

## Lesson 3.1: Investigating Wind

You know that Galetown has experienced an increase in the amount of rain. In the last two chapters you learned about how the lake and temperature affected the amount of rain. Today, you will begin to consider one claim we have not yet discussed: that wind affects amount of rain. In this lesson, you will first complete activities to familiarize yourself with how wind behaves before using the *Weather Patterns* Simulation to investigate whether wind is connected to increased rainfall.

### Unit Question

- Why do some rainstorms have more rain than others?

### Chapter 3 Question

- Why did the most recent storm in Galetown have the greatest amount of rain?

### Vocabulary

- air parcel
- change
- cloud
- condensation
- energy
- evaporation
- pattern
- stability
- temperature
- transfer
- troposphere
- water vapor
- weather
- wind

### Digital Tools

- *Weather Patterns* Simulation

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Warm-Up

### Thinking About Wind

**From:** Dr. Kenji Emerson  
**To:** Student Meteorologists  
**Subject:** Temperature Data for Galetown

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Remember the claims below are ideas we are considering about why the rainfall in Galetown has become severe:

1. The lake that was built near Galetown caused it to have more severe rainstorms.
2. Warmer weather caused Galetown to have more severe rainstorms.
3. Stronger winds caused Galetown to have more severe rainstorms.

Recently, you created models and wrote short arguments for the citizens of Galetown, explaining how the lake and the recent higher temperatures could be contributing to the town's severe storms. We have talked about the lake and the warmer weather, and now we will focus on this last claim. Let's start by thinking about wind.

What is wind?

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How do you think wind could be related to severe rainstorms?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Exploring Wind

- Push down on the plunger to push out the air in the barrel.
  - What do you notice?
  - What do you feel?
- Block the tip of the syringe with your finger. Push down on the plunger.
  - What do you notice?
- Push down on the plunger as far as you can and then remove your finger from the end of the syringe.
  - What happens to the air inside the barrel?

When you blocked the tip with your finger, what did you feel?

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What happened when you removed your finger?

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## Wind and Air Parcels

### Part 1: Make Wind!

- Explore the new mode: Regional Weather 2 in the *Weather Patterns* Sim.
- Work with a partner to explore this new mode. Try to make wind.

### Part 2: Make Two Air Parcels

Use the *Weather Patterns* Sim to gather evidence that will help you answer the Investigation Question: *How can wind affect the cooling of an air parcel?*

- Set the sliders for Sunlight to Surface and Surface Water to level 3.
- Set Pressure at Parcel and Pressure around Parcel to create wind that blows toward the parcel.
- Press RUN, and then ANALYZE.
- Complete the first row of the table below.
- Repeat the process to create a parcel with no wind.
- Complete the second row of the table below.

		Parcel height	Air parcel final temperature	Energy released	Amount of rain (cm)
Parcel 1	wind				
Parcel 2	no wind				

Use your data table to describe how wind can affect the cooling of an air parcel.

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How does wind affect the amount of rain?

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Homework: Reading “Types of Rain”

You have been learning about one type of rain which occurs when warm air parcels rise in the atmosphere and their water vapor condenses into liquid water. This is known as convection rain.

Read the “Types of Rain” article to learn about other types of rain. Annotate the article as you read.

Then, answer the questions below.

What type of rain do you think you normally experience?

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What is **orographic** rain and how does it happen?

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What is **frontal** rain?

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### 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.