2019-20 DIFFERENTIATED GEOMETRY

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Welcome to Differentiated Geometry! You are about to begin an exciting course, but also one different from Algebra 1-2 (both content and rigor) as well as one that will be much more rigorous than the "regular" geometry course offered at WHS. Algebra 1-2 was a more procedural-based course where there was often a distinct procedure that could be followed step-by-step. Diff. Geometry, on the other hand, is more of a problem-solving based course. This means there are often multiple ways to solve a problem, and each problem may feel different than the preceding one. In geometry you are given tools, then asked to select the appropriate tools to solve the problem. Problem solving can be challenging at the beginning of the year and you may initially find it more challenging than Algebra 1-2. Your thinking skills will be pushed early and often in this course. Several factors that affect your success in Diff Geometry include:

- Your Algebra 1-2 skills
- Your ability to justify, explain, and defend your reasoning. (You will hear me use the phrase, "convince yourself…convince a friend…and convince a skeptic.)
- Your willingness to persevere when a solution is not immediately obvious. (You will hear me use the phrase "productive struggle" as we move through the course.)
- Your willingness to study the vocabulary and theorems and learn new tools.
- Your willingness to ask questions. Questions show a desire to truly understand concepts and help clarify ideas.
- Your willingness to come in for help, *even if you have never needed to do this before!*
- Your willingness to COMPLETE THE HOMEWORK. Practice counts and makes a huge difference both in terms of your grade and your understanding.
- Your willingness to think outside the box and consider alternate perspectives.

To capture my philosophy in teaching Diff Geometry, I use four simple words, **"Just Think About It."** I will say this phrase often. I want my students to simply think.

Comparing Differentiated Geometry and a Proposed Advanced Algebra 3-4 (for 2020-21):

All students who demonstrate success in 8th Grade Algebra and a select few who excel during 9th Grade Algebra are recommended for Diff Geometry. District 145 staff do not consider a cut score on the MAP test or a certain grade in class. (Students who do not demonstrate success in 8th Grade Algebra repeat Algebra during their 9th grade year.) Placement into Advanced Algebra 3-4 will be different. This will be addressed below and a later time.

The collective purpose of Diff Geometry is to continually expose students to an environment that focuses on all seven of the District Essentials (The seven are underlined below and summarized in more detail on the last page of this syllabus.) You will be consistently asked to collaborate in small and larger group settings, both with peers you consider to be your friends and those who you do not necessarily hang out it. You will be consistently asked to communicate

your thinking, verbally and on paper (i.e., show your work at all times). You will be consistently asked to problem solve and deepen your capacity as a critical thinker and creative thinking to solve problems. You will be asked to assess your confidence as a learner on every exam, reflecting afterwards to verify that you have an accurate picture of your confidence and more importantly that your confidence is growing. Finally, Diff Geometry will afford you opportunities daily to work on your independent and responsible citizen skills!

Throughout this course, Dr. Hartman will be observing your capacity with these district essentials as well as your general thinking skills. How quickly do you grasp a concept? How well can you communicate your understanding of concepts to others? How much day-to-day algebra have you retained from your past? Dr. Hartman will also be examining your standardized MAP scores, performance in last year's algebra 1-2 class, input from last year's teacher, and demonstration on an Advanced Algebra 3-4 placement test. Dr. Hartman will also individually talk with each of you about your thoughts of math in general.

Based on a comprehensive review, some students will be placed in an Accelerated Algebra 3-4 class next year. Others will be placed in the traditional Algebra 3-4 course offered. The Accelerated course will not simply focus on a deeper exposure to the district essentials; rather the Accelerated course will move through Algebra 3-4 faster, deeper, and with the expectations that students are firm in their procedural and conceptual background from Algebra 1-2. More information regarding Accelerated Algebra 3-4 will come as the year progresses. Please note: Just because you are in Diff Geometry does not mean you will be placed in Advanced Algebra 3-4. I take very seriously each students path of learning. For a good fifteen of my last twenty-five years of teaching I have had the following phrase above my front board:

Dr. Hartman's Goals for You:
Success & Opportunity

I want the best for each one of my students; thus, I am very intentional and purposeful in the decisions I make for my daily classroom instruction, assessments I give, and future placements of students. I've been on both sides of this issue myself in the past…being placed in a more accelerated class and not being placed in a different accelerated class. I have also been on both sides of this issue in regards to my own daughters. Every single time I have found the decision was the absolute correct decision. All students successful in 8th Algebra and a select few who excelled in 9th Algebra moved into Diff Geometry. We will use a different lens, especially examining your specific algebra skills, to place students in Advanced Algebra 3-4. I wanted to "begin" to communicate this information early in this course.

Grading: A (100-94) B (93-86) C (85-78) D (77-70) F (Below 70)

Breakdown: 80% Summative *("of" learning…demonstrating what you have learned)*

70%: tests, projects, and test corrections

10%: semester final exam.

20% Formative *("for" learning…the process along the way)*

Purposeful homework, quizzes, projects, reflections on corrections

Tests: Tests are purposely designed to include some problems where students must apply what they have learned in class in a slightly different situation. In the future students will be asked to do similar problem solving when they take the ACT test. Thus, this approach to testing will help prepare students for future success. I will make sure students know in advance all the necessary elements/ideas, but students will need to determine an appropriate approach and apply it to solve problems. It is expected that all summative tests will be completed in one class period.

Test Corrections: In lieu of retesting, students will have the opportunity to work through test corrections to earn as much as 50% of the missed points back on a chapter test*. (*Note: to prevent "leapfrogging" and recognize those who earned an "A" on the original test, the highest possible grade a student, who did not earn an "A" on the original test, can earn following test corrections is a 94%.) The test correction process includes self-reflection, item analyses, correcting missed problems, explaining errors, and then offering even more reflection! Note: ALL students must complete the first test correction.

Semester Final: This exam will be a multiple choice.

Projects: There will be a few chapter projects assigned in conjunction with chapter tests as well as in lieu of chapter tests. These projects, which you will complete outside of class, will afford you time to put together your best effort towards demonstrating an understanding of the concepts found in the chapter.

Quizzes: There will be a mix of traditional in-class quizzes, pop quizzes, partner quizzes, homework quizzes, take-home quizzes, etc. to gauge students level of understanding throughout the quarter. <u>There will be no retakes or corrections on quizzes</u>.

Homework: Students will have an assignment almost every night. I am purposeful in what I assign. I view homework as important practice that students and I can use the gauge growth as well as areas of struggle. Putting forth effort on each problem is more important than getting every problem correct. Several assignments will include the answers in the back of the book. Again, I am more concerned with the work and reasoning behind those answers. Homework will be graded a variety of ways, including turning it in, self-grading, peer grading, posting a solution/work on the board, or most often a mere completion grade. The bottom line is that students must learn to use the assigned homework problems as an opportunity to practice and figure out what they are "C" confident in, "S" shaky on, or need to "R" relearn.

Cheating: This is pretty simple. Cheating will not be tolerated on homework, quizzes, test, or the final. Students caught cheating on <u>homework</u> will receive a zero and an email will be sent home. Students caught cheating on <u>homework a second time</u> will receive a zero, will make a phone call home with Dr. Hartman at their side, and be referred to administration. Students caught cheating on a <u>quiz</u> will receive a zero, will make a phone call home with Dr. Hartman at their side, and be referred to admin. Students caught cheating on a <u>test</u> will make a phone call home with Dr. Hartman at their side and be referred to admin. Unfortunately for Dr. Hartman, he will have to take the time to make an alternate version of the test. The student will then take the alternate test. The student's score will be prorated, setting the highest possible score as a 70%. (Thus, scoring an 82% on the exam would result in 57.4 in the gradebook.) Students caught cheating on the <u>final</u> will receive a zero, will make a phone call home with Dr. Hartman at their side, and be referred to admin. There will be no second chance on a final.

Image of Grading Work:

Grading (on a 5 point scale)			
Code*	Gradebook Value		Code Explanation (WHS Grading)
5	A (100%)	Mathematically Sound	College Preparation Proficiency
4	B (91%)	Minor Error(s)	College Preparation
3	C (81%)	Gray Area--some Major *minor* error(s) or some Minor *major* error(s)	Approaching Basic Proficiency
2	F (68%)	Major Error(s)	Below Basic Proficiency
1	F (50%)	Minimal Progress	
0	F (0%)	Nothing of Mathematical Value / Blank / Missing	

*Note: There is a **second** image of grading work located at the end of this syllabus.*

Phones: We all know that phones are both amazing and problematic (and addicting) at the same time. I have witnessed too many students (and adults) abusing their phones during learning opportunities for years now…and driving...and the movies…etc. It really is an addiction for too many in life, teens and adults. (What does your screen time say???) We are dealing with many consequences as a society due to this "addiction." I expect for phones to not be out unless we need them for an activity. From my experience teaching any math class, students who want success in the class are willing to "ignore" their phone for 50 minutes! Naturally if the phone becomes a distraction to other students' learning opportunities and my own instructional opportunities, then I will have to address it. Also, you cannot use your phone as your calculator in this class. You need a separate calculator for class! Further, phones are to be given to Dr. Hartman anytime a student needs to use the restroom (or get a drink).

Missing Class (illness, etc.): Recognizing that "life happens," students should be aware that the class does move on even if they are not in class! When they are gone, (a) students should check my website to find out if there is an assignment posted and (b) contact a peer in the class to find out what you missed. Students can always send me an email if they need clarification.

Missing Class (sports, clubs, school related activities, etc.): This is a different story. Students need to communicate with me ahead of time. Work should be completed and turned in before a student is gone. If a student is going to miss a test or quiz, they need to make it up in advance (or have an approved plan set up with me.) It is not acceptable to show up that day following a school-related activity and say, "what did I miss yesterday?"

Classroom Rules: **S.O.A.R.**

S – Safety (this is #1)
O – Opportunity (for students to learn and me to teach!)
A – Attendance (be here and on time)
R – Respect &
Responsibility (these two are big in life)

Calculator: While any basic scientific calculator that includes square root is sufficient for this course, a graphing calculator is preferred. Most students will likely be using a graphing calculator in future high school and (most definitely) in college math classes. Now is a good time to CONSIDER learning "how" to use it! The best on the market is in the family of the TI-84+ graphing calculators. (If you do purchase one, please bring me the 'points' on the package!)

Textbook: Students are responsible for taking care of their school-provided text. Students should have access to their book in class and at home. There are no extra books in the classroom.

Course Requirements:

* 3-ring binder (for handouts, worksheet, quizzes, etc.)
* 3-hole punched, lined notebook paper in the binder.
* Scientific or graphing calculator (one in the family of the TI-84+)
* Plenty of pencils and erasers (as well as a few pens)

Communication: Email is the best way! David.Hartman@District145.org. I also am diligent about using a website.: drdhartman.com I usually post assignments daily. This is helpful for students, especially when they miss class. My website also allows parents and guardians the opportunity to know what we are doing in class. I encourage all involved to take the time to bookmark my website; also spend some time getting to know more about my personal and professional background.

Final Comment #1: My oldest daughter started her senior year this fall at WHS; my youngest started 9th grade. My daughters and all of their Waverly peers are the reason I came to this district five years ago. I'm so excited for this year. Yet while I am so excited for both of them, I continue to be nervous like any parent. Lauren and Brianna mean the world to me! I want both to have a safe and meaningful experience each and every day. I expect nothing less than the best from this school, my fellow staff members that will work with them, and their fellow classmates who interact with them more than I do. I know you love your children as much as I love mine. You expect the best for them in my classroom at all times. I keep this in mind everyday.

Final Comment #2: Balance! Some of us are involved in a lot! Balance seems to be a challenge for most teenagers (and adults). From sports and clubs to work and family time, keeping a healthy balance is a necessity for all! Being a husband, father, teacher, department chair, student council co-sponsor, quiz bowl sponsor, marching band "watcher," NWU stats instructor, Bryan stats instructor, and multi-dog owner, I also struggle with balance every week. I understand when your child feels a bit overwhelmed during various times of a course.

A Second Image for Problem Scoring in Dr. Hartman's Classroom:

Generic Rubric: At each course level I teach and for each problem I assign, I seek to assess your content knowledge and problem solving as well as the justification of the solution provided by you. In assigning scores to your work, I hold this image for scores based on a your overall percentage of progress toward a correct answer with sufficient justification.

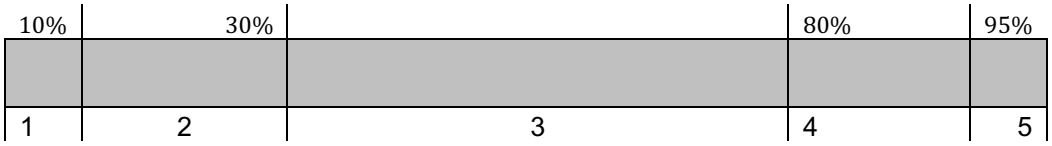

Image of Scores based on Percentage of Work's Correctness & Completeness

Level 5 – A correct answer. The solution is correct and the work shown is sufficient to demonstrate the answer is correct. The justification is satisfactory given your grade level (and course) and the explanation requested. Any errors or shortcomings in the correctness or completeness of the justification are so minor that in comparison with the quality of the solution, it is appropriate to ignore them.

Level 4 – Errors are minor. There is much of value in your solution and justification that merits the assessment that the solution is close to being correct and the justification appropriate. The work does include some minor errors (in the solution or the logic of the justification) or is incomplete in some way that results in the work falling short of being a completely correct answer.

Level 3 – Major errors. Some part of the solution or justification offers work that demonstrates that you have reasonable knowledge of the mathematics that needs to be used to solve the problem or to provide a justification, but at the same time the work (solution or justification) has major errors or (in the case of the justification) is missing.

Level 2 – Minimal progress in solving the problem (and justifying the answer). Answers (solution and justification) are incorrect but the work provided indicates that you have some understanding of the mathematics needed to solve the problem or explain your work. The work clearly falls short of offering evidence that "you have reasonable knowledge of the mathematics that needs to be used to solve the problem or provide a justification."

Level 1 – No mathematical work of value is included. The work provided offers no evidence that you have an understanding of the mathematical work needed to solve the problem and explain a solution. Numbers may be written or a diagram drawn, but no important part of the work is correct.

Level 0 – Problem was not attempted / is missing.

Note: Your **justification** should be consistent with the wording in the problem.

- Show all work; (No explicit explanation is needed as your work should justify your answer.)
- Show how you found your answer. Be more explicit…use words, diagrams, etc.
- How do you know this (i.e., your answer) is correct? Without a doubt use words, etc.
- Explain your reasoning. Ditto.
- Justify your answer. Ditto but start to be more formal.
- Prove that your answer is correct. Be formal whether 2-column, paragraph, flowchart.

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Diff Geometry

Semester 1

WHS Diff Geometry—Semester 1—Concepts and Skills—Tentative and Subject to Change!	WHS Section	2017-18 Date
Transformations, Dilations, and Similarity Transformations		
Draw translations; draw translations in the coordinate plane.	4.1	
Draw reflections; draw reflections in the coordinate plane.	4.2	
Draw rotations; draw rotations in the coordinate plane.	4.3	
Draw dilations; draw dilations in a coordinate plane.	4.5	
Identify similarity transformations, and verify similarity after a similarity transformation.	4.6	
Chapter 4 has a summative M/C test and a take-home project. (Use of GeoGebra, Khan, Mathisfun.com, and game: "transtar")		
Understand Basic Concepts, Linear Relationships, and Angle Relationships		
Identify and model points, lines, and planes.	1.1	
Measure segments.	1.2	
Introduction to postulates	1.2	
Find distance between points (include pythag perspective). Find midpoint of a segment. (Both patty paper & compass)	1.3	
Measure, classify, and use congruent angles and bisectors. (Both copy an angle and bisect an angle with compass)	1.5	
Identify and use special pairs of angles.	1.6	
Chapter 1 has a summative test.		
Logic, Inductive Reasoning, Deductive Reasoning, and Proof		
Analyze conditional statements. Write converse, inverse, and contrapositive statements.	2.1	
Use inductive reasoning, make & test conjectures, and find counter examples.	2.2	
Use deductive reasoning and laws of logic.	2.2	
Point, line, and plane postulates.	2.3	
Algebraic proofs. (Give a bank of properties; use strips of paper and then skeleton proof for 2-column)	2.4	
Feromax proofs F1-F6	Post 2.4	
Segment and angle proofs.	2.5	
Angle proofs (Give bank of postulates; strips of paper & skeleton proof for 2-column; introduce flowchart & paragraph)	2.6	
Chapter 2 has a summative test. (Use of videos for conditionals, Feromax.com proofs)		
"Euclid The Game" Computer Activities		
Angle Relationships with Parallel (and Perpendicular) Lines		
Identify relationships between lines or planes. Identify parallel and perpendicular lines. Name angle pairs formed by two lines and transversals.	3.1	
Use theorems to determine relationships between pairs of angles given parallel lines and transversals. (Consider using geogebra to investigate)	3.2 & 3.3	
Feromax proofs F7-F13; F24-F26 (include diagram for F13 and F24-F26)	3.2 & 3.3	
Theorems with perpendicular lines (be brief)	3.4	
Slopes & equations of parallel/perpendicular lines….review (Optional…2016-17 used Flashback Fridays)	*(3.5)*	
Chapter 3 has a summative test. (Use of Feromax.com proofs)		
Triangles and Congruence; Equilateral and Isosceles Triangles		
Classify triangles and find angle measures; Angle theorems (tear off "corners"; proof ext. angle thm)	5.1	
Relating side and angle measures in triangles; triangle inequality theorem	6.5b	
Congruent polygons; corresponding parts; find angle measures (possible intro to anglegs)	5.2	
Equilateral and Isosceles Triangles (anglegs)	5.4	
Prove triangles are congruent. (generic sense…an introduction)		
Use SAS and SSS to prove triangles congruent. (anglegs)	5.3 & 5.5	
Use AAS and ASA to prove triangles congruent. (anglegs)	5.6	
Using congruent triangles.	5.7	
Feromax proofs F27-F30; F36-F37; CHALLENGE F39 (include diagram for F29 and F39)	Post 5.6	
Chapter 5 has a summative test. (Use of anglegs; Feromax.com proofs)		
Similar Triangles (Proportional Relationships) only START this before the S1 final!		
Start…Similar polygons; use scale factor to solve problems. (Connect back to dilation.)	8.1	
Start…Prove triangles are similar. (Generic sense…an introduction)		
Start…Use AA to prove triangles similar. (Shadow outside to determine height of flagpole/tree)	8.2	
Start…Use SSS and SAS to prove triangles similar.	8.3	
Chapter 8 has a formative quiz.		

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Diff Geometry

Semester 2

WHS Diff Geometry—Semester 2—Concepts and Skills—Tentative and Subject to Change!	WHS Section	2017-18 Date
Similar Triangles (Proportional Relationships) continuation as we start S2 START		
Review 8.1/8.2/8.3		
Proportionality theorems. (Use geogebra)	8.4	
Feromax proofs F32-F35 (include diagrams for all F32-F35)		
Chapter 8 has a partner test on similarity		
Special Right Triangle Properties; Right Triangle Trig		
Simplify radicals (supplement as needed)	9.0	
Use the Pythagorean theorem and its converse.	9.1	
Use properties of 30-60-90º and 45-45-90º triangles.	9.2	
Investigating similar right triangles	9.3	
Find and use trig ratios in right triangles. (Sin-Cos-Tan)	9.4 & 9.5	
Solve problems using trig (including angles of elevation and depression)	9.4 & 9.5	
Completely "solve" a right triangle	9.6	
Chapter 9 has a summative test. (Spent 16-18 school days on trig! Heavy hitter for Geom!)		
Properties of Parallelograms as well as Rectangles, Rhombi, Squares, and Trapezoids		
Quadrilateral naming and classification	7.0	
Recognize and apply properties of sides, angles, and diagonals of parallelograms	7.2	
Ways to prove a quadrilateral is a parallelogram	7.3	
(Not essential if time is limited…give brief overview if needed) Recognize and apply the properties of rectangles, squares, and rhombi as well as trapezoids and kites	7.4 & 7.5	
Feromax proofs F31; F16-F23; F38 (include diagrams for F20, F22-F23, F38)		
Chapter 7 has a summative test.		
Using Perimeter and Area Formulas of Geometric Figures and find Surface Area		
Identify and name polygons. Interior and exterior angle theorems	7.1	
Review finding area perimeter and area of triangles, parallelograms, and trapezoids (supp. materials; include trig)		
Review finding areas of rhombi and kites	11.3	
Find areas of regular polygons (use trig)	11.3	
Polyhedra; Euler's theorem; Identifying and naming 3-D figures (supp. materials in addition to 11.4)	11.4	
Describing cross sections and solids of revolution	11.4	
Chapter 11a has a summative test and the start of a project		
Surface Area and Volume		
Dan Meyer's Cabinet Sticky Note problem		
NCTM net activity (cube)		
Explore nets of three-dimensional figures. (geo-solids)		
Review the basics of finding surface area (11.0 and supp. materials)	11.0	
Find surface area of prisms, cylinders, pyramids, cones (11.7), spheres (11.8) (orange activity). (supp. materials)	(11.7; 11.8)	
Find volumes of prisms and cylinders. (geo-solids)	11.5	
Find volumes of pyramids and cones (geo-solids) (Rice)	11.6 & 11.7	
Find the volume of spheres. (Playdoh transparency activity)	11.8	
Chapter 11b has a summative test and the second part of the project		
Finding the value of circular "parts"; Angle and Segment Relationship in Circles		
Independent study (and with peers) to learn chapter 10…capstone to the course		
Identify and use part of circles; intersecting circles; tangent theorems	10.1	
Identify central angles, major and minor arcs, semicircles and their **measures**.	10.2	
Find circumference and arc **length**	11.1	
Areas of circles and sectors	11.2	
Major quiz-test A		
Use chord relationships	10.3	
Find measures of inscribed angles. Find measures of angles of inscribed polygons.	10.4	
Find measures of angles formed by lines intersecting on, inside and outside a circle.	10.5	
Find measures of segments that intersect inside and outside a circle.	10.6	
Major quiz-test B		
Write equations of circles. Graph circles on the coordinate plane.	10.7	
Minor quiz-test C		
Chapter 10 has a summative test.		

Students in District 145 will be:

Confident Learners

•Recognize, discover and pursue opportunities for success
•Set personal goals that are challenging yet attainable
•Are independent and believe they are capable
•Take risks and learn from mistakes

Collaborators

•Are willing to work with others towards a common goal
•Are respectful, positive, flexible, supportive of others

Communicators

•Articulate thoughts and ideas effectively in a variety of forms (oral, written, and nonverbal)
•Provide constructive feedback in appropriate context
•Listen actively and with purpose
•Respect the perspectives of others

Problem Solvers

•See problems as an opportunity to expand learning
•Use various processes to find reasonable and justifiable solutions
•Recognize that there are a variety of ways to solve a problem

Critical Thinkers

•Analyze information, ideas, and possibilities to develop a point of view, infer, draw
conclusions and make predictions
•Use evidence and reasoning to guide decision making.
•Use prior knowledge and new knowledge to apply what they've learned in new ways.

Creative Thinkers

•Synthesize existing and new knowledge to create unique solutions
•Generate, develop and test new ideas

Independent and Responsible Citizens

•Build strong values and have actions reflect those values
•Apply the principles of democracy
•Take action to contribute positively to the local, national, and/or global community