	3, 9, 27, 81,		(243)
	Write a formula that could be us	sed to extend this seque	ence. 3 ⁽ⁿ⁾
Pattern 5:			
	Pattern 5 will be comple	eted by drawing a 7-side	ed shape.
Pattern 6:	0, 1, 3, 6, 10, 15,		(21)
Explain the pat	tern of these numbers.	(differences between n 1, 2, 3, 4, 5)	numbers are increasing by one -
Pattern 7:	Create a new sequence and exp	lain how one would ext	end it to 10 places.
	10		

(Answers will vary.)

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Directions and puzzle from: www.mathdoku.com

12*		4+	
2/	1-	1-	
			9+
3-]