

Lesson 1.6: Explaining Surface Water and Rain in Galetown

Student meteorologists, we are getting closer to understanding what caused Galetown to have more severe storms. First, however, you'll need to review some new data that Dr. Emerson sent. Using the data, you'll create two models of different storms that happened in Galetown, one before the lake and one after the lake. You'll then use this information to write to the citizens and explain what is causing the rainfall in Galetown.

Unit Question

- Why do some rainstorms have more rain than others?

Chapter 1 Question

- What causes the rainfall in Galetown?

Key Concepts

- When liquid water becomes warmer it can evaporate and become water vapor in the air. All air contains water.
- When water vapor in an air parcel cools, it can condense into liquid water which can form a cloud and fall as rain.
- Energy transfers from warm air to cold air until their temperatures become equal.
- The more an air parcel loses energy and cools, the more rainfall can happen.

Vocabulary

- | | | |
|----------------|---------------|---------------|
| • air parcel | • energy | • transfer |
| • change | • evaporation | • water vapor |
| • cloud | • stability | • weather |
| • condensation | • temperature | |

Name: _____

Date: _____

Warm-Up

From: Dr. Kenji Emerson
To: Student Meteorologists
Subject: Data About the Rainfall in Galetown

We've put together this data table for you. It has data about the amount of rain from Galetown's recent rainstorms. It also includes information about the amount of surface water in Galetown. Remember, local surface water is all of the water that is at the surface and that can evaporate, including water from the lake.

Weather Event	Local Surface Water	Amount of Rain
Storm 1 (before lake)	low	mild, 6 cm (2.4 in)
Storm 2 (after lake)	high	moderate, 12.7 cm (5 in)
Storm 3 (after lake)	high	severe, 20.3 cm (8 in)
Storm 4 (after lake, July of this year)	high	very severe, 30.5 cm (12 in)

One of the claims that is used to explain the severe rainstorms in Galetown is this: The lake that was built near Galetown caused it to have more severe rainstorms.

Do you think the lake is affecting the amount of rain in Galetown? (check one)

- yes
- no
- not sure

Explain your answer using evidence from the table above.

Name: _____ Date: _____

Word Relationships Routine

In order to prepare to explain why rainfall happens, use the Word Relationships cards to create sentences that answer the question *What causes the rainfall in Galetown?*

- Use at least two different Word Relationships cards in each sentence. In your group of four, take turns as both the speaker and the listener.
- Your group may use the same word more than once. You do not need to use all the vocabulary words.
- There are many different ways to answer the Chapter 1 Question, and you will need to create more than one sentence in order to express your ideas completely.

Word Bank

air parcel

water vapor

energy

temperature

transfer

Modeling Galetown

In Chapter 1, you have been investigating what caused the rainfall in Galetown. Use the Modeling Tool activity: Effect of Surface Water (on the next two pages) to show how the amount of surface water caused different amounts of rain during two different storms in Galetown.

Goal: Show how the amount of surface water caused different amounts of rain in Galetown, using the items in the Modeling Tool Key.

Do:



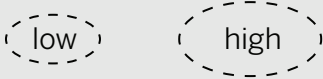
- Label your model Storm 1 or Storm 2
- Show the temperature of and water vapor inside the air parcel
- Show the temperature of the surrounding air
- Show the direction of energy transfer, using the arrow
- Show the amount of liquid water inside the air parcel
- Show the amount of cloud and rain
- Show the amount of surface water

Tips:

- Use information from the data table to complete your model.

Weather event	Local surface water	Amount of rain
Storm 1	low	mild, 6 cm (2.4 in)
Storm 2	high	moderate, 12.7 cm (5 in)

Modeling Tool Key

<p>temperature: high, low</p> <p>water vapor: high, low</p> <p>liquid water: high, low</p>	<p>energy transfer:</p>  <p>amount of cloud and rain:</p> 	<p>amount of surface water:</p> 
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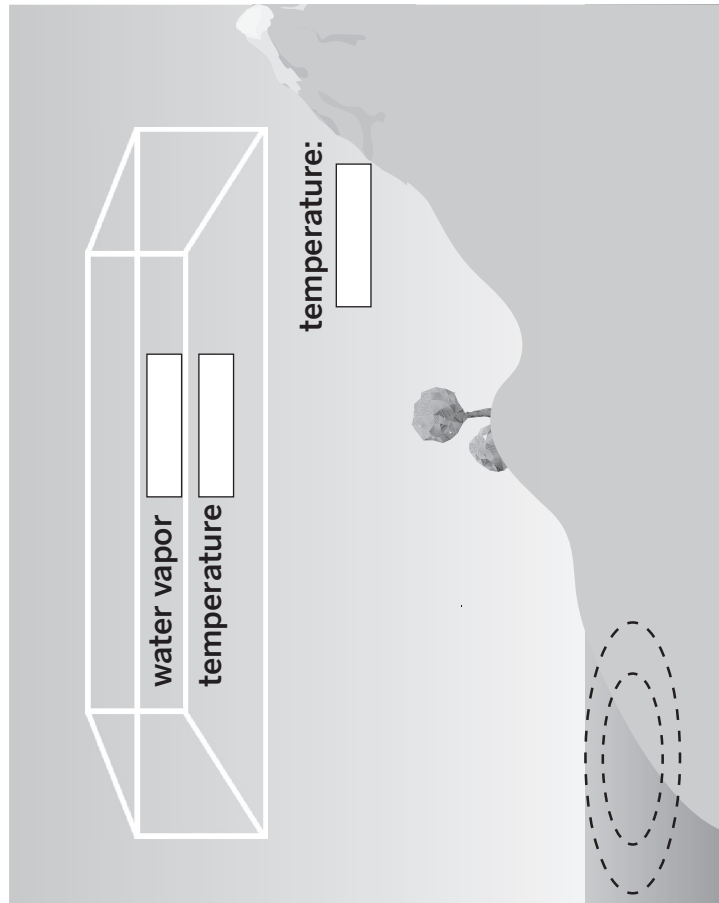
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Modeling Galetown (continued)

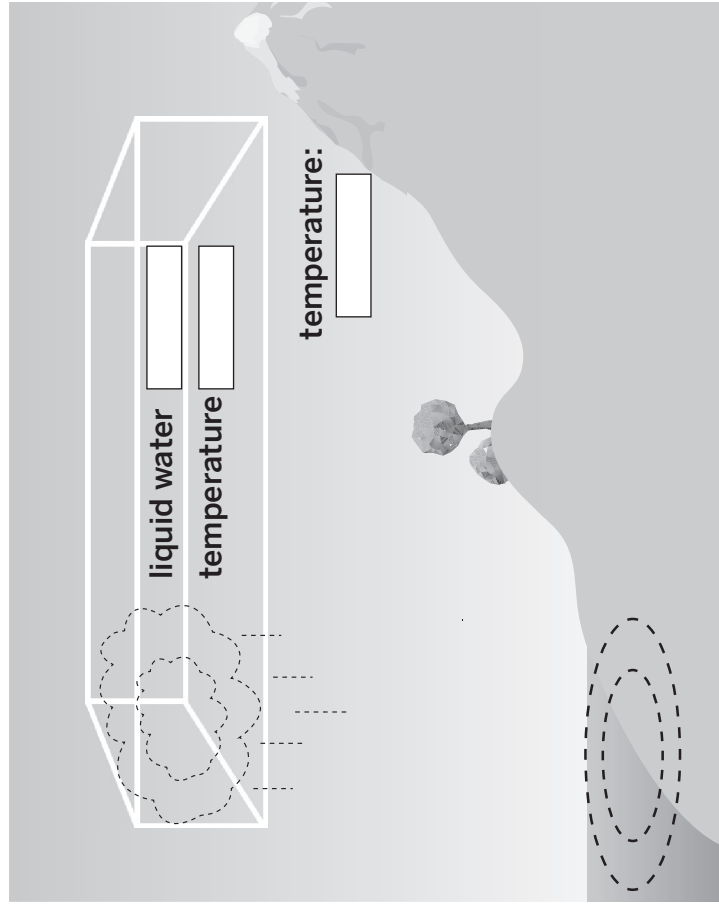
Weather Patterns Modeling Tool: Effect of Surface Water

Goal: Show how the amount of surface water caused different amounts of rain in Galetown.

Before



After



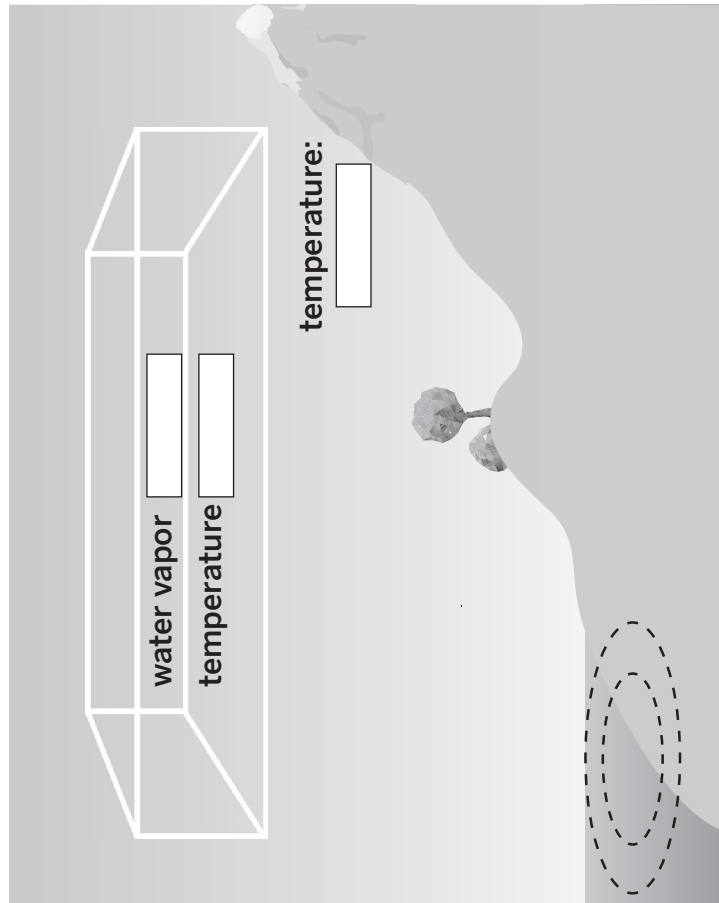
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Modeling Galetown (continued)

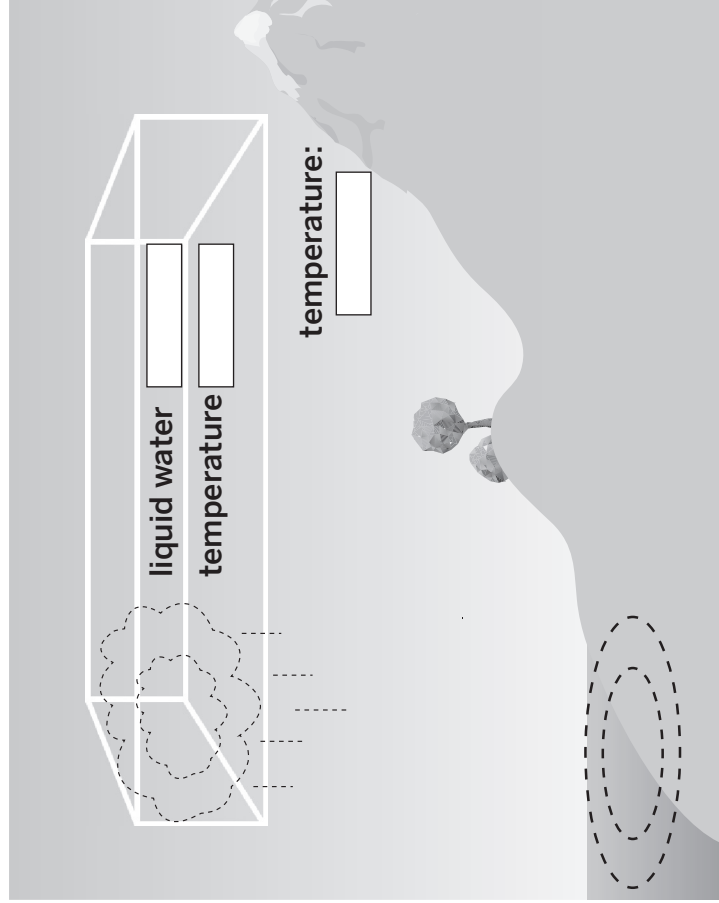
Weather Patterns Modeling Tool: Effect of Surface Water

Goal: Show how the amount of surface water caused different amounts of rain in Galetown.

Before



After



Name: _____ Date: _____

Homework: Writing to the People of Galetown

Use the information you've learned in this chapter, along with the new data you received from Dr. Emerson and the model you created in class today, as evidence to explain to the citizens how the lake that was built near Galetown caused it to have more severe rainstorms. You can use the words in the word bank to support your answer.

Word Bank

air parcel	change	cloud	condensation
energy	evaporation	stability	temperature
transfer	water vapor	weather	

Write a short explanation to support the claim: The lake that was built near Galetown caused it to have more severe rainstorms.

If you don't believe that the evidence you were given supports this claim, you can make another claim and write an explanation to support it. If you choose to do this, you must include evidence in support of your new claim.

Name: _____ Date: _____

Homework: Check Your Understanding

This is a chance for you to reflect on your learning so far. This is not a test. Be open and truthful when you respond to the questions below.

1. I understand how the lake that was built near Galetown can affect the amount of rain in Galetown. (check one)

yes

not yet

Explain your answer choice.

2. I understand how transfer of energy causes water vapor to turn into rain. (check one)

yes

not yet

Explain your answer choice.

3. I understand how warmer weather can affect the amount of rain in Galetown. (check one)

yes

not yet

Explain your answer choice.

Name: _____ Date: _____

Homework: Check Your Understanding (continued)

4. I understand how wind can affect the amount of rain in Galetown. (check one).

yes

not yet

Explain your answer choice.

5. I understand why the amount of energy transfer is different depending on how high an air parcel travels. (check one)

yes

not yet

Explain your answer choice.

6. What are you still wondering about why Galetown had more severe rainstorms this year than previous years?
