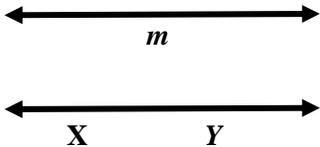
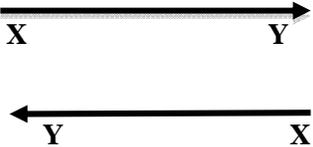


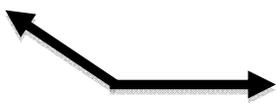
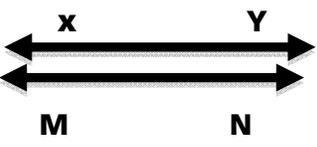
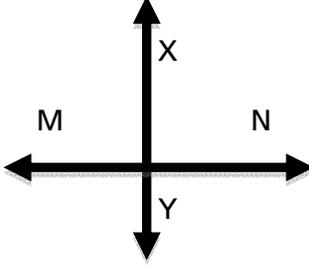
Dear Parents and Caregivers,

Thank you for continually supporting us to help your child achieve success in school. We value your input and active participation in your child's education. It is critical that we share similar academic expectations and keep the lines of communication open at all times so we can identify your child's strengths and weaknesses in mathematics. By doing so, together, we will help your children develop necessary skills and knowledge to help them compute, think, and reason mathematically.

Your child will learn about some basic aspects of geometry in **fourth grade**, as explained in the chart that follows. They will then identify these characteristics in two-dimensional (flat) figures.

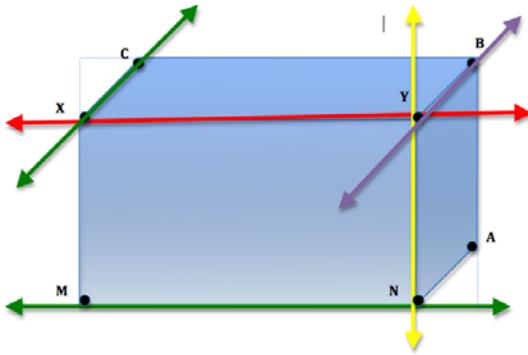
These are some basic terms for fourth grade geometry.

	<p><i>Points.</i> A point has no length, width, or height and is shown by a dot. We use an upper case letter to name a point. A point can be called point P. An example is a dot on a clock or a decimal point.</p>
	<p><i>Line.</i> A line has no start and no end. The arrows indicate that it goes on forever, infinitely, in both directions and so cannot be measured. A line can be named by using one lowercase letter. For example, line m. Another way is to label two points on the line with capital letters and call it, for example, line XY.</p>
	<p><i>Line segment.</i> Line segments are <i>parts</i> of those endless lines but they have beginnings and ends. These lengths can, therefore, be measured. A real world example is the line segment that shows the length of a book. Use any two upper case letters to name the two endpoints of a line segment A and B (see figure to the left). This line segment can also be called <i>BA</i>.</p>
	<p><i>Ray.</i> Part of a line that has one endpoint and goes endlessly in one direction. An example is a ray of sunlight, originating from the sun (endpoint) and then extending infinitely into space. A ray is named by its endpoint and another point on the ray. The top drawing is the Ray XY. The bottom is the Ray YX. Ray XY is NOT the same as Ray YX since their endpoints are not the same and they extend in different directions.</p>

 <p>Acute angle</p>  <p>Obtuse angle</p>  <p>Right angle</p>	<p>Angles. Students learn that an angle is formed when two rays have a common. The common endpoint is called the <i>vertex</i>. The two rays are called the <i>sides</i> of the angle. Angles can be classified according to the measures of the angles. Angles formed by perpendicular lines make a "square" corner, measure 90° and are called <i>right angles</i>. Angles whose measures are less than 90° are <i>acute</i>. Angles whose measures are greater than 90° are <i>obtuse</i>. Angles whose measures are exactly 180° are called <i>straight</i> angles. You can help your child recognize and identify angles in the real world.</p> <ul style="list-style-type: none"> • Open the cover of a book or a pair of pliers just a little to form an <i>acute</i> angle. • A recliner chair leaning back forms an <i>obtuse</i> angle. So does a book opened wide but not flat. • Walls form <i>right angles</i> when they meet the floor and ceiling. Picture frames and notebook paper usually have four right angles.
	<p>Parallel lines are on the same plane but will never touch nor meet. In words we say, "Line XY is parallel to line MN." Symbolically, we can write line XY // line MN. Ask your child to identify parallel lines around them.</p> <ul style="list-style-type: none"> • Sides of a door, drawer, TV set, window, book and napkin are parallel. • Railroad and streetcar tracks are parallel.
	<p>Perpendicular lines. Perpendicular lines form right angles when they meet. In words, we say line XY is perpendicular to line MN. Symbolically, we write "line XY \perp line MN." Ask your child to find perpendicular lines around them.</p> <ul style="list-style-type: none"> • Where walls meet floor, table top meets legs, • Find them in ladders, graph paper, street maps and boxes.

You can help your child understand these geometric terms and definitions by asking your child to point out and give real world examples where they can see each one. These are abstract concepts so it is important to help students make connections to real world representations.

FAMILY SUPPORT. Use the picture of the box (a larger picture is attached for your child) and ask the student to find examples of each of these geometric terms.



1. Find Point C. Name another point. (M, N, A, B, Y)
2. Find Line segment MN. Name another line segment. (XY, YN, XM)
3. Find Line MN. Name another line. (XY, BY, CX)
4. Find Ray YN. Identify another ray. ($NY, YB, YX, XY, CX, XC, MN, NM$)
5. Find Ray NY. Is Ray NY the same as Ray YN? Explain your answer. (*No. Endpoints are different and continue in different directions*)
6. Is Line MN \parallel Line XY? Explain your thinking. Name another set of parallel lines. (*Yes. They are always the same distance apart and will never meet. They are like railroad tracks.*)
7. Is Line YN \perp Line MN? Explain your thinking. (*Yes. They form right angles of 90° where they meet.*) Name another set of \perp lines. ($XM \perp MN$)
8. Can you find a right angle? Explain. (*These are 90° , like "square corners." YXM, XMN, MNY, NYX*)
9. Can you find straight angles? Explain your thinking. (*Straight lines are straight angles. They measure 180° . MN, XY, YN, XM, CB, BA , are all straight angles.*)

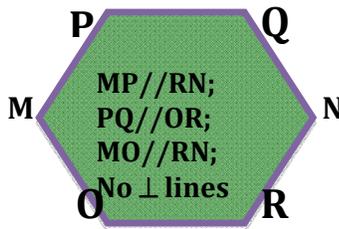
Then or at another time have them identify points, line segments and parallel and perpendicular lines in these figures (also on the student sheet).

Key: \parallel =parallel; \perp =perpendicular lines



$AB \parallel DC; AD \parallel BC$
 $AD \perp DC; BC \perp DC$
 $AD \perp DC; AB \perp BC$

Points: A,B,C,D
Line segments: AB,BC,CD,AD



$MP \parallel RN;$
 $PQ \parallel OR;$
 $MO \parallel RN;$
 No \perp lines

O,M,P,Q,N,R
 PQ,QN,NR,RO,OM,MP



$ST \parallel VU$
 $SV \parallel TU$
 No \perp lines

S,T,U,V
 ST,TV,VU,US

Fourth Grade Teacher

STUDENT STUDY SHEET: PARALLEL AND PERPENDICULAR LINES

