

NYCDOE Magnet Program District 25 & 28

JHS 185 Magnet School Grade 6; Unit 2 Weather

Essential Question: How does weather impact the architectural designs of various global communities?

Suggested Time Frame: 6 weeks

Magnet Theme: Architecture

Stage 1- Desired Results	
Standards-Based Learning Goals: Standards-Based Learning Goals: PS 2.1 a, c, d, j, 2.2 i, k, l, m, n, o, p, q, r, 3.1 a, c, 3.2 a, 4.1a, 4.2 a, b, c, d, 4.4 a, b, 4.5 a, b	
Concepts	
<p>Big Ideas for this Unit:</p> <ul style="list-style-type: none"> ➤ Relationships/Interactions ➤ All matter on earth interacts to form predictable relationships 	<p>Magnet School Theme: Architecture</p> <p>Relevant/Connected Big Idea:</p> <ul style="list-style-type: none"> ➤ The building structures in an area are influenced by the area’s weather.
<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ➤ Students will understand that weather impacts architectural designs. ➤ Students will understand that they have a role and impact on the earth’s weather system. ➤ Students will understand that the weather around them affects them, it is global not just local. 	<p>Overarching Essential Question(s):</p> <p>How does weather impact the architectural designs of various global communities?</p> <ul style="list-style-type: none"> ➤ What decisions do humans make based on weather? ➤ How does weather affect where and how we live? ➤ How can architecture be modified to combat as well as utilize various weather conditions?
Content and Skills	
<p>Content (nouns) Students will know... Conservation of energy, Sun - energy source, patterns of energy (heat), Convection, conduction, radiation, phase change, physical change, heat expansion, cooling contraction, atmosphere, troposphere, stratosphere, mesosphere, ionosphere, exosphere, lithosphere, hydrosphere, altitude, water cycle, energy transformation, electromagnetic waves, interactions of waves, air masses, temperature, humidity, pressure, prevailing winds, coriolis effect, Fronts, precipitation, high pressure system, low pressure system,</p>	<p>Skills (verbs) Students will be able to...</p> <ul style="list-style-type: none"> ➤ Recognize and analyze patterns and trends, sequence of events ➤ Identify and discuss cause and effect relationships ➤ Generate and interpret weather maps ➤ Measure weather variables such as wind, speed, direction, relative humidity, barometric pressure. ➤ Predict the characteristics of an air mass band on the origin of the air mass ➤ Graphing and analyzing data. ➤ Employ conventions of good discussion

general movement of weather in US, thunderstorms, tornadoes, hurricanes, adverse weather preparedness, industrial based weather influences, cause and effect, patterns and trends, social conventions of good discussions.	

Stage 2- Summative Assessment Evidence

If students understand, know and are able to do the items in Stage 1, they should be able to show their understanding by completing an authentic task found in the world beyond the classroom.

➤ Design the Culminating/Summative Project:

G- (goal): Demonstrate understanding on the impact of weather on architectural designs.

R- (role): You are a civil engineer

A- (audience): Members of the National Board of Housing Development Co.

S- (situation): You must research and design a community whose focus is on housing and its durability and sustainability [ex. energy conservation] depending on various weather conditions.

P- (purpose and product): Explain research, construct weather maps, graphs and a 3-D model / software blueprint of a community in order to support your design during a presentation for members of the National Board of Housing Development Co.

S- (standards for performance):

- (1) Clearly identify annual weather conditions in your area.
- (2) Develop accurate weather maps and graphs with keys for June, September, December and March.
- (3) Research current architectural designs, explain how they were influenced by the weather, any weaknesses they may have and how you would improve those current designs.
- (4) Construct an accurate 3-D model or software blueprint that best

represents your designs

(5) Presentation should be clear, loud, eye contact should be made and references should be made to maps, graphs and models/software designs.

Culminating Project

(Write the culminating project on this page, as you would present it to your students)

Student Task

In the space below, write the task exactly as students will see it.

You are a civil engineer employed by a development company who must give a presentation to the National Board of Housing Development Co. in order to be hired for the development of a community. The focus of your presentation is on housing and its durability and sustainability [ex. energy conservation] depending on various weather conditions. The world contains many different types of weather patterns and it is your task to take a given landscape and pick which option of global weather patterns you want your landscape to be affected by. Then you must construct either a 3-D model or software program that will be used as a blueprint for the development of your community. In addition you must support your model with an oral presentation describing the benefits of your design. The design, that best shows how the weather can be resisted and at the same time utilized, will most likely be hired by the National Board of Housing Development Co.

1: Research your assigned area. Find out what type of weather usually occurs throughout the year in the various locations that were provided. Then choose one location to be the site for the development of your community. For example if you chose New York, then you would describe the four seasons with varying temperatures and coastal storms.

2: Read, analyze and create a weather map. You will receive actual maps showing weather conditions in the area you are currently living in. After interpreting and analyzing what all the symbols mean, you will then create 4 weather maps of the location that you chose. Each map will indicate the average weather conditions in June, September, December and March.

3: Research and describe the building in your area. What are some of the architectural designs in the location you chose and how well do they protect against weather? In addition how well do they utilize those conditions to best sustain our way of life?

4: Design a residential community. You will construct a 3-D model or computer software design of a given landscape program that will be used as a blueprint for the development of your community. Each design must be able to withstand various weather conditions, but at the same time use the weather to help in our way of life.

- Example of withstanding weather conditions;
 - ✓ Houses should not be built on a barren hill when the location has high rate of rainfall.

- Example of utilizing weather conditions;
 - ✓ Locations with high winds should incorporate wind turbines to generate free energy.

5: Present and support your design. Once your model or software design has been created you must then present it to the class which will act as the National Board of Housing Development Co. You must present the research that lead to your design, what your designs are and why your designs will protect against weather and utilize it at the same time.

Global Weather Warning System:

Task 1: Research your Assigned Area :

Job A: Describe your location:

- Describe the latitude and longitude ranges
- What hemisphere is your area located in, northern or southern?
- Describe the landscape of your area, example are there mountains, plains, deserts or rainforests?
- Describe the population size of the area.

Job B: Describing local weather trends:

- Indicate if there are seasons.
- Weather Trends
 - Average temperature
 - Average rainfall
 - Average snowfall
 - Average humidity
 - Amount and speed of wind

Job C: Describe adverse extreme weather:

- Example: Hurricanes, tornadoes and blizzards
- Frequency, season/ time of year
- Largest/ most severe in history
 - Dates and describe the events

Task 2: Read, analyze and create a weather map :

Job A: Read and analyze several weather maps where we currently live (New York City).

- Describe pressure systems
 - Location and direction of movement
- Describe current temperatures
- Locate areas of precipitation
 - Describe; is it snow, rain, hail, etc.
- Locate and describe air masses
 - Temperature and humidity
- State wind directions and speed
- Describe fronts types and direction of motions

Job B: Create a weather map and graphs of the location you chose that best represents the months of June, September, December and March.

- Include the following on your maps.
 - Pressure systems
 - Temperatures
 - Fronts
- Wind directions and speeds
- Make a graph [bar or column] comparing the following for all 4 months.
 - Average rainfall
 - Temperature
 - Winds speed

Task 3 Research and describe the building in your area.

Job A: Describe the average residential home

- Size and Shape
- Maximum people it holds.
- Materials the homes are made of.
- Describe how it protects against the weather?
ex. do windows break or fall apart?
- Describe how it utilizes the weather to sustain our way of life.

Job B: Describe the structures of major commercial and/or industrial buildings in the given location.

- Size and Shape
- Maximum people it holds.
- Materials the homes are made of.
- Describe how it protects against the weather?
- Describe how it utilizes the weather to sustain our way of life

Task 4 Design a residential community.

****[must choose either 3-D model or computer software program]****

Job A Create architectural designs for the buildings in your community

- Create a design that will protect against the following;
 - ❖ protect against common weather?
 - ❖ protect against extreme weather?
- Take into consideration the following architectural basics but do not limit your design just off of these.
 - The shape of the building as a whole; rounded or sided?
 - Roof size and shape
 - The material of the foundation or base of the building.
 - Should there be basements or underground levels.
 - Are there windows and if so what are they made of?

Job B Create architectural designs for the following;

- Roads - What are the driving conditions? Icy, wet roads?
- Vegetation – Does there need to be trees or bushes in a particular area?
If so then why?
- Drainage systems – Where does water drain?
- Reservoir – Does water need to be stored for use

Job C Create some designs that can be added to use weather to aid in our way of living?

[Take into consideration the following suggestions but do not limit your design just off of these]

- Should turbines be used to create electricity and if so then what type?
 - ❖ Wind
 - ❖ Water
- Would solar power be a reliable source in your assigned location and if so then where would you place the solar panels?
- How would turbines or solar power affect your building design?

Task 5: Present and support your design.

- Present your research and model / software design to the class in the following parts. Presentation should take 10-15 minutes.
 - I. Introduce your location and its weather trends.
 - ❖ Use your weather maps and graphs to act as visual aids when explaining your research. Make sure you explain every map and graph.
 - II. What are the current building designs and explain whether they are effective against common and extreme weather conditions. Also include if they use weather as a way to enhance their style of living?
 - III. Discuss how you would engineer a new city design in order to better protect against various weather conditions. For every design use the model or software design as a visual guide for the audience. Also discuss how your designs will use weather as a way to enhance their style of living.

Model of Culminating Project

(Create a model of the culminating project that you can share with your students)