

Cloudy with a Chance of Science!

Week 3: Grades 6-8

Day 2: Building a House Right for the Climate

Teacher/Parent Background:

Understanding short term weather conditions compared to atmospheric conditions averaged over a longer period of time helps students interpret cycles, patterns, and natural events on Earth. Students have had prior experience with the weather vs. climate component of this concept in fourth grade where students collected, analyzed, and interpreted data to explain weather and climate patterns.

We are going to go beyond interpreting simple weather maps, so that students must differentiate between weather and climate by compiling and making generalizations about weather data and trends (repeated patterns) for a longer period of time to infer climate conditions for specific regions. In the next 2 day's activities we will focus on 3 main concepts:

- Weather refers to the daily environmental conditions we experience around us.
- Climate refers to the average conditions in a place over a longer period of time.
- Weather can be observed each day, whereas climate must be observed over time.

Overview: In this activity, adapted from Teachengineering.com, students will differentiate between weather and climate so that they can research the characteristics of different climate regions and begin designing a home to withstand the elements found in a specific climate region.

Related Standards:

Analyze and interpret data to construct an explanation for how advances in technology has improved weather prediction.

Key Terms:

Weather- Describes the condition of the air outdoors, such as temperature, cloud cover, wind speed and rainfall.

Climate- The set of weather conditions that prevail in a region year after year.

Precipitation- Rain, snow, sleet or hail that falls from the clouds in the sky.

Temperature- How hot or cold something is.

Data- Pieces of information.

Humidity- The amount of water vapor in the air.

Typical- Common

Materials List:

Possible Building Materials May Include:

- Cardboard
- Popsicle Sticks
- Straws
- Fabric Scraps
- Rocks
- Duct tape or Masking tape
- Paper
- Toothpicks
- Foil
- Plastic Wrap

Activity Description:

1. Make students aware that they will be designing and building a prototype of a house for different climate regions in the continental U.S.
2. Students will review weather vs. climate with the Comparing Weather and Climate table in the Student Handout.

Answers:

Comparing Weather and Climate		
	Weather	Climate
Definition	The condition of the atmosphere at a place at any given time	The general weather of an area over a long period of time
Components	Precipitation, fronts, cloud cover, wind speed, temperature, thunderstorms	Precipitation, temperature, humidity, wind speed, amount of sunshine

Determined By	Measuring precipitation, wind speed, etc., on a daily basis	Averaging weather statistics over a period of at least 30 years
Time Frame	Measured for a short period of time	Measured over a long period of time

3. Students will observe the map of the climate zones of the continental U.S. and choose to design a house for the humid subtropical, humid continental or midlatitude desert climates.
4. Encourage students to follow the steps of the engineering design process today students will engage in the ask, imagine and plan phases of the engineering design process.
 - a. Ask: Students should research things such as how hot does it get in their climate region? Is flooding common? Is there a lot of snowfall? Etc.
 - b. Imagine: Students should sketch two possible solutions.
 - c. Plan: Students will choose their best solution and make sure they label their plans with the materials they plan on using.

Closure:

Discuss the following with students:

-What aspects of climate (average temperatures, average rainfalls or snowfalls, etc.) and weather (tornadoes, hurricanes, etc.) the engineers should consider when designing and constructing buildings and homes. *Climate: Average temperature, average rainfall or snowfall. Weather: Tornadoes, hurricanes, etc.*

-What are some examples of how people in different cultures and locations create(d) homes with different design, construction and materials? What materials do/did they use? How do/did climate considerations shape the house designs? (Listen to student answers; correct and amend as necessary.)

Extension:

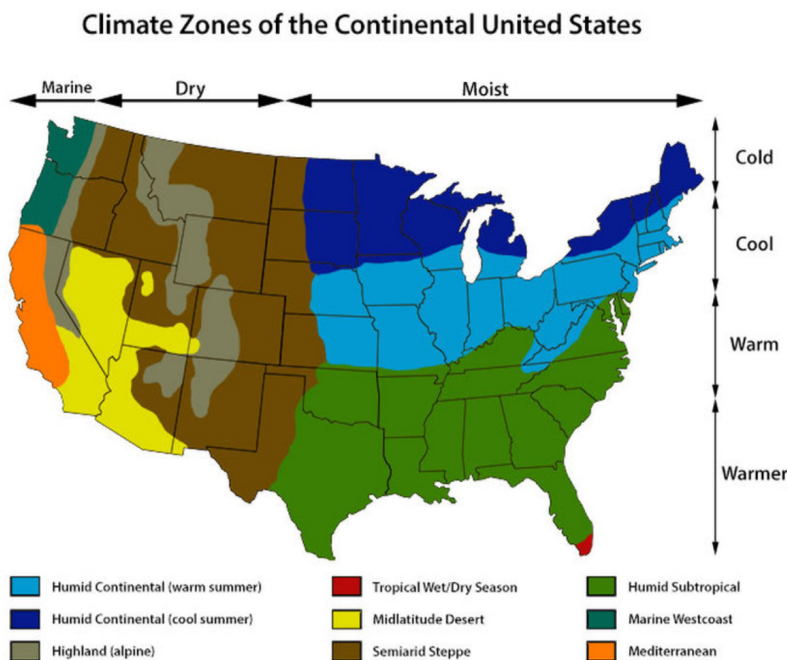
-Read & Learn: [Eye of the Storms](#)

-Have students show photographs or pictures of houses from magazines and talk about why they think each home was designed in its particular way. Can we figure out what climate they were designed for just by looking at the pictures?

Student Handouts

Fill in the table based on your knowledge of weather vs. climate.

Comparing Weather and Climate		
	Weather	Climate
Definition		
Components	Precipitation, fronts, cloud cover, wind speed, temperature, thunderstorms	Precipitation, temperature, humidity, wind speed, amount of sunshine
Determined By		
Time Frame		



Choose to build your house in one of the three U.S. climate regions:

Humid Subtropical- Hot and humid summers with mild winters and lots of rainfall.

Humid Continental- Summers are cool and winters are freezing, snowy, and windy.

Midlatitude Desert- Very hot and dry summers with mild winters. Very little rainfall.

Every climate has weather extremes that homes need to be able to handle. Your challenge will be to build a home for the climate of your choice. You can use any materials you have at home. In addition to being aesthetically pleasing your home will also need to be able to withstand the following challenges depending on the climate region.

Humid Subtropical- Your house must keep a piece of tissue paper dry inside when you pour 1 cup of water (rain) on top of it.

Humid Continental- Your house must be able to keep the roof from caving in when you pour a lot of snow (1 cup of rice) on top of it.

Midlatitude Desert- Your house must be able to keep an ice cube from melting as you heat the house with a hairdryer for 1 minute.

Work through the engineering design process to build your home!

Imagine

Possible Solution #1 (include a diagram with labels)

Possible Solution #2 (include a diagram with labels)

Plan

Choose your best plan from above and make any tweaks. Make sure your plan is labeled with the materials you plan on using.

Chosen Solution

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