A	B	C	
1	**LESSON**	**OBJECTIVES**	
2		**Hands-On Equations(R) Learning System: Level I**	**Indiana State Standards Grade 3: Computation; Algebra and Functions; Problem Solving**
3		Students will use a symbol to represent an unknown.	
4		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	3.3.2 **Solve problems involving numeric equations.**
5		Students will use substitution and mental math to find and check solutions to physical or pictorial representations of algebraic equations in one variable.	
6			3.2.8 **Use mental arithmetic to add** or subtract with **numbers** less than 100.
7			3.3.2 **Solve problems involving numeric equations.**
8	**Lesson 1**		3.6.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
9			
10		Students will demonstrate an understanding of the abstract representation of an algebraic equation in one variable.	
11		Students will model an abstract algebraic equation using concrete materials.	
12		Students will use repeated addition to represent multiplication in an algebraic expression.	3.2.2 **Represent the concept of multiplication as repeated addition.**
13		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	3.3.2 **Solve problems involving numeric equations.**
14		Students will use concrete models, guess-and-check, and number sense to solve one- and multi-step algebraic equations in one variable.	
15			3.6.9 **Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems.**
16		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	
17			
18	**Lesson 2**		3.2.8 **Use mental arithmetic to add** or subtract with **numbers** less than 100.

19			3.3.2 **Solve problems involving numeric equations.**
20			3.6.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
21			
22		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	3.6.3 **Apply strategies and results from simpler problems to solve more complex problems.**
23		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	3.6.9 **Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems.**
24			3.6.3 **Apply strategies and results from simpler problems to solve more complex problems.**
25		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	3.3.2 **Solve problems involving numeric equations.**
26		Students will use repeated addition to represent multiplication in an algebraic expression.	3.2.2 **Represent the concept of multiplication as repeated addition.**
27		Students will use the Subtraction Property of Equality with variables to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	3.6.9 **Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems.**
28			
29			3.6.3 **Apply strategies and results from simpler problems to solve more complex problems.**
30		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	
31			3.2.8 **Use mental arithmetic to add** or subtract with **numbers** less than 100.
32			3.3.2 **Solve problems involving numeric equations.**
33	**Lesson 3**		3.6.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
34			
35		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	3.6.3 **Apply strategies and results from simpler problems to solve more complex problems.**
36		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	3.6.9 **Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems.**
37	**Lesson 4**		3.6.3 **Apply strategies and results from simpler problems to solve more complex**

			problems.
38		Students will use the Subtraction Property of Equality with variables and with constants to form equivalent statements when solving algebraic equations in one variable.	3.6.9 **Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems.**
39			
40		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	3.2.8 **Use mental arithmetic to add** or subtract with **numbers** less than 100.
41			
42			3.3.2 **Solve problems involving numeric equations.**
43			3.6.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
44			
45		Students will use concrete models and kinesthetic motions (physical actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	3.6.9 **Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems.**
46			3.6.3 **Apply strategies and results from simpler problems to solve more complex problems.**
47		Students will add and subtract monomials and combine like terms to form equivalent expressions when solving algebraic equations in one variable.	
48			
49		Students will use Properties of Equality, such as the Subtraction Property of Equality, to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	3.6.9 **Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems.**
50			3.6.3 **Apply strategies and results from simpler problems to solve more complex problems.**
51		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	
52			3.2.8 **Use mental arithmetic to add** or subtract with **numbers** less than 100.
53			3.3.2 **Solve problems involving numeric equations.**
54	**Lesson 5**		3.6.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
55			
56		Students will use concrete models to represent the multiplication of a binomial by a positive integer constant, such as $2(x + 1)$.	3.6.3 **Apply strategies and results from simpler problems to solve more complex problems.**
57	**Lesson 6**	Students will use concrete models and kinesthetic motions (physical	3.6.3 **Apply strategies and results from simpler problems to solve more complex problems.**

58		actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	3.6.9 **Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems.**
59		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	3.6.9 **Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems.**
60			3.2.8 **Use mental arithmetic to add** or subtract with **numbers** less than 100.
61			3.3.2 **Solve problems involving numeric equations.**
62		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	3.6.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
63			
64		Students will use pictorial models to represent abstract algebraic equations, including equations that contain multiplication of a binomial by a positive integer constant, such as 2(*x* + 1).	3.6.3 **Apply strategies and results from simpler problems to solve more complex problems.**
65			3.6.3 **Apply strategies and results from simpler problems to solve more complex problems.**
66		Students will use pictorial representations to solve algebraic equations in one variable with unknowns on both sides of the equation.	3.6.9 **Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems.**
67		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	3.6.9 **Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems.**
68			3.3.2 **Solve problems involving numeric equations.**
69	**Lesson 7**	Students will use substitution and mental math to check solutions to algebraic equations in one variable.	3.6.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
70		**Hands-On Equations(R) Verbal Problems Book: Introduction & Level I**	
71		Students will analyze verbal problems and determine what strategy is best for representing the problem using concrete models or pictorial symbols.	
72			3.3.6 **Solve simple problems involving a functional relationship between two quantities.**
73	**Level I Verbal Problems**	Students will use mathematical models (e.g., concrete, pictorial) to represent and solve application problems involving quantitative	3.6.9 **Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems.**

		relationships with rational numbers.	
74		Students will write down the representation of the unknown elements of the verbal problem.	
75		Students will use multiple strategies (e.g., a 5-step problem solving process, breaking a problem into parts, and determining whether a problem has too much information or not enough information) to solve real-world application problems.	3.6.1 **Analyze problems by identifying relationships, telling relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.**
76			3.6.2 **Decide when and how to break a problem into simpler parts.**
77		Students will represent physically or pictorially given relations, such as Jim's age 10 years from now given his current age, the amount of rain that falls in three months given the amount it falls in one month, the distance travelled by a train in two hours given the distance it travels in one hour, or a number that is 2/3 of another number.	3.3.1 **Represent relationships of quantities in the form of a numeric expression or equation.**
78		Students will represent and solve application problems including problems involving distance, money, age, and patterns of numbers (e.g., consecutive numbers, consecutive even numbers, and consecutive odd numbers).	3.3.6 **Solve simple problems involving a functional relationship between two quantities.**
79			3.6.9 **Note the method of finding the solutions and show a conceptual understanding of the method by solving similar problems.**
80		Students will provide the answer to verbal problems in full sentence format.	3.6.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation.** Support solutions with evidence in both verbal and symbolic work.
81			3.6.4 Express solutions clearly and logically by using the appropriate mathematical terms and notation. **Support solutions with evidence in both verbal and symbolic work.**
82		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	3.3.2 **Solve problems involving numeric equations.**
83			3.6.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
84			

IN Grade 4

	A	B	C
1	**LESSON**	**OBJECTIVES**	**CORRELATIONS**
2		**Hands-On Equations(R) Learning System: Level I**	**Indiana State Standards Grade 4: Algebra and Functions; Problem Solving**

3		Students will use a symbol to represent an unknown.	4.3.1 **Use letters, boxes, or other symbols to represent any number in simple expressions, equations**, or inequalities **(i.e., demonstrate an understanding of and use the concept of a variable).**
4		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	
5			
6	**Lesson 1**	Students will use substitution and mental math to find and check solutions to physical or pictorial representations of algebraic equations in one variable.	4.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
7			
8		Students will demonstrate an understanding of the abstract representation of an algebraic equation in one variable.	4.3.1 **Use letters, boxes, or other symbols to represent any number in simple expressions, equations,** or inequalities **(i.e., demonstrate an understanding of and use the concept of a variable).**
9		Students will model an abstract algebraic equation using concrete materials.	
10		Students will use repeated addition to represent multiplication in an algebraic expression.	4.3.6 **Recognize and apply the relationships between addition and multiplication**, between subtraction and division, **and the inverse relationship between multiplication and division to solve problems.**
11		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	4.3.1 **Use letters, boxes, or other symbols to represent any number in simple expressions, equations,** or inequalities **(i.e., demonstrate an understanding of and use the concept of a variable).**
12			
13		Students will use concrete models, guess-and-check, and number sense to solve one- and multi-step algebraic equations in one variable.	4.7.10 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
14			
15			
16	**Lesson 2**	Students will use substitution and mental math to check solutions to algebraic equations in one variable.	4.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
17			
18		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	4.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
19		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	4.7.10 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
20	**Lesson 3**		4.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**

21		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	4.3.1 **Use letters, boxes, or other symbols to represent any number in simple expressions, equations**, or inequalities **(i.e., demonstrate an understanding of and use the concept of a variable).**
22		Students will use repeated addition to represent multiplication in an algebraic expression.	4.3.6 **Recognize and apply the relationships between addition and multiplication**, between subtraction and division, **and the inverse relationship between multiplication and division to solve problems.**
23		Students will use the Subtraction Property of Equality with variables to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	4.3.6 **Recognize and apply the relationships between addition and multiplication**, between subtraction and division, **and the inverse relationship between multiplication and division to solve problems.**
24			4.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
25			4.7.10 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
26		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	4.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
27			
28			
29		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	4.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
30		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	4.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
31			4.7.10 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
32		Students will use the Subtraction Property of Equality with variables and with constants to form equivalent statements when solving algebraic equations in one variable.	4.3.6 **Recognize and apply the relationships between addition and multiplication**, between subtraction and division, **and the inverse relationship between multiplication and division to solve problems.**
33			4.7.10 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
34		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	4.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
35	**Lesson 4**		
36			
37	**Lesson 5**	Students will use concrete models and kinesthetic motions (physical	4.7.10 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**

38		actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	4.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
39		Students will add and subtract monomials and combine like terms to form equivalent expressions when solving algebraic equations in one variable.	
40			
41		Students will use Properties of Equality, such as the Subtraction Property of Equality, to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	4.3.6 **Recognize and apply the relationships between addition and multiplication**, between subtraction and division, **and the inverse relationship between multiplication and division to solve problems.**
42			4.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
43			4.7.10 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
44		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	4.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
45			
46			
47		Students will use concrete models to represent the multiplication of a binomial by a positive integer constant, such as $2(x + 1)$.	4.3.1 **Use letters, boxes, or other symbols to represent any number in simple expressions, equations,** or inequalities **(i.e., demonstrate an understanding of and use the concept of a variable).**
48			4.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
49		Students will use concrete models and kinesthetic motions (physical actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	4.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
50			4.7.10 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
51		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	4.3.6 **Recognize and apply the relationships between addition and multiplication**, between subtraction and division, **and the inverse relationship between multiplication and division to solve problems.**
52			5.3.3 **Use the distributive property in** numerical **equations and expressions.**
53			4.7.10 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
54		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	4.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
55	**Lesson 6**		
56			

57		Students will use pictorial models to represent abstract algebraic equations, including equations that contain multiplication of a binomial by a positive integer constant, such as 2(x + 1).	**4.3.1 Use letters, boxes, or other symbols to represent any number in simple expressions, equations,** or inequalities **(i.e., demonstrate an understanding of and use the concept of a variable).**
58			4.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
59		Students will use pictorial representations to solve algebraic equations in one variable with unknowns on both sides of the equation.	4.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
60			4.7.10 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
61		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	4.3.6 **Recognize and apply the relationships between addition and multiplication**, between subtraction and division, **and the inverse relationship between multiplication and division to solve problems.**
62			5.3.3 **Use the distributive property in** numerical **equations and expressions.**
63			4.7.10 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
64		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	4.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
65	**Lesson 7**		
66		**Hands-On Equations(R) Verbal Problems Book: Introduction & Level I**	**Indiana State Standards Grade 4: Algebra and Functions; Problem Solving**
67		Students will analyze verbal problems and determine what strategy is best for representing the problem using concrete models or pictorial symbols.	4.3.1 **Use letters, boxes, or other symbols to represent any number in simple expressions, equations,** or inequalities **(i.e., demonstrate an understanding of and use the concept of a variable).**
68		Students will use mathematical models (e.g., concrete, pictorial) to represent and solve application problems involving quantitative relationships with rational numbers.	4.7.4 **Use a variety of methods, such as words, numbers, symbols, charts,** graphs, **tables, diagrams, tools, and models to solve problems, justify arguments, and make conjectures.**
69			4.7.10 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
70		Students will write down the representation of the unknown elements of the verbal problem.	4.3.1 **Use letters, boxes, or other symbols to represent any number in simple expressions, equations,** or inequalities **(i.e., demonstrate an understanding of and use the concept of a variable).**
71	**Level I Verbal Problems**	Students will use multiple strategies (e.g., a 5-step problem solving process, breaking a problem into parts, and determining whether a problem has too much information or not enough information) to solve real-world	4.7.1 **Analyze problems by identifying relationships, telling relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.**
72			4.7.2 **Decide when and how to break a problem into simpler parts.**

		application problems.	
73		Students will represent physically or pictorially given relations, such as Jim's age 10 years from now given his current age, the amount of rain that falls in three months given the amount it falls in one month, the distance travelled by a train in two hours given the distance it travels in one hour, or a number that is 2/3 of another number.	4.3.7 **Relate problem situations to number sentences involving multiplication and division.**
74		Students will represent and solve application problems including problems involving distance, money, age, and patterns of numbers (e.g., consecutive numbers, consecutive even numbers, and consecutive odd numbers).	
75			
76		Students will provide the answer to verbal problems in full sentence format.	4.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
77			
78		Students will use substitution and mental math to check solutions to application problems involving algebraic equations in one variable.	4.7.9 **Decide whether a solution is reasonable in the context of the original situation.**
79			4.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
80			

IN Grade 5

	A	B	C
1	**LESSON**	**OBJECTIVES**	
2		**Hands-On Equations(R) Learning System: Level I**	**Indiana State Standards Grade 5: Algebra and Functions; Problem Solving**
3		Students will use a symbol to represent an unknown.	5.3.1 **Use a variable to represent an unknown number.**
4		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	
5			
6	**Lesson 1**	Students will use substitution and mental math to find and check solutions	5.7.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both**

		to physical or pictorial representations of algebraic equations in one variable.	**verbal and symbolic work.**
7			
8		Students will demonstrate an understanding of the abstract representation of an algebraic equation in one variable.	
9		Students will model an abstract algebraic equation using concrete materials.	
10		Students will use repeated addition to represent multiplication in an algebraic expression.	
11		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	5.3.1 **Use a variable to represent an unknown number.**
12			
13		Students will use concrete models, guess-and-check, and number sense to solve one- and multi-step algebraic equations in one variable.	5.7.9 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
14			
15			
16	**Lesson 2**	Students will use substitution and mental math to check solutions to algebraic equations in one variable.	5.7.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
17			
18		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	5.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
19			5.7.9 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
20		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	5.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
21		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	5.3.1 **Use a variable to represent an unknown number.**
22	**Lesson 3**	Students will use repeated addition to represent multiplication in an algebraic expression.	

23		Students will use the Subtraction Property of Equality with variables to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	5.7.9 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
24			5.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
25			
26		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	5.7.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
27			
28			
29		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	5.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
30		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	5.7.9 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
31			5.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
32		Students will use the Subtraction Property of Equality with variables and with constants to form equivalent statements when solving algebraic equations in one variable.	
33			5.7.9 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
34		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	5.7.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
35	**Lesson 4**		
36			
37		Students will use concrete models and kinesthetic motions (physical actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	5.7.9 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
38			5.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
39		Students will add and subtract monomials and combine like terms to form equivalent expressions when solving algebraic equations in one variable.	
40			
41		Students will use Properties of Equality, such as the Subtraction Property of Equality, to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	5.7.9 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
42			5.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
43	**Lesson 5**		5.7.4 **Express solutions clearly and logically by using the appropriate**

44		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	**mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
45			
46		Students will use concrete models to represent the multiplication of a binomial by a positive integer constant, such as 2(*x* + 1).	5.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
47		Students will use concrete models and kinesthetic motions (physical actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	5.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
48			5.7.9 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
49		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	
50			
51			5.7.9 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
52		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	5.7.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
53	**Lesson 6**		
54			
55		Students will use pictorial models to represent abstract algebraic equations, including equations that contain multiplication of a binomial by a positive integer constant, such as 2(x + 1).	5.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
56		Students will use pictorial representations to solve algebraic equations in one variable with unknowns on both sides of the equation.	5.7.3 **Apply strategies and results from simpler problems to solve more complex problems.**
57			5.7.9 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
58		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	
59			
60			5.7.9 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
61		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	5.7.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
62	**Lesson 7**		
63		**Hands-On Equations(R) Verbal Problems Book: Introduction & Level I**	

64		Students will analyze verbal problems and determine what strategy is best for representing the problem using concrete models or pictorial symbols.	
65		Students will use mathematical models (e.g., concrete, pictorial) to represent and solve application problems involving quantitative relationships with rational numbers.	5.7.9 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
66			
67		Students will write down the representation of the unknown elements of the verbal problem.	5.3.1 **Use a variable to represent an unknown number.**
68		Students will use multiple strategies (e.g., a 5-step problem solving process, breaking a problem into parts, and determining whether a problem has too much information or not enough information) to solve real-world application problems.	5.7.1 **Analyze problems by identifying relationships, telling relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.**
69			5.7.2 **Decide when and how to break a problem into simpler parts.**
70		Students will represent physically or pictorially given relations, such as Jim's age 10 years from now given his current age, the amount of rain that falls in three months given the amount it falls in one month, the distance travelled by a train in two hours given the distance it travels in one hour, or a number that is 2/3 of another number.	
71		Students will represent and solve application problems including problems involving distance, money, age, and patterns of numbers (e.g., consecutive numbers, consecutive even numbers, and consecutive odd numbers).	
72			
73		Students will provide the answer to verbal problems in full sentence format.	
74			
75		Students will use substitution and mental math to check solutions to application problems involving algebraic equations in one variable.	5.7.8 **Decide whether a solution is reasonable in the context of the original situation.**
76	**Level I Verbal Problems**		5.7.4 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
77			

IN Grade 6

	A	B	C
1	**LESSON**	**OBJECTIVES**	
2		**Hands-On Equations(R) Learning System: Level I**	**Indiana State Standards Grade 6: Algebra and Functions; Problem Solving**
3		Students will use a symbol to represent an unknown.	
4		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	
5		Students will use substitution and mental math to find and check solutions to physical or pictorial representations of algebraic equations in one variable.	6.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
6	**Lesson 1**		
7			
8		Students will demonstrate an understanding of the abstract representation of an algebraic equation in one variable.	
9		Students will model an abstract algebraic equation using concrete materials.	
10		Students will use repeated addition to represent multiplication in an algebraic expression.	
11		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	
12		Students will use concrete models, guess-and-check, and number sense to solve one- and multi-step algebraic equations in one variable.	6.3.1 Write and **solve** one-step **linear equations** and inequalities **in one variable** and check the answers.
13			6.7.11 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
14		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	6.3.1 Write and **solve** one-step **linear equations** and inequalities **in one variable and check the answers.**
15			
16	**Lesson 2**		6.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**

17			
18		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	6.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
19		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	6.7.11 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
20			6.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
21		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	
22		Students will use repeated addition to represent multiplication in an algebraic expression.	
23		Students will use the Subtraction Property of Equality with variables to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	6.7.11 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
24			
25			6.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
26		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	6.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
27	**Lesson 3**		
28			
29		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	6.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
30		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	6.7.11 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
31			6.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
32		Students will use the Subtraction Property of Equality with variables and with constants to form equivalent statements when solving algebraic equations in one variable.	
33			6.7.11 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
34	**Lesson 4**		6.7.5 **Express solutions clearly and logically by using the appropriate**

35		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	**mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
36			
37		Students will use concrete models and kinesthetic motions (physical actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	6.7.11 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
38			6.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
39		Students will add and subtract monomials and combine like terms to form equivalent expressions when solving algebraic equations in one variable.	
40			
41		Students will use Properties of Equality, such as the Subtraction Property of Equality, to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	6.7.11 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
42			6.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
43		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	6.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
44	**Lesson 5**		
45			
46		Students will use concrete models to represent the multiplication of a binomial by a positive integer constant, such as $2(x + 1)$.	6.3.3 **Interpret and evaluate mathematical expressions that use grouping symbols such as parentheses.**
47			6.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
48		Students will use concrete models and kinesthetic motions (physical actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	6.7.11 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
49			6.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
50		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	6.3.6 **Apply the correct order of operations and the properties of real numbers (e.g.,** identity, inverse, **commutative, associative, and distributive properties) to evaluate numerical expressions.** Justify each step in the process.
51			6.7.11 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
52			
53		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	6.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
54	**Lesson 6**		
55			

56		Students will use pictorial models to represent abstract algebraic equations, including equations that contain multiplication of a binomial by a positive integer constant, such as 2(x + 1).	6.3.3 **Interpret and evaluate mathematical expressions that use grouping symbols such as parentheses.**
57			6.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
58		Students will use pictorial representations to solve algebraic equations in one variable with unknowns on both sides of the equation.	6.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
59			6.7.11 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
60		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	6.3.6 **Apply the correct order of operations and the properties of real numbers (e.g.,** identity, inverse, **commutative, associative, and distributive properties) to evaluate numerical expressions.** Justify each step in the process.
61			
62			6.7.11 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
63		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	6.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
64	**Lesson 7**		
65		**Hands-On Equations(R) Verbal Problems Book: Introduction & Level I**	
66		Students will analyze verbal problems and determine what strategy is best for representing the problem using concrete models or pictorial symbols.	
67		Students will use mathematical models (e.g., concrete, pictorial) to represent and solve application problems involving quantitative relationships with rational numbers.	6.7.11 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
68			
69		Students will write down the representation of the unknown elements of the verbal problem.	
70		Students will use multiple strategies (e.g., a 5-step problem solving process, breaking a problem into parts, and determining whether a problem has too much information or not enough information) to solve real-world application problems.	6.7.1 **Analyze problems by identifying relationships, telling relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.**
71			6.7.3 **Decide when and how to break a problem into simpler parts.**
72	**Level I Verbal Problems**	Students will represent physically or pictorially given relations, such as Jim's age 10 years from now given his current age, the amount of rain that falls in three months given the amount it falls in one month, the distance travelled	6.2.7 **Understand proportions and use them to solve problems.**

		by a train in two hours given the distance it travels in one hour, or a number that is 2/3 of another number.	
73			
74		Students will represent and solve application problems including problems involving distance, money, age, and patterns of numbers (e.g., consecutive numbers, consecutive even numbers, and consecutive odd numbers).	
75			
76		Students will provide the answer to verbal problems in full sentence format.	
77			6.7.5 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
78		Students will use substitution and mental math to check solutions to application problems involving algebraic equations in one variable.	6.7.10 **Decide whether a solution is reasonable in the context of the original situation.**
79			

IN Grade 7

	A	B	C
1	**LESSON**	**OBJECTIVES**	
2		**Hands-On Equations(R) Learning System: Level I**	**Indiana State Standards Grade 7: Algebra and Functions; Problem Solving**
3		Students will use a symbol to represent an unknown.	
4		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	
5			
6	**Lesson 1**	Students will use substitution and mental math to find and check solutions to physical or pictorial representations of algebraic equations in one variable.	7.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
7			
8	**Lesson 2**	Students will demonstrate an understanding of the abstract representation of an algebraic equation in one variable.	

9		Students will model an abstract algebraic equation using concrete materials.	
10		Students will use repeated addition to represent multiplication in an algebraic expression.	
11		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	
12		Students will use concrete models, guess-and-check, and number sense to solve one- and multi-step algebraic equations in one variable.	7.3.2 W**rite and solve two-step linear equations** and inequalities **in one variable and check the answers.**
13			7.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
14		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	7.3.2 Write and solve two-step linear equations and inequalities in one variable and **check the answers.**
15			
16			7.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
17			
18		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	7.3.2 **Write and solve two-step linear equations** and inequalities **in one variable and check the answers.**
19			7.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
20		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	7.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
21			7.3.2 **Write and solve** two-step **linear equations** and inequalities **in one variable and check the answers.**
22			7.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
23		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	
24		Students will use repeated addition to represent multiplication in an algebraic expression.	
25	**Lesson 3**		7.3.2 W**rite and solve two-step linear equations** and inequalities **in one variable**

		Students will use the Subtraction Property of Equality with variables to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	**and check the answers.**
26			7.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
27			7.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
28		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	7.3.2 Write and solve two-step linear equations and inequalities in one variable and **check the answers.**
29			7.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
30			
31		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	7.3.2 **Write and solve two-step linear equations** and inequalities **in one variable and check the answers.**
32			7.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
33		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	7.3.2 **Write and solve two-step linear equations** and inequalities **in one variable and check the answers.**
34			7.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
35		Students will use the Subtraction Property of Equality with variables and with constants to form equivalent statements when solving algebraic equations in one variable.	7.3.2 **Write and solve two-step linear equations** and inequalities **in one variable and check the answers.**
36			7.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
37		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	7.3.2 Write and solve two-step linear equations and inequalities in one variable and **check the answers.**
38	**Lesson 4**		7.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
39			
40		Students will use concrete models and kinesthetic motions (physical actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	7.3.2 **Write and solve two-step linear equations** and inequalities **in one variable and check the answers.**
41			7.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
42	**Lesson 5**		7.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**

43		Students will add and subtract monomials and combine like terms to form equivalent expressions when solving algebraic equations in one variable.	
44			
45		Students will use Properties of Equality, such as the Subtraction Property of Equality, to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	7.3.2 W**rite and solve two-step linear equations** and inequalities **in one variable and check the answers.**
46			7.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
47			7.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
48		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	7.3.2 Write and solve two-step linear equations and inequalities in one variable and **check the answers.**
49			7.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
50			
51		Students will use concrete models to represent the multiplication of a binomial by a positive integer constant, such as 2(x + 1).	7.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
52		Students will use concrete models and kinesthetic motions (physical actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	7.3.2 **Write and solve two-step linear equations** and inequalities **in one variable and check the answers.**
53			7.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
54			7.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
55		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	7.3.2 W**rite and solve two-step linear equations** and inequalities **in one variable and check the answers.**
56			
57			7.3.4 Evaluate numerical expressions and **simplify algebraic expressions by applying the correct order of operations and the properties of rational numbers (e.g.,** identity, inverse, **commutative, associative, distributive).** Justify each step in the process.
58		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	7.3.2 Write and solve two-step linear equations and inequalities in one variable and **check the answers.**
59	**Lesson 6**		7.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
60			

61		Students will use pictorial models to represent abstract algebraic equations, including equations that contain multiplication of a binomial by a positive integer constant, such as 2(x + 1).	7.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
62			7.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
63		Students will use pictorial representations to solve algebraic equations in one variable with unknowns on both sides of the equation.	7.3.2 **Write and solve two-step linear equations** and inequalities **in one variable and check the answers.**
64			7.3.2 **Write and solve two-step linear equations** and inequalities **in one variable and check the answers.**
65		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	7.3.4 Evaluate numerical expressions and **simplify algebraic expressions by applying the correct order of operations and the properties of rational numbers (e.g.,** identity, inverse, commutative, associative, **distributive).** Justify each step in the process.
66			7.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
67			7.3.2 Write and solve two-step linear equations and inequalities in one variable and **check the answers.**
68	**Lesson 7**	Students will use substitution and mental math to check solutions to algebraic equations in one variable.	7.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
69		**Hands-On Equations(R) Verbal Problems Book: Introduction & Level I**	
70		Students will analyze verbal problems and determine what strategy is best for representing the problem using concrete models or pictorial symbols.	
71		Students will use mathematical models (e.g., concrete, pictorial) to represent and solve application problems involving quantitative relationships with rational numbers.	7.3.1 **Use variables and appropriate operations to write an expression,** a formula, **an equation**, or an inequality **that represents a verbal description.**
72			7.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
73		Students will write down the representation of the unknown elements of the verbal problem.	7.3.1 **Use variables and appropriate operations to write an expression, a formula, an equation, or an inequality that represents a verbal description.**
74	**Level I Verbal Problems**	Students will use multiple strategies (e.g., a 5-step problem solving process, breaking a problem into parts, and determining whether a problem has too	7.7.1 **Analyze problems by identifying relationships, telling relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.**

75		much information or not enough information) to solve real-world application problems.	7.7.3 **Decide when and how to break a problem into simpler parts.**
76		Students will represent physically or pictorially given relations, such as Jim's age 10 years from now given his current age, the amount of rain that falls in three months given the amount it falls in one month, the distance travelled by a train in two hours given the distance it travels in one hour, or a number that is 2/3 of another number.	7.3.1 **Use variables and appropriate operations to write an expression,** a formula, **an equation**, or an inequality **that represents a verbal description.**
77			
78		Students will represent and solve application problems including problems involving distance, money, age, and patterns of numbers (e.g., consecutive numbers, consecutive even numbers, and consecutive odd numbers).	7.3.1 **Use variables and appropriate operations to write an expression,** a formula, **an equation**, or an inequality **that represents a verbal description.**
79			
80		Students will provide the answer to verbal problems in full sentence format.	
81			7.3.2 Write and solve two-step linear equations and inequalities in one variable **and check the answers.**
82			7.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
83		Students will use substitution and mental math to check solutions to application problems involving algebraic equations in one variable.	7.7.11 **Decide whether a solution is reasonable in the context of the original solution.**
84			

IN Grade 8

	A	B	C
1	**LESSON**	**OBJECTIVES**	
2		**Hands-On Equations(R) Learning System: Level I**	**Indiana State Standards Grade 8: Algebra and Functions; Problem Solving**
3		Students will use a symbol to represent an unknown.	
4	**Lesson 1**	Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	

5			
6		Students will use substitution and mental math to find and check solutions to physical or pictorial representations of algebraic equations in one variable.	8.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
7			
8		Students will demonstrate an understanding of the abstract representation of an algebraic equation in one variable.	8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, and verify the reasonableness of the results.
9		Students will model an abstract algebraic equation using concrete materials.	8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, and verify the reasonableness of the results.
10		Students will use repeated addition to represent multiplication in an algebraic expression.	8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, and verify the reasonableness of the results.
11		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, and verify the reasonableness of the results.
12		Students will use concrete models, guess-and-check, and number sense to solve one- and multi-step algebraic equations in one variable.	8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, **and verify the reasonableness of the results.**
13			8.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
14			
15			
16	**Lesson 2**	Students will use substitution and mental math to check solutions to algebraic equations in one variable.	8.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
17			
18		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, and verify the reasonableness of the results.
19			8.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
20		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	8.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
21	**Lesson 3**		8.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**

22			8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, **and verify the reasonableness of the results.**
23		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	
24		Students will use repeated addition to represent multiplication in an algebraic expression.	
25		Students will use the Subtraction Property of Equality with variables to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, **and verify the reasonableness of the results.**
26			
27			8.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
28			8.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
29		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	8.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
30			
31			
32		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	8.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
33		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	8.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
34			8.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
35		Students will use the Subtraction Property of Equality with variables and with constants to form equivalent statements when solving algebraic equations in one variable.	8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, **and verify the reasonableness of the results.**
36			8.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
37		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	8.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
38	**Lesson 4**		
39			

40			
41		Students will use concrete models and kinesthetic motions (physical actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	8.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
42			8.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
43		Students will add and subtract monomials and combine like terms to form equivalent expressions when solving algebraic equations in one variable.	
44			
45		Students will use Properties of Equality, such as the Subtraction Property of Equality, to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, **and verify the reasonableness of the results.**
46			8.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
47			8.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
48		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	8.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
49	**Lesson 5**		
50			
51		Students will use concrete models to represent the multiplication of a binomial by a positive integer constant, such as $2(x + 1)$.	8.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
52		Students will use concrete models and kinesthetic motions (physical actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, **and verify the reasonableness of the results.**
53			8.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
54			8.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
55		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, **and verify the reasonableness of the results.**
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57			8.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
58		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	8.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
59	**Lesson 6**		

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61		Students will use pictorial models to represent abstract algebraic equations, including equations that contain multiplication of a binomial by a positive integer constant, such as 2(x + 1).	8.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
62		Students will use pictorial representations to solve algebraic equations in one variable with unknowns on both sides of the equation.	8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, **and verify the reasonableness of the results.**
63			8.7.4 **Apply strategies and results from simpler problems to solve more complex problems.**
64		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	8.3.1 **Write and solve linear equations** and inequalities **in one variable**, interpret the solution or solutions in their context, **and verify the reasonableness of the results.**
65			8.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
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67		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	8.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
68	**Lesson 7**		
69		**Hands-On Equations(R) Verbal Problems Book: Introduction & Level I**	
70		Students will analyze verbal problems and determine what strategy is best for representing the problem using concrete models or pictorial symbols.	
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72		Students will use mathematical models (e.g., concrete, pictorial) to represent and solve application problems involving quantitative relationships with rational numbers.	8.7.12 **Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.**
73		Students will write down the representation of the unknown elements of the verbal problem.	
74	**Level I**	Students will use multiple strategies (e.g., a 5-step problem solving process, breaking a problem into parts, and determining whether a problem has too much information or not enough information) to solve real-world application problems.	8.7.1 **Analyze problems by identifying relationships, telling relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.**
75	**Verbal Problems**		8.7.3 **Decide when and how to divide a problem into simpler parts.**

76		Students will represent physically or pictorially given relations, such as Jim's age 10 years from now given his current age, the amount of rain that falls in three months given the amount it falls in one month, the distance travelled by a train in two hours given the distance it travels in one hour, or a number that is 2/3 of another number.	8.3.7 **Demonstrate an understanding of rate as a measure of one quantity with respect to another quantity.**
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78		Students will represent and solve application problems including problems involving distance, money, age, and patterns of numbers (e.g., consecutive numbers, consecutive even numbers, and consecutive odd numbers).	8.3.7 **Demonstrate an understanding of rate as a measure of one quantity with respect to another quantity.**
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80		Students will provide the answer to verbal problems in full sentence format.	
81			8.7.6 **Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.**
82		Students will use substitution and mental math to check solutions to application problems involving algebraic equations in one variable.	8.7.11 **Decide whether a solution is reasonable in the context of the original situation.**
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IN Grade 9

	A	B	C
1	**LESSON**	**OBJECTIVES**	
2		**Hands-On Equations(R) Learning System: Level I**	**Indiana State Standards Grade 9: Operations With Real Numbers; Algebra and Functions; Problem Solving**
3		Students will use a symbol to represent an unknown.	
4		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	
5			
6	**Lesson 1**	Students will use substitution and mental math to find and check solutions to physical or pictorial representations of algebraic equations in one variable.	
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8		Students will demonstrate an understanding of the abstract representation of an algebraic equation in one variable.	
9		Students will model an abstract algebraic equation using concrete materials.	
10		Students will use repeated addition to represent multiplication in an algebraic expression.	
11		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	
12			
13		Students will use concrete models, guess-and-check, and number sense to solve one- and multi-step algebraic equations in one variable.	A1.9.1 **Use a variety of problem-solving strategies, such as** drawing a diagram, making a chart, **guess-and-check, solving a simpler problem,** writing an equation, and working backwards.
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16	**Lesson 2**	Students will use substitution and mental math to check solutions to algebraic equations in one variable.	
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18		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	A1.2.1 **Solve linear equations.**
19			A1.2.1 **Solve linear equations.**
20		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	A1.9.4 **Understand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation and that the steps taken when solving equations create new equations that have, in most cases, the same solutions set as the original.** Understand that similar logic applies to solving systems of equations simultaneously.
21		Students will demonstrate an understanding of the concepts of *equivalence*, *variable*, *constant*, *equation*, *equal to* (=), and *not equal to* (≠).	A1.9.4 U**nderstand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation and that the steps taken when solving equations create new equations that have, in most cases, the same solutions set as the original.** Understand that similar logic applies to solving systems of equations simultaneously.
22	**Lesson 3**	Students will use repeated addition to represent multiplication in an algebraic expression.	

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24			A1.2.1 **Solve linear equations.**
25		Students will use the Subtraction Property of Equality with variables to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	A1.9.4 U**nderstand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation and that the steps taken when solving equations create new equations that have, in most cases, the same solutions set as the original.** Understand that similar logic applies to solving systems of equations simultaneously.
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27		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	
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29		Students will use concrete models to represent algebraic equations in one variable with unknowns on both sides of the equation.	
30			A1.2.1 **Solve linear equations.**
31		Students will use kinesthetic motions (physical actions) to solve algebraic equations in one variable with unknowns on both sides of the equation.	A1.9.4 U**nderstand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation and that the steps taken when solving equations create new equations that have, in most cases, the same solutions set as the original.** Understand that similar logic applies to solving systems of equations simultaneously.
32			A1.2.1 **Solve linear equations.**
33		Students will use the Subtraction Property of Equality with variables and with constants to form equivalent statements when solving algebraic equations in one variable.	A1.9.4 U**nderstand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation and that the steps taken when solving equations create new equations that have, in most cases, the same solutions set as the original.** Understand that similar logic applies to solving systems of equations simultaneously.
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35	**Lesson 4**	Students will use substitution and mental math to check solutions to algebraic equations in one variable.	
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37			A1.9.4 **Understand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation and that the steps taken when solving equations create new equations that have, in most cases, the same solutions set as the original.** Understand that similar logic applies to solving systems of equations simultaneously.
38		Students will use concrete models and kinesthetic motions (physical actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	
39	**Lesson 5**	Students will add and subtract monomials and combine like terms to form	A1.2.1 **Solve linear equations.**

40		equivalent expressions when solving algebraic equations in one variable.	A1.9.4 U**nderstand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation and that the steps taken when solving equations create new equations that have, in most cases, the same solutions set as the original.** Understand that similar logic applies to solving systems of equations simultaneously.
41		Students will use Properties of Equality, such as the Subtraction Property of Equality, to form equivalent statements when solving algebraic equations in one variable with unknowns on both sides of the equation.	A1.2.1 **Solve linear equations.**
42			A1.9.4 U**nderstand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation and that the steps taken when solving equations create new equations that have, in most cases, the same solutions set as the original.** Understand that similar logic applies to solving systems of equations simultaneously.
43		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	
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46		Students will use concrete models to represent the multiplication of a binomial by a positive integer constant, such as 2(x + 1).	A1.1.3 **Understand and use the distributive, associative, and commutative properties.**
47		Students will use concrete models and kinesthetic motions (physical actions) to represent and solve algebraic equations in one variable with unknowns on both sides of the equation.	
48		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	A1.1.3 **Understand and use the distributive, associative, and commutative properties.**
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50			A1.9.4 U**nderstand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation and that the steps taken when solving equations create new equations that have, in most cases, the same solutions set as the original.** Understand that similar logic applies to solving systems of equations simultaneously.
51		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	
52	**Lesson 6**		
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54	**Lesson 7**	Students will use pictorial models to represent abstract algebraic equations, including equations that contain multiplication of a binomial by a positive integer constant, such as 2(x + 1).	A1.1.3 **Understand and use the distributive, associative, and commutative properties.**

55		Students will use pictorial representations to solve algebraic equations in one variable with unknowns on both sides of the equation.	A1.2.1 **Solve linear equations.**
56			A1.9.4 **Understand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation and that the steps taken when solving equations create new equations that have, in most cases, the same solutions set as the original.** Understand that similar logic applies to solving systems of equations simultaneously.
57		Students will use algebraic properties, such as the Subtraction Property of Equality and the Distributive Property of Multiplication over Addition, to form equivalent statements and expressions when solving algebraic equations in one variable.	A1.1.3 **Understand and use the distributive, associative, and commutative properties.**
58			A1.2.1 **Solve linear equations.**
59			A1.9.4 U**nderstand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation and that the steps taken when solving equations create new equations that have, in most cases, the same solutions set as the original.** Understand that similar logic applies to solving systems of equations simultaneously.
60		Students will use substitution and mental math to check solutions to algebraic equations in one variable.	
61			
62		**Hands-On Equations(R) Verbal Problems Book: Introduction & Level I**	
63	**Level I Verbal Problems**	Students will analyze verbal problems and determine what strategy is best for representing the problem using concrete models or pictorial symbols.	
64		Students will use mathematical models (e.g., concrete, pictorial) to represent and solve application problems involving quantitative relationships with rational numbers.	A1.2.6 **Solve word problems that involve linear equations**, formulas, and inequalities.
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66		Students will write down the representation of the unknown elements of the verbal problem.	A1.9.1 **Use a variety of problem-solving strategies, such as** drawing a diagram, making a chart, **guess-and-check, solving a simpler problem**, writing an equation, and working backwards.
67		Students will use multiple strategies (e.g., a 5-step problem solving process, breaking a problem into parts, and determining whether a problem has too much information or not enough information) to solve real-world application problems.	A1.2.6 **Solve word problems that involve linear equations**, formulas, and inequalities.
68			A1.9.1 **Use a variety of problem-solving strategies, such as** drawing a diagram, making a chart, **guess-and-check, solving a simpler problem**, writing an equation, and working backwards.

69		Students will represent physically or pictorially given relations, such as Jim's age 10 years from now given his current age, the amount of rain that falls in three months given the amount it falls in one month, the distance travelled by a train in two hours given the distance it travels in one hour, or a number that is 2/3 of another number.	
70		Students will represent and solve application problems including problems involving distance, money, age, and patterns of numbers (e.g., consecutive numbers, consecutive even numbers, and consecutive odd numbers).	A1.2.6 **Solve word problems that involve linear equations**, formulas, and inequalities.
71			A1.9.1 **Use a variety of problem-solving strategies, such as** drawing a diagram, making a chart, **guess-and-check, solving a simpler problem,** writing an equation, and working backwards.
72		Students will provide the answer to verbal problems in full sentence format.	
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74		Students will use substitution and mental math to check solutions to application problems involving algebraic equations in one variable.	A1.9.2 **Decide whether a solution is reasonable in the context of the original situation.**
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