هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Learning Outcomes for National Assessment in the Learning Areas of:

Reading - Mathematics – Science

2023

بِسْمِ اللَّـهِ الرَّحْمَـٰنِ الرَّحِيمِ

Contents list

Introduction

The Specialized learning outcomes document is a practical application of the reference framework for national assessment, which the Education and Training Evaluation Commission developed in coordination with the Ministry of Education. Its second issuance was approved by the Commission's Board of Directors in its fourth meeting on 10/11/2020, based on the Council of Ministers Resolution No. (108), 14/2/1440 AH, which includes paragraphs (2 and 6) of Article 4. " Evaluating the performance of schools, higher education institutions and training institutions, and periodically accrediting them according to the standards approved by the Council, also building and implementing Educational measures and standardized tests, such as university admission assessments, national assessment in general education stages related to the evaluation of general education, training, professional, linguistic, and cognitive assessments etc.

This document provides guidance for the preparation of large-scale assessments, measures, and tools, along with their application guides. It also covers the production of reports and studies at each stage of the assessment process. The purpose is to evaluate school performance and provide reliable cumulative data for decision-makers. The data relates to the level of learners and schools achieving the targeted learning outcomes in the national evaluation of specialized learning outcomes. It provides comparable performance indicators at the national level and monitors progress over successive periods for learning outcomes in the targeted areas for 2023 in reading, mathematics, and natural sciences, in addition to comparing their results with relevant international studies, which is a vital source to support the development of teaching and learning practices in schools and improve learners' learning.

This document was prepared by utilizing the results of the national tests, measures, and accompanying tools that the Commission implemented for the fourth and eighth grades in 2018 and analyzing international practices that focused on the quality of education outputs and learning outcomes to prepare the learners for life and future jobs. This was based on national evaluation results according to scientific methodologies that determine by learners' knowledge and skills, as well as their ability to do them in targeted areas (reading, mathematics, natural sciences), and to employ them to address the problems and face challenges in a rapidly changing era shifting towards a knowledge economy and competing in it.

Target group:

National assessments are applied to a representative grade sample in the targeted schools, representing the end of each academic stage expressed by learning levels, in line with their distinctive characteristics, learners' needs and abilities. Moreover, it covers all public, private, and international schools in Saudi Arabia as follows:

01

All third-grade learners' sample in the targeted schools: The national assessments covers the measurement of knowledge and cognitive skills learning outcomes that learners have learned in reading and mathematics areas for grades (1-3).

02

All sixth-grade learners' in the targeted schools: The national assessments covers the measurement of knowledge and cognitive skills learning outcomes that learners have learned in the reading, mathematics, and science areas for grades (4-6).

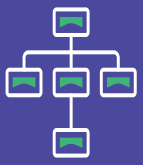
03

All ninth-grade learners in the targeted schools: The national assessments covers the measurement of knowledge and cognitive skills learning outcomes that learners have learned in the reading, mathematics, and science areas for grades (7-9).

Goals

This document was prepared for national assessment purposes in the areas of reading, mathematics, and natural sciences, to achieve the following objectives:

Periodic monitoring of progress levels of the learners and school's performance for the areas of reading, mathematics, and natural sciences at all stages of education in Saudi Arabia.



Monitor the level of progress in the performance of learners and schools in the reading, mathematics, and science areas at different stages of education in the Kingdom of Saudi Arabia periodically.

Expose learners' achievement of basic learning outcomes in the reading, mathematics, and natural sciences areas in line with the national standards, to support the learning for all principle according to a scientific methodology.

Employ the national assessment results in the areas of reading, mathematics, and natural sciences in evaluating general education schools., as a standardized indicator for evaluating the schools' performance.

Scope:

This document covers the learning outcomes in the reading, mathematics, and natural sciences areas. It is used to guide the measurement processes of achievement levels of the outcomes among learners in the target grades. It applies large-scale assessment, accompanying measures, and assessment tools, then analyzes their results and subsequent studies. It primarily focuses on designing large-scale national assessments for measuring learning outcomes that represent a description of what the learner should know, understand, and be able to do at the end of each class of the target learning levels.

Targeted Levels in the Reading Domain

Table (1): Third Grade Reading Learning Outcomes and Indicators

Reading Domain (2) – Grade Three (3)	
Learning Outcomes	**Indicators**
1. Reading	
1.1 Vocabulary Acquisition and Use of Verbal Semantics	
By the end of third grade (3), the student will demonstrate proficiency in:	
3.2.1.1.1 Identifying vocabulary meanings in the text, their synonyms, and antonyms, classifying them according to meanings and types in terms of number and type, and using them in meaningful sentences and new contexts.	1. Identifying the synonyms and antonyms of vocabulary mentioned in the text and clarifying their meanings.
	2. Classifying vocabulary according to meanings, type (masculine-feminine), (noun-verb-letter), and number (singular-two-plural).
	3. Using vocabulary in meaningful sentences and new linguistic contexts.
2. Reading	
2.1 Reading Comprehension	
3.2.1.1.2 Identifying explicit ideas in the text, determining facts, interpreting and analyzing them, and determining text type.	1. Determining the goal of the text and identifying the main idea in a paragraph.
	2. Answering detail and explanatory questions about direct information in the text and determining its type.
	3. Identifying the components and elements of the text, and arranging events, ideas, or information according to their occurrence.
	4. Determining causes, results, and relationships, and describing motives and actions of the characters in a text.
	5. Inferring similarities and differences in the text and linking causes to results.
3.2.1.1.3 Distinguishing between multiple expressions, expressing opinion about points of view, and proposing alternatives.	1. Distinguishing between given phrases in the read text, identifying phrases and aesthetic expressions and expressing his/her opinion about them.
	2. Expressing his/her opinion and points of view on the subject of the read text with appropriate justifications.
	3. Identifying a given opinion about the completeness or clarity of the information contained in the text and justifying his/her opinion.
	4. Evaluating the fact possibility of occurrence for the events described by the writer and the potential of their occurrence.
	5. Suggesting a title, an ending different from the end of the read text, and solutions to problems or ideas appeared within.

Table (2): Learning Outcomes Targeted by the end of Grade (6) and its detailed indicators and classification in the Reading Domain (2)

Reading Domain (2) – Grade Six (6)	
Learning Outcome	**Indicators**
1. Reading	
1.1 Vocabulary Acquisition and Use of Verbal Semantics	
By the end of third grade (6), the student will demonstrate proficiency in:	
6.2.1.1.1 Inferring synonyms and meanings of vocabulary mentioned in the read text, distinguishing vocabulary that is similar in meaning, giving examples, and using vocabulary, synonyms and antonyms in meaningful sentences.	1. Inferring synonyms of vocabulary mentioned in the text and explaining the meanings of vocabulary whose connotations have changed with context.
	2. Distinguishing vocabulary similar in meaning and giving examples in meaningful sentences and different reading contexts.
	3. Classifying synonyms and antonyms that are similar in meaning according to their purpose in the text.
	4. Using vocabulary, their synonyms and antonyms in meaningful sentences and different reading contexts.
2. Reading	
2.1 Reading Comprehension	
6.2.1.1.2 Distinguishing the main and sub-ideas of the read text, inferring its facts, interpreting, and analyzing it, and determining its type, purpose, and function.	1. Answering questions about direct information and facts within a text and distinguishing the text type (poetry/prose- nonfiction/fiction), its purpose, topic, and function.
	2. Identifying information in the text (read and observed), comparing two or more concepts in the text, and deriving similarities and differences between them.
	3. Distinguishing the main, sub and implicit ideas, comparing their relationships and links, and deriving similarities and differences.
	4. Describing characters and events in the text, distinguishing relationships between characters, and arranging and rearranging events.
	5. Deducing phenomena and events from text and linking them to reality based on the text.

Reading Domain (2) – Grade Six (6)	
Learning Outcome	**Indicators**
6.2.1.1.3 Distinguishing between phrases, sentences, and ideas of the read text and evaluating and criticizing it. expressing an opinion about the author's point of view, values and attitudes, proposing alternatives and solutions, and using means of persuasion and reasoning.	1. Distinguishing between phrases, sentences and ideas of the read text, and defining the phrases and aesthetic expressions, and expressing his/her opinion about them.
	2. Expressing his/ her opinion about the values and attitudes mentioned in the text and giving justification.
	3. Proposing a different title, beginning, or conclusion, rephrasing a text or a paragraph in his/her language and style, and organizing the information of the text in graphic organizers.
	4. Using persuasion and reasoning to support an idea or opinion from options.
	5. Employing the gist and ideas of the text in proposing solutions to school, life, or societal problems.

Table (3): Learning Outcomes Targeted by the end of Grade (9) and its detailed indicators and classification in the Reading Domain (2)

Reading Domain (2) – Grade Nine (9)	
Learning Outcomes	**Indicators**
1. Reading	
1.1 Vocabulary Acquisition and Use of Verbal Semantics	
By the end of third grade (9), the student will demonstrate proficiency in:	
9.2.1.1.1 Inferring and classifying the semantics of vocabulary, through synonymy, antonymy, context, interpretation, definition, classification, representation, and using them in new contexts.	1. Inferring the meanings of vocabulary through employing his/her previous experiences (synonymy, antonymy, context, interpretation, definition, classification, and representation).
	2. Classifying vocabulary and the relationship between them according to their semantics.
	3.Using vocabulary in new contexts.

Reading Domain (2) – Grade Nine (9)	
Learning Outcomes	**Indicators**
2. Reading	
2.1 Reading Comprehension	
9.2.1.1.2 Eliciting the main and sub-ideas of a long and complex text, deducing implicit ideas, distinguishing, interpreting, and analyzing them.	1. Answering questions about the text's indirect information, defining its topic, and asking questions (explanatory, deductive, analytical, or critical).
	2. Eliciting the main and sub ideas from the text or one of its paragraphs, deducing the main intent that leads to a series of argumentative sentences, and identifying the prominent elements in the text, such as: time, place, characters and events.
	3. Implicating ideas and points of similarity and difference in a text, or between more than one text, in terms of: (type of examples, strength of evidence, language and style) and explaining them based on the text some phenomena or events, comparing, and linking them to life situations.
	4. Explaining the relationships and links between parts of one text or more than one text, and comparing information contained in more than one text, or between two texts having the same idea, or two contradictory ideas.
	5. Analyzing the texts in terms of (chronological and spatial order, importance, comparison, contrast, general issue and supporting evidence).
	6. Distinguishing between facts and opinions in given texts, and between direct and indirect expressions contained in a single text or in more than one given text.

Reading Domain (2) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9.2.1.1.3 Distinguishing between the phrases, sentences, ideas and paragraphs of the read text, evaluate, and criticizing it, expressing an opinion on the writer's point of view, values and attitudes, proposing alternatives, using means of persuasion and reasoning, applying data of the text in different life situations, and summarizing it.	1. Distinguishing between phrases, sentences, ideas and paragraphs of the read text, and identifying the use of specific structure for certain expressions and enriching the text with expressions of his/her own creation.
	2. Showing his/her point of view on the events, information or ideas contained in the text, and judging the credibility of the information contained in the texts from his/ her experiences.
	3. Expressing his/her opinion on the values and attitudes mentioned in the read text, explaining their impact on individual and society, linking them to his/ her reality, and proposing alternatives and solutions.
	4. Drawing arguments and proofs from the text and supporting them with his/her information for persuasion and justification, and evaluating the opinions and viewpoints contained in the text.
	5. Giving examples of a problem in the narration from his/her reality, and applying the data of the read text to solve individual, family, or social problems via scientific or creative methods.
	6. Summarizing and rephrasing the text and organizing its information and ideas in his/her own style using different graphic organizers.

Learning outcomes for the target levels in the field of mathematics

Table (4): Third Grade Mathematics Learning Outcomes and Indicators

Mathematics (4) - grade (3)	
Learning Outcomes	**Indicators**
By the end of third grade (3), the student will demonstrate proficiency in:	
1- Numbers and operations	
1-1 Numbers and sets	
3-4-1-1-1 Identifying, representing, reading and writing numbers up to four digits, performing comparison, ordering and rounding operations.	1- Understanding place value and representing numbers using models, graphs, and number lines, rounding to the nearest ten, hundred, or thousand.
	2- Reading and writing numbers up to four digits in standard, verbal and expanded forms.
	3- Counting number in ascending, descending, and jumping of (two, five, ten, hundred, and thousands), and determining even and odd numbers.
	4- Comparing and ordering numbers up to four digits using symbols (>, <, =) in ascending and descending order.
3-4-1-1-2 Identifying unit fractions, recognizing their multiples, representing, reading, writing, comparing, and ordering unit fractions.	1. Defining unit fractions as parts of a whole or group, identifying multiples with a denominator or numerator not exceeding 12, and representing them using models and drawings.
	2. Reading and writing unit fractions and their multiples, and representing them on a number line.
	3. Comparing and ordering fractions with equal denominators or numerators using forms, graphs, number lines, and symbols (>, <, =) in ascending and descending order.

Mathematics (4) - grade (3)	
Learning Outcomes	**Indicators**
1-2 Number sense and operations	
3-4-1-2-1 Performing addition and subtraction of whole numbers up to three digits, and applying these operations to solve mathematical problems.	1. Adding numbers up to three digits using place value strategies with and without regrouping
	2. Subtracting numbers up to three digits using place value strategies, with and without regrouping.
	3. Solving real-world mathematical problems with one or two steps using addition and subtraction of numbers up to three digits, and explaining the solution process
3-4-1-2-2 Describing the operations of multiplication and division, representing them using models, forming fact family, finding their results, and using them to solve mathematical problems.	1. Understanding the concept of multiplication, representing it, and forming multiplication facts up to (10x10).
	2. Describing the concept of division, representing it, and forming division facts related to the multiplication facts up to (10x10).
	3. Multiplying two numbers within multiplication tables up to (10x10) and finding the result of the associated division products.
	4. Solving real-world mathematical problems with one or two steps using the four operations and explaining the solution process.
3-4-1-2-3 Estimating the results of addition, subtraction and multiplication whole numbers up to 3-digit and using mental calculation strategies.	1.Estimating the results of addition and subtraction up to three-digit by rounding or using compatible numbers.
	2. Applying the associate property to perform mental multiplication of three-digit numbers.
	3. verifying the reasonable of the operations results using approximation and mental calculation strategies

Mathematics (4) - grade (3)	
Learning Outcomes	**Indicators**
2- Algebra and analysis	
2-1 Patterns, Relationships and Functions	
3-4-2-1-1 Describing and expanding numerical, non-numerical and geometric patterns.	1. Identifying and describing simple repeating patterns in sequences of numbers or objects based on a given rule.
	2. Describing non-numerical patterns by using up to three properties (color, size, shape, and direction), expanding the patterns, and completing missing elements.
	3. Describing growing number patterns whose base involves a single arithmetic operation (addition, subtraction, or multiplication), expanding the patterns, and completing missing elements.
	4. Describing growing geometric patterns (increasing or decreasing by a fixed amount), expanding the patterns, and completing missing elements.

Mathematics (4) - grade (3)	
Learning Outcomes	**Indicators**
2-2 Algebraic structures and mathematical expressions	
3-4-2-2-1 Distinguishing the characteristics of four operations, and using them.	1. Distinguishing properties of addition and subtraction with zero, multiplication and division with one, and multiplication with zero, and applying them in arithmetic operations.
	2. Recognizing the commutative property of addition and multiplication and using it to find results, and writing addition and multiplication facts.
	3. Recognizing the associative property of addition and multiplication and using it to find the result of adding three numbers within 2-digit, and the result of multiplying several numbers of 1-digit.
	4. Applying the distributive property of multiplication by addition to find the product of multiplying two numbers of 1-digit.
3-4-2-2-2 Distinguishing the relations between the four operations, and using them.	1. Recognizing and utilizing the relation between addition and subtraction to find results within three places, verifying their results, and writing subtraction facts that related to addition facts.
	2. Understanding the relation between multiplication and addition to find results of multiplication and verifying them.
	3. Understanding the relation between division and subtraction operations to find division results and verifying them.
	4. Understanding the relation between multiplication and division to find multiplication products up to 10 x 10, verifying the products, and finding division facts that related to multiplication facts.
	5. Formulating and solving numerical sentences using the four operations.

Mathematics (4) - grade (3)	
Learning Outcomes	**Indicators**
3- Geometry and measurement	
3-1 Geometric shapes	
3-4-3-1-1 Describing the properties and characteristics of two-dimensional and three-dimensional shapes, classifying, comparing them and creating shapes by combining and transforming basic shapes.	1. Identifying and classifying two-dimensional geometric shapes (triangles, squares, rectangles, circles, parallelograms, trapezoids, pentagons, hexagons), and comparing them based on their properties, such as number of sides, vertices, and congruence of sides.
	2. Describing symmetry of shapes, identifying and drawing line of symmetry on shapes, drawings and images.
	3. Recognizing and classifying three-dimensional geometric shapes (cubes, spheres, cones, cylinders, pyramids, cuboids) and comparing them based on their properties, such as number of faces, shapes, vertices, and edges.
	4. Creating new geometric shapes (two-dimensional or three-dimensional) by combining or separating existing shapes into simpler forms.
3-2 Measurement and its units	
3-4-3-2-1 Describing the perimeter and area, measuring and estimating them.	1. Describing and measuring perimeter of a polygon using grid squares and appropriate metric units of length.
	2. Finding or estimating the area of a plane by using models and grids.
	3. Determining the area of a square or rectangle by grid squares.

Mathematics (4) - grade (3)	
Learning Outcomes	**Indicators**
3-4-4-2-2 Describing and estimating length, estimating and measuring masses and capacities, comparing and arranging them.	1. Describing lengths, estimating, comparing and arranging them, and choosing appropriate metric units (millimeter, centimeter, meter, and kilometer) to measure lengths.
	2. Estimating, comparing and arranging masses, and choosing appropriate units of measurement (grams, kilograms) to measure masses.
	3. Estimating, comparing and arranging capacities, and choosing appropriate units of measurement (milliliter, liter) to measure capacities.
3-4-3-2-3 Distinguishing, using, representing, and comparing different categories of money to count and solve mathematical problems.	1. Distinguishing the types of coins and banknotes and using them to count amounts within 9999 riyals.
	2. Representing amounts up to 9999 riyals using money categories in a variety of ways, and comparing them.
	3. Solving mathematical problems that include financial applications on money within 9999 riyals, and explaining their solution.
3-4-3-2-4 Choosing appropriate time units, reading and writing time, estimating the lengths of time periods, and calculating them.	1. Selecting the suitable units of time (seconds, minutes, hours) to estimate the duration of an event.
	2. Reading and writing the time accurately (full hours, half an hour, quarter of an hour, to the nearest five minutes, or to the nearest minute) by using both clockwise and a digital clock, and specifying if it's in the morning or evening.
	3. Determining the estimated length of time between two events and calculating it in hours and minutes.

Mathematics (4) - grade (3)	
Learning Outcomes	**Indicators**
4- Statistics and probabilities	
4-1 Statistics and graphic representations	
3-4-4-1-1 Collecting and interpreting data from the environment by organizing it and representing it using bar graphs, symbols, and points.	1. Collecting data from the environment and organizing it into multiple categories using frequency tables.
	2. Representing data with vertical and horizontal bar graphs, symbols, and points.
	3. Reading and interpreting data represented by bar graphs, symbols, and points.

Table (5): Sixth Grade Mathematics Learning Outcomes and Indicators

Mathematics (4) - sixth grade (6)	
Learning Outcomes	**Iindicators**
By the end of third grade (6), the student will demonstrate proficiency in:	
1- Numbers and operations	
1-1 Numbers and sets	
6-4-1-1-1 Understanding and representing numbers up to 12 digits, including reading, writing, comparing, arranging, and rounding them.	1. Understanding place value in 12-digit numbers, representing numbers through graphs and a number line, and rounding to specified places.
	2. Reading and writing numbers within 12 digits in standard, verbal, and analytical forms.
	3. Comparing and arranging numbers within 12 digits using symbols (>, <, =) in ascending and descending order.

Mathematics (4) - sixth grade (6)	
Learning Outcomes	**lindicators**
6-4-1-1-2 Understanding the concepts of ordinary fractions, mixed numbers, and improper fractions, representing them through mathematical notation, accurately reading and writing them, comparing and ordering them, and applying rounding to estimate values.	1. Identifying fractions, representing them using various models, diagrams, and number lines, and reading and writing them.
	2. Finding equivalent fractions and converting them to their simplest form, rounding them to the nearest whole, half, or one.
	3. Distinguishing mixed numbers, representing them by using models, diagrams, and number lines, reading and writing them.
	4. Converting improper fractions to mixed numbers and vice versa.
	5. Comparing and ordering fractions and mixed numbers in ascending and descending order.
6-4-1-1-3 Identifying and representing decimals, recognizing the place value of a digit in a decimal, reading, writing ,comparing and arranging them, and rounding decimals to a specified place. Converting between decimals, fractions, and mixed numbers.	1. Identifying decimal fractions, representing them through forms, graphs, and a number line, determining place value of a decimal fraction, and rounding it to the nearest whole number or specified place value.
	2. Reading and writing decimal numbers in standard, verbal, and analytical forms.
	3. Comparing and arranging decimal numbers in ascending or descending order.
	4. Converting between decimal fractions, standard fractions, and mixed numbers.

Mathematics (4) - sixth grade (6)	
Learning Outcomes	**lindicators**
1-2 Number sense and operations	
6-4-1-2-1 Adding and subtracting numbers within seven digits, multiplying numbers up to three digits, dividing numbers within four digits to number of two digits at most, and using it to solve mathematical problems.	1. Performing addition and subtraction on numbers up to seven digits, using regrouping when necessary.
	2. Using place value strategies to multiply three-digit numbers by two-digit numbers, including regrouping.
	3. Employing place value strategies to divide four-digit numbers by two-digit numbers, with or without remainders.
	4. Solving mathematical problems up to three steps, including real-world applications on all four operations, and explaining their solutions.
6-4-1-2-2 Identifying factors and multiples of a number, representing them using models and sets, determining them using division, and utilizing them to solve mathematical problems.	1. Identifying and representing factors of a number using models and diagrams.
	2. Identifying and representing multiples of a number using models and diagrams
	3. Describing prime numbers, identifying and representing them by using forms and diagrams, recognizing them from non-prime numbers, and finding the prime factorization of a number.
	4. Determining the greatest common factor and least common multiple of two or more numbers through factorization.
	5. Solving mathematical problems that utilize the concepts of greatest common factor and least common multiple in real-world applications and explaining the solutions.
6-4-1-2-3 Describing and representing powers of whole numbers, finding their values and using them to solve mathematical problems.	1. Describing and finding powers of a whole number with a whole number exponent.
	2. Evaluating numerical expressions with powers by using order of operations.
	3. Applying power concepts to real-world problems and explaining their solutions.

Mathematics (4) - sixth grade (6)	
Learning Outcomes	**lindicators**
6-4-1-2-4 Describing ratio, rate, percentage, and proportion, representing, expressing and recognizing them, and finding them, and using it to solve mathematical problems.	1. Understanding ratio, rate and distinguishing between them, representing them through models and diagrams, finding them, converting them to fractional form and comparing quantities.
	2. Recognizing percentage, representing it through models and diagrams, finding and expressing it as a decimal or fraction.
	3. Describing proportions, representing it through models and diagrams, determining proportional quantities, and solving proportions.
	4. Solving real-life mathematical problems that involve ratio, rate, percentage, and proportion and explaining their solutions.
6-4-1-2-5 Performing the four operations on fractions and mixed numbers and using them to solve mathematical problems.	1. Implementing addition and subtraction of like and unlike fractions.
	2. Adding mixed numbers and subtracting them by converting them to improper fractions.
	3. Multiplying and dividing fractions.
	4. Multiplying mixed numbers and dividing them into improper fractions.
	5. Solving mathematical problems up to three steps that include real life applications on the four operations on fractions and mixed numbers and explaining their solutions.
6-4-1-2-6 Adding, subtracting, multiplying, and dividing decimals, and using them to solve mathematical problems.	1. Adding and subtracting decimals up to thousandths place.
	2. Multiplying and dividing decimals up to hundredths place.
	3. Solving mathematical problems up to three steps that involve real-life applications on the four operations on decimals and explaining their solutions.

Mathematics (4) - sixth grade (6)	
Learning Outcomes	**lindicators**
6-4-1-2-7 Estimating outcomes of applying the four operations on whole numbers, fractions, and using mental calculation.	1.Estimating the results of adding, subtracting, multiplying and dividing on whole numbers, fractions, mixed numbers and decimals by using rounding or compatible numbers.
	2. Using mental calculation to find the product of a two-digit number with a one-digit number and dividing it by multiples of (10, 100, 1000).
	3. Appling the distributive property in mental multiplication of a two-digit number by a one-digit number.
	4. Using mental calculation to perform multiplication of decimals up to thousandths and dividing it by (10, 100, 1000).
	5. Verifying the results of applying the four operations on whole numbers, fractions, mixed numbers, and decimals by using approximation or mental calculation.

Mathematics (4) - sixth grade (6)	
Learning Outcomes	**lindicators**
2- Algebra and analysis	
2-1 Patterns, Relationships and Functions	
6-4-2-1-1 Identifying numerical patterns, geometric growths, and relationships in tables, describing, expanding and forming them, and utilizing them in solving mathematical problems.	1. Recognizing growing numerical patterns, describing, expanding them, completing missing elements, forming, and generalizing them.
	2. Identifying growing geometric patterns (increase or decrease by a fixed amount), describing them, expanding them, completing missing elements, forming them, and generalizing them.
	3. Describing the relationship between two sets of data in an input-output table, expressing it in words, symbols, and ordered pairs, and representing it on the coordinate plane.
	4. Completing an input-output table according to a given rule that includes at most two operations.
	5. Solving mathematical problems with real-world applications of growing numerical and geometric patterns and their relationships and explaining their solutions.

Mathematics (4) - sixth grade (6)	
Learning Outcomes	**lindicators**
2-2 Algebraic structures and mathematical expressions	
6-4-2-2-1 describing numerical and algebraic expressions, distinguishing simple linear equation, writing it, finding its values, and using it to solve mathematical problems	1. Describing and writing numerical expressions that include powers and parentheses and finding their values by using the order of operations.
	2. Describing and writing algebraic expressions with at most two operations and parentheses and finding their values by using order of operations.
	3. Describing and writing simple one-step linear equations.
	4. Solving simple linear equations mentally, in writing, and with models, and checking the solution for correctness.
	5. Solving mathematical problems that include real-life applications on numerical expressions, algebraic expressions, and simple linear equations, and explaining their solutions.
3- Geometry and measurement	
3-1 Geometric shapes	
6-4-3-1-1 Describing and distinguishing elementary geometry concepts, describing angles, and distinguishing relationships between straight lines and angles.	1. Describing, distinguishing, and identifying points, lines, semi-lines, and line segments on geometric figures.
	2. Describing angles (right, acute, obtuse, and straight), distinguishing, estimating, measuring, classifying, and drawing them.
	3. Distinguishing intersecting, parallel, and perpendicular lines and defining them on geometric shapes.
	4. Distinguishing vertically opposite, adjacent, complementary, and supplementary angles, identifying them on geometric shapes, and using them to find unknown measures.

Mathematics (4) - sixth grade (6)	
Learning Outcomes	**lindicators**
3-2 Identifying 2D and 3D geometric shapes, classifying them based on their element's properties, and creating accurate drawings of them.	
6-4-3-2-1 Distinguishing the characteristics of two-dimensional and three-dimensional geometric shapes, identifying their elements, and classifying them.	1. Identifying polygons and circles, classifying them by their elements.
	2. Distinguishing and classifying triangles based on the lengths of sides and measures of angles.
	3. Recognizing and classifying quadrilaterals (parallelograms, rectangles, rhombuses, squares, trapezoids) based on the properties of their sides and angles.
	4. Identifying vertices, edges, faces, and bases of triangular, quadrilateral, and cubic prisms.
	5. Finding the measures of unknown angles by using the sum of angles of triangles and quadrilaterals.
3-3 Coordinates and Geometric Transformations	
6-4-3-3-1 Using coordinates plane to designate locations and describing geometric transformations.	1. Designating points in the first quadrant of the coordinate plane using ordered pairs and mapping their locations.
	2. Drawing geometric shapes and polygons in the first quadrant of the coordinate plane based on the given coordinates of their vertices.
	3. Describing and performing translations to draw an image of a shape in the first quadrant of the coordinate plane.
	4. Describing and performing reflections over an axis to draw an image of a shape in the first quadrant of the coordinate plane.
	5. Describing and performing rotations about a point to graph a shape in the first quadrant of the coordinate plane.

Mathematics (4) - sixth grade (6)	
Learning Outcomes	**lindicators**
3-4 Measurement and its units	
6-4-3-4-1 Recognizing the relationships between units of length, mass, capacity, and time, and performing conversions between them.	1. Identifying the most appropriate unit of measure from the metric units of length, mass, and capacity.
	2. Recognizing the relationships between metric units of length (cm, mm), (m, cm), (km, m) and converting between them.
	3. Recognizing the relationships between metric mass units (gm, mg), (kg, g), (ton, kg) and converting between them.
	4. Recognizing the relationships between the metric units of capacity (liters, milliliters) and converting between them.
	5. Recognizing the relationships between units of time (minute, second), (hour, minute), (day, hour), (week, day), (month, day), (year, month) and converting between them.
6-4-3-4-2 Distinguishing the perimeter and area formulas for two-dimensional shapes, and using them to find the perimeter and area, and to solve mathematical problems.	1. Identifying the formulas for the perimeter of rectangles, squares, and circles, and using them to find their circumferences.
	2. Recognizing the formulas for the areas of rectangles, squares, parallelograms, triangles, and using them to calculate the areas of complex shapes.
	3. Solving real-world problems by calculating the perimeter and area of geometric shapes, and explaining the solutions.

Mathematics (4) - sixth grade (6)	
Learning Outcomes	**lindicators**
6-4-3-4-3 Describing volume and surface area, distinguishing their formulas and units, and using them in solving mathematical problems.	1. Describing volume, distinguishing the appropriate units and their relationships (cubic millimeter, cubic centimeter, cubic meter), and converting between them.
	2. Identifying the formula for the volume of a right prism, and using it to calculate its volume.
	3. Identifying the formula for the surface area of a right prism, and using it to estimate and calculate the surface area.
	4. Solving real-life mathematical problems by calculating the volume and surface area of a right prism and explaining the solution.
4- Statistics and probabilities	
4-1 Statistics and graphic representations	
6-4-4-1-1 Organizing and representing realistic quantitative and qualitative data through points, graphs, columns, and pie sectors, and interpreting the resulting representations	1. Gathering realistic quantitative and qualitative data, arranging it, and presenting it through scatter plots, bar charts, histograms, and pie charts.
	2. Interpreting and analyzing data depicted in scatter plots, bar charts, histograms, and pie charts.
	3 Evaluating and selecting the most fitting representation for the given data by comparing various data presentations.
4-2 Data analysis and interpretation	
6-4-4-2-1 Describing the measures of central tendency and range, finding them, interpreting them, and choosing the most appropriate measure from them.	1. Calculating the mean, median, mode, and range of individual values and interpreting them in context.
	2. Finding the mean, median, mode, and range for represented data by points and columns.
	3. Determining the most appropriate measure of central tendency or range to describe a set of data based on comparison.

Mathematics (4) - sixth grade (6)	
Learning Outcomes	**lindicators**
4-3 Calculate Probabilities	
6-4-4-3-1 Describing a random experiment, finding its possible outcomes, characterizing the event, and expressing the probabilities of its occurrence.	1. Identifying the possible outcomes of a random experiment and determining their number through the use of tables, organized lists, tree diagrams, and the counting principle.
	2. Expressing the probability of an event in words, fractions, decimals, and percentages.
	3. Applying the concepts of outcomes and probability in real-life applications to make predictions and solving problems, and explaining the solutions.

Table (6): Ninth Grade Mathematics Learning Outcomes and Indicators

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
By the end of third grade (9), the student will demonstrate proficiency in:	
1- Numbers and operations	
1-1 Numbers and groups of numbers	
9-4-1-1-1 Describing the whole and rational numbers, reading, writing, representing, comparing, and arranging them.	1. Describing integers, using them to express opposite situations, reading, writing, and representing them on a number line.
	2. Comparing and arranging integers in ascending and descending order.
	3. Describing, finding, and representing the absolute value of an integer on a number line.
	4. Distinguishing between different forms of rational numbers, reading, writing, and representing them on a number line.
	5. Comparing and arranging rational numbers in ascending and descending order.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
9-4-1-1-2 Describing real numbers, classifying, comparing, and arranging them.	1. Describing the square root of a number, finding and writing it in the simplest form.
	2. Arranging irrational numbers in ascending and descending order, rounding them to rational numbers, and representing them on a number line.
	3. Understanding Real Numbers, classifying real numbers into whole, integer, rational, and irrational numbers, and comparing them.
	4. Comparing and arranging integer, rational, and real numbers in ascending and descending order.
1-2 Number sense and operations	
9-4-1-2-1 Finding and simplifying powers of rational numbers using laws of exponents and writing in scientific notation.	1. Understanding the concept of powers of rational numbers and integer exponents.
	2. Applying laws of exponents to simplify numerical expressions.
	3. Writing and evaluating numerical expressions with rational numbers, including powers and parentheses.
	4. Utilizing scientific notation to represent very large or very small numbers and converting between them and the standard form.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
9-4-1-2-2 Performing the four operations on integers, rational numbers, and square roots, simplifying the numerical expressions that contained, and using them to solve mathematical problems.	1. Engaging in arithmetic operations of addition, subtraction, multiplication, and division on integer numbers.
	2. Engaging in arithmetic operations of addition, subtraction, multiplication, and division on rational numbers.
	3. Conducting addition, subtraction, multiplication, and division of square roots.
	4. Simplifying numerical expressions that include square roots through utilizing operations on square roots, conjugates, denominator ranges, simplifying expressions with rational exponents and parentheses by using laws of exponents and order of operations.
	5. Solving mathematical problems with real-life applications that require the four operations on integers and rational numbers, numerical expressions, and providing an explanation for their solutions.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
9-4-1-2-3 Finding the ratio, unit rate, percentage, distinguishing proportional relationships, solving proportions, and using them to solve mathematical problems.	1. Calculating the ratio, unit rate, and percentage of a number, including percentages greater than 100%, to facilitate comparisons of quantities that involve fractions.
	2. Identifying proportional and disproportionate relationships, formulating proportions, and finding solutions of proportion problems.
	3. Utilizing the concept of percentage to determine a missing value when given two of the following: percentage, whole, and part.
	4. Solving real-life mathematical problems related to ratio, rate, percentage, proportionality, and percentage proportion, such as zakat, discounts and increases, profit and loss, added value, and scale, and presenting clear explanations of their solutions.
9-4-1-2-4 Estimating percentages and square roots.	1. Estimating the percentage of a number by utilizing fractions, compatible numbers, and rounding techniques.
	2. Estimating square roots to a single decimal place through both manual and calculator-assisted methods.
	3. Determining the percentage of a number mentally by utilizing ordinary fractions and decimal fractions.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
2- Algebra and analysis	
2-1 Patterns, Relationships and Functions	
9-4-2-1-1 Describing the characteristics of an arithmetic sequence, its relationship, graphical representation, and using linear relationships to solve mathematical problem.	1. Describing the characteristics of an arithmetic sequence, distinguishing it from other sequences, determining the nth term, and calculating any specific term within the sequence.
	2. Expressing an arithmetic sequence through a linear function and presenting a graphical representation.
	3. Distinguishing the relationship between two variables, defining its domain and range, and representing it through various means such as tables, ordered pairs, scatter plots, graphs, and equations, as well as converting between these representations.
	4. Recognizing rates of change in linear relationships and utilizing constant change to define linear relationships.
	5. Solving mathematical problems that include life applications on arithmetic sequences, the relationship between two variables, and rates of change, and explaining their solution.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
9-4-2-1-2 Differentiating between linear and quadratic functions, defining their distinct properties, and presenting graphical representations to showcase their characteristics.	1. Defining a function, determining its domain and range, writing its base equation, and evaluating values at specified domain values.
	2. Identifying a linear function and representing it graphically.
	3. Distinguishing a quadratic function ((parabola), representing it graphically, and determining its properties from its graph or equation.
	4. Finding maximum and minimum values, domain and range of a quadratic function, and determining its zeros algebraically and graphically.
	5. Solving real-life problems involving linear and quadratic functions, and explaining the solution process.
2-2 Algebraic structures and mathematical expressions	
9-4-2-2-1 Writing algebraic expressions with rational coefficients, evaluating them, performing arithmetic operations, and applying basic algebraic identities.	1. Writing algebraic expressions with rational coefficients and evaluating expressions that contain absolute values, positive and negative powers.
	2. Adding, subtracting, multiplying, dividing and simplifying algebraic expressions.
	3. Using basic identities to find squares of sums and differences and products of sums and differences.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
9-4-2-2-2 Factoring algebraic term, algebraic expression, the quadratic algebraic expression.	1. Factorizing algebraic terms completely and finding the greatest common factor of algebraic expressions.
	2. Analyzing algebraic expressions by applying the distributive property, grouping terms, and expressing them in their simplest form.
	3. Factoring quadratic algebraic expressions into perfect squares of two factors, in the form of, (x^2+ bx + c, ax^2 + bx + c.)
9-4-2-2-3 Writing and solving linear and quadratic equations, both algebraically and graphically, and estimating solutions from graph representations.	1. Writing and solving multi-step linear equations with brackets or variables at both sides, both algebraically and graphically, and estimating solutions from graph representations, finding the x and y sections of an equation represented graphically.
	2. Solving equations with absolute values on one side and representing its solution graphically.
	3. Identifying linear equations in two variables, and finding ordered pairs by substitution method.
	4. Solving quadratic equations algebraically (by factoring, general law or completing the square), representing their solution graphically, estimating solutions from graph representations, and determining the number of roots using the discriminant.
	5. Solving equations that involved square roots, both algebraically and graphically.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
9-4-2-2-4 Writing a system of two linear equations with two variables, and solving them algebraically and graphically.	1. Writing and solving a system of two linear equations in two variables, both algebraically (by substitution or elimination) and graphically.
	2. Identifying consistent and inconsistent systems and dependent and independent systems from graph representations.
	3. Solving real-life problems that involved systems of two linear equations, and explaining the solutions.
9-4-2-2-5 Describing and solving inequalities, differentiating linear and non-linear inequalities, writing and representing solutions on the number line.	1. Describing, and solving linear inequalities in one or two steps (within integer numbers), and representing their solutions on a number line.
	2. Solving multi-step linear inequalities that involved brackets, and representing solutions on a number line.
	3. Describing, writing, solving compound inequalities and representing it graphically.
	4. Solving inequalities that involved absolute values.
	5. Solving real-life problems that involved linear inequalities and explaining the solutions.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
3- Geometry and measurement	
3-1 Geometric shapes	
9-4-3-1-1 Identifying interior and exterior angles, analyzing angle relationships, calculating the sum of angles, determining unknown angle measures, and recognizing polygon tailing.	1. Analyzing triangle angles, including the exterior angle and its relationship to interior angles, and using this information to find measures of unknown angles.
	2. Determining the sum of interior angles in polygons, using it to calculate angle measures, identifying polygons that form a tiling pattern, and finding unknown angles.
	3. Distinguishing exterior angles in polygons, calculating their sum, and using it to determine measures of unknown angles.
	4. Evaluating angle relationships in parallel lines, including alternate interior and exterior angles and corresponding angles, and using these relationships to find unknown angle measures.
9-4-3-1-2 Identifying, drawing, and using symmetrical shapes, quadrilaterals, and three-dimensional shapes to find unknown measurements.	1. Identifying shapes that are symmetrical about an axis, determining their axis of symmetry, and recognizing shapes with rotational symmetry around a point, calculating their angles of rotation.
	2. Classifying quadrilaterals based on their properties, and using these relationships to draw them and determine unknown measurements.
	3. Distinguishing between 3-dimensional shapes (such as triangular and quadrilateral prisms, triangular and quadrilateral pyramids, cylinders, and cones), and creating an accurate representation of a 3-dimensional shape given its upper, frontal, and lateral views.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
9-4-3-1-3 Distinguishing the properties of triangles, and the relationship between the sides of the right sides of them (Pythagorean theorem), and using them to find unknown measurements, and to solve mathematical problems.	1. Recognizing the common characteristics of all triangles, as well as specific properties of different types, and applying them in constructing triangles and determining unknown angle measures.
	2. Determining the relationship between sides in a right triangle by using the Pythagorean theorem and applying it to find unknown side lengths by knowing the lengths of the other two sides.
	3. Using the converse of the Pythagorean theorem to determine right-angled triangle.
	4. Solving real-world problems involving the Pythagorean theorem and its converse and explaining the solutions.
9-4-3-1-4 Describing the congruence and similarity of two polygons, and using it to find unknown measurements, and to solve mathematical problems.	1. Identifying congruence between two polygons, utilizing it to determine congruent polygons and calculating unknown measures.
	2. Examining cases of congruence between two triangles and utilizing them to prove their congruence.
	3. Describing the similarity between two polygons, applying it to determine similar polygons and calculate unknown measures.
	4. Examining cases of similarity between two triangles and utilizing them to prove their similarity.
	5. Solving real-world problems related to lengths or distances through the application of congruence and similarity of polygons, and explaining their solutions.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
9-4-3-1-5 Identifying and calculating the basic trigonometric ratios (sine, cosine, tangent) for an acute angle, as well as their inverses, and using them in solving right-angled triangles.	1. Identifying the basic trigonometric ratios (sine, cosine, tangent) of an acute angle in a right triangle, and determining their values through manual calculation and calculator and rounding to the nearest given place.
	2. Describing the inverse trigonometric ratios to determine the measure of an acute angle in a right triangle through calculator.
	3. Applying the basic trigonometric ratios to solve a right-angled triangle, finding its side lengths, and using inverse trigonometric ratios to find the measures of its angles.
3-2 Coordinates and Geometric Transformations	
9-4-3-2-1 Identifying points in the coordinate plane, assigning coordinates to each, and utilizing these values to determine the slope, expressing the equation, displaying graphically, calculating the distance between two points, and finding the midpoint's coordinates	1. Determining the locations of points in the coordinate plane by utilizing ordered pairs of rational numbers.
	2. Calculating the slope of a straight line through both graphical representation and utilizing the coordinates of two points on the line, and explaining solutions both algebraically and graphically.
	3. Expressing the equation of a straight-line by using slope-intercept form, point-slope form, and standard form.
	4. Analyzing the relationship between the slopes of two parallel or perpendicular lines, and utilizing it to derive the equation of a line that is either parallel or perpendicular to a given line.
	5. Computing the distance between two points in the coordinate plane, and finding the coordinates of the midpoint.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
9-4-3-2-2 Determining the type of geometric transformation, describing it, and drawing the picture resulting from these transformations in the coordinate plane.	1. Determining the type of transformation for a given figure, including reflection, translation, and rotation. Plotting the axis of reflection, specifying the amount and direction of translation, determining the center and angle of rotation, and determining the coefficient of dilation.
	2. Specifying the type and center of dilation, and determining the coefficient of expansion.
	3. Visualizing the transformation of a figure in the coordinate plane through reflection, translation, rotation, or dilation.
3-3 Measurement and its units	
9-4-3-3-1 Recognizing the interconversions between the units of length, mass, and capacity in both the English and metric measurement systems. .	1. Distinguishing the relationships between English units of length (inch, foot, yard, mile) and utilizing them to convert between them.
	2. Distinguishing the relationships between English units of mass (ounce, pound, and ton) and utilizing them to convert between them.
	3. Distinguishing the relationship between the two English units of capacity (cups and gallons) and utilizing them to convert between them.
	4. Distinguishing the relationships between English and metric units of length, mass, and capacitance, and utilizing them to convert between them.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
9-4-3-3-2 Identifying perimeter and area formulas for 2D shapes, understanding their relationship, analyzing impact of dimensional changes, and applying them to determine perimeter and area, finding area of complex shapes, solving for unknown measurements, and solving mathematical problems.	1. Identifying formulas for circumference and area of a circle and the area of a regular polygon, and utilizing them to calculate perimeter or area.
	2. Determining areas of compound shapes through dividing them into shapes with known area formulas.
	3. Analyzing the impact of dimensional changes on a shape's perimeter and area.
	4. Distinguishing the relationship between perimeters and areas of similar shapes and using it to find unknown measures.
	5. Solving mathematical problems involving real-world applications of circumference, area, regular polygon area, and complex shape areas, and explaining the solutions.
9-4-3-3-3 Recognizing the volume and surface area formulas for three-dimensional shapes, and using them to find volume and surface area, and to solve mathematical problems.	1. Identifying the formulas for the volumes of the right quadrilateral pyramid, the right triangular pyramid, the cylinder, and the cone, and utilizing them to find the volumes of these shapes and complex solids.
	2. Identifying the formulas for the surface areas of the right quadrilateral pyramid, the right triangular pyramid, cylinder, and cone, and utilizing them to determine their surface areas.
	3. Solving mathematical problems with real-world applications by calculating the volumes of 3D shapes (right quadrilateral and right triangular pyramid, cylinder, cone, and polyhedrons), determining their surface areas, and explaining the solutions.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
4- Statistics and probabilities	
4-1 Statistics and graphic representations	
9-4-4-1-1 Describing surveys for data collection, organizing and representing the data, selecting the most appropriate representation, interpreting the data, and utilizing it for prediction and decision-making.	1. Describing the survey study, using it in data collection, and organizing it, distinguishing and classifying the random sample.
	2. Recognizing data for discrete and continuous variables, and determining an appropriate representation for them.
	3. Comparing between different graphical representations data (columns, histograms, stem-and-leaf plot, double columns, box-plot, line graph and scatter graph) and choosing the best representation for the given data.
	4. Reading data from its various graphical representations, (columns, histograms, stem-and-leaf plot, double columns, box-plot, line graph and scatter graph) explaining and using it to predicting and making decisions.
	5- Reading scatter plot and using it to determine the strength of the relation between two variables, and to predict the value of one variable by knowing other value

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
4-2 Data analysis and interpretation	
9-4-4-2-1 Analyzing data using measures of central tendency and measures of dispersion, interpreting and comparing them.	1. Determining measures of central tendency for single values or organizing them into frequency tables with categories, and representing them graphically to describe and interpret data.
	2. Comparing measures of central tendency for a set of values, and selecting the most appropriate measure to represent these values.
	3. Identifying measures of dispersion (range, interquartile range), outliers, and using them to describe the data.
	4. Describing measures of dispersion (mean, standard deviation, variance) and calculating them for a set of individual values.
	5. Solving mathematical problems with real-world applications of measures of central tendency and dispersion, and explaining the solutions.

Mathematics (4) - ninth grade (9)	
Learning Outcomes	**Indicators**
4-3 Calculating probabilities	
9-4-4-3-1 Writing the sample space for a random experiment, finding the number of possible outcomes for an accident, distinguishing the types of accidents, and calculating the probabilities of their occurrence.	1. Organizing the sample space of a random experiment using lists, tables, and tree diagrams.
	2. Determining the number of possible outcomes for an event by using the basic principle of counting, permutations, combinations, and expressing the probabilities in various forms (words, fractions, decimals, percentages).
	3. Classifying types of events (simple, compound, mutually exclusive, non-mutually exclusive, complementary, compound independent, non-independent), and calculating their probabilities.
	4. Comparing theoretical and empirical probabilities of an event and using them to make predictions.
	5. Solving mathematical problems with real-world applications on sample space, types of events, and their probabilities, and explaining the solutions.

Learning outcomes for the targeted levels in the field of science

Table (7): Sixth Grade Science Learning Outcomes and Indicators

Science (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
1-Life Sciences	
1-1 Structure and function in living organisms	
By the end of third grade (6), the student will demonstrate proficiency in:	
6-5-1-1-1 Describing the cell structures and linking them to their vital functions.	1. Explaining the concept of a cell and distinguishing between unicellular and multicellular organisms.
	2. Identifying and naming structures in the cell (nucleus, cytoplasm, cell membrane, cell wall).
	3. Linking between cellular structures and their specific functions.
6-5-1-1-2 Identifying the major structural and functional differences between animal and plant cells.	1- Comparing between the cell membrane in animal cells and the cell wall in plant cells, and their functions.
	2- Identifying chloroplasts in plant cells and determining its function.
	3- Describing how animal and plant cells performs biological processes (passive transport, diffusion, photosynthesis, cellular respiration).

Science (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
6-5-1-1-3 Identifying the main body systems and their specialized organs and linking them to their functions that supports growth and survival of living organisms (plants and animals).	1- Explaining that the common biological processes in living organisms are carried out by specialized organs in their bodies.
	2- Identifying the main systems in animal's body and its specialized organs, and linking them to their functions that helps them grow and survive (digestive, circulatory, excretory, respiratory, skeletal, muscular, and nervous).
	3- Identifying basic plant structures and relating them to specific functions that support plant growth and survival. (root, stem, leaves and flowers).
6-5-1-1-4 Describing the different patterns in the life cycles of animals and plants and the changes accompanying them, and comparing them.	4- Describing the different patterns in life cycles of different animals (insects, amphibians, and mammals) and different plants, and comparing them.
	5- Describing the changes that occur to animals and plants during life cycles and predict them based on the pattern of reproduction and the life cycle.

Science (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
1-Life Sciences	
1-2 Organization and diversity of living organisms	
6-5-1-2-1 Classifying living organisms into groups based on common phenotypic traits.	1. Classifying different plants from the local environment into two groups (gymnosperms and angiosperms); and comparing them according to their similarities and differences in phenotypic traits and characteristics.
	2. Determining the common characteristics and traits of various animals in order to justify their classification within specific groups.
	3. Classifying animals and microorganisms from local environment into groups based on common phenotypic characteristics.
1- Life Science	
1-3. Ecosystems and their interactions	
6-5-1-3-1 Representing biological communities and identifying types of population that lives in it, describing the interrelationships among them, and their interaction with the abiotic components, and the impact of biological communities changes on their survival and sustainability.	1. Describing the biological community and the types of population and living organisms that live in it, and their ability to survive in their habitats through the availability of the necessities of life.
	2. Identifying the interrelationships among living organisms, and their interaction with the abiotic components of their habitats to obtain their needs.
	3. Describing the effect of different changes in biological communities on the survival and sustainability of different species.

Science (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
6-5-1-3-2 Describing the components of the ecosystem and explaining the impact of the availability of different resources in ecosystems on the survival and sustainability of living organisms, and proposing solutions to problems that affect the stability of the ecosystem.	1. Describing the biotic and abiotic components of ecosystems and their interaction to provide the needs of living organisms, and its impact on the survival and stability of the ecosystem.
	2. Determining the causes of changes in habitats and their impact on plants and animals that lives there.
	3. Identifying problems that results from changes in habitats, and provide evidence on the efficiency of solutions to restore ecological balance.
6-5-1-3-3 Representing the relationships between living organisms in which matter is circulated in the ecosystem, and identifying the relationship between plants and energy obtained from the sun to produce food.	1. Clarifying the cycle of matter between living organisms, and the transfer of energy in the ecosystem through food chain, and classify their different roles (producer, consumer, predator, decomposer)
	2. Classifying living organisms into (autotrophic - heterotrophic).
	3. Explaining the process of photosynthesis and its role in determining the relationship between plants and the energy obtained from the sun to produce food.
6-5-1-3-4 Describing the effect of environmental changes on plants and animals that live in specific environments. Inferring how behavioral and structural adaptations can help plants and animals survive in their habitats	1. Identifying the physical factors that affect the survival of plants and animals in specific habitats
	2. Predicting the changes that will happen to living organisms because of changes in their environments.
	3. Describing how structural and behavioral adaptations can help plants and animals live and survive in specific habitats.
	4. Describing the climatic conditions in different environments and their impact on living organisms.

Science (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
6-5-1-3-5 Inferring the effects of human activity on environmental habitats and populations, and predicting its impact, proposing solutions to protect them	1. Explaining human interaction with environments, and inferring the positive and negative impact of human activities on the environmental habitats and populations.
	2. Identifying natural environmental events of the Kingdom of Saudi Arabia and predicting their positive and negative impacts.
	3. Proposing solutions to protect the earth's resources and preserve the environment.
1- Life Science	
1-4. Genetics	
6-5-1-4-1 dentifying the inheritance of traits, explaining the variation in them, tracing their transmission from one generation to the next, distinguishing their types (dominant and recessive), and clarifying the impact of the environment on them.	1. Clarifying that variation in inherited traits results from a pattern of variation between inherited traits in living organisms of the same species.
	2. Applying a pedigree chart to track the transmission of inherited traits from parents to offspring
	3. Comparing dominant and recessive traits, identifying the letter symbols for each of them, and providing examples.
	4. Distinguishing genetic traits from acquired traits and comparing them.
	5. Identifying some of the environmental factors that affect the acquired traits of animals and plants (the amount of food, the amount of water, the amount of animal movement), and identifying the traits that are affected by environmental factors (height, weight, and color).

Science Learning Area (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
2- physical Sciences	
2-1. Matter and its interactions	
By the end of third grade (6), the student will demonstrate proficiency in:	
6- 5-2-1-1-Exploring the physical properties of matter, distinguishing the molecular structure of its different states, and explaining the change of matter states due to heat.	1. Identifying the physical properties of matter that can be measured or calculated, and indicates the scientific units of measurement used.
	2. Distinguishing the different materials in terms of the physical properties of the substance that can be calculated or measured, such as mass, volume, density, buoyancy, color and boiling point
	3. Comparing between conductors and insulators in terms of their physical properties, supported by examples
	4. Comparing, through models, the states of matter (solid, liquid, and gas), and in terms of movement and forces of attraction between molecules, and the effect of that on the shape and size of matter.
	5. Explaining the changes of matter due to the effect of heat.

Science Learning Area (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
6-5-2-1-2 Understanding the chemical changes of matter, clarifying the concepts and methods related to it, and comparing mass of different matters when their properties change based on the law of conservation of mass.	1. Explaining the changes in the composition and properties of matter as a result of a chemical reaction. Concluding that the mass of the substance remains preserved during the chemical reaction and when forming mixtures. 2. Distinguishing between a mixture and a compound, enumerating the types of mixtures, distinguishing them, and giving examples of each type. 3. Defining the solution, identifying its parts, and describing the concentration of the solution in terms of quality (concentrated, dilute) or in terms of quantity (saturated, unsaturated). 4. Explaining the concept of solubility and gives the factors affecting it. 5. Distinguishing between the physical methods used to separate the components of a mixture or solution, and providing examples. Describing the process of distillation and identifying some of its industrial applications

Science Learning Area (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
6-5-2-1-3 Understanding chemical reactions, the indicators of their occurrence, types, and factors affecting their reaction rate	1. Defining the chemical bond, explaining its role in changing the properties of a chemical substance, and identifying indicators of a chemical reaction occurrence. 2. Describing the chemical change (reaction) using the chemical equation, fulfilling the law of conservation of mass. Identifying the atoms of the elements of the reactants and products in the chemical equation, and their ratios. 3. Classifying chemical reactions and gives examples of each type, and explains the factors affecting the rate of a chemical reaction from a variety of chemical reactions. 4. Distinguishing between endothermic and exothermic reactions and gives examples of each

Science Learning Area (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
6-5-2-1-4 Exploring the chemical properties of materials, and distinguishing between the interactions of acids and bases, their chemical properties, and their uses.	1. Defining the chemical property and classifying the chemical elements; according to its chemical properties. 2. Distinguishing between acids and bases and give examples of each type. 3. Listing the uses of acids and bases according to their properties, identify the reagents, give examples of them, and explain how to detect acids and bases through them. 4. Defining the pH, determining the values of solutions of some acidic, basic, or neutral substances, and classifies them. 5. Explaining what is meant by the neutralization reaction between an acid and a base to form a salt, and name some types of salts, and their properties and uses
2- Physical Sciences	
2-2. Motion and Forces	
At the end of Grade Six (6) students will be able to:	
6-5-2-2-1 Describing the effect of force on objects, and distinguishing types of forces	1. Distinguish between balanced and unbalanced forces. 2. Distinguish between types of force according to their existence (gravity, friction, magnetism). 3. Describing how does force affect the shape and motion of objects

Science Learning Area (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
6-5-2-2-2 Understanding Newton's three laws of motion and using them to explain body motion	1. Determining the relationship of distance to motion and explaining how the position of an object can be determined using a reference point. 2. Define velocity and its unit, calculating velocity by knowing distance and time, and distinguishing between speed and velocity. 3. Defining acceleration and its unit, calculating acceleration by knowing the change in velocity and time, and showing the effect of changing the direction of movement on acceleration. 4. Explaining Newton's three laws of motion and their real life applications.
6-5-2-2-3 Explaining the factors affecting types of forces, such as gravitational force, friction, and magnetism.	1. Explaining the relationship between force of attraction and weights of objects and the factors affecting it. 2. Explaining how the force of friction is arises and the factors affecting its magnitude. 3. Demonstrating the effect of air resistance on the movement of objects. 4. Explaining the occurrence of attraction and repulsion in the magnetic force with no contact between the objects...

Science Learning Area (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
2- Physical Sciences	
2-3. Energy	
6-5-2-3-1 Understanding the concept of energy and work, distinguishing between them, and giving real life examples.	1. Explaining the concept of energy and work based on their role and impact on bodies. 2. Explaining the concept of potential energy and kinetic energy and their relationship to body movement. 3. Give examples of the benefits of simple machines in their daily life 4. Choosing the simple machine that achieves the effect and the task they want from several machines.
6-5-2-3-2 Understanding the principle of energy conservation during its transformations and apply it in daily life	1. Describing how energy is transferred from one place to another in its surroundings and between objects and systems. 2. Explaining the principle of conservation of energy. 3. Providing examples and describing models for converting energy from one form to another.

Science Learning Area (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
2- Physical Sciences	
2-4 waves and vibrations	
6-5-2-4-1 Describing waves, distinguishing between their properties theoretically and graphically, and predicting their movement.	1. Explaining the concept of wave and representing it graphically. 2. Distinguishing between the properties of sound and light waves theoretically and graphically. 3. Predicting the movement of the wave when exposed to some natural influences. 4. Describing the transmission of sound and light as waves through material media and space and distinguishing between them
6-5-2-4-2 Understanding the concepts of reflection and refraction of light, transmission of sound, and explaining their role in interaction and communication in the surrounding environment.	1. Explaining the concept of reflection and refraction of light, and supports that with examples of the applications of reflection, refraction and absorption of light in mirrors and lenses. 2. Explaining the eye's vision of the objects and colors around it. 3. Describing the transmission of sound by absorbing or reflecting it through different media and objects. 4. Describing the pitch and intensity of the sound, and determines their relationship to frequency.

Science Learning Area (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
2- Physical Sciences	
2-5 Electromagnetism	
6-5-2-5-1 Understanding the concept of electric charge, explaining the attraction and repulsion of charged bodies, and comparing electrical circuits connected in series and in parallel	1. Explaining the concept of electric charge and explaining the attraction and repulsion of charged bodies theoretically and graphically 2. Explaining how electric current flows in electrical circuits. 3. Comparing electrical circuits connected in series and parallel theoretically and by drawing
6-5-2-5-2 Understanding the properties of magnets and their uses in daily life.	1. Defining magnets, identifying and naming their poles, and explain how magnets are formed. 2. Describing the properties of magnets and providing examples of the uses in everyday life 3. Comparing permanent magnets and electromagnets and explaining how they can be used to generate electricity

Science Learning Area (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
3- Earth and Space Sciences	
3-1 The universe and the solar system	
By the end of third grade (6), the student will demonstrate proficiency in:	
6-5-3-1-1 Describing the changes in the appearance of the moon during its revolution around the Earth and identifying the phenomena associated with that.	1. Describing the apparent shape of the moon during its rotation around the earth, and naming the different phases of the moon. 2. Explaining the change in the apparent shape of the moon during its orbit around earth.
6-5-3-1-2 Explaining the phenomena related to the movement of the earth, the moon and the sun and the resulting changes.	1. Explaining the importance and impact of the sun's movement on aspects of life around them. 2. Explaining the occurrence of the phenomena of night and day, and the four seasons. 3. Explaining the occurrence of the lunar eclipse and the solar eclipse.
6-5-3-1-3 Concluding the effect of gravity on the movement of the solar system, galaxies and associated phenomena.	1. Explaining the phenomenon of tides, and explaining the influence of the moon in its occurrence and its geological effects. 2. Describing the movement of celestial bodies in the solar system, their relationships with each other, and their effects. 3. Distinguishing the phenomena associated with the movement of celestial bodies, and providing supporting evidence. 4. Relating the speed of rotation and gravity between celestial bodies, and providing evidence for that.

Science Learning Area (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
6 5-3-1-4-Determining the characteristics of the solar system, and comparing the solar system to the galaxy and the universe	1. Comparing the solar system, the galaxy and the universe in terms of size and locating the solar system in the Milky Way galaxy. 2. Comparing the sun and other stars in terms of size, color and temperature. 3. Distinguishing the extent of the universe and the sizes of its bodies, providing supporting evidence.
3- Earth and Space Sciences	
3-2The Earth System	
6-5-3-2-1 Classifying the layers of the atmosphere and identifying their components, characteristics, changes, its effects on the environment and their benefits to humans.	1. Classifying the layers of the atmosphere and comparing them according to their similarities and differences. Explaining some environmental problems resulting from changes occurring in the layers of the atmosphere. 2. Determining the causes of weather fluctuations and their relationship to the earth's water cycle and predicts their environmental effects on the weather. 3. Explaining the movement of air masses and currents stating their effects on the earth's weather. 4. Explain the causes of climate change in some parts of the world and proposes multiple solutions to address the impact and risks of weather fluctuations

Science Learning Area (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
6 5-3-2-2-Deducing the relationship of the Earth's spheres to each other and predicting the interactions, and changes that occur between them and the geological effects resulting from them	1. Describing the Earth's spheres and Plate tectonics, identifying the layers of the Earth that make up the lithosphere and the biosphere, and distinguishing between them. 2. Describing how magma moves Earth's plates, using that for explaining the formation of oceans and mountains. 3. Determining how the Earth's physical features (land features and water features) are described.
6-5-3-2-3 Describing the factors and processes that affected the Earth's surface which changed some of its features	1- Explaining the geological changes and processes that affect the earth's surface, classifying and locating them. 2- Describing the impact of earthquakes and volcanoes in shaping the Earth's surface and changing its features. 3- Explaining the factors of erosion, weathering, and sedimentation and their causes, and predicting the patterns of their action and their effects on earth.
6-5-3-2-4 Describing the types of rocks and their relationship to minerals and distinguishing their characteristics and uses	1- Distinguishing mineral and its properties and describing its relationship to rocks, and how they are formed. 2- Describing the types of rocks in his area, explaining their characteristics, and their use. 3- Explaining the geological events that the rocks were exposed to in his area.

Science Learning Area (5) – Grade Six (6)	
Learning Outcomes	**Indicators**
6-5-3-2-5 Determining the causes and effects of earthquakes and volcanoes and identifying the sites most vulnerable to earthquakes and volcanoes	1- Relating the change of the Earth's shape with the external and internal geological processes. 2- Explaining the causes of earthquakes and volcanoes, anticipating the damages that result from them, and proposing solutions for prevention to limit their effects. 3- Determining the locations and types of earthquake monitoring stations and devices in the Kingdom of Saudi Arabia and comparing between them.

Table (8): ninth Grade Science Learning Outcomes and Indicators

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
1- Life Sciences	
1-1. Structure and function in living organisms	
By the end of third grade (9), the student will demonstrate proficiency in:	
9 5-1-1-1-Understanding that the cell is the basic building unit of living organisms, knowing some of the technologies that helped study them, and comparing single-celled and multi-cellular organisms.	1- Identifying the unit of structure of living organisms, tracking the development stages of the cell theory, and mentioning its components and the role of scientists in its discovery. 2- Appreciating the importance of technical tools (magnification devices, microscopes) and explaining their role in identifying cells and their components. 3- Comparing single-celled organisms and multicellular organisms and providing examples thereof. 4- Describing the vital activities and processes in living cells necessary for the continuation of living organisms.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-1-1-3 Describing the main events in the stages of the cell cycle and comparing between mitosis and meiosis.	1. Illustrating the two main phases of the cell cycle (the interphase and the cell division phase), explaining the changes and events accompanying them, determining their time, and providing examples. 2. Explaining the importance of interphase and cell division, describing the state of cells in it, and distinguishing between them and active cells. 3. Comparing between mitosis and meiotic division in terms of importance, phases, outgrowths, and types of cells in which division occurs. 4. Defining mitosis, enumerate its successive phases and the changes that occur to the cell in each phase. 5. Defining meiosis, describe its phases, and compare with a drawing what happens in the first meiotic phase and the second meiotic phase in the processes of division, and distinguishing their different forms.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-1-1-4 Understanding the importance of integration of human body systems and how the structure of different organ relate to one another to maintain homeostasis and body health.	1. Identifying the components of the human's body systems (circulatory, immune, digestive, respiratory, excretory, muscular, skeletal, nervous, hormonal, and reproductive) and their specific functions that support the functioning of the body. 2. Explaining how the systems interact and integrate in maintaining homeostasis health and safety of the body's balance. 3. Predicting diseases resulting from a malfunction in the functioning of organs and systems in the human body and suggesting ways of prevention.
1- Life Science	
1-2. Organizing of living organisms and their diversity	
9-5-1-2-1 Classifying living organisms according to Linnaeus system based on their features and characteristics.	1. Comparing the ancient and modern methods of classification and identifying the kingdoms and levels of Linnaeus' taxonomic scale. 2. Comparing the main characteristics of living organisms. 3. Classifying living organisms from the local environment using graded taxonomic levels based on internal and external structural features and characteristics.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
1- Life Sciences	
1-3 Genetics	
9-5-1-4-1 Describing the development of genetics, and the use of Mendelian laws to explain the inheritance of genetic traits, and the probabilities of their appearance in different generations	1. Explaining the development of genetics, and illustrating Mendel's role in it. 2. Applying Mendel's first and second law for the transmission of genetic traits, and predicting the emergence of genetic traits in generations and their occurrence ratio. 3. Clarifying the concept of genetics and its principles and explaining how traits are inherited, and explaining the role of alleles. 4. Distinguishing between homozygous and heterozygous genes, distinguish between homozygous genes organisms and non-homozygous organisms, and providing an example of each. 5. Calculating the probability of the appearance of genetic characteristics of living organisms using the Punnett square.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-1-4-2 Describing the structure of the chromosome and the relationship between its components, and predicting the results of the defects that occur in the genetic chain when genetic mutations occur and their effects.	1. Distinguishing the structure of the chromosome, and the relationship between its components. Explaining the concept of a gene, identifying its components and its location on the chromosome, and explains the occurrence of genetic mutation and its effects on making protein in the cell. 2. Describing the result of deviation and defect in meiosis, and providing examples. 3. Comparing nucleic acids, DNA and RNA, and describing their shapes and structures, importance and functions of each type. 4. Explaining the number and types of chromosomes in the human body's cell, and providing examples. Differentiating between diploid cells and haploid cells, and providing examples for each.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
2- Physical Sciences	
2-1 Matter and its interactions	
By the end of third grade (9), the student will demonstrate proficiency in:	
9 5-2-1-1-Explaining the development of the atomic model throughout history, and understanding the structure and components of the atom.	1. Explaining atomic models and their development throughout history, evaluating them and describing their results, and relating that to aspects of the nature of science and the development of scientific knowledge. 2. Illustrating the components of the atom's nucleus (protons and neutrons) and their properties, describing the movement of electrons (electronic cloud) around the nucleus, and determining the number of protons, neutrons and electrons in the atom of the elements based on their atomic numbers. 3. Defining isotopes, providing an example of them, comparing isotopes of an element according to mass and atomic numbers, explaining the meaning of radioactive decay, and how it occurs, and differentiating between it and radioactive transformation. 4. Comparing alpha and beta particles, explaining the changes that occur in the nucleus upon emission of each of them, and their uses in life, explaining the concept of decay rate (half-life), and calculating the half-life of some isotopes.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-2-1-2 Comparing between compounds and mixtures, classifying mixtures, suggesting appropriate methods to separate their components, and distinguishing between types of solutions and their components.	1. Comparing compounds and mixtures according to their chemical and physical properties. 2. Classifying homogeneous and heterogeneous mixtures according to the nature of their components. 3. Suggesting appropriate methods for separating different mixtures according to their type and the nature of their components. 4. Describing different types of solutions from real life. Defining aqueous solutions and explaining why water is a universal solvent. 5. Identifying the component of the solution, and factors influencing the amount of solute that dissolves in a solvent.
9 5-2-1-3-Determining the concept of solubility, the rate of solubility in a solution, and deducing the factors affecting the solubility rate of a solute in a solvent.	1. Defining the concept of solubility and the rate of dissolution in a solution graphically and describing the relationship between the solvent and the solute according to the concept of solubility. 2. Inferring the effect of temperature and compound composition on the solubility of a solution and explaining it. 3. Inferring the factors affecting the rate of solubility of the solute in the solvent for different types of solutions.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-2-1-4 Explaining the properties of liquids, comparing crystalline and amorphous solids, and describing the pattern of crystals in solids.	1. Explaining the properties of liquids (viscosity, surface tension) according to the composition of the substance, the arrangement of its molecules, and the forces between them. 2. Comparing crystalline and non-crystalline solids according to the organization and arrangement of their atoms. 3. Describing the organization of molecules in crystalline solids by building models that describe their structure.
9 5 5-2-1-6- Describing the history of the periodic table, explaining how the elements are organized in the periodic table, and the properties of the elements and their common uses	1. Explaining the contributions of scientists to the arrangement of the elements discovered in the periodic table and the history of its development leading to the modern periodic table. 2. Explaining the properties of the elements in the periodic table sectors within the period and group, and lists the uses of the common elements around it. 3. Explaining the element key, naming some chemical elements and knowing how to write their chemical symbols. Distinguishing between metals, non-metals and metalloids, and providing examples thereof. 4. Recognizing the location of the representative elements, the transitional elements, and the inner transition (lanthanides and actinides) in the periodic table, based on their electronic composition, predicting their physical and chemical properties, and identifying some of their uses. 5. Explaining the meaning of processed elements and catalyst, and providing examples for each.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-2- 1-7 Comparing acids and bases according to their properties and uses, and their effect on reagents	1. Comparing acids and bases according to their properties and determining their applied uses in real life cases. 2. Comparing the strength of acids and bases using the pH and explaining the effect of acids and bases on some reagents. Explaining what is meant by a neutralization reaction and providing examples. 3. Inferring that salts result from the reaction of acids and bases, determining its properties, and naming some types of salts and their uses.
9-5-2-1-8 Explaining how atoms bond with each other, identifying what is a chemical bond and how it is formed, and distinguishing between different types of bonds	1. Describing how electrons are arranged within the atom, and its relationship to their position in the periodic table. Comparing the numbers of electrons in each energy levels, and determining the lowest and highest energy levels of an element. 2. Describing how the periodicity of the chemical properties of the elements of the same family in the periodic table reflects the patterns of the outer-level states of electrons (valence electrons). 3. Illustrating the electronic distribution of a number of groups of the periodic table, and explaining the method of dot representation of electrons, and represent it for a number of elements. 4. Explaining the concept of a chemical bond, comparing its different types (ionic, covalent, metallic, and polar), and describing how atoms are linked together by different chemical bonds to form compounds, using examples and illustrative models. 5. Distinguishing between an ion, a molecule, a compound, and give examples for each one, explaining what is meant by a chemical formula, and its indication through various examples.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-2-1-9 Understanding how a chemical reaction occurs, expressing it in a balanced chemical equation based on the law of conservation of mass, and distinguishing chemical reactions according to the energy associated with them	1. Explaining information on the properties of materials before and after a reaction, determining whether a reaction will occur or not, and describing indications of its occurrence. 2. Describing a chemical reaction using a balanced verbal and symbolic chemical equation and apply the law of conservation of mass to different chemical reactions. 3. Listing the different forms of energy associated with chemical reactions (absorbed, released), and providing examples thereof. 4. Distinguishing between an endothermic reaction and an exothermic reaction, providing examples of each, explaining how to express them in a chemical equation.
9-5-2-1-10 Describing the speed of chemical reactions and identifying the factors affecting them	1. Defining the rate of a chemical reaction and determining how it is measured and the factors or conditions affecting it, distinguishing between automatic and non-spontaneous ones, providing examples thereof. 2. Determining the factors affecting the rate of a chemical reaction (concentration of reactants, concentration of reactants, pressure, temperature, catalyst). 3. Explaining the concept of activation energy and its role in the rate of reaction and providing an example of it. 4. Defining inhibitors, catalysts, and enzymes and explaining the importance of their use to slow down or speed up chemical reactions, and providing examples thereof.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
2- Physical Sciences	
2-2 Motion and Forces	
9-5-2-2-1 Describing the movement of a body based on the concepts of the main elements of movement and distinguishing between them	1. Distinguishing between types of velocity theoretically and graphically by calculating the velocity value of a moving object. 2. Explaining the concept of acceleration for a moving body, and indicating the time of its occurrence. 3. Explaining the relationship between acceleration, velocity, displacement, time and direction of motion theoretically and mathematically. 4. Calculating the value of positive and negative acceleration mathematically for a moving object in its environment. 5. Identifying the circular motion, show the effect of the centripetal force on it, and providing an example of it.
9-5-2-2-2 Understanding the concept of momentum and the law of momentum conservation	1. Explaining the concept of momentum, listing daily life examples of it, identifying the factors affecting it, and describing it graphically and mathematically. 2. Calculating the magnitude of momentum mathematically for a moving body. Explaining the law of conservation of momentum theoretically and mathematically. 3. Predicting the motion of bodies based on the principle of conservation of momentum and providing examples thereof.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-2-2-3 Understanding the concept of friction force, its types, and how it affects the movement of objects.	1. Stating Newton's first law of motion and providing examples thereof. 2. Defining the force of friction, give examples of it, and explaining how friction affects motion. 3. Listing types of friction (static, sliding, and rolling), distinguishing each type, and providing examples thereof.
9-5-2-2-4 Understanding the concept of moment of inertia and reformulating Newton's first law based on it.	1. Clarifying the concept of moment of inertia. 2. Giving examples of factors affecting inertia in daily life. 3. Formulating Newton's first law according to the moment of inertia.
9-5-2-2-5 Understanding Newton's second law theoretically and graphically and determining the relationship between body acceleration and the factors affecting it.	1. Explaining Newton's second law theoretically and graphically. Listing daily life examples. 2. Determining the relationship between the acceleration of the body and the factors affecting it, based on Newton's second law, theoretically and mathematically. 3. Calculating the value of the acceleration of the body affected by the resultant force mathematically. 4. Defining the force of gravity and its effects on bodies and providing examples. 5. Defining the concept of weight, differentiating between the weight and the mass. Calculating the weight of an object mathematically.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-2-2-6 Understanding Newton's third law and calculating the value of mutual forces mathematically based on it.	1. Determining the magnitude and direction of the mutual forces between two bodies, theoretically and graphically, and calculating them mathematically. 2. Formulating Newton's third law and giving practical daily life examples. 3. Explaining some phenomena related to Newton's third law, such as weightlessness and free fall, theoretically and graphically. 4. Explaining gravitational attraction between two bodies and the factors affecting it based on the universal law of attraction.
2- Physical Sciences	
2-3 Electromagnetism	
9-5-2-3-1 Explaining the concept of electric current and methods of generating it in electrical circuits and its relationship to voltage and electrical resistance, and distinguishing between direct and alternating currents	1. Explaining the concept of electric current theoretically and by drawing. 2. Describing the methods of generating electric current in electrical circuits. 3. Explaining the flow of electric current in a circuit and its relationship to voltage and electrical resistance. 4. Distinguishing between direct current and alternating current and their sources

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-2-3-2 Understanding the relationship between the electric field and the electric force and the role of electric circuits in transferring energy in different ways, and the relationship between the magnetic field and the electric field theoretically and by drawing.	1. Explaining the formation of the electric force between charges theoretically and graphically, and describing its relationship to the electric field. 2. Comparing the magnetic field and the electric field theoretically and by drawing. 3. Explaining the components and role of electrical circuits in energy transmission. 4. Comparing between series and parallel connection in electrical circuits, theoretically and by drawing. 5. Calculating the value of voltage, current and resistance in electrical circuits from Ohm's law mathematically.
9-5-2-3-3 Comparing between different types of materials in terms of their electrical conductivity	1. Comparing the types of materials in terms of their electrical conductivity. 2. Explaining the meaning of superconductors, explaining their characteristics, providing an example of these materials, and listing their uses. 3. Providing examples of conductive and insulating materials and their uses in daily life.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-2-3-4 Describing the relationship between magnets and electric current and their role in designing devices that convert electrical energy into mechanical energy and vice versa.	1. Describing magnets, and how they are created, listing their uses, explaining the difference between them and electromagnets. 2. Explaining the relationship between the electric current and the magnetic field, and deducing the factors that control it. 3. Explaining the meaning of electromagnet, listing its applied uses, and showing how an electric current generates a magnetic field. 4. Defining the magnetic region, explaining how magnets are generated, and providing an example. 5. Suggesting devices that convert electrical energy into mechanical energy and vice versa, using magnetic fields produced by currents.
2- Physical Sciences	
2-3 Energy	
9-5-2-4-1 Clarifying the concept of thermal energy, its impact and relationship to temperature	1. Explaining the concept of thermal energy. 2. Giving examples of thermal energy and its effects on his daily life. 3. Describing the relationship between thermal energy and temperature.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-2-4-2 Understanding the mechanism of heat transmission and conduction between objects, and measuring temperature.	1. Explaining the transfer and conduction of heat between objects. 2. Comparing the methods of transmission and conduction of thermal energy between objects. 3. Distinguishing between materials based on their degree of heat conduction. 4. Explaining the method of designing a thermometer. 5. Comparing the properties of temperature scales (Celsius, Fahrenheit, and Kelvin) and mathematically convert between them.
9-5-2-4-3 Understanding specific heat and the factors affecting it	1. Explaining the concept of specific heat. 2. Describing the relationship between thermal conductivity and specific heat. 3. Determining the factors affecting the body's absorption or loss of thermal energy.
9-5-2-4-4 Distinguishing between the kinetic and potential energy of a body and the factors affecting them.	1. Comparing between the characteristics of the body's kinetic energy, potential energy, and the factors affecting each type. 2. Listing daily life examples of the transformation from kinetic energy to potential energy and vice versa. 3. Deducing the linear and non-linear relationship between kinetic energy and the mass and speed of the moving body and express it mathematically. 4. Calculating the kinetic and potential energy of objects, and deducing the relationship between them. 5. Predicting the relationship between the potential energy and the height of the object above the Earth's surface.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-2-4-5 Understanding the law of energy conservation during its transformations and suggesting ways to generate energy	1. Giving examples from the surrounding environment that illustrate the concept of energy transformation from one form to another. 2. Tracking a series of applications of technical or natural energy transformations and applying the law of conservation of energy in it. 3. Proposing ways to generate energy from renewable and non-renewable natural resources depending on the mechanism of energy generation.
2- Physical Sciences	
2-5 Waves and vibrations	
9-5-2-5-1 Understanding the behavior and characteristics of sound waves.	1. Explaining the concept of sound wave theoretically and by drawing. 2. Determining the type of sound wave (longitudinal or transverse) 3. Describing the properties of sound waves (wavelength, frequency, amplitude) mathematically and graphically. 4. Distinguishing between the intensity of the sound, its sharpness, and its loudness. 5. Explaining the occurrence of echo and its applications in daily life.
9-5-2-5-2 Understanding the behavior of light waves, their distinctive properties, and their associated applications	1. Explaining the concept of light wave theoretically and by drawing, and defining the type of light wave (longitudinal or transverse.), describing the properties of light waves (wavelength, frequency, amplitude) mathematically and graphically. 2. Explaining color vision based on the properties of light waves as they travel through physical media. 3. Explaining with examples the applications of light electromagnetic spectrum in everyday life. 4. Explaining the reflection, refraction, and absorption of light through its transmission through different media.

3- Earth and space sciences	
3-1 The universe and the solar system	
By the end of third grade (9), the student will demonstrate proficiency in:	
9-5-3-1-1 Describing some of the methods, techniques and tools used in exploring the universe and evaluating the information explored about it.	1. Explaining the means, techniques and tools used in space exploration and listing the most important space flights. 2. Explaining one of the means of exploring the universe, illustrating its basic characteristics and its most prominent advantages. 3. Organizing and analyzing the data and information available on the vastness and magnitude of the universe, on the number of galaxies, their cosmic distances and paths, to provide evidence for them.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-3-1-3 Analyzing information related to the movement of celestial bodies and their apparent and relative locations, and deducing the conditions prevailing in them	1- Explaining some of the tools and means of exploring the solar system. 2- Describing the prevailing climatic conditions in some planets of the solar system. 3- Analyzing information related to the movement of celestial bodies across the sky to know their apparent and relative locations. 4- Evaluating the supporting or denying information about the existence of life outside of planet Earth.
At the end of Grade Nine (9) students will be able to:	
3- Earth and space sciences	
3-2 Earth System	
9 5-3-2-1-Explaining the causes of climate change, its effects and associated phenomena	1- Describing the changes resulting from the phenomenon of heat transfer, retention and their effects. 2- Analyzing data to identify similarities and differences in temperatures in the surrounding area. 3- Providing evidence of the causes of climate change in some parts of the world and its future consequences.
9 5-3-2-2-Understanding the importance of the carbon cycle, its geological utility and describing the phenomena associated with it	1- Determining the rates and locations of carbon in the Earth's layers and explaining the process by which it is cyclically transported. 2- Describing the phenomena associated with the process of carbon transport through the earth's layers and various materials. 3- Illustrating the role of organic carbon in the life of organisms after their death its importance, and usefulness.
9 5-3-2-3-Describing the natural cycles and identifying their causes and benefits.	1- Explaining how natural cycles occur in the local environment and determining their usefulness. 2- Analyzing information and data related to natural cycles and their effects on the environment.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9 5-3-2-4-Describing the types of rocks and minerals, their characteristics and uses.	1- Determining the general and specific characteristics of rocks and minerals, and indicating their uses in his area. 2- Classifying minerals and providing examples for comparison to identify similarities and differences between them. 3- Explaining the common characteristics of different types of rocks that are useful in the process of classifying, and distinguishing between them.
9 5-3-2-5-Explaining the characteristics of different rocks, their classification methods, and the cycle of their change from one type to another.	1- Classifying Igneous rocks according to their characteristics and locations of origin. 2- Comparing the types of metamorphic rocks to determine the similarities and differences in their characteristics. 3- Explaining the characteristics of sedimentary rocks, the method of their formation, and the best way to classify them. 4- Describing the cycle of rock metamorphism.
9 5-3-2-6-Explaining the causes of stresses affecting the rocks that make up the Earth's interior, and describing the resulting effects.	1- Defining the concept of crack, listing the types of cracks (normal, reverse, lateral, or slip), and distinguishing each type by drawing. 2- Defining earthquakes, seismic waves and their types, and defining the epicenter of the earthquake and distinguishing each of them through drawing. 3- Explaining the phenomena resulting from earthquakes, explaining the reasons of their occurrence, showing their destructive effects, and explaining ways to be safe from them. 4- Listing the different forms of volcanoes (shield, conical, compound, and fissure eruptions), identifying and distinguishing each of them, and providing an example.

Science Learning Area (5) – Grade Nine (9)	
Learning Outcomes	**Indicators**
9-5-3-2-7 Analyzing information and data related to the theory of plate motion and continental drift and predicting its results and benefits.	1- Defining the theory of the earth's plates, their structure and components, listing their types (oceanic and continental), identifying the lithosphere, the plate and the fluid layers, and distinguishing the shape of each of them. 2- Explaining what is meant by moving plate boundaries, listing their types (convergence boundaries, divergence boundaries, and lateral or transformational boundaries), and distinguishing each type. 3- Explaining the relationship of volcano sites and earthquake centers to plate boundaries, showing the effect of divergent plate boundaries, defining rupture pits, and providing an example of them. 4- Explaining the relationship of convergent and divergent plate boundaries to earthquakes and volcanoes. 5- Explaining the results related to the reasons for platelet movement, its benefits, and the positive aspect of it

Science Learning Area (5) – Grade Nine (9) Learning Outcomes	Indicators
3- Earth and space sciences	
3-3 Land and human activity	
9 5-3-3-1-Tracking some of the changes that occurred to the Earth as a result of human activity and exploring the natural hazards that may occur on Earth and how to predict them.	1- Describing the impact of human activity on the future of the Earth and predicting various and adverse changes in human life. 2- Explaining the negative impact of humans on the Earth system, and providing evidence about it. 3- Analyzing data and information about natural events on Earth to comparing them in terms of their effects, and to knowing the role of science in predicting them and limiting their damage. 4- Proposing solutions and means to prevent natural and human hazards and proving their effectiveness.
9-5-3-3-3 Determining the sources of natural resources, ways of managing them, and the importance of preserving and developing them.	1- Describing environmental changes and their negative effects on natural resources and tracks their occurrence over time. 2- Predicting the effects and variables when relying entirely on non-renewable energy sources. 3- Proposing solutions and means to preserve natural resources and protect them from pollution and depletion

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