



SEATTLE
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SCHOOLS

Science Learning Packet

Grade 6:

Weather Patterns, Lesson 7

science learning activities for SPS students during the COVID-19 school closure.

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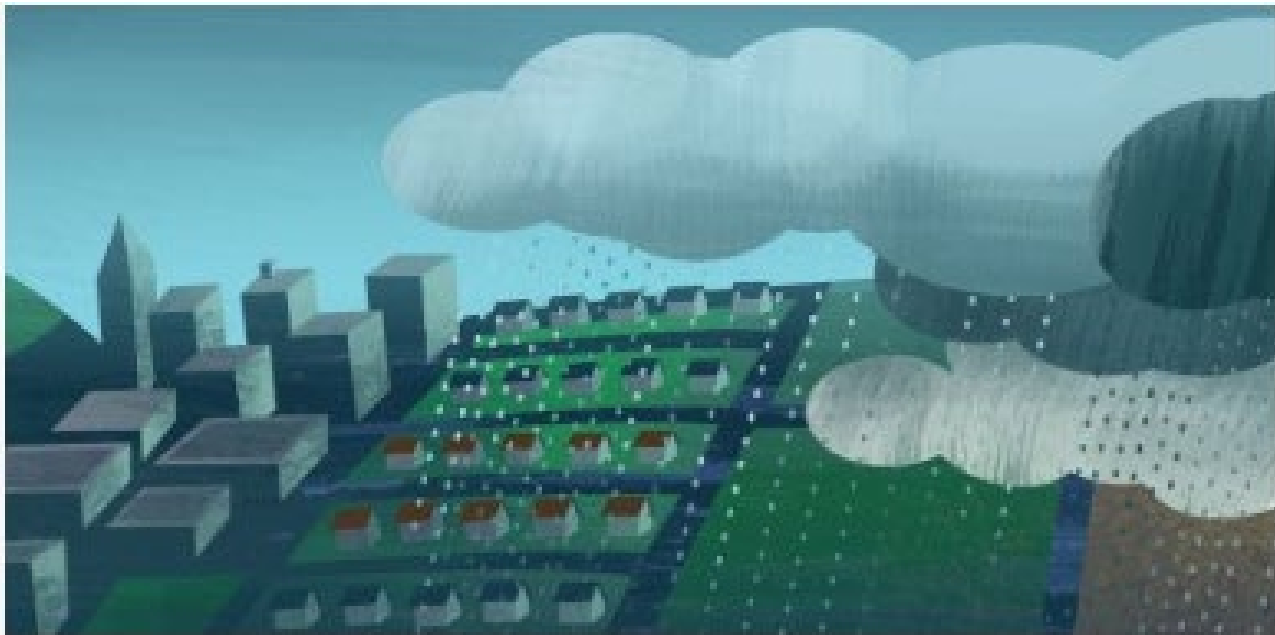
Due to the COVID-19 closure, teachers were asked to provide packets of home activities. This is not intended to take the place of regular classroom instruction but will help supplement student learning and provide opportunities for student learning while they are absent from school. Assignments are not required or graded. Because of the unprecedented nature of this health crisis and the District's swift closure, some home activities may not be accessible.

If you have difficulty accessing the material or have any questions, please contact your student's teacher.



Grade 6 Science Learning Activity
Weather Patterns Unit Instructional Materials
Lesson 7 (Amplify Chapter 2, Lesson 2.2)

AmplifyScience



Weather Patterns

Chapter 1: Understanding Rainfall

Chapter 2: Investigating Temperature

Student Name: _____

School: _____ Grade: _____

Science Teacher: _____

Date: _____

Hello Families,

We hope you and your family are well and safe during this time. During this unprecedented out-of-school time, the SPS middle school science team will be offering instructional opportunities for students that align with the district's adopted middle school science instructional materials.

This investigation packet is part of a series of district-aligned lessons about **Weather Patterns, a 6th grade life science unit developed by AmplifyScience** and adopted by SPS in 2019. While Amplify Science lessons are designed to be done in the classroom with peers, there are some activities that students can complete at home. In this packet you will find activities to accompany lessons in the unit. **Accompanying lesson videos are posted on the [SPS Science webpage](#) under Grade 6.** These lesson videos, developed in collaboration between SPS teachers, Denver Public Schools teachers, and Amplify Science, feature teachers going through the information in the lessons. **The work in this packet is intended to be completed alongside the viewing of the video of the corresponding videos.**

To find the correct lesson videos:

- Go to [SPS Science webpage](#)
- Scroll to "6th Grade"
- Find the "Weather Patterns" videos section
- Select the video that matches the lesson you are completing that day.

For students who have access to the internet and the following devices and browsers **may wish to log-in to their AmplifyScience account from home are welcome to do so.** Chrome and Safari are the recommended browsers to use for full functionality of the Amplify digital tools and features.

Sincerely,

The Jane Addams Grade 6 Science Team & Seattle Public Schools Science Department



This packet continues Chapter 2, Investigating Temperature

Lesson 7: Chapter 2, Lesson 2.2 Reading “Disaster In California”

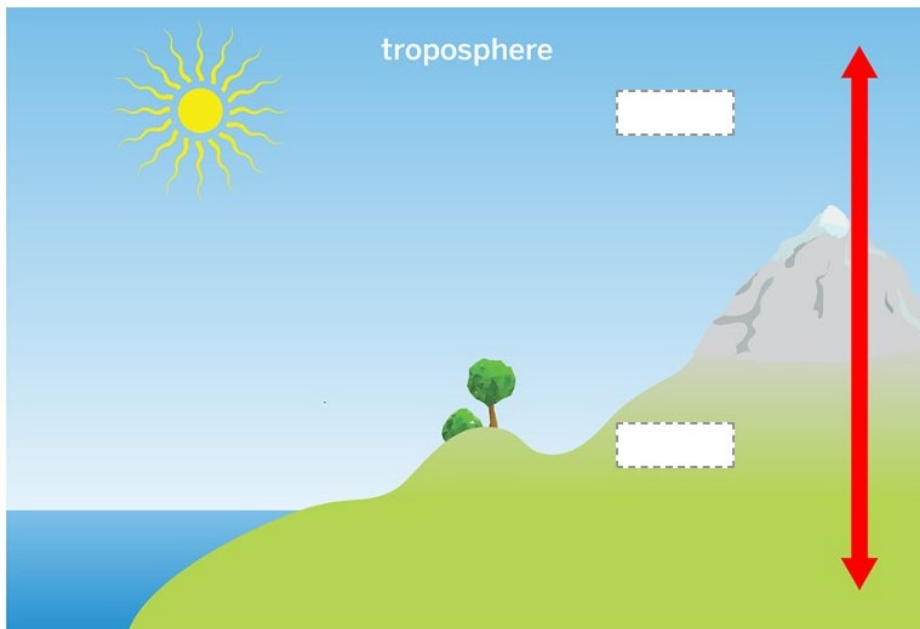
Lesson 8: Chapter 2, Lesson 2.3 Simulating a Large Storm

Lesson 9: Chapter 2, Lesson 2.4 Analyzing New Data About Galetown

-Day 4: “Check your Understanding” quiz on Schoology

Lesson 2.2 Reading “Disaster in California”

WARM-UP: In our last lesson learned about a specific layer in the atmosphere.



Which end of the arrow is warmer and which end is colder?
What happens in between the two ends of the arrow?

Vocabulary So Far:

AIR PARCEL: An amount of air that moves as a unit

CLOUD: Liquid water droplets suspended in the air

CONDENSATION: The process by which a gas changes into a liquid

ENERGY: The ability to make things move or change

EVAPORATION: to move from one object to another or one place to another

TEMPERATURE: A measure of how hot or cold something is; a measure of the average kinetic energy of the molecules of a thing

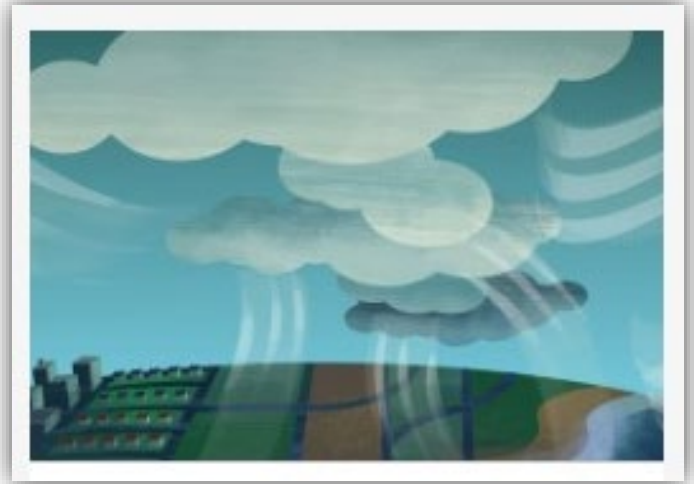
TRANSFER: To move from one object to another or one place to another

TROPOSPHERE: the layer of the atmosphere closest to Earth, where weather happens

WATER VAPOR: Water as a gas

WEATHER: Conditions such a rain, clouds, wind at a particular time and place

Goal: Investigate a historic weather event and analyze what caused it to happen. We will do this by reading an article and applying our new knowledge of how rainstorms form.



The article you will read today is about a particularly dangerous series of rainstorms that happened over 100 years ago. To understand why these storms happened you will need to understand factors that can cause severe storms that produce a lot of rain.

So far, we understand that when an air parcel cools it loses energy, and the more energy it loses the more rain can be produced. Be we still do not know everything about what causes an air parcel to cool. Learning about these storms in California will give us some insight into that question.

Active Reading Guidelines

1. Think carefully about what you read. Pay attention to your own understanding.
2. As you read, annotate the text to make a record of your thinking. Highlight challenging words and add notes to record questions and make connections to your own experience.
3. Examine all visual representations carefully. Consider how they go together with the text.
4. After you read, discuss what you have read with others to help you better understand the text.



This photograph, taken during the Great Flood of 1862, shows people rowing boats in the flooded streets of Sacramento. Sacramento is the capital of California.

Disaster in California!

In 1862, a natural disaster in California caused thousands of deaths and destroyed the state's economy. This disaster wasn't an earthquake or a fire—it was an enormous flood that hit huge sections of the state. The Great Flood of 1862 was caused by a series of storms that brought more than double the normal amount of rain to California in a very short period of time.

Scientists and historians call the Great Flood of 1862 a "megaflood" because of the devastation it caused. Before the flood, there was an extensive period of time with little rain, and California farmers were struggling because there wasn't enough rain to water their crops. However, they probably weren't expecting what came next! During December 1861 and January 1862, so

much rain fell that many of the dry, flat farms in the center of California were completely covered in water—the whole valley looked like a large inland sea. Rivers and streams all over the state swelled up and over their banks, causing dangerous water flow that destroyed homes and killed animals and people in its path.

Using sources such as newspaper reports, data collected by scientists, and diaries and letters from people living in California at the time, people have reconstructed the kinds of damage done in this two-month period. Because of the massive rainfall and flooding, entire towns were destroyed. In some places, the water from the flood was 30 feet deep, covering the telephone poles that had just been put in place. Farmers and ranchers all across the state reported that they lost their homes, barns, farm equipment, and most of their animals. The devastation was so great and affected so many people that the state of California went bankrupt trying to support the people who were affected by the flood.

What Caused the Great Flood of 1862?

The Great Flood of 1862 was caused by a series of powerful storms that began over the Pacific Ocean. These storms were so strong because local temperatures were higher than normal—the winter of 1862 was unusually warm in California. Out in the ocean, both the ocean surface water and the air above it were also warmer than usual. The higher temperatures caused more ocean water to evaporate into the air. These warm air parcels full of water vapor rose high into the troposphere above California. In fact, because they were warmer than usual, they rose higher in the troposphere than the cooler air parcels that cause normal rain storms. As they traveled up through the colder parts of the troposphere, energy transferred from the parcels to the surrounding air, lowering the temperature of the air in the parcels. The parcels cooled until they had the same temperature as the surrounding air, causing the water vapor inside to condense into liquid water. The higher they rose, the more energy the parcels lost and the more water vapor condensed. The clouds that formed from these air parcels were full of liquid water that would soon fall as rain.

The same pattern of high temperatures leading to more water vapor in the air continued through the winter, causing multiple storms and record rainfall in many parts of California. Los Angeles received over 167 centimeters (66 inches) of rain in just two months—four times the amount of rain that normally falls there each winter. Rivers and streams were already full of water, so there was no place for the extra water from the rainfall to go. The water stayed above ground for weeks and caused flooding all across the state.



The darker brown areas of this map show the parts of California that were underwater during the Great Flood of 1862.

Could the conditions that caused the Great Flood of 1862 happen today? Meteorologists say that the perfect conditions for these kinds of storms—surface air temperatures that stay warm for several months and a constant source of water for evaporation—happen once every 100–200 years, so it's possible that California will see this kind of rainfall again. However, we now have a better understanding of the pattern that leads to these storm clusters and can predict when and where they might happen. We can't avoid storms, but we can figure out when they might happen and help people prepare when they do occur.

Let's look specifically at the first paragraph in the section "What Caused the Great Flood of 1862?" What evidence can you find to help answer the question why were these storms so strong?

What conditions are necessary for these kinds of storms to happen?

Lesson 2.2 Wrap-Up

- Air parcels cool as a result of energy transfer
- Temperature affects how much rainfall can happen
- The amount of surface water available affects the amount of water vapor

No new key concepts this lesson.

Bonus Challenge activity:

Use the internet to research the rainfall in our state. Fill in the table below.

1. What is the average annual rainfall in your state?

2. What is the average annual rainfall in your city?

3. What day had the highest rainfall?

4. How many inches of rain fell on that day?



Up Next: Lesson 2.3

- Simulating a large storm
- Revising key concepts
- Answering the question what determines how much an air parcel will cool?