

Second Stage of Schooling (Grade 4~6)

I. Number and algebra

(I) Recognizing numbers

1. In concrete situation, Recognize numbers greater than 10 thousand; understand the method of decimal counting system; can express large numbers with 10 thousand one hundred millions.
2. Coupled with realistic situations to have a feel on the meaning of large numbers, and can do estimation (Refer to example 23).
3. Able to use numbers to represent objects and move a step further to experience the application of numbers in everyday living. (Refer to example 24).
4. Know the characteristics of the multiples of 2, 3, and 5 and understand the common multiple and minimum common multiple. For all natural numbers within 1 to 100, able to find multiples of all natural numbers less than 10. Able to find common multiples and minimum common multiple of 2 natural numbers that are less than 10.
5. Understand common factor and greatest common factor. Within natural numbers 1 to 100, able to find all factors of 1 natural number. And able to find common factors and greatest common factor of 2 natural numbers.
6. Know natural number, integer, odd number, even number, prime number, and composite number.
7. Coupled with realistic situations, understand the meaning of decimal, fraction and percentile (Refer to example 25), as well as able to carry out conversion of decimal, fraction and percentile (not including the conversion of recurring decimals into fraction).
8. Able to compare the magnitudes of decimals and fractions.
9. In familiar everyday living context, understand the meaning of negative number. And able to use negative numbers to represent some problems encountered in daily life.

(II) Number computations

1. Able to do multiplication of 3-digit numbers by 2-digit numbers, and division of 3-digit numbers by 2-digit numbers.
2. Recognize brackets and can do simple arithmetic mixed operation for integers (mainly 2 steps, not exceeding 3 steps).
3. Explore and understand operation rules (rule of commutation and rule of association for addition, rule of commutation and law of association for multiplication, rule of distribution for multiplication to addition). Able to use operation rules to carry out simple operations.
4. During the process of concrete operation and solving of simple practical problems, able to experience the inverse relations between addition and subtraction, as well as multiplication and division.
5. Able to do simple operations of addition, subtraction, multiplication, and division for decimals and fractions (excluding mixed number) respectively, as well as mixing (mainly 2 steps, not exceeding 3 steps).
6. Able to solve simple and practical problems related to decimal, fraction, and percentiles.

7. In concrete contexts, understand familiar quantitative relations: total price= unit price × quantity, distance = velocity × time, and able to solve simple and practical problems.
8. Able to experience the process of communicating each one's own algorithm with others, and can express one's ideas.
9. Able to select adequate methods to carry out estimation in the process of solving problems (Refer to example 26, example 27).
10. Able to do calculation by means of calculator to solve simple and practical problems, as well as explore simple rules (Refer to example 28).

(III) Expression and equation

1. Able to use letters to represent numbers in concrete situations and context.
2. Coupled with simple practical situation, understand relation of equal quantities, and can represent them with letters.
3. Able to use equation to represent relations of equal quantities in simple contexts (for example, $3x+2=5$, $2x-x=3$); understand the effects of equation.
4. Understand the properties of equality, and able to use property of equality to solve simple equations.

(IV) Direct proportion and inverse proportion

1. Understand the meaning of proportion and proportional distribution in practical situational contexts, and able to solve simple problems.
2. Through concrete context problems to acquire knowledge of quantities in direct or inverse proportions.
3. Able to draw figures on grid paper to depict data with direct proportional relations, as well as to estimate the value of a quantity given a value of the other. (Refer to example 29).
4. Able to give real life examples of direct or inverse proportion, and engage in exchange of ideas.

(V) Explore patterns

Explore the implicit pattern or change tendency of given objects and events. (Refer to example 30, 31).

II Figures and Geometry

(I) Knowing Figures

1. Knowing straight line, segment and ray coupled with practical examples.
2. Experience that amongst all lines connecting two points the segment is the shortest. Know the distance between two points.
3. Know the concepts of straight angle and round angle, as well as the interrelations of round angle, flat angle, obtuse angle, right angle and acute angle.
4. Coupled with everyday living situations, familiarize with the parallel and intersection

relations of two lines (including perpendicular relations).

5. By means of observation and manipulation, acquire knowledge of parallelogram, trapezoid and circle, know fan-shape, and able to draw circles with compasses.
6. Recognize triangles. By means of observation and manipulation, know that the sum of two sides of a triangle is greater than the third side. The sum of interior angles of a triangle is 180 degrees.
7. Recognize isosceles triangle, equilateral triangle, right-angled triangle, acute triangle and obtuse triangle.
8. Able to discriminate amongst the shapes and relative positions of objects, seen from different orientations (front, lateral and top) (Refer to example 32).
9. By means of observation and manipulation, acquire knowledge of cuboids, cube, cylinder, and cone; recognize the nets of cuboids, cube, and cylinder.

(II). Measurement

1. Able to use a protractor to measure the degrees of specified angles, able to draw angles of specified degrees, able to use set squares to construct angles of 30° , 45° , 60° , and 90° .
2. Explore and master the area formulas of a triangle, parallelogram, and trapezoid. And able to solve simple practical problems.
3. Know the area units of km^2 and hectare.
4. By means of manipulation, understand that the ratio of the circumference of a circle to its diameter is a constant, master the use of the circumference formula of a circle, explore and master the use of the area formula of a circle, and able to solve simple practical problems.
5. Able to use grid paper to estimate the areas of an irregular figure (Refer to example 33).
6. By means of real examples, understand the meaning of volume and the units of measurement (metre^3 , decimetre^3 , centimetre^3 , liter, military), able to convert from one units to another. And feel the practical meanings of metre^3 , decimetre^3 , centimetre^3 , 1 liter and 1 military.
7. Coupled with concrete situations, explore and master the computing methods of the volume and surface area of cuboids, cube, cylinder, and the volume of a cone. And can solve simple practical problems.
8. Experience measuring methods for some real objects (such as potato, etc) (Refer to example 31).

(III). Figures and their Movement

1. By means of activities like observation and manipulation, further acquire knowledge of axis-symmetric figures and their axes of symmetry, and able to draw axis-symmetric figures and their axes of symmetry on a grid paper, able to complete a simple axis-symmetric figure on a grid paper.
2. By means of observation and manipulation, acquire knowledge of translation and rotation of a figure on a grid paper, able to use a grid paper to carry out translation of simple figures, and rotation by 90° horizontally or vertically (Refer to example 35).
3. Able to use grid paper to magnify or reduce the size of a figure according to some specified ratio

4. Able to appreciate figures encountered in daily living from the view point of translation, rotation and axis-symmetry, and able to use them to design simple patterns on a piece of grid paper.

(IV). Figures and their positions

1. Understand what scale is. In concrete situations, able to convert a distance on a diagram into practical distance in accordance with the specified scale of the diagram...
2. Able to ascertain the position of an object in accordance with the direction and distance referring to a reference point.
3. Able to describe simple route diagram. (Refer to example 36).
4. In concrete situations, able to represent a position with a pair of numbers (within integers); know the correspondence of a pair of numbers to ascertain position on grid paper (Refer to example 37).

III Statistics and probability

(I). Simple Statistics Data Processing

1. Experience in a simple way processing of collecting organizing, describing and analyzing data. (Use calculator if necessary).
2. Able to design a simple questionnaire in accordance with practical problems. and choose adequate methods (such as investigation, test, or measurement) to collect data.
3. Knowing statistical bar chart, fan-shaped pie chart and broken-line graph, and able to select bar chart or broken-line graph to represent data intuitively and effectively. (Refer to example 38).
4. Experience and learn the meaning of mean, able to obtain the mean, and to explain its meanings from a practical point of view with one's own word (Refer to example 38).
5. Able to acquire some data information from media like newspaper, magazines and television intentionally, and can comprehend simple statistical graphs and tables.
6. Able to explain statistical results, and make simple judgment and prediction according to the results as well as engage in communications. (Refer to examples 38, 40).

(II). Probability of the random event occurrence

1. Experience simple random events by means of practical examples on concrete context problems, and able to list all possible results in a simple random events (Refer to example 41).
2. Through the activities such as experiments and games to experience the possible results of a random event occurrence could be big or small, and able to make qualitative description to the possible results for a simple random event, as well as engage in communications. (Refer to example 41).

IV Synthesis and practice

1. Experience practical activities with concrete goals, designing, procedures and collaborations.

2. In accordance with practical contexts, experience a process that full of explorations, questions, analyzing and solving problems.
3. Through a concrete problem, acquire experiences of proposing ideas and making simple plan to solve a problem with given goals,
4. In accordance with applications and reflections, understand further the knowledge and methods, feel the connections amongst the different branches of mathematical knowledge, and gain experience of mathematical activities (Refer to example 42, 43, 44, 45, 46).