Ganado Unified School District (Career Math 12th Grade)

PACING Guide: Career Math SY 2022-23

	AZ College and Career Readiness Standard	Essential Question (HESS Matrix)	Learning Goal	Vocabulary (Content/Academic)
References:	Standards for Mathematical	Distances.	Timeline & Resources	
McGraw Hill Practical Business Math Procedures	(<i>These will be applied in all units of study.</i>) 1. Make sense of problems and persevere in solving them.	COMMUNICATION		
	 Reason abstractly and quantitatively. Construct viable arguments and critique the reasoning of others. Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of 	SELF & BOCIAL AWARENESS	CARGER	
Points, Lines, and Planes	structure.8. Look for and express regularity in repeated			
Lesson 1-3 Line Segments	reasoning.			
Lesson 1-4 Distance				
Lesson 1-5				

Locating Points on a	MODULE 1	MODULE 1		MODULE 1
Number Line	Tools of Geometry	Too <mark>ls of Geo</mark> metry		Tools of Geometry
Lesson 1-6 Locating Points on a Coordinate Place Lesson 1-7 Midpoints and Bisectors	 G.CO.1 Know precise definitions of geometric terms based on the undefined notion of point, line, distance along a line and distance around a circular arc. G.MG.1 Use geometric shapes, their measures and their properties to describe objects (e.g. modelling a tree trunk or a human torso as a cylinder). 	How are points, lines, and segments used to model the real world?		Analytic geometry Axiom Axiomatic system Betweenness of points Bisect Collinear Congruent Congruent Congruent segments Coplanar Defined term
	G.CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective	COMMUNICATION	CARGER	Definition Directed line segment Distance Equidistant
MODULE 2 Angles and Geometric Figures Lesson 2-1 Angles and	devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.	SELF & BOCIAL AMARENESS		Fractional distance Intersection Line Line segment Midpoint Plane Point Postulate Segment bisector Space
Congruence Lesson 2-2 Angle Relationships	G.GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.			Synthetic geometry Theorem Undefined terms
Lesson 2-3 Two-Dimensional Figures				
Lesson 2-4				
	MODULE 2			

Transformations in	Angles and Geometric Figures	MODULE 2		MODULE 2
the Plane		Angles and Geometric		Angles and Geometric
L	G.CO.1 Know precise definitions of	Figures		Figures
Lesson 2-5 Three Dimensional	geometric terms based on the undefined	5		6
Figures	notion of point, line, distance along a	How are angles and two-		Accuracy
i igui co	line and distance around a circular arc.	dimensional figures used		Adjacent angles
Lesson 2-6		to model the real world?		Angle
Two-Dimensional	G.CO.2 Represent transformations in	Anton		Angle bisector
Representations of	the plane using, e.g. transparencies and			Angle of rotation
Three-Dimensional	geometry software. describes	The second second		Approximate error
Figures	transformations as functions that take	a providence of the		Area
Losson 2.7	points in the plane as inputs and give			Base of a pyramid or
Precision and	other points as outputs. Compare			cone
Accuracy	transformations that preserve distance			Bases of a prism or
,	and angle to those that do not	COMMANDER STROM		cylinder
Lesson 2-8	(e.g. translation versus horizontal		5	Center of rotation
Representing	stretch).	and the second	CARGER	Circumference
Measurements	PEVERFACE			Complementary angles
	G.MG.I Use geometric shapes, their			Component form
	measures and their properties to	1004001115		Concave
	describe objects (e.g. modelling a tree			Cone
	trunk or a human torso as a cylinder).		1 State	Congruent angles
				Convex
	G.MG.3 Apply geometric methods to	SELF & BOCIAL		Cylinder
	solve problems.	ALL MARKERS & STREET,		Edge of a polyhedron
		and the second	1	Equiangular polygon
	G.CO.12 Make formal geometric			Equilateral polygon
	constructions with a variety of tools			Exterior Ease of a polyhodron
	and methods (compass and			Geometric model
	straightedge, string, reflective			Image
	devices, paper folding, dynamic			Interior
	geometric software, etc.). Copying a			Line of reflection
	segment; copying an angle; bisecting			Line of reflection Linear pair
	a segment; bisecting an angle;			Net
	constructing perpendicular lines,			Opposite rays
	including the perpendicular bisector			Orthographic drawing
	of a line segment; and constructing a			Orthographic drawing



	Logical Arguments and Line	MODULE 3		MODULE 3
Lesson 3-4	Relationships	Logical Arguments and		Logical Arguments
Writing Proofs	-	Line Relationships		and Line
Lesson 3-5	G.CO.1 Know precise definitions of	-		Relationships
Proving Segment	geometric terms based on the undefined	What makes a logical		-
Relationships	notion of point, line, distance along a	argument, and how are		Alternate exterior angles
-	line and distance around a circular arc.	logical arguments used in		Alternate interior angles
Lesson 3-6		geometry?		Biconditional statement
Proving Angle	G.MG.3 Apply geometric methods to			Compound statement
Relationships	solve problems.	The second second second		Conclusion
Loccor 2.7		Concernance,		Conditional statement
Dessoli 5-7 Parallel Lines and	G.CO.9. Prove theorems about lines			Conjecture
Transversals	and angles. Theorems include: vertical		- A	Conjunction
	angles are congruent; when a		120	Consecutive interior
Lesson 3-8	transversal crosses parallel lines,	COMMUNIC STICK		angles
Slope and Equations	and compose and in a set also are congruent			Contrapositive
of Lines	and corresponding angles are congruent,		CAREER	Converse
Loggon 2.0	line segment are exactly those			Corresponding angles
Lesson 5-9 Proving Parallel	aquidistant from the segments'			Counterexample
Lines	endpoints	10400125		Deductive arguent
2	enapoints.			Deductive reasoning
Lesson 3-10	C CO 12 Make formal geometric			Disjunction
Perpendiculars and	G.CO.12 Make for man geometric			Equidistant
Distance	and matheda (compass and	SELF & BOCIAL ;		Exterior angles
	and methods (compass and	# min REMESS		Flow proof
	devices paper folding dynamic			If then statement
	geometric software etc.) Conving a			In-then statement
	segment: conving an angle: bisecting			Inductive reasoning
	a segment: hisecting an angle:			Inverse
	constructing perpendicular lines			I ogically equivalent
	including the perpendicular hisector			Negation
	of a line segment: and constructing a			Paragraph proof
	line narallel to a given line through a			Parallel lines
	noint not on the line			Parallel planes
	point not on the mit.			Proof
				Skew lines

	G.GPE.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems.			Slope Slope criteria Statement Transversal Truth value Two-column proof Valid argument
MODULE 4	MODULE 4	MODULE 4	MODULE 4	MODULE 4
Transformations and Symmetry Lesson 4-1	Transformations and Symmetry G.CO.3 Given a rectangle, parallelogram, trapezoid or regular	Transformations and Symmetry How are rigid motions	Transformations and Symmetry -define congruence in terms of rigid motions	Transformations and Symmetry Center of symmetry
Reflections	reflections that carry it onto itself	used to show geometric relationships?	-reflect figures -draw and analyze reflected figures	Composition of transformations
Lesson 4-2 Translations	G.CO.4 Develop and use definitions of rigid motion of rotation, reflection and	Calut 1 h	-translate figures -draw and analyze translated	Line of symmetry Line symmetry
Lesson 4-3 Rotations Lesson 4-4	translation in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	<u></u>	rotate figures -draw and analyze rotated figures	Magnitude Magnitude of symmetry Point of symmetry
Compositions of Transformations	G.CO.5 Given a geometric figure and a rotation, reflection, or translation draw the transformed figure using a g graph	SELF & BODIAL	-draw and analyze figures under multiple transformations -identify tessellations	Point symmetry Regular tessellation Rotational symmetry
Lesson 4-5 Tessellations	paper, tracing paper, or geometry software. Specify a sequence of	AWARENESS	dimensional figures -identify rotational symmetries in	Symmetry Tessellation
Lesson 4-6 Symmetry	transformations that will carry a given figure onto another.		two-dimensional figures	Uniform tessellation
	G.CO.6 Use geometric of rigid motions to transforms figures and to predict the effect of a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.			

MODULE 5	MODULE 5	MODULE 5	MODULE 5	MODULE 5
Triangles and	Triangles and Congruence	T <mark>riangles</mark> and	Triangles and Congruence	Triangles and
Triangles and Congruence Lesson 5-1: Angles of Triangles Lesson 5-2: Congruent Triangles Lesson 5-3: Proving Triangles Congruent: SSS, SAS Lesson 5-4: Proving Triangles Congruent: ASA, AAS Lesson 5-4: Proving Right Triangles Congruent Lesson 5-6: Isosceles and Equilateral Triangles Lesson 5-7: Triangles and Coordinate Proof	 G.GPE.4 Use coordinates to prove simple geometric theorems algebraically. G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. G-CO.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of angles are congruent. G-CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. G.CO.10 Prove theorems about triangles. 	How can you prove congruence and use congruent figures in real- world situations?	 -solve problems using the Triangle Angle-Sum Theorem -solve problems using the Exterior Angle Theorem -show that triangles are congruent -identify corresponding parts of congruent triangles -solve problems using the SSS/SAS/ASA Congruence Postulate -solve problems using the AAS Congruent Theorem -construct congruent triangles -solve problems using the LL, HA, LA and HL Theorem -solve problems involving isosceles and equilateral triangles -write coordinate proofs 	Auxiliary line Base angles of an isosceles triangle Congruent polygons Coordinate proofs Corollary Corresponding parts Exterior angle of a triangle Included angle Included side Interior angle of a triangle Isosceles triangle Legs of an isosceles triangle Principle of superposition Remote interior angles Vertex angle of an isosceles triangle
MODULE 6	MODULE 6	MODULE 6	MODULE 6	MODULE 6

Relationships	Relationships in Triangles	Relationships in	Relationships in Triangles	Relationships in
in Triangles	C CO 0 Prove theorems shout lines	Triangles	salva mahlama using naman digular	Triangles
Lesson 6-1: Perpendicular Bisectors	and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent	How can relationships in triangles be used in real-world situations?	-solve problems using perpendicular bisectors in triangles -solve problems using angle bisectors -solve problems using medians in triangles	Altitude of a triangle Centroid Circumcenter Concurrent lines
Lesson 6-2: Angle Bisectors	and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those		-solve problems using altitudes in triangles -solve problems using inequalities in	Incenter Indirect proof Indirect reasoning
Lesson 6-3: Medians and Altitudes of	equidistant from the segments' endpoints.	THERE IS A	the angles in a triangle -solve problems using inequalities in the angles and sides in a triangle	Median Orthocenter Perpendicular bisector
Lesson 6-4:	G.CO.10 Prove theorems about triangles.		-prove algebraic and geometric relationships by using indirect proof	Point of concurrency Proof by contradiction
Inequalities in One		COMMUNICATION /	-apply the Triangle Inequality	100 m
Triangle	G.CO.12 Make formal geometric constructions with a variety of tools	1000 C	-apply the Hinge Theorem and its	
Lesson 6-5: Indirect Proof	and methods (compass and straightedge, string, reflective		converse	
Lesson 6-6: The Triangle Inequality	devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle;	\bigtriangleup		
Lesson 6-7: Inequalities in Two Triangles	constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.	A WARENESS		
MODULE 7	MODULE 7	MODULE 7 Quadrilaterals	MODULE 7 Quadrilaterals	MODULE 7 Quadrilaterals

Ouadrilaterals	Quadrilaterals			
2		What are the different	-solve problems involving the interior	Base angle of a trapezoid
Lesson 7-1.	G.MG.1 Use geometric shapes, their	types of quadrilaterals, and	angles of polygons	Bases of a trapezoid
Angles of Polygons	measures and their properties to	how can their	-solve problems involving the exterior	Diagonal
ringles of ronggoins	describe objects (e.g. modelling a tree	characteristics be used to	angles of polygons	Isosceles trapezoid
Lesson 7-2:	trunk or a human torso as a cylinder).	model real-world	-solve problems using the properties	Kite
Parallelograms		situations?	of parallelograms	Legs of a trapezoid
_	G.CO.12 Make formal geometric		-solve problems involving the	Midsegment of a
Lesson 7-3:	constructions with a variety of tools		diagonals of parallelograms	trapezoid
Tests for	and methods (compass and	1	-solve problems using the properties	Parallelogram
Parallelograms	straightedge, string, <mark>re</mark> flective	THE PAPER NEW YORK	of rectangles	Rectangle
Losson 7.4	devices, paper foldi <mark>ng</mark> , dynamic		-solve problems using the properties	Rhombus
Lesson 7-4: Rectangles	geometric software, etc.). Copying a		of rhombi	Square
Rectangles	segment; copying an angle; bisecting		-solve problems using the properties	Trapezoid
Lesson7-5:	a segment; bisecting an angle;	NUMBER OF STREET, STREE	of squares	lenge in the second sec
Rhombi and	constructing perpendicular lines,	COMMUNICATION	-solve problems using the properties	
Squares	including the perpendicular bisector	and the second second	of trapezoids	/
1.3	of a line segment; and constructing a	a contract of the second second	-solve problems using the properties	
Lesson 7-6:	line parallel to a given line through a		of kites	
Trapezoids and	point not on the lin <mark>e.</mark>			
Kites		A		
	G.GPE.4 Use coordinates to prove	44	and a second	
	simple geometric theorems			
	algebraically.	Contract of the second second		
		SELF & SOCIAL		
	G-CO.11. Prove theorems about	周期,在我们的55		
	parallelograms. Theorems include:			
	opposite sides are congruent, opposite			
	angles are congruent, the diagonals of a			
	parallelogram bisect each other, and			
	conversely, rectangles are			
	parallelograms with congruent			
	diagonals.			
ΜΟΠΙΊΕ				
		MODULE 8	MODULE 8	MODULE 8
Similarity	NIUDULE 8 Similarity	Similarity	Similarity	Similarity
	Similarity			-

Lesson 8-1: Dilations Lesson 8-2: Similar Polygons Lesson 8-3: Similar Triangles AA Similarity	G.SRT.2 Given two figures, use the definition of similarity in terms of similarity transformation to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	What does it mean for objects to be similar, and how is similarity useful for modeling in the real world?	 -draw and analyze dilated figures using tools or functions -solve problems using the definition of similar polygons -solve problems involving identifying the corresponding parts of similar polygons -solve problems involving identifying similar polygons based on 	Center of dilation Dilation Enlargement Midsegment of a triangle Nonrigid motion Reduction Scale factor of a dilation Similar polygons Similarity ratio
Lesson 8-4: Similar Triangles SSS and SAS Similarity Lesson 8-5: Triangle Proportionality Lesson 8-6: Parts of Similar Triangles	 G.SRT.4 Prove theorems about triangles. G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. G.GPE.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems 	COMMUNIC ATION	corresponding sides and angles -solve problems using the AA Postulate of triangle similarity -solve problems involving parts of similar triangles -solve problems using the SSS and SAS Theorems of triangle similarity -prove geometric theorems using triangle similarity -use the Converse of the Triangle Proportionality Theorem to determine	Similarity transformation Similar triangles
	 G.CO.10 Prove theorems about triangles. G.CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a 	SELF & SOCIAL, AMARENESS	if lines are parallel -solve problems and prove relationships using the Triangle Midsegment Theorem and its corollaries	



Timeline &	AZ College and Career	Essential Question	Learning Goal	Vocabulary
Resources	Readiness Standard	(HESS Matrix)		(Content/Academic)
MODULE 9	MODULE 9	MODULE 9	MODULE 9	MODULE 9
Right Triangles	Right Triangles and Trigonometry	Right Triangles and	Right Triangles and Trigonometry	Right Triangles and
and	C SPT 4 Prove theorems about	Trigonometry	-solve problems using geometric	Irigonometry
Trigonometry	triangles	How are right triangle	mean and relationships between parts	30-60-90 triangle
ingonomeny	unungreb.	relationships useful in	of a right triangle when an altitude is	45-45-90 triangle
Lesson 9-1:	G.SRT.5 Use congruence and	solving real-world	drawn to the hypotenuse	angle of depression
Geometric Mean	similarity criteria for triangles to	problems?	-solve problems suing the	angle of elevation
Loggon 0.2.	solve problems and to prove	Constant and the	Pythagorean Theorem and its	cosine
The Pythagorean	relationships in geometric figures.		-graph points and find distances using	geometric mean
Theorem and Its	G.SRT.6 Understand that by		the Distance Formula in three	inverse cosine
Converse	similarity, side ratios in right triangles	0.0243-02400000000000000000000000000000000	dimensions	inverse sine
Losson 0.3.	are properties of the angles in the	COMMUNICATION	-solve problems using the properties	inverse tangent
Coordinates in Space	triangle, leading to definitions of	and the second sec	of 45-45-90 and 30-60-90 right	octant
	trigonometric ratios for acute angles.		triangles	ordered triple
Lesson 9-4	G SRT 7 Explain and use the		-solve problems using the	Pythagorean triple
Special Right Triangles	relationship between the sine and	STACES.	-derive and use a formula for the area	solving a triangle
	cosine of complementary angles.	AA	of a triangle using trigonometry	tangent
Lesson 9-5:			-solve problems using the Law of	trigonometric ratio
Trigonometry	G.SRT.8 Use trigonometric ratios and	CPUP IS NOTIAL	Sines and the Law of Cosine	trigonometry
Lesson 9-6.	the Pythagorean Theorem to solve	A MARSHESS	-determine whether there given	
Applying	right triangles in applied problems.	and other states and	triangles using the Law of Sines	
Trigonometry	G.SRT.9 Derive the formula A=		thangles using the Law of Silles	
Loggon 0.7.	$(1/2)$ ab sin \bigcirc for the area of a triangle			
The Law of Sines	by drawing an auxiliary line from a			
	vertex perpendicular to the opposite			
T 0.0	side.			
Lesson 9-8: The Law of Cosines	G.SRT.10 Prove the Laws of Sines			
The Law of Cosines	and Cosines and use them to solve			
	problems.			

MODULE 10	MODULE 10	MODULE 10	MODULE 10	MODULE 10
CIRCLES	Circles	Circles	Circles	Circles
Lesson 10-1 Circles and Circumference	G.C.1 Prove that all circles are similar.	How can circles and parts of circles be used to model situations in the real world	-use the formula for circumference of a circle -prove all circles are similar	adjacent arcs arc arc length
Lesson 10-2 Measuring Angles and Arcs	relationships among inscribed angles, radii, and chords. -relationship between central, inscribed angles:		-ind measures of angles and arcs using the properties of circles -solve problems using the relationships between arc, chords, and diameters	central angle of a circle chord of a circle circle circumscribed angle
Lesson 10-3 Arcs and Chords	-inscribed angles on a diameter are right angles;	1,00,000,000,000	-solve problems using inscribed angles	circumscribed polygon common tangent
Lesson 10-4 Inscribed Angles	to the tangent where the radius intersects the circle.	COMMUNIC STICK	-solve problems using inscribed polygons -solve problems using relationships	concentric circles congruent arcs degree
Lesson 10-5 Tangents	G.C.3 Construct the inscribed and circumscribed circles of a triangle.		-construct inscribed and circumscribed circles -use equations of circles to solve	directrix focus inscribed angle
Lesson 10-6 Tangents, Secants and Angle Measures	G.C. 4 Construct a tangent line from a point outside a given circle to the circle.	A	problems -graph equations of parabolas	inscribed polygon intercepted arc major arc minor arc
Lesson 10-7 Equations of Circles	G.C.5 Derive using similarity the fact that the length of the arc	SELF & BOCIAL		parabola pi
Lesson 10-8 Equations of Parabolas	intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.			point of tangency radian radius of a circle secant semicircle tangent to a circle
	G.GMD.1 Given an informal argument for the formulas for the circumference of a circle, area of a			



MODULE 11	MODULE 11	MODULE 11	MODULE 11	MODULE 11
Monsuromont	Measurement	M <mark>easurem</mark> ent	Measurement	Measurement
Measurement Lesson 11-1 Areas of Quadrilaterals Lesson 11-2 Areas of Regular Polygons Lesson 11-3 Areas of Circles and Sectors Lesson 11-4 Surface Area Lesson 11-5 Cross Sections and Solids of Revolution Lesson 11-6 Volume of Prisms and Pyramids Lesson 11-7 Volume of Cylinders, Cones, and Spheres Lesson 11-8 Applying Similarity to Solid Figures Lesson 11-9 Density	Measurement G.MG.2 Apply concepts of density based on area and volume in modelling situations (e.g. persons per square mile, BTUs per cubic foot). G.MG.3 Use volume formulas for cylinders, pyramids, cones and spheres to solve problems. G.GMD.1 Analyze and verify the formulas for the volume of a cylinder, pyramid, and cone. G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems utilizing real-world context. G.GMD.4 Identify the shapes the shapes of two-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	Measurements of two- and there-dimensional figures useful for modeling situations in the real world?	Measurement -find areas of quadrilaterals using formulas -find areas of regular polygons using formulas -find areas of circles and sectors using formulas -find surface areas of there- dimensional solids -identify cross sections of three- dimensional solids -identify three-dimensional objects generated by rotations of two- dimensional objects -find volumes of similar two- and there-dimensional figures -solve real-world problems involving density using area and volume	Measurement Altitude of a parallelogram Altitude of a prism or cylinder Altitude of a pyramid or cone apothem axis of a cone axis of a cone axis of a cylinder axis symmetry base edge base of a parallelogram center of a regular polygon central angle of a regular polygon chord of a sphere composite figure composite figure composite solid congruent solids conic sections cross section decomposition density diameter of a sphere height of a parallelogram height of a trapezoid lateral area lateral edges lateral faces lateral surface of a cone
Density				lateral faces lateral surface of a c lateral surface of a cylinder

