

Inquiry Project Design Plan

Teacher/Designer Names: Ching Yam	
Name of Project: Parallel Lines CityProject	Grade Level: Geometry (9 & 10)
Est Launch Date:	Est Duration (in weeks): 1
Disciplines Involved:	
Problem Statement: Designing city streets and roads involves knowing how one street’s direction and length directly affects surrounding streets. Knowing the properties of lines and angles can help with planning.	

STAGE 1: DESIRED RESULTS	
Big Idea: Congruency	
Enduring Understandings: <ul style="list-style-type: none">Parallel lines are created using translationAngles formed must be congruent or supplementary	Essential Question(s): (MEANT TO BE SHARED WITH STUDENTS) <ul style="list-style-type: none">How can congruent angles be formed?What other ways can angle relationships be formed?What do need to consider when planning city streets and buildings?
Established Goals (Standards, Performance Indicators, Learning Goals): *choose relevant standards to unit/project plan timing and learning goals; do not need to use all disciplines below. ** unpack into SWK and SWBAT under identified standards as this will lead to aligned assessment design	
Mathematics Standards: GEO-G.CO.9 Prove and apply theorems about lines and angles. SWK: <ul style="list-style-type: none">parallel lines are lines that go in the same direction and never intersectVertical angles are angles formed by two intersecting lines and have the same measurementAlternate interior angles are formed when two parallel lines are cut by a transversal, they have the same measurementThat knowing one angle means you can find all the other angles along that same transversal SWBAT: <ul style="list-style-type: none">Indentify parallel lines, vertical angles, alternate interior angles, alternate exterior angles, corresponding angles, consecutive interior anglesArticulate why 2 angles are congruent or supplementaryUse a given angle measurement to find the measurement of the other angles	
Technology Standards: ISTE: 9-12.DL.4 Independently select advanced digital tools and resources to create, revise, and publish complex digital artifacts or collection of artifacts.	

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SWK:

- How to create, edit, delete points on Thinklink
- Images, audio and hyperlinks can be added to enhance their project

SWBAT:

- Create a map on their own or find one on google maps
- Create an account on Thinklink and decide on how best to make their city/town
- Incorporate images, sound, and/or links to enhance their project

Links to Standards/Reference Frameworks:
[NGSS](#), [NGSS by DCI](#), [Nat'l C3 SS Framework](#), [NYS K-8 SS Standards](#), [Common Core](#), [ISTE](#),
[Learning for Justice Social Justice Standards](#), [CASEL SEL Framework](#), [NYS CS and Digital Fluency](#)

STAGE 2: EVIDENCE & ASSESSMENTS:

Performance Task Narrative:

Goal: The goal of this performance task is to have students become knowledgeable on vertical, alternate interior, and cooresponding angles.

Role: Designers, Mathematicians, City planners, Residents

Audience: City dwellers, residents

Situation: A section of a town or city needs to be redesigned. Specific city zoning laws require that the streets need to be parallel with two or more non-parallel transversals. Certain buildings must be placed in a specific angle relationship to another building. Make sure all criteria are met.

Product(s): Students will create a map of a part of a city.

Standards (criteria for success): *Provide students with a clear picture of success. Identify specific standards for success.*

- ☐ There are 3 or more parallel streets
- ☐ There are 2 or more non parallel transversal streets
- ☐ All pre-set criteria for building placements are correctly met
- ☐ Appropriate icons are selected
- ☐ Each location contains an image, sound, and/or a link
- ☐ Each location describes the location in relationship to another using relevent vocabulary

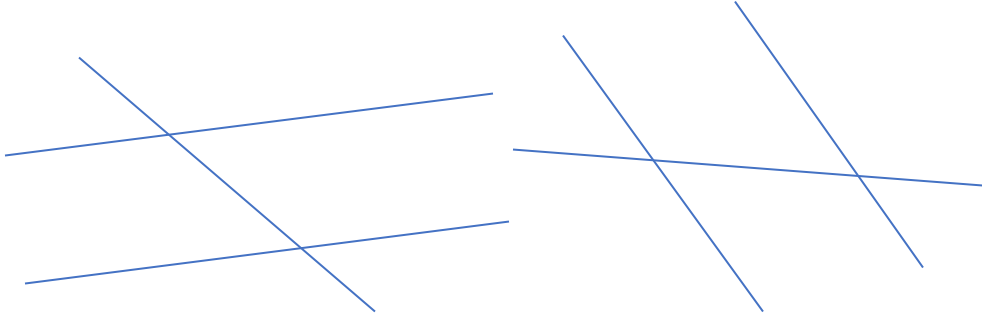
STAGE 3: THE LEARNING PLAN:

Backward Stages: 1. Identify desired results. 2. Determine acceptable evidence. 3. Plan learning experiences and instruction.
Adapted from Wiggins & McTighe (2005) Understanding by Design (UbD)

Revised April 2021

Center for Technology and School Change <http://ctsc.tc.columbia.edu/>

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Learning Activities
(potential layout below. Can be daily, divided by periods, or even using the Engineering Design Process to divide into stages such as Ask, Imagine, Plan, Create, Improve)
Day 1
Learning Goals: SWBAT: <ul style="list-style-type: none">• identify parallel lines and transversals• Locate and identify alternate interior angles, cooresponding angles, vertical angles
Learning Events: Students will recall how to construct parallel lines with a ruler and compass. After constructing parallel lines, they will draw a transversal. The subsequent angles formed will be identical on one of the parallel lines to the ones on the other parallel line. Practice identifying Alternate Interior Angles, Corresponding Angles, Vertical Angles, Alternate Exterior Angles, Consecutive Interior Angles
Formative Assessments: Assess whether or not students are able to identify angle relationships if the diagram is drawn differently.  Students need to articulate why angles made by the transversal on one line are identical to angles made by that transversal on another line.
Day 2
Learning Goals: SWBAT: <ul style="list-style-type: none">• Identify pairs of angles that are congruent• Identify pairs of angles that are supplementary
Learning Events: How does knowing the measure of one angle help you find the measure of the other angles? Due to angle congruency, it is possible to find the other angles! Due to angle congruency, supplementary angles can be paired.

Backward Stages: 1. Identify desired results. 2. Determine acceptable evidence. 3. Plan learning experiences and instruction.
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Formative Assessments:

Given a single angle measurement, students will find the measurement of all the other angles in the diagram. Given an algebraic expression to represent a measure, students will find the angle measurement value.

Day 3

Learning Goals:

SWBAT:

- Identify angle relationships in a diagram with multiple non-parallel transversals
- Explain why angles formed by one transversal are not necessarily congruent to angles formed by a different transversal
- Locate parallel streets that have a transversal street on a map

Learning Events: Introduction to Parallel Lines City project

Create sketches of what their city/town might look like.

Identify where alternate interior, alternate exterior, corresponding, vertical angles are on their sketch.

Place buildings at appropriate locations (using physical markers so they can be moved and changed) according to the written directions.

Formative Assessments:

Sketches contain straight lines, at least 2 transversals, at least 3 parallel lines

Day 4

Learning Goals:

Students will use Google Maps, Canva to take screen shots of appropriate maps.

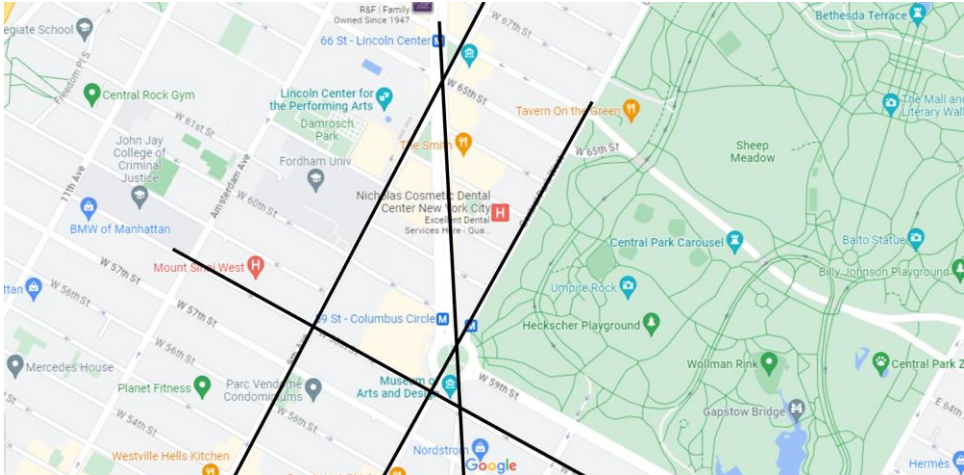
Students will draw lines on top of the streets they are using.

Students will use Thinglink to create way points at appropriate locations

Learning Events:

Library laptop cart time will be reserved.

Students will work in groups to make the maps.



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Formative Assessments:
Teacher will circulate and question why buildings were placed at the chosen locations.
Teacher will ask individuals to identify where specific angles are (alternate interior, exterior, corresponding, vertical)