

Mathematics Syllabus
Grade 4

Learning and Teaching Mathematics in Grade Four

Grade Four is the end of the lower primary cycle and is a crucial year for students. Many have found mathematics enjoyable and are confident in their ability to succeed in it. It is important that this enjoyment and confidence continues. Teachers can do much to achieve this.

They can

- be enthusiastic mathematics teachers showing that they enjoy mathematics themselves
- use everyday examples so that students see that mathematics is useful
- use the students' own interests as examples in their lessons to motivate them
- explain to students how important mathematics is for their future careers
- use different activities and teaching methods so that their mathematics lessons are motivating
- make sure that the work given is achievable so that the majority of students have a good chance of being successful
- give praise whenever possible

In Grade Four there are many problems to solve as problem solving is at the heart of mathematics. It is important at this stage that students become confident in their ability to solve problems. Problem solving can be seen as four definite steps

1. understanding the task
2. starting the task
3. doing the task
4. reporting on it

Remember the two important rules when setting problems:

- The problems should not be too difficult for the students. If you give too difficult problems students will decide they can never solve problems and will stop trying.
- The language must be carefully chosen. Your problems are to test mathematical skills and not language skills. The language used must be simple and easily understood by the student so that the problem is clear. Read through each problem with your students before they start solving it so that they know exactly what it means.

The Learning Objectives for Grade Four

- The following level of mathematical knowledge, abilities and skills have to be achieved in Grade Four.
- At the end of Grade Four, students should be able to:
- read, write and order whole numbers up to 1,000,000.
- perform the four fundamental operations on whole numbers up to 1,000,000
- use units of mass, capacity and length.
- extend knowledge of fractions
- recognize and draw a right angle
- describe different cases of positional relations between straight lines.
- acquire basic skills on drawing and construction of geometric figures.
- perform simple exercises on perimeter and area
- recognize solids like cubes, cylinders, spheres and pyramids
- use hours, minutes and seconds
- compare measures of time
- construct and interpret simple bar graphs
- find an average of up to 4 numbers

Unit 1: The whole numbers up to 1,000,000 (25 periods)

Unit outcomes: Students will be able to:

- read, write, compare and order whole numbers up to 10,000
- read and write multiples of 10,000 and 100,000 up to 1,000,000
- read and write whole numbers up to 1,000,000
- identify place value of 6 digit numbers
- compare and order whole numbers up to 1,000,000
- approximate values of numbers by round off numbers to the nearest 10s, 100s, 1000, 10,000s and 100,000s.

<i>Competencies</i>	<i>Contents</i>	<i>Teaching & Learning Activities and Resources</i>	<i>Assessment Techniques</i>
<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> • read whole numbers up to 10,000 • write whole numbers up to 10,000 • compare and order whole numbers up to 10,000 • determine the multiples of 1000 up to 1,000,000 • determine the multiples of 10,000 up to 1,000,000 • determine the multiples of 100,000 up to 1,000,000 • perform addition of two whole numbers which are multiples of 1000 and • perform addition of two whole numbers which are multiples of 1000 and 100,000 • perform subtraction of two whole numbers which are multiples of 1000 • perform subtraction of 	<p>1. The whole numbers up to 1,000,000</p> <p>1.1 revision of whole numbers up to 10,000 (3 periods)</p> <p>1.2 The multiples of 1000, 10,000 and 100,000 (3 periods)</p>	<ul style="list-style-type: none"> • Students read and write whole numbers up to 10,000 • Students in pairs make up sets of five whole numbers up to 10,000 and ask their neighbour to order them. • Students determine the multiples of 1000, 10,000 & 100,000 up to 1,000,000 • Students add and subtract two whole numbers which are multiples of 1000, 10,000, 100,000 & up to 1,000,000 • Compare whole number which are multiples of 1000, 10,000 & 100,000. 	<ul style="list-style-type: none"> • Give exercises on order of whole numbers up to 10,000. • Class work/ Home work exercises on multiples of 1000, 10,000 & 100,000. • Ask students to add, subtract and compare multiples of 1000, 10,000 & 100,000.

Competencies	Contents	Teaching & Learning Activities and Resources	Assessment Techniques												
<p> multiples of 1000 and 10,000 • Perform subtraction of multiples of 10,000 and 100,000 • compare whole numbers which are multiples of 1000, 10,000 and 100,000 • find whole numbers up to 1,000,000 by adding numbers up to 5 digit numbers to multiples of 1000, 10,000 and 100,000 • read whole numbers up to 1,000,000 • write whole numbers up to 1,000,000 • identify the place value of a digit in a 6-digit numeral </p> <p> • compare two whole numbers up to 1,000,000 • order whole numbers up to 1,000,000 in ascending and descending order </p>	<p>1.3 Whole numbers up to 1,000,000 (4 periods)</p> <p>1.4 Place value of 6-digit numbers (5 periods)</p> <p>1.5 Comparing and ordering whole numbers up to 1,000,000 (5 periods)</p>	<p> • Students make a table of the multiples of 10,000 100,000, up to 1,000,000 • Students read whole numbers up to 1,000,000 from constructed table. </p> <p> • Students make a place value table of hundred thousands, ten thousands, thousands, hundreds, tens and ones place given numbers in their correct column </p> <div data-bbox="921 966 1304 1078" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <table style="border-collapse: collapse; text-align: center;"> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;">HTh</td> <td style="border-right: 1px solid black; padding: 2px 5px;">TTh</td> <td style="border-right: 1px solid black; padding: 2px 5px;">Th</td> <td style="border-right: 1px solid black; padding: 2px 5px;">H</td> <td style="border-right: 1px solid black; padding: 2px 5px;">T</td> <td style="padding: 2px 5px;">O</td> </tr> <tr> <td style="border-right: 1px solid black; height: 20px;"></td> <td style="border-right: 1px solid black; height: 20px;"></td> <td style="border-right: 1px solid black; height: 20px;"></td> <td style="border-right: 1px solid black; height: 20px;"></td> <td style="border-right: 1px solid black; height: 20px;"></td> <td style="height: 20px;"></td> </tr> </table> </div> <p> • Students find out numbers between two 6-digit numbers if there is any • Students use the symbols (<, =, >) to compare two 6-digit numbers • Students in pairs write four or five 6-digit numbers and ask each other to order them in ascending and descending order </p>	HTh	TTh	Th	H	T	O							<p> • Class and home work exercises on writing whole numbers up to 1,000,000. • Ask students to tell aloud whole number up to 1,000,000 </p> <p> • Give students 6-digit numbers to put into a place value table. </p> <p> • Ask students to order three-6 digit numbers for homework • Ask students to determine numbers between two given 6-digit numbers </p>
HTh	TTh	Th	H	T	O										

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<i>Competencies</i>	<i>Contents</i>	<i>Teaching & Learning Activities and Resources</i>	<i>Assessment Techniques</i>
<ul style="list-style-type: none"> • use the symbol for approximation • round whole numbers up to 1000 to 10s and 100s • round whole numbers up to 1,000,000 to 10s, 100s, 1000s, 10,000s and 100,000s 	<p>1.6 Approximation of numbers by rounding off. <i>(5 periods)</i></p>	<ul style="list-style-type: none"> • Students understand the importance of approximation in everyday life like in counting populations • Students read and write the symbol for approximation • Students round numbers first to 10s and then to 100s like 6346 \approx 6350 (rounding to tens) 6346 \approx 6300 (rounding to hundreds) • Students continue rounding to a higher place value 	<ul style="list-style-type: none"> • Ask students to distinguish the symbol for approximation from a set of other symbols. • Give students examples of rounding to 10s, 100s and 1000s.

Unit 2: The four operations on whole numbers up to 1,000,000 (41 period)

Unit outcomes: Students will be able to:

- add whole numbers up to 1,000,000
- subtract whole numbers up to 1,000,000.

<i>Competencies</i>	<i>Contents</i>	<i>Teaching and Learning Activities and Resources</i>	<i>Assessment Techniques</i>
<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> • determine the sum of two whole numbers up to 1,000,000 • determine the difference of two whole numbers up to 1,000,000. • use the commutative law and the associative law of addition to solve problems • describe the relationship between addition and subtraction • solve word problems using addition and subtraction • multiply whole numbers by a 1-digit number whose product is less than 1,000,000 • multiply whole numbers by a 2-digit number whose product is less than 1,000,000 • show the commutative law and the associative law of multiplication by giving examples • solve word problems 	<p>2. The four operations on whole numbers up to 1,000,000</p> <p>2.1 Addition and subtraction of whole numbers up to 1,000,000 (11 periods)</p> <p>2.2 Multiplication of whole numbers with product less than 1,000,000 (15 periods)</p>	<ul style="list-style-type: none"> • Students find the sum of two whole numbers using place value. • Students in pairs recall the commutative law for addition and check it with numbers • students use associative property of addition to find sum of three numbers. like $(21 + 76) + 45$ $21 + (76 + 45)$ and let them compare the result. • students find the difference of two whole numbers using place value. • Using numbers students discover that subtraction is not commutative • Students in pairs recall the relationship between addition and subtraction and check it • Students in pairs solve word problems in addition • Students practice multiplication by 1-digit numbers • Let students show how to multiply by 2-digits starting with 2-digit by 2-digits and increasing to 2-digit by 5 digits. • Students in pairs recall the commutative law of multiplication and give examples using two numbers. • Students in pairs recall the associative law of multiplication and give each other examples using four number • Students solve word problems using multiplication 	<ul style="list-style-type: none"> • Ask students to give an example showing the commutative law of addition • Ask students to show that subtraction is not commutative • Students solve problems in addition and subtraction for home work • Ask students to determine the product of a whole number by 1 digit with product less than 1,000,000 • Ask students to do exercise on multiplying a 2-digit number by a 3-digit number, by a 4-digit number followed by a 2-digit number multiplying a 5-digit number • Ask students to give

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<i>Competencies</i>	<i>Contents</i>	<i>Teaching and Learning Activities and Resources</i>	<i>Assessment Techniques</i>
<p>involving multiplication using whole numbers up to 1,000,000</p> <ul style="list-style-type: none"> • divide a given whole number by 1-digit numbers without and with remainder • apply the relationship between multiplication and division to check division problems • solve word problems involving division of whole numbers up to 1,000,000 by 1-digit numbers 	<p>2.3 Division of whole numbers up to 1,000,000 by a 1-digit number and 10 (15 periods)</p>	<ul style="list-style-type: none"> • Let Students practice dividing a 4-digit number up-to a 6-digit number by 1-digit number without and with remainders • Students in pairs recall the relationship between multiplication and division • Students use the relationship between multiplication and division to check division exercises • Students solve word problems using division of whole numbers by a 1-digit number. 	<p>examples showing multiplication is commutative & associative.</p> <ul style="list-style-type: none"> • Ask students to solve word problems using multiplication • Ask and follow students to do exercise in dividing whole numbers by 1-digit numbers. • Ask students to show you the relations between multiplication and division using any two numbers • Give students home/ class work on word problems using division

Unit 3: Fractions and decimals (27 periods)

Unit outcomes: Students will be able to:

- identify fractions as parts of a whole
- compare and order fractions with the same denominator
- add and subtract fractions with the same denominator
- identify and calculate equivalent fractions
- define and use tenths, hundredths and decimals
- compare and order decimals with 2 decimal places
- add and subtract decimals with 2 decimal place

<i>Competencies</i>	<i>Contents</i>	<i>Teaching and learning activities and resources</i>	<i>Assessment Techniques</i>
<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> • represent parts of a whole by fractions • define the terms numerator and denominator of a fraction • identify the numerator and denominator of fractions • compare fractions with the same denominator • order fractions with the same denominator • add fractions with the same denominator • subtract fractions with the same denominator • show equivalent fractions using pictures • find equivalent fractions for a given fraction 	<p>3. Fractions and decimals</p> <p>3.1 Fractions as parts of a whole (4 periods)</p> <p>3.2 Comparison and ordering of fractions with the same denominator (2 periods)</p> <p>3.3 Addition and subtraction of fractions with the same denominator (3 periods)</p> <p>3.4 Equivalent fractions (5 periods)</p>	<ul style="list-style-type: none"> • Using a concrete object or pictures students show fractional parts of a whole. • Students give the contextual meaning to the terms "numerator" "and" "denominator" by using a picture showing parts of a whole. • Students identify the numerator and denominator of a fraction • Students using a fraction strip write the fractions represented by each part like 1/10, 2/10, 3/10, 4/10 and so on • Students using fraction strips compare fractions with the same denominator like 3/10 is less than 5/10 and use the symbol $3/10 < 5/10$ • Students use two similar fraction strips or a number line to add and subtract fractions with the same denominator • Students understand equivalent fractions by using pictures like an orange cut into halves, another cut into quarters and another cut into eighths showing that $\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$ • Show students the steps of finding equivalent fractions 	<ul style="list-style-type: none"> • Ask and follow students to represent parts of a whole with fractions. • Ask students to identify the denominator & numerator of a given fraction • Ask students to show you how to order fractions with the same denominator • For home work give students exercises on adding and subtracting fractions with the same denominator • Ask and follow students to find equivalent fractions for a given fraction

Competencies	Contents	Teaching and learning activities and resources	Assessment Techniques
<ul style="list-style-type: none"> • represent tenths on a number line • represent hundredths on a 10x10 unit square • rename tenths as decimal • rename hundredths as decimals • show place value for decimals to 2 decimal places • compare decimals up to 2 decimal places • order decimals up to 2 decimal places • add decimals up to 2 decimal places • subtract decimals up to 2 decimal 	<p>3.5 Tenths, hundredths and decimals (4 periods)</p> <p>3.6 Comparison and ordering of decimals to 2 decimal places (5 periods)</p> <p>3.7 Addition and subtraction of decimals up to 2 decimal places (4 periods)</p>	<p>examples like: $\frac{1}{2} = \frac{1 \times 6}{2 \times 6} = \frac{6}{12}$</p> <ul style="list-style-type: none"> • Students determine equivalent fractions of a given fraction • Students draw a number line from 0 to 1 and put in tenths. • Let students show how to rename each tenths by its corresponding decimal. like $\frac{3}{10} = 0.3$ • Students represent a few hundredths on a 10x10 square • Show students how to rename each hundredth by its corresponding decimal like $\frac{5}{100} = 0.05$ and also $\frac{25}{100} = 0.25$ • Students change examples of fractions to the corresponding decimal like $\frac{25}{100}$ Birr = 0.25 Birr • Students practice comparing decimals to 1 decimal place solving problems like “A tunnel is 2.8m high. A lorry when loaded reached a height of 2.5 m. Can the loaded lorry pass through the tunnel?” • Student solve similar problems using decimals to 2 decimal places. • Let students order decimals by comparing the numerals having the same place value. • Students in pairs discuss the order of decimals to 2 decimal places through examples like “Order the decimals 2.54, 3.2, 2.62, 2.54, 3.1 starting from the greatest.” and write as $3.2 > 3.18 > 2.62 > 2.54 > 2.53$. • Using the number line marked in decimals to 1 decimal place and the 10x10 square showing hundredths students add decimals • Using the number line marked in decimals to 1 decimal place and the 10x10 square showing hundredths students subtract decimals 	<ul style="list-style-type: none"> • Give students home work (class work) to change fractions of tenths and hundredths to decimals with one or two decimal places and observe their performance. • Ask students to solve problems comparing decimals to 2 decimal places • Give students home work to put in ascending and descending order five decimals • Ask students to do an exercise in adding and subtracting decimals to 2 decimal place

Unit 4: Measurement (18 periods)

Unit outcomes: Students will be able to:

- calculate using different units of length
- calculate using different units of weight
- calculate using different units of capacity

<i>Competencies</i>	<i>Contents</i>	<i>Teaching and learning activities and resources</i>	<i>Assessment Techniques</i>
<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> • convert larger units of length to smaller units • convert smaller units of length to larger units • add units of length • subtract units of length • compare units of length • solve word problems involving units of length <ul style="list-style-type: none"> • explain the unit ton • describe the relationship between a ton and a quintal • convert one units of weight to another units • add units of weight • subtract units of weight • compare units of weight • solve word problems involving units of weight <ul style="list-style-type: none"> • convert liters to milliliters and vice-versa • add units of capacity 	<p>4. Measurement</p> <p>4.1 Measurement of length (6 periods)</p> <p>4.2 Measurement of weight (6 periods)</p> <p>4.3 Measurement of capacity (6 periods)</p>	<ul style="list-style-type: none"> • Students convert km to m and to cm • Students convert m to cm and mm • Students convert m to km and cm to m. so that the result should be expressed in decimals not more than 2-decimal place. • Students add and subtract lengths in km, m and cm by converting first to cm • Students compare lengths of different units by converting all to the same unit. • Students solve word problems involving length <ul style="list-style-type: none"> • Students recognize the unit ton and what it is used to weigh • Students describe the relationship between ton and other units of weight • Students practice adding and subtracting weight using different units. • Students solve word problems involving weight given in different units. • Students convert units from one unit to the other units so that the result should be expressed in decimals not more than 2 decimal place. <ul style="list-style-type: none"> • Let students show various containers which show their capacity and ask them to convert the liters to milliliters and the milliliters to liters. (like : 500 ml to 1/2 l.) 	<ul style="list-style-type: none"> • Ask students to measure length of their desk in m, cm and mm • Give students an exercise for homework on converting, adding, subtracting, comparing and converting various units of length from larger to smaller <ul style="list-style-type: none"> • Ask students to compare the weights of two objects when their weights are given in different units. • Give an exercise on adding and subtracting weights in different units • Give word problems involving weight as class work & homework • Ask students to convert from litres to milliliters and Vice-versa.

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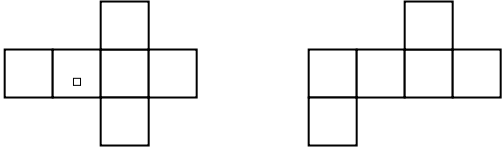
<i>Competencies</i>	<i>Contents</i>	<i>Teaching and learning activities and resources</i>	<i>Assessment Techniques</i>
<ul style="list-style-type: none">• subtract units of capacity• compare units of capacity• solve word problems involving units of capacity		<ul style="list-style-type: none">• Compare different units of capacity.• Students add and subtract different units of capacity• Students solve word problems involving units of capacity	<ul style="list-style-type: none">• Ask students to compare units of capacity.• Ask students to solve word problems using litres and millilitres

Unit 5: Shapes and solids (20 periods)

Unit outcomes: Students will be able to:

- recognize and draw right angles
- describe points, straight lines and planes
- calculate the perimeter and area of rectangles and squares
- recognize and make models of simple solids.

<i>Competencies</i>	<i>Contents</i>	<i>Teaching and learning activities and resources</i>	<i>Assessment Techniques</i>
<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> • Identify right angles in their environment • construct right angles • describe a plane by using the surface of common objects • describe positional relationship between points, lines and planes • define perimeter of shapes • find the perimeter of a rectangle and a square • using non standard measures like unit squares compare areas of rectangles and squares 	<p>5. Shapes and solids</p> <p>5.1 The right angle (3 periods)</p> <p>5.2 Points, straight lines and planes (5 periods)</p> <p>5.3 The perimeter and area of rectangles and squares (7 periods)</p>	<ul style="list-style-type: none"> • Students in pairs look around themselves and identify right angles in the classroom • Students describe right angles using their arms • Students draw right angles using a ruler or objects like the corner of a book • Let the student describe the position of a line with respect to a plane by saying: "The line is above, on or below the given plane like sheet of paper as a plane" • Students show surface of common object like sheet of paper, surface of a solid object (box) to associate with and describe the notion "plane" • Let the student describe the position of a point with respect to a plane by saying "the point is above, on or below the given plane (sheet of paper as a plane)" • Students measure the perimeter of their desk using string and a ruler • Students solve word problems to find perimeter • Students draw small unit squares or use square paper to compare areas of different rectangles and squares • Calculate areas of rectangles and squares by counting the unit squares • Students solve word problems on area and perimeters. 	<ul style="list-style-type: none"> • Ask students to identify right angles from objects they know • Ask students to draw perpendicular and parallel lines using everyday objects to assist them lines. • Ask students to show example of plane using objects • Describe the positional relationship between points, lines and planes. • Give students problems on finding perimeter of a rectangle and a square. • Ask students to compare the area of a rectangle and a square

Competencies	Contents	Teaching and learning activities and resources	Assessment Techniques
<ul style="list-style-type: none"> • find the areas of squares and rectangles • using non standard measure like unit squares • solve word problems on perimeter and area of rectangles and squares. • identity solids in everyday life like cubes, cuboids, cylinders, cones & spheres • identify the similarities and differences of simple solids • make models of simple solids. 	<p>5.4 Simple solids (5 periods)</p>	<ul style="list-style-type: none"> • Bring to class some examples of solids like a match box, a tin, a football, a cone, dice and tell students the mathematical name for each • Students make models of different solids using wire, straws and thread and by making nets like these <div style="text-align: center;">  </div>	<ul style="list-style-type: none"> • Ask students to describe how cuboids, cubes, cylinders and spheres are different from each other • Ask students to name as many solids as they see or use in their everyday life • students make models and decorate them

Unit 6: Time (9 periods)

Unit outcomes: Students will be able to:

- describe the relationship between hours, minutes and seconds
- convert units of time
- compare units of time.

<i>Competencies</i>	<i>Contents</i>	<i>Teaching and learning activities and resources</i>	<i>Assessment Techniques</i>
<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> • describe seconds as a unit of time • describe the relation between hours, minutes and seconds • convert from larger units of time to smaller units • convert from smaller units of time to larger • add units of time • subtract units of time • compare different measurement s of time • solve word problems comparing units of time 	<p>6. Time</p> <p>6.1 Hours, minutes and seconds (3 periods)</p> <p>6.2 Calculations with units of time (3 periods)</p> <p>6.3 Comparison of units of time (3 periods)</p>	<ul style="list-style-type: none"> • Students in pairs identify seconds on a clock • Students discover the relationship between hours, minutes and second using a clock • Students work an exercise converting from hours to minutes, hours to seconds and minutes to seconds • Students work an exercise converting from seconds to minutes and minutes to hours • Students compare units of time using conversion table like “Which time is longer between 2 hours 30minutes and 6000 seconds?” • Students solve problems like “Which boy reached his home first if one left school at 3 in the afternoon and took 30 minutes while the other left school at 12 noon and took 2 hours and 15 minutes? Also find the difference in time to reach their homes?” 	<ul style="list-style-type: none"> • Ask students make a table showing the relationship between hours, minutes and seconds • Ask students to change some hours and minutes to seconds • Ask student to add and subtract unit of time • Ask students questions comparing measurement of time in different units • Give students problems concerning time using different units of time.

Unit 7: Data handling (10 periods)

Unit outcomes: Students will be able to:

- construct bar graphs from data collected
- interpret data from bar graphs
- find average of up to 4 whole numbers.

<i>Competencies</i>	<i>Contents</i>	<i>Teaching and learning activities and resources</i>	<i>Assessment Techniques</i>
<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> • collect and organize data • construct simple bar graph from collected data <ul style="list-style-type: none"> • interpret data and information from a bar graph <ul style="list-style-type: none"> • compute the average of 2 numbers • compute the average of 3 numbers • compute the average of 4 numbers 	<p>7. Data handling</p> <p>7.1 Construction of bar graphs from collected data (3 periods)</p> <p>7.2 Interpretation of bar graphs (3 periods)</p> <p>7.3 Average of up to 4 whole numbers (4 periods)</p>	<ul style="list-style-type: none"> • Students collect data like the favorite fruit of the students in their class and represent it on a bar graph <ul style="list-style-type: none"> • Acquire a bar graph from the newspaper or a Government Department like Education and ask the students in groups to interpret it <ul style="list-style-type: none"> • Students find the average of two numbers like their mark in mathematics and in science • Students find the average of three numbers like their marks in mathematics, science and English • Students find the average of four numbers like their marks in mathematics, science, English and Amharic 	<ul style="list-style-type: none"> • Ask students to collect data from their home like how many are male and how many female and show on a bar graph <ul style="list-style-type: none"> • Ask students interpret a bar graph you have made showing the number of heads and tails from tossing a coin <ul style="list-style-type: none"> • Give students exercises for homework finding the average of 2, 3 and 4 whole numbers