6th grade Math Assessment Tool

#-6	Standard	Bloom	Synonyms/Verbs	Sample question starters	Assessment from Standards
2.1	Understand whole-number percentages through 100.	(B2)	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	1. Explain how … has impacted… 2. Describe in clear logical steps…. 3. Paraphrase in your own words…. 4. Give reasons for… 5. Using words, pictures and icons, restate what you know about…. 6. Use the metaphor of … to help you understand…. 7. State three things you know about…	The objective of this indicator is to understand which is in the "understand conceptual" knowledge cell of the Revised Bloom's Taxonomy. To understand is to construct meaning. Conceptual knowledge is not bound by specific examples; therefore, the student's conceptual knowledge should include a variety of examples. The learning progression to **understand** requires students to recall the meaning of fractions and decimals. Students use the definition of percent to generate examples of percentages by generalizing connections (6-1.7) to real world situations where percentages are needed. They analyze these situations and explore how the percentages can be represented as fraction and decimals. As students analyze these situations, they use inductive and/or deductive reasoning to formulate mathematical arguments (6-1.3) about the relationship between fractions, decimals and percents. Students understand equivalent symbolic expressions as distinct symbolic forms (percent, fraction, decimal) that represent the same relationship (6-1.4).
2.2	Understand integers.	(B2)	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	1. Explain how … has impacted… 2. Describe in clear logical steps…. 3. Paraphrase in your own words…. 4. Give reasons for… 5. Using words, pictures and icons, restate what you know about…. 6. Use the metaphor of … to help you understand…. 7. State three things you know about…	The objective of this indicator is to understand, which is in the "conceptual knowledge" of the Revised Taxonomy. Conceptual knowledge is not bound by specific examples and shows the interrelationship of among integers, whole numbers, fractions and decimals (rational numbers). The learning progression to understand requires students to recall the characteristics of whole numbers, fractions, and decimals. Students generate examples by generalizing connections (6-1.7) of real world situations where positive and negative numbers are needed. Then students should use correct and clearly written or spoken words (6-1.6) to create a definition of integers. In order to understand integers, students also examine non-examples of integers. They generalize connections (6-1.7) by representing integers (whole numbers), fractions, and decimals on the number line. Using this understanding, students evaluate their definition of integers by posing questions to prove or disprove their conjecture (6-1.2).
2.3	Compare rational numbers and whole-number percentages through 100 by using the symbols ≤, ≥, <, >, and =.	(B2)	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	1. Explain how … has impacted… 2. Describe in clear logical steps…. 3. Paraphrase in your own words…. 4. Give reasons for… 5. Using words, pictures and icons, restate what you know about….	The objective of this indicator is to compare which is in the "understand conceptual" knowledge cell of the Revised Taxonomy. To understand is to construct meaning therefore, students should not just learn procedural strategies for comparing but they should build number sense around these types of numbers. The learning progression to **compare** requires students to recognize and understand rational numbers and whole number percentages through 100. Students understand the magnitude of rational number and whole numbers. Students use their conceptual understanding to compare without dependent on a traditional algorithm and use concrete models to support understanding where appropriate. Students recognize mathematical symbols <, >, >, < and = and their

				6. Use the metaphor of … to help you understand…. 7. State three things you know about…	meanings. As students analyze (5-1.1) the relationships to compare percentages and rational numbers, they construct arguments and explain and justify their answer to classmates and their teacher (5-1.3). Students should use correct, complete and clearly written and oral mathematical language to communicate their reasoning (5-1.5).
2.4	Apply an algorithm to add and subtract fractions.	(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write, organize, generalize, prepare, apply, calculate, compile, complete, demonstrate, illustrate, operate, solve, dramatize, classify, categorize	1. Applying previously learned knowledge, construct…. 2. Using your knowledge of …. Formulate 6 questions… 3. Write a letter to the editor pointing out… 4. Classify the following … into their correct…. 5. Write a news report… 6. Construct a flow chart for…	The objective of this indicator is apply, which is in the "apply procedural" of the Revised Taxonomy. Procedural knowledge is knowledge of specific steps or strategies that can be used to solve a problem or problem situation. Although the focus is to gain computational fluency with addition and subtraction of fractions, the learning progression should integrate strategies to enhance both conceptual and procedural knowledge. The learning progression to **apply** requires students to understand fractional forms such as mixed numbers, proper fractions, and improper fractions. Students should apply their conceptual knowledge of fractions to transfer their understanding of concrete and/or pictorial representations to symbolic representations (numbers only) by generalizing connections among a variety of representational forms and real world situations (6-1.7). Students use these procedures in context as opposed to only rote computational exercises and use correct and clearly written or spoken words to communicate about these significant mathematical tasks (6-1.6). Students engage in repeated practice using pictorial models, if needed, to support learning. Lastly, students should evaluate the reasonableness of their answers using appropriate estimation strategies.
2.5	Generate strategies to multiply and divide fractions and decimals.	(B6)	Assemble, construct, create, design, develop, formulate, write, compose, originate, produce, invent, improve	1. Design and improved… for… 2. Formulate a set of criteria to judge… 3. Compose a song, jingle or rap to illustrate… 4. Modify … in order to create a more fair….. 5. Develop and argument to persuade people to…. 6. Generate key questions for… 7. Create an experiment to… 8. Adapt a project studied so that.. 9. Design a personal action plan	The objective of this indicator is to generate which is in the "conceptual knowledge" of the Revised Taxonomy. To create is to put together elements to form a new, coherent whole or to make an original product. Conceptual knowledge is not bound by specific examples. The learning progression to **generate** requires students to recall concepts of multiplying, dividing, and relate parts to a whole. Students explore problem situations (story problems) and explore various strategies to solve those problems by applying their conceptual knowledge of fractions. Students translate their understanding of concrete and/or pictorial representations by generalizing connections between their models and real world situations (6-1.7). Students should use these procedures in context as opposed to only rote computational exercises and use correct and clearly written or spoken words to communicate about these significant mathematical tasks (6-1.6). Students formulate questions to prove or disprove their methods (6-1.2) and generate mathematical statement (6-1.6) about these operations. They should evaluate the reasonableness of their answers using appropriate estimation strategies.
2.	Understand the	(B2)	Classify, describe,	1. Explain how … has	The objective of this indicator is to understand, which is in the "understand

6	relationship between ratio/rate and multiplication/division.		discuss, explain, identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	impacted… 2. Describe in clear logical steps…. 3. Paraphrase in your own words…. 4. Give reasons for… 5. Using words, pictures and icons, restate what you know about…. 6. Use the metaphor of … to help you understand…. 7. State three things you know about…	conceptual" of the Revised Taxonomy. To understand is to construct meaning about the interrelationship among multiplication/division and ratio/rate. The learning progression to **understand** requires students to understand and represent ratio and rate using appropriate forms. Students generalize connection among rate and ratio and real world problems. As students analyze these problems, their use inductive and deductive reasoning to generalize mathematical statements (6-1.5) summarizing how multiplication and division are used to solve problems involving ratios and rates.
2.7	Apply strategies and procedures to determine values of powers of 10, up to 10^6.	(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write, organize, generalize, prepare, apply, calculate, compile, complete, demonstrate, illustrate, operate, solve, dramatize, classify, categorize	1. Applying previously learned knowledge, construct…. 2. Using your knowledge of …. Formulate 6 questions… 3. Write a letter to the editor pointing out… 4. Classify the following … into their correct…. 5. Write a news report… 6. Construct a flow chart for…	The objective of this indicator is apply, which is in the "apply procedural" of the Revised Taxonomy. Procedural knowledge is knowledge of specific steps or strategies that can be used to solve a problem or problem situation. Although the focus is to gain computational fluency in computing powers of 10, the learning progression should integrate strategies to enhance both conceptual and procedural knowledge. The learning progression to **apply** requires students to understand the structure of exponent form (base and exponent). Students explore powers of 10 by analyze the relationship between the exponent form, expanded form and numerical value. Students generalize mathematical statements (6-1.5) about these relationship based on inductive and deductive reasoning (6-1.3). They understand that each is an equivalent symbolic expression that conveys the same meaning but in different forms. Students then develop strategies that can be used to compute powers of 10 fluently.
2.8	Represent the prime factorization of numbers by using exponents.	(C2)	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	1. Explain how … has impacted… 2. Describe in clear logical steps…. 3. Paraphrase in your own words…. 4. Give reasons for… 5. Using words, pictures and icons, restate what you know about…. 6. Use the metaphor of … to help you understand…. 7. State three things you know about…	The objective of this indicator is represent which is in the "understand procedural" knowledge of the Revised Taxonomy**.** To understand a procedural implies not only knowing the steps of the procedural but also understanding the purpose and value of using it. The learning progression to **represent** requires students to recall the concept of prime and composite numbers by making connections to prior knowledge. Students explore problems situation where using the process of prime factorization is using. They analyze these situations and use inductive reasoning (6-1.3) to generalize a mathematical statement (6-1.5) about prime factorization. Students understand that the prime factorization is an equivalent symbolic expression that represents the same the number but in a different form (6-1.4). Students then rehearse strategies to find the prime factorization of a number and explain and justify their answers to their classmates and teacher.

2.9	Represent whole numbers in exponential form.	(C2)	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	8. Explain how … has impacted… 9. Describe in clear logical steps…. 10. Paraphrase in your own words…. 11. Give reasons for… 12. Using words, pictures and icons, restate what you know about…. 13. Use the metaphor of … to help you understand…. 14. State three things you know about…	The objective of this indicator is represent which is in the "understand procedural" knowledge of the Revised Taxonomy**.** To understand a procedural implies not only knowing the steps of the procedural but also understanding the purpose and value of using it. The learning progression to **represent** requires students to recall the structure of exponential form. Students explore a variety of problems. They analyze these situations and use inductive reasoning (6-1.3) to generalize a mathematical statements (6-1.5) about the relationship between exponential and whole number form. Students understand that the exponential form is an equivalent symbolic expression that represents the same the number but in a different form (6-1.4). Students engage in meaningful practice to support retention.
3.1	Analyze numeric and algebraic patterns and pattern relationships.	(B4)	Appraise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test, categorize, critique, debate, discuss, identify	1. From at least 4 peoples' viewpoint, analyze… 2. Discuss the similarities and differences of… 3. Compare and contrast… 4. Investigate all the factors that could influence… 5. Summarize the reasons for…. 6. Deduce how the parts interact in… 7. List the pros and cons of…	The objective of this indicator is to analyze, which is in the "understand conceptual" knowledge cell of the Revised Taxonomy. Conceptual knowledge is not bound by specific examples; therefore, the student's conceptual knowledge of these patterns relationships (words, table and graph) should be explored using a variety of examples. The learning progression to **analyze** requires students to recall the structure of a function table and a graph. Students generalize connections (6-1.7) among the multiple representations and generate descriptions and mathematical statements about pattern relationships using correct and clearly written and spoken words (6-1.6). Students prove or disprove their answer (6-1.2) and place an emphasis on the similar meaning that is conveyed by each representation.
3.2	Apply order of operations to simplify whole-number expressions.	(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write, organize, generalize, prepare, apply, calculate, compile, complete, demonstrate,	1. Applying previously learned knowledge, construct…. 2. Using your knowledge of …. Formulate 6 questions… 3. Write a letter to the editor pointing out… 4. Classify the following … into their correct…. 5. Write a news report…	The objective of this indicator is apply, which is in the "apply procedural" of the Revised Taxonomy. Procedural knowledge is knowledge of specific steps or strategies that can be used to solve a problem or problem situation. Although the focus is to gain computational fluency with order of operations, the learning progression should integrate strategies to enhance both conceptual and procedural knowledge. The learning progression to **apply** requires student to be fluently in all whole number operations. Given an expression, students explore various ways to simplify the expression. Students explain and justify their process of simplifying to their classmates and their teacher. They use inductive reasoning to generalize connections among strategies with an emphasis on the need for a common process to simplify. Students analyze the order of operations

			illustrate, operate, solve, dramatize, classify, categorize	6. Construct a flow chart for…	and gain of understanding of the structure and purpose of each level. They use this understanding to generate and solve more complex problems (6-1.1).
3.3	Represent algebraic relationships with variables in expressions, simple equations, and simple inequalities.	(B2)	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	1. Explain how … has impacted… 2. Describe in clear logical steps…. 3. Paraphrase in your own words…. 4. Give reasons for… 5. Using words, pictures and icons, restate what you know about…. 6. Use the metaphor of … to help you understand…. 7. State three things you know about…	The objective of this indicator is to represent which is in the "understand conceptual" knowledge cell of the Revised Taxonomy. To understand means to construct meaning; therefore, the students' focus is on building conceptual knowledge of the relationships between the forms. The learning progression to **represent** requires students to understand the concepts of equivalency and inequalities. Students analyze algebraic relationships (words, tables and graphs) to determine known and unknown values and the operations involved. They generate descriptions of the observed relationship and generalize the connection (6-1.7) between their description and structure of expression, equations or inequalities. Students explain and justify their ideas with their classmates and teachers using correct and clearly written or spoken words, variables and notation to communicate their ideas (6-1.6). Students then compare the relationships (words, tables and graphs) to their equation, inequality or expression to verify that each form conveys the same meaning.
3.4	Use the commutative, associative, and distributive properties to show that two expressions are equivalent.	(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write, organize, generalize, prepare, apply, calculate, compile, complete, demonstrate, illustrate, operate, solve, dramatize, classify, categorize	1. Applying previously learned knowledge, construct…. 2. Using your knowledge of …. Formulate 6 questions… 3. Write a letter to the editor pointing out… 4. Classify the following … into their correct…. 5. Write a news report… 6. Construct a flow chart for…	The objective of this indicator is to use which is in the "apply procedural" knowledge cell of the Revised Taxonomy. Although the focus of the indicator is to use which is a knowledge of specific steps and details, learning experiences should integrate both memorization and concept building strategies to support retention. The learning progression to **use** requires student to explore a variety of examples of these number properties using a various types of numbers. They analyze these examples and generalize connections (6-1.7) about what they observe using correct and clearly written or spoken language (6-1.6) to communicate their understanding. Students do not generalize these connections using formal rules involving variables. Students connect these statements to the terms commutative, associative and distributive. Students then develop meaningful and personal strategies that enable them to recall these relationships.
3.5	Use inverse operations to solve one-step equations that have whole number solutions and variables with whole-number coefficients.	(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write, organize, generalize, prepare, apply, calculate, compile, complete, demonstrate,	7. Applying previously learned knowledge, construct…. 8. Using your knowledge of …. Formulate 6 questions… 9. Write a letter to the editor pointing out… 10. Classify the following … into their correct…. 11. Write a news report…	The objective of this indicator is use which is in the "apply procedural" of the Revised Taxonomy. Procedural knowledge is knowledge of specific steps or strategies that can be used to solve a problem or problem situation. Although the focus is to gain computational fluency with solving one step equations, the learning progression should integrate strategies to enhance both conceptual and procedural knowledge. The learning progression to **use** requires students to explore the concepts of equivalency and variables using concrete models such as balance scales. Student use this understanding of balance to analyze a variety of examples of simple one step equations. Students use inductive reasoning (6-1.3) to generalize connections (6-1.7) among types of equations (addition, subtraction, multiplication and division) and generate mathematical statements

			illustrate, operate, solve, dramatize, classify, categorize	12. Construct a flow chart for…	(6-1.5) related to how these equations can be solved. Students engage in repeated practice to support retention and check their answers.
4.1	Represent with ordered pairs of integers the location of points in a coordinate grid.	(C2)	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	1. Explain how … has impacted… 2. Describe in clear logical steps…. 3. Paraphrase in your own words…. 4. Give reasons for… 5. Using words, pictures and icons, restate what you know about…. 6. Use the metaphor of … to help you understand…. 7. State three things you know about…	The objective of this indicator is to represent which is in the "understand conceptual" knowledge cell of the Revised Taxonomy. To represent means to change from one form to another; therefore, students gain an understanding of coordinates by translating them from numerical form (coordinate) to graphical form (grid). The learning progression to **represent** requires students to understand the meaning of integers. They recall and understand the structure of the coordinate plane (grid). Students use correct and clearly written or spoken words to communicate the meaning 6-1.6) of a coordinate by identify the values of x and y. They use a strategy to plot points and explain their strategy to their classmates and teachers. Students also analyze a graph to determine the coordinates. They use their understanding of quadrants to justify why a coordinate as certain signs. They evaluate their explanations and pose follow-up questions to prove or disprove their answers (6-1.2). Students then engage in repeated practice to support retention.
4.2	Apply strategies and procedures to find the coordinates of the missing vertex of a square, rectangle, or right triangle when given the coordinates of the polygon's other vertices.	(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write, organize, generalize, prepare, apply, calculate, compile, complete, demonstrate, illustrate, operate, solve, dramatize, classify, categorize	1. Applying previously learned knowledge, construct…. 2. Using your knowledge of …. Formulate 6 questions… 3. Write a letter to the editor pointing out… 4. Classify the following … into their correct…. 5. Write a news report… 6. Construct a flow chart for…	The objective of this indicator is to apply, which is in the "apply procedural" knowledge cell of the Revised Taxonomy table. Procedural knowledge is knowledge of specific steps or strategies that can be used to solve a problem or problem situation. Although the focus of the indicator is to apply, the learning progressions should include strategies that integrate conceptual and procedural knowledge. The learning progression to **apply** requires students to understand integers and the properties of the squares, rectangles and the right triangles. Students generalize mathematical statements related to the relationship between and among coordinates (6-1.5) such as the x values for two coordinates on the same vertical side are the same but the y values are different. As students explore a variety of examples, they use inductive and deductive reasoning to formulate conjectures (6- 1.3) and evaluate these conjectures by posing follow-up questions to prove or disprove their them (6-1.2). Students use their understanding of these relationships to generate and solve complex problems. They use correct and clearlywritten or spoken notation to communicate their answers.
4.3	Generalize the relationship between line symmetry and rotational symmetry for two-dimensional	(B2)	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate,	1. Explain how … has impacted… 2. Describe in clear logical steps…. 3. Paraphrase in your own words…. 4. Give reasons for… 5. Using words, pictures	The objective of this indicator is to generalize which is in the "understand conceptual" knowledge cell of the Revised Taxonomy. Conceptual knowledge is not bound by specific examples; therefore, the student's conceptual knowledge of rotational and line symmetry should be explored using a variety of examples. The learning progression to **generalize** requires students to recall and understand the meaning of line symmetry and rotational symmetry. Students experiment with rotating concrete models and generate descriptions and mathematical statements about their observations. Students use inductive and deductive

	shapes.		summarize, extend, outline	and icons, restate what you know about…. 6. Use the metaphor of … to help you understand…. 7. State three things you know about…	reasoning to formulate mathematical arguments about the relationship between the two types of symmetry. They explain and justify their answers using correct and clearly written or spoken words to communicate their understanding of this relationship (6-1.6).
4.4	Construct two-dimensional shapes with line or rotational symmetry.	(B6)	Assemble, construct, create, design, develop, formulate, write, compose, originate, produce, invent, improve	1. Design and improved… for… 2. Formulate a set of criteria to judge… 3. Compose a song, jingle or rap to illustrate… 4. Modify … in order to create a more fair….. 5. Develop and argument to persuade people to…. 6. Generate key questions for… 7. Create an experiment to… 8. Adapt a project studied so that.. 9. Design a personal action plan	The objective of this indicator is to construct, which is in the "create conceptual" knowledge cell of the Revised Taxonomy table. To construct means to put elements together to form a coherent or functional whole; therefore, students show their conceptual knowledge of line and rotational symmetry by creating shapes. The learning progression to **construct** requires students to recall and understand characteristics of two dimensional shapes. Students analyze two-dimensional shapes to identify pattern relationships between shapes that have line or rotational symmetry. They use inductive and deductive reasoning to formulate mathematical arguments explaining the similarities and differences between two- dimensional shapes with line or rotational symmetry (6-1.3). They use this understanding to construct shapes and use correct and clearly written or spoken words and notations to explain how they constructed their shapes (6-1.6).
4.5	Identify the transformation (s) used to move a polygon from one location to another in the coordinate plane.	(A1)	Define, duplicate, list, memorize, recall, repeat, reproduce, state, describe, identify, label, find, match, quote	1. Describe what happened at… 2. List all the… 3. Name all the… 4. What is (fact /definition, etc) 5. List the attributes of.. 6. Write 10 facts about… 7. Make an A-Z list of… 8. Recall… 9. In what way are you like…	The objective of this indicator is to identify which is in the "remember factual" knowledge cell of the Revised Taxonomy. To identify is to locate knowledge in long term memory. Although the focus of the indicator is to remember, hands-on activities build conceptual knowledge and support retention. The learning progression to **identify** requires students to recall the meaning of transformation, translation, rotation and reflection. They explore these transformations using concrete models, pictorial models and real world examples to generalize mathematical statements (6-1.5) about the relationships between transformed shapes. Students use these relationships to identify transformations when given two polygons. They explain and justify their answers using correct and clearly written or spoken words (6-1.6).
4.6	Explain how transformations affect the location of the	(B2)	Classify, describe, discuss, explain, identify, locate, recognize, report,	1. Explain how … has impacted… 2. Describe in clear logical steps….	The objective of this indicator is explain which is in the "understand conceptual" knowledge cell of the Revised Taxonomy. To explain is to construct a caluse and effect models; therefore, as students explain they use the structure "the transformation _____ because _____." The learning progression to **explain**

	original polygon in the coordinate plane.		select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	3. Paraphrase in your own words…. 4. Give reasons for… 5. Using words, pictures and icons, restate what you know about…. 6. Use the metaphor of … to help you understand…. 7. State three things you know about…	requires students to recall and understand the meaning of transformation. They *recognize* the relationships among rotations, reflections, and translations. Students explore and generate examples of transformation and generalize connections (6- 1.7) of real world situations where transformations are needed. Using their understanding, students *evaluate* their explanations of the effect of transformation by posing questions to prove or disprove their reasoning (6-1.2). They use correct and clearly written or spoken words and notation to communicate their reasoning (6-1.6).
4.7	Compare the angles, side lengths, and perimeters of similar shapes.	(B2)	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	1. Explain how … has impacted… 2. Describe in clear logical steps…. 3. Paraphrase in your own words…. 4. Give reasons for… 5. Using words, pictures and icons, restate what you know about…. 6. Use the metaphor of … to help you understand…. 7. State three things you know about…	The objective of this indicator is to compare which is in the "understand conceptual" knowledge cell of the Revised Taxonomy. To compare is to detect correspondences between ideas; therefore, student construct an understanding of similarity by exploring a variety of examples. The learning progression to **compare** requires students to recall the characteristics of congruent shapes. Students investigate and analyze a variety of shapes based on characteristics and generalize connections among these them (6-1.7). They use these generalizations to generate mathematical statements (6-1.5) about the relationships among similar shapes, perimeter, corresponding sides and angles. Students use these relationships to identify and generate examples of similar shapes. They *evaluate* their using by posing questions to prove or disprove their conjecture (6-1.2). Students explain and justify their answers using correct and clearly written and spoken words and notation (6-1.6). As students compare, they write statements that summarize the relationship between specific angles, sides and perimeters.
4.8	Classify shapes as similar.	(B2)	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	1. Explain how … has impacted… 2. Describe in clear logical steps…. 3. Paraphrase in your own words…. 4. Give reasons for… 5. Using words, pictures and icons, restate what you know about…. 6. Use the metaphor of … to help you understand…. 7. State three things you know about…	The objective of this indicator is classify which is in the "understand conceptual" knowledge cell of the Revise Taxonomy. To classify is to determine if something belongs to a category; therefore, students build a conceptual understanding of similarity by placing shapes in appropriate categories. The learning progression to **classify** requires students to recall the characteristics of congruent and similar shapes. Students use inductive and deductive reasoning to analyze problems (6- 1.3). They recognize these characteristics when given examples and explain and justify their classifications using correct and clearly written or spoken words and notations (6-1.6).
4.9	Classify pairs of angles as	(A2)	Classify, describe, discuss, explain,	1. Explain how … has impacted…	The objective of this indicator is classify which is in the "understand conceptual" knowledge cell of the Revised Taxonomy. To classify is to determine if

	either complementary or supplementary.		identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	2. Describe in clear logical steps…. 3. Paraphrase in your own words…. 4. Give reasons for… 5. Using words, pictures and icons, restate what you know about…. 6. Use the metaphor of … to help you understand…. 7. State three things you know about…	something belongs to a category; therefore, students build a conceptual understanding of supplementary and complementary angles by placing pairs of angles in appropriate categories. The learning progression to **classify** requires students to recall the definition of complementary and supplementary angles. Students construct numerical (numbers only), concrete and pictorial representations of pairs of angles that are complementary and supplementary. Students analyze these constructions to generalize connections (6-1.7) between complementary angles and a right angle and the connection between supplementary angles and a straight angle. They use their understanding of these relationships to classify angles as supplementary or complementary when given the numerical representation (numbers only) and the pictorial representation. They explain and justify their answers using correct and clearly written or spoken word and notations (6-1.6).
5.1	Explain the relationships among the circumference, diameter, and radius of a circle.	(B2)	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	1. Explain how … has impacted… 2. Describe in clear logical steps…. 3. Paraphrase in your own words…. 4. Give reasons for… 5. Using words, pictures and icons, restate what you know about…. 6. Use the metaphor of … to help you understand…. 7. State three things you know about…	The objective of this indicator is to explain which is in the "understand conceptual" knowledge cell of the Revised Taxonomy. To explain is to construct a cause and effect model; therefore, students demonstrate their understand of these relationships by using statements such as "the circumference is Ð times D because the diameter will fit around etc.." Because conceptual knowledge is not bound by specific examples, students should build understanding by exploring a variety of examples. The learning progression to **explain** requires students to recall parts of a circle (radius, diameter and circumference). Students investigate relationships using standard and nonstandard representational forms (6-1.8) that allow them to construct an understanding of the number *pi* by using inductive reasoning (details to generalization). They formulate an argument regarding the relationship among pi, circumference and diameter (6-1.3) and pose follow questions to prove or disprove their argument (6-1.2). Students explain the relationship among pi, circumference, diameter, and area using correct and clear written or spoken words, variable, and notations (6-1.6).
5.2	Apply strategies and formulas with an approximation of pi (3.14 , or. .) to find the circumference and area of a	(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write, organize, generalize, prepare, apply, calculate,	1. Applying previously learned knowledge, construct…. 2. Using your knowledge of …. Formulate 6 questions… 3. Write a letter to the editor pointing out… 4. Classify the following	The objective of this indicator is apply, which is in the "apply procedural" cell of the Revised Taxonomy. Procedural knowledge is knowledge of specific steps or strategies that can be used to solve a problem or problem situation. Although the focus is to gain fluency with setting up circumference and area formulas, the learning progression should integrate strategies to enhance both conceptual and procedural knowledge. The learning progression to **apply** requires students to recall and understand the concepts of pi, diameter, radius, and circumference. Students explore a variety of situations that involve both computational and application problems.

	circle		compile, complete, demonstrate, illustrate, operate, solve, dramatize, classify, categorize	… into their correct…. 5. Write a news report… 6. Construct a flow chart for…	Students analyze these situations to determine which formula is appropriate based on the given information. They explain and justify their answers using correct and clearly written or spoken words (6-1.6) and check the reasonableness of their solutions.
5. 3.	Generate strategies to determine the surface area of a rectangular prism and a cylinder.	(B6)	Assemble, construct, create, design, develop, formulate, write, compose, originate, produce, invent, improve	1. Design and improved… for… 2. Formulate a set of criteria to judge… 3. Compose a song, jingle or rap to illustrate… 4. Modify … in order to create a more fair….. 5. Develop and argument to persuade people to 6. Generate key questions for… 7. Create an experiment to… 8. Adapt a project studied so that.. 9. Design a personal action plan	The objective of this indicator is to generate, which is in the "create conceptual" knowledge cell of the Revised Taxonomy. To create is to reorganize elements (areas of square, circles and rectangles) into a new pattern or structure (surface area). The learning progression to **generate** requires the students to recall the formulas for area of squares, rectangles and circles. They understand that the surface area is the sum of the areas of all faces. As students explore the concept of surface area, they should generate conjectures (6-1.2) and exchange mathematical ideas with classmates. They evaluate those conjectures and pose questions for further understanding (6-1.2). Students use correct and clearly written or spoken words to explain their reasoning for their answers (6-1.6). By using deductive reasoning (specific to general), students generalize mathematical statements (6-1.5) about surface area and how to find it.
5. 4	Apply strategies and procedures to estimate the perimeters and areas of irregular shapes.	(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write, organize, generalize, prepare, apply, calculate, compile, complete, demonstrate, illustrate, operate, solve, dramatize, classify, categorize	1. Applying previously learned knowledge, construct…. 2. Using your knowledge of …. Formulate 6 questions… 3. Write a letter to the editor pointing out… 4. Classify the following … into their correct…. 5. Write a news report… 6. Construct a flow chart for…	The objective of this indicator is apply which is in the "apply procedural" cell of the Revised Taxonomy. Although the focus of the indicator is to apply, the learning progression should include opportunities for students to generate strategies for estimating the area and then apply it other shapes. The learning progression to **apply** requires students to recall and understand formulas for the areas and perimeter of squares, rectangles, triangles, circles, etc.. Given an irregular shape, students generate ideas related to how they could estimate the area using their prior knowledge. They explore these strategies using a variety of examples. They explain and justify their strategy using correct and clearly written or spoken words (6-1.6). Students should generalize mathematical statements (6-1.5) summarizing strategies used to estimate the area and perimeter of irregular shapes.
5. 5	Apply strategies and procedures of combining and subdividing to	(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule,	1. Applying previously learned knowledge, construct…. 2. Using your knowledge of …. Formulate 6	The objective of this indicator is apply which is in the "apply procedural" cell of the Revised Taxonomy. The focus of the indicator is to apply; therefore, students should gain computational fluency with finding perimeter and area of irregular shapes. The learning progression to **apply** requires students to recall and understand formulas for the areas and perimeter of squares,

	find the perimeters and areas of irregular shapes.		sketch, solve, use, write, organize, generalize, prepare, apply, calculate, compile, complete, demonstrate, illustrate, operate, solve, dramatize, classify, categorize	questions… 3. Write a letter to the editor pointing out… 4. Classify the following … into their correct…. 5. Write a news report… 6. Construct a flow chart for…	rectangles, triangles, circles, etc.. Given an irregular shape, students explore how the shapes can be divided or combined using manipulatives, where appropriate. They develop strategies for computing the area and perimeter. They explain and justify their strategy and their answers using correct and clearly written or spoken words (6-1.6). Students engage in repeated practice to support retention and understanding of their strategy.
5.6	Use proportions to determine unit rates.	(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write, organize, generalize, prepare, apply, calculate, compile, complete, demonstrate, illustrate, operate, solve, dramatize, classify, categorize	1. Applying previously learned knowledge, construct…. 2. Using your knowledge of …. Formulate 6 questions… 3. Write a letter to the editor pointing out… 4. Classify the following … into their correct…. 5. Write a news report… 6. Construct a flow chart for…	The objective of this indicator is use, which is in the "apply procedural" cell of the Revised Bloom's Taxonomy. Procedural knowledge is knowledge of specific steps or strategies that can be used to solve a problem or problem situation. Although the focus is to gain computational fluency with problems involving the use of proportions to solve problems with and rates, the learning progression should integrate strategies to enhance both conceptual and procedural knowledge. The learning progression to **use** requires students recall the definition of ratio and proportion and how to use proportions (equivalent ratios) to solve simple problems involving unit rates. Students should be given a variety of situations that involve rates and be able to generalize connections among real-world situations (6-1.7). Then students use correct and clearly written or spoken words (6-1.6) to explain their reasoning.
5.7	Use a scale to determine distance.	(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write, organize, generalize, prepare, apply, calculate, compile, complete, demonstrate, illustrate, operate, solve, dramatize, classify, categorize	1. Applying previously learned knowledge, construct…. 2. Using your knowledge of …. Formulate 6 questions… 3. Write a letter to the editor pointing out… 4. Classify the following … into their correct…. 5. Write a news report… 6. Construct a flow chart for…	The objective of this indicator is use, which is in the "apply procedural" cell of the Revised Bloom's Taxonomy. Procedural knowledge is knowledge of specific steps or strategies that can be used to solve a problem or problem situation. Although the focus is to gain computational fluency with problems involving the use of proportions to solve problems with and rates, the learning progression should integrate strategies to enhance both conceptual and procedural knowledge. The learning progression to **use** requires students recall the definition of ratio and proportion and how to use proportions (equivalent ratios) to solve simple problems involving unit rates. Students should be given a variety of situations that involve scale factors and rates and be able to generalize connections among real-world situations (6-1.7). Then students should use correct and clearly written or spoken words (6-1.6) to explain their reasoning.
6.1	Predict the characteristics of one population based on the	(B2)	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate,	8. Explain how … has impacted… 9. Describe in clear logical steps…. 10. Paraphrase in your	The objective of this indicator is to predict, which is in the "understand conceptual" knowledge cell of the Revised Taxonomy. To predict means to draw logical conclusion from presented information. The learning progression to **predict** requires students analyze a set of data and generate conjectures about the population. They understand that it is sometimes difficult to do so from just

	analysis of sample data.		paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	own words…. 11. Give reasons for… 12. Using words, pictures and icons, restate what you know about…. 13. Use the metaphor of … to help you understand…. 14. State three things you know about…	analyzing the numbers. They translate their data to another form (graph or picture). They understand that each is a distinct symbolic form that represent the same relationship (6-1.4) and generalize connections (6-1.7) among these representational forms. They make observations about the shapes and proximity of the data in order to make reasonable predictions based on those observations. They use inductive and deductive reasoning (6-1.3). Students explore a variety of real world situations (6-1.7) and summarize their predictions using correct and clearly written or spoken words to communicate their understanding (6-1.6).
6.2	Organize data in frequency tables, histograms, or stem-and-leaf plots as appropriate.	(B4)	Appraise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test, categorize, critique, debate, discuss, identify	1. From at least 4 peoples' viewpoint, analyze… 2. Discuss the similarities and differences of… 3. Compare and contrast… 4. Investigate all the factors that could influence… 5. Summarize the reasons for…. 6. Deduce how the parts interact in… 7. List the pros and cons of…	The objective of this indicator is to organize which is in the "analyze conceptual" knowledge cell of the Revised Bloom's Taxonomy. Conceptual knowledge is knowledge of interrelationships among basic elements (frequency tables, histograms and stem-and-leaf plots) within a larger structure (data analysis) that enable them to function together. The learning progression to **organize** requires students to understand the structure and purpose for each type of graph. Students compare each type of graph and discuss the data based on the advantages and disadvantages of each. To deepen conceptual understanding, students maygenerate questions that could be answered by the data display in each type of graph. They explain and justify their answers using correct and clearly written or spoken words (6-1.6)
6.3	Analyze which measure of central tendency (mean, median, or mode) is the most appropriate for a given purpose.	(B4)	Appraise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test, categorize, critique, debate, discuss, identify	1. From at least 4 peoples' viewpoint, analyze… 2. Discuss the similarities and differences of… 3. Compare and contrast… 4. Investigate all the factors that could influence… 5. Summarize the reasons for…. 6. Deduce how the parts interact in… 7. List the pros and cons of…	The objective of this indicator is to *analyze*, which is in the "analyze procedural" knowledge cell of the Revised Taxonomy. Analyze requires student to break material into its constituent parts and to determine how the parts relate to one another and to an overall structure or purpose. Procedural knowledge is tied to knowledge of criteria for determining when to use appropriate procedures or steps. The learning progression to **analyze** requires students to understand the differences between the mean, median and mode and how they compare to each other. Students should differentiate between varying situations where mean, median, or mode is the preferred measure of central tendency to use when describing data. Students determine which measure best represents the data with respect to the context in which it is presented. Although, student work with central tendency will be limited to relationships within one population or sample, they are exposed to problem situations with deconstructing (determining point of view) where bias or values influences the choice of central tendency in a sample or population. Students apply reasoning skills to evaluate their conjectures and pose questions to prove or disprove their conjectures (6 – 1.2) using correct and clearly written or spoken words (6–1.6) Students also use deductive reasoning to

					reach a conclusion from known facts (6-1.5).
6.4	Use theoretical probability to determine the sample space and probability for one- and two-stage events such as tree diagrams, models, lists, charts, and pictures.	(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write, organize, generalize, prepare, apply, calculate, compile, complete, demonstrate, illustrate, operate, solve, dramatize, classify, categorize	1. Applying previously learned knowledge, construct…. 2. Using your knowledge of …. Formulate 6 questions… 3. Write a letter to the editor pointing out… 4. Classify the following … into their correct…. 5. Write a news report… 6. Construct a flow chart for…	The objective of this indicator is to use which is in the "apply procedural" knowledge cell of the Revised Taxonomy. Although the focus of the indicator is to use, the learning progression should integrate experience that build the student's conceptual understanding of theoretical probability as well computational fluency with constructing representation of sample space. The learning progression to **use** requires students to understand the meaning of sample space and an event. Given an event, students make and justify a prediction of the probability of the event. Students evaluate their conjectures (6-1.2) by creating the sample space (the set of all possible outcomes) for one-and two- stage events and making decisions about what form of representation is best for the situation. Students develop probability based thinking by performing actual experiments, recording and discussing the results and using the results as evidence for drawing conclusions. They use correct and clearly written or spoken words to communicate their understanding (6-1.6).
6.5	Apply procedures to calculate the probability of complementary events.	(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write, organize, generalize, prepare, apply, calculate, compile, complete, demonstrate, illustrate, operate, solve, dramatize, classify, categorize	1. Applying previously learned knowledge, construct…. 2. Using your knowledge of …. Formulate 6 questions… 3. Write a letter to the editor pointing out… 4. Classify the following … into their correct…. 5. Write a news report… 6. Construct a flow chart for…	The objective of this indicator is to apply which is in the "apply procedural" knowledge cell of the Revised Taxonomy. To apply is means to carry out a procedure on a familiar task or use a procedural with an unfamiliar task; therefore, student's experiences should extend beyond familiar tasks such as cards, dice and coins. The learning progression to **apply** requires students to understand the meaning of complementary events and sample space. Students generate examples of complementary events to demonstrate understanding of the concept. They use their understanding of the relationship between complementary events to find the probability of one of the simple events. They explain and justify their answers using correct and clearly spoken words and notation (6-1.6).

(A1)	Define, duplicate, list, memorize, recall, repeat, reproduce, state, describe, identify, label, find, match, quote	10. Describe what happened at… 11. List all the… 12. Name all the… 13. What is (fact /definition, etc) 14. List the attributes of.. 15. Write 10 facts about… 16. Make an A-Z list of… 17. Recall… 18. In what way are you like…
(B2)	Classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase, match, restate, give-example, illustrate, summarize, extend, outline	15. Explain how … has impacted… 16. Describe in clear logical steps…. 17. Paraphrase in your own words…. 18. Give reasons for… 19. Using words, pictures and icons, restate what you know about…. 20. Use the metaphor of … to help you understand…. 21. State three things you know about…
(C3)	Choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write, organize, generalize, prepare, apply, calculate, compile, complete, demonstrate, illustrate, operate, solve, dramatize, classify, categorize	7. Applying previously learned knowledge, construct…. 8. Using your knowledge of …. Formulate 6 questions… 9. Write a letter to the editor pointing out… 10. Classify the following … into their correct…. 11. Write a news report… 12. Construct a flow chart for…
(B4)	Appraise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test, categorize, critique, debate, discuss, identify	8. From at least 4 peoples' viewpoint, analyze… 9. Discuss the similarities and differences of… 10. Compare and contrast… 11. Investigate all the factors that could influence… 12. Summarize the reasons for…. 13. Deduce how the parts interact in… 14. List the pros and cons of…
(B5)	Argue (for/against), assess, critique, decide, judge, justify, prioritize, recommend, appraise, defend, select, support, value, evaluate, relate, weigh,	Which of the two….would be better for… Choose and justify a theme song for… Justify the decision of… Determine which is the more effective… Evaluate the effectiveness of…. Select which is the best option…or.. Rank the following from…to most.. Debate the issue… Defend the decision to…. How would you prove/disprove? What would you cite to defend the actions? How could you determine?

		How would you prioritize?
(B6)	Assemble, construct, create, design, develop, formulate, write, compose, originate, produce, invent, improve	10. Design and improved… for… 11. Formulate a set of criteria to judge… 12. Compose a song, jingle or rap to illustrate… 13. Modify … in order to create a more fair….. 14. Develop and argument to persuade people to…. 15. Generate key questions for… 16. Create an experiment to… 17. Adapt a project studied so that.. 18. Design a personal action plan 19. What changes would you make to solve? 20. What would happen if…. 21. What would you propose as an alternative method? 22. How could you change or modify the plan? 23. What could be done to simplify/minimize/maximize…? 24. Can you predict the outcome if……