Weather

Kindergarten
Earth and Space Science

This work was collaboratively developed through the Early Elementary Science Partnership by the program partners at the Big Shoulders Fund, the Chicago Academy of Sciences / Peggy Notebaert Nature Museum, the Field Museum, and Northwestern University.

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Unit Overview

Unit Description

Students will begin the unit by listening to the book *Cloudy with a Chance of Meatballs,* then draw comparisons between weather forecasting and responses in the fictional town of Chewandswallow from the book and Chicago. Throughout the unit, students will observe and analyze Chicago weather patterns and send their information to Basil, a representative from Chewandswallow who is considering moving to Chicago. For one week, students will observe, record, and analyze the typical morning and afternoon weather that they experience in Chicago. Students will practice making close observations and asking questions based on their observations; then they will apply these skills to describing and analyzing winter weather in Chicago. Students will extend their practices of asking observation-based questions and obtaining information to study snowstorms as a type of severe weather that Chicago can experience in the winter.

Note: This specific unit was written to be taught in the fall to allow students to be able to compare two seasons, but the lessons are adaptable to other seasons and times of year.

Driving Phenomena

What would someone who is moving to Chicago need to know about the weather? Does weather follow a pattern?

NGSS Performance Expectation

This unit was aligned to the following Next Generation Science Standards (NGSS) Performance Expectations:

K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.
K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

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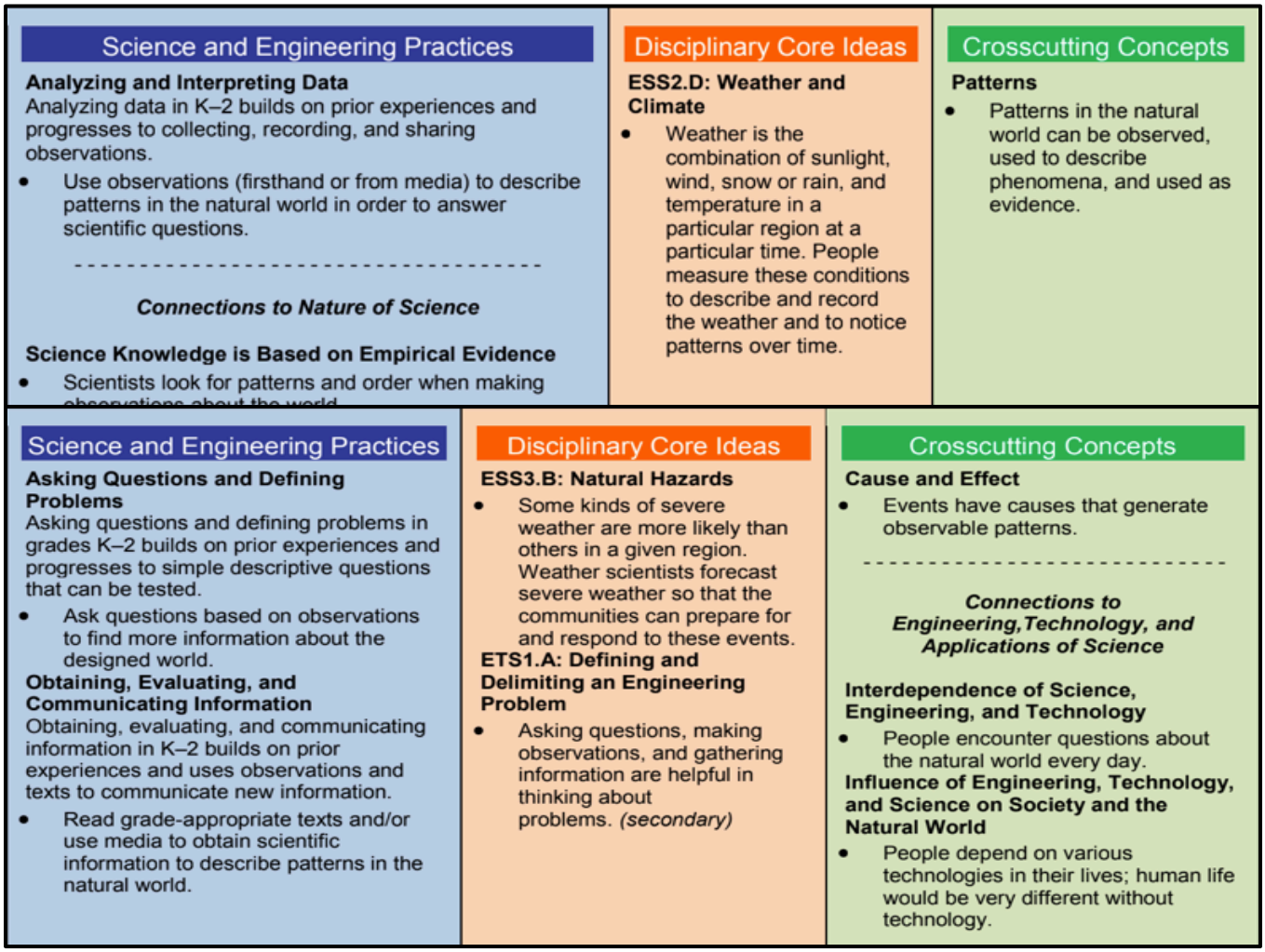
NGSS Unit Alignment

K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time.
K-ESS3-2 Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.



Connections to the three dimensions in this unit:

SEP: Asking Questions and Defining Problems & Analyzing and Interpreting Data

- Throughout the unit, students will develop the practice of asking observation-based questions by sharing wonderings and questions while listening to a story, participating in guided observations of images and museum resources, and watching videos of snowstorms in Chicago.
- Students will analyze a bar graph of Chicago winter snowfall to describe winter weather patterns. Students will use firsthand observations to describe typical weather patterns and will use observations from media to describe snowstorms as severe weather events in Chicago.

DCI:	**Weather and Climate & Natural Hazards**

- Students will observe and record the weather conditions outside their school twice a day. Students will analyze the data from their recorded observations on a weather chart to determine patterns for typical morning and afternoon weather during their current season.
- Students will make observations of Chicago winter weather scenes in the classroom and various resources. After analyzing Chicago snowfall data, students will obtain and communicate information about snowstorms as severe weather events that Chicago can experience in the winter and watch videos of community preparation and response to snowstorms.

CCC:	**Patterns**

Students will observe and record the morning and afternoon weather in order to determine patterns in typical weather conditions for a given area and time of day. Using their observations as data, students will describe the patterns they notice in typical and severe weather.

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Investigation 1: What are the daily weather patterns in Chicago?
Lesson 1.1: Weather and Forecasting in *Cloudy with a Chance of Meatballs*

Lesson Description

30 minutes

Students will listen to the book *Cloudy with a Chance of Meatballs*. During key points in the story, students will discuss, reflect, and ask questions about the weather and forecasting in the fictional town of Chewandswallow as compared to the real city of Chicago.

Objective

Students will be able to make observations and ask questions about weather patterns and weather forecasting.

Guiding Questions

How is the weather in Chewandswallow similar to and different from the weather in Chicago?

Materials

Per Class

- Teacher Resource 1.1.A
- Teacher Resource 1.1.B
- *Cloudy with a Chance of Meatballs* written by Judi Barrett and illustrated by Ron Barrett
- Chart paper or Smartboard

Materials Preparation

- Review *Cloudy with a Chance of Meatballs* and mark stopping points in the story where students will discuss.

New Vocabulary

Predict – use observations to guess what might happen in the future
Weather – The mix of sunlight, wind, snow or rain, and temperature in one location at one time

Alignment to Additional Standards

This activity aligns with Common Core English Language Arts standard:
CCSS.ELA-LITERACY.RL.K.1: With prompting and support, ask and answer questions about key details in a text.

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Investigation 1: What are the daily weather patterns in Chicago?
Lesson 1.1: Weather and Forecasting in *Cloudy with a Chance of Meatballs*

Engage — 5 minutes

1. Tell students that we have received a letter from a very special person, a character named Basil Macaroni. He has experienced some very strange weather, and would like to hear our thoughts about it. Read **Teacher Resource 1.1.A.**
2. Tell students that you will read the book *Cloudy with a Chance of Meatballs*. Tell students to listen for weather patterns throughout the book and think about how the weather in the book is the same as or different from the weather in Chicago.

Investigate — 15 minutes

1. Read *Cloudy with a Chance of Meatballs* to the students as a class or in small groups.
2. Throughout the story, stop at key points (see **Teacher Resource 1.1.B**) to check for understanding, ask clarifying questions, and give students the opportunity to make connections and share observations about weather.

Reflect and Share — 10 minutes

1. Ask students to think about the weather they read about in *Cloudy with a Chance of Meatballs*. Create a T-Chart on the board to compare Chewandswallow and Chicago. Ask students to recall the ways in which people in both places learn about what the weather will be like and respond to the weather.
2. Have students turn to a neighbor and share one thing they still wonder about weather. Challenge students to think of one question they would ask someone in Chewandswallow to find out more information about what the weather is like there.
3. Allow a few students to share their wonderings with the class, and record a synthesis of student questions and wonderings on the board or a piece of chart paper titled "Questions We Have." Save the chart paper or take a photo of the board to keep a record of how students' questions evolve throughout the unit.

Teacher Resource 1.1.A
Letter #1 from Basil

Dear Kindergarten,

My name is Basil Macaroni, and I used to live in the town of Chewandswallow. I heard that your class is full of science experts, and that you are getting ready to study weather. The weather sure did get interesting in our town! What is the weather like where you live? Listen closely to the story your teacher is about to read you and see if you notice the patterns in our weather.

I am looking forward to talking to you soon.

Yours fully,

—Basil

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Investigation 1: What are the daily weather patterns in Chicago?
Lesson 1.2: Observing and Recording Weather

Lesson Description

30 minutes

Students will hear from Basil Macaroni, a former citizen of Chewandswallow who is considering moving to Chicago, who wants the class to provide information about weather in Chicago to help him make the decision. In order to recognize and communicate patterns in the weather they experience in Chicago, students will make a plan to observe and record the weather two times a day for each day of the week. They will begin adding observations to their weather chart.

Objective

Students will be able to collect data about weather in Chicago by observing and recording the weather twice a day for a week.

Guiding Questions

Is the weather in Chicago the same throughout the day? Is the weather in Chicago the same every day?

Materials

Per class

- Teacher Resource 1.2.A
- Teacher Resource 1.2.B
- Teacher Resource 1.2.C
- Thermometer (or access to Accuweather, etc.)

Materials Preparation

Prepare a weeklong weather chart (See example in **Teacher Resource 1.2.C**). If students already record weather data in the classroom, use the same chart, ensuring that there will be room for two observations per day and a place to record temperature.

New Vocabulary

Forecast - a prediction of what the weather will be like
Temperature - how hot or cold something is (can be measured)

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Investigation 1: What are the daily weather patterns in Chicago?
Lesson 1.2: Observing and Recording Weather

Engage — 5 minutes

1. Tell students that you have received another message from Basil Macaroni who needs some important information from them. Read **Teacher Resource 1.2.A.**
2. Ask students to turn to a partner and think-pair-share the answer to Basil's first question, "Do you usually get the same types of weather during the day?" Allow a few students to share their thinking.

Investigate — 20 minutes

1. Remind students that they need to help Basil understand Chicago's weather to help him make his decision about moving.
2. Ask students how they could find information about the weather to show Basil what it is usually like in Chicago at this time of year. In needed, guide students to the conclusion that they could look at the weather multiple times every day and make a weather chart.
3. Ask students what information might be important to consider in their plan to observe the weather. Possible considerations may include:
   - Evidence of the type of weather (clouds, rain, sun, wind, snow, temperature, etc.)
   - Times of day to record the weather
   - Where to find out more information about weather

Teaching Tip: *Build this observation process into the daily routine. For an extension and more data points, students could continue tracking the weather for an additional week.*

Reflect and Share — 10 minutes

1. Show students the blank weather chart based on the criteria they selected (see **Teacher Resource 1.2.C** for example set-up). Explain that they will observe and record the weather twice a day for a week.
2. Review the weather icons (see **Teacher Resource 1.2.B**) with students and explain that students will look for weather that is represented on the icons (i.e. clouds, sun, rain, snow, wind). They will also record the temperature, or what the weather feels like (cold, mild, or hot).
3. As a class, go outside and do the first weather observation. Remind students to pay close attention to what they sky looks like and what the weather feels like to them.
4. Go back inside and have a student record the class' consensus about what the weather looked like using the weather icons and the weather chart. Ask students what the weather felt like (cold, mild, or hot). Optionally, using a thermometer or a weather website, you may also read the current temperature and ask a student to mark the temperature data on the chart.
5. Ask students if they have any predictions about what the weather might be like the next time they record the weather.
6. For the next five school days, continue to observe the weather twice a day (at consistent times) and record observations on the weather chart.

Teacher Resource 1.2.A
Letter #2 from Basil

Dear Kindergarten,

Hi, it's me Basil! You have heard about our incredible snackstorm. We found a small town close by to escape the storms, but there isn't enough room for all of us, so we need to find a bigger city! I'm hoping that you can give me information about the weather in Chicago so we can decide if we want to move there.

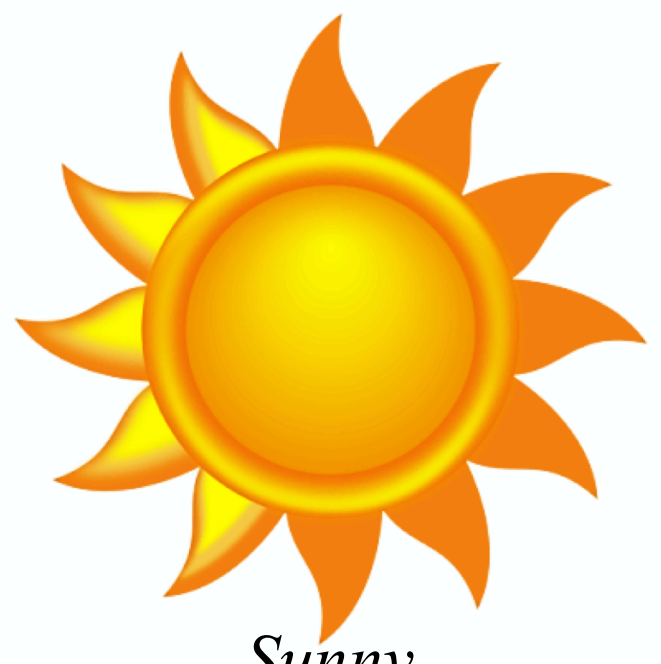
Before the big storms in Chewandswallow, we usually got breakfast food in the morning, lunch food in the afternoon, and dinner food in the evening. Do you usually get the same types of weather during the day? What does a usual week of weather look for you in Chicago during this time of year? I'd love to know so that I can report back at our town meeting.

Please send any questions or information to my email address at: basilmacaroni@hotmeal.com. I may have more questions for you later. Thank you!

Yours fully,

—Basil

Teacher Resource 1.2.B
Weather and Temperature Icons

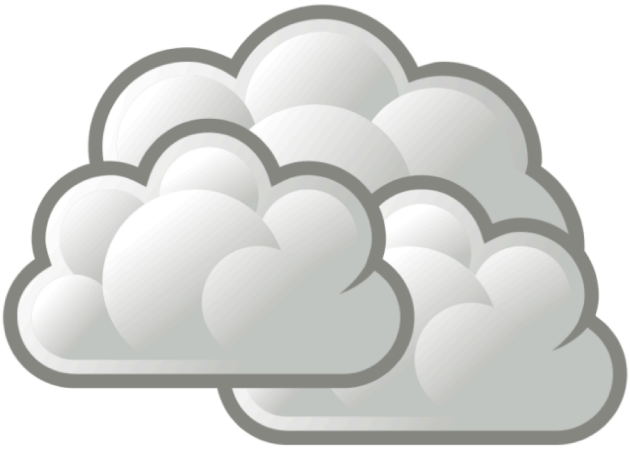


Sunny

Rainy

Teacher Resource 1.2.B
Weather and Temperature Icons

Snowy



Cloudy

Teacher Resource 1.2.B
Weather and Temperature Icons

Windy

Cold

Teacher Resource 1.2.B
Weather and Temperature Icons

Hot

Mild

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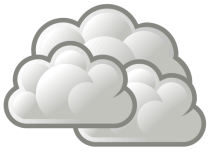
Teacher Resource 1.2.C
Winter Weather Chart-EXAMPLE

	Morning		Afternoon	
1	 **Looks rainy**	 **Feels mild (60 degrees)**	 **Looks sunny**	 **Feels mild (65 degrees)**
2	 **Looks cloudy**	 **Feels cold (53 degrees)**	 **Looks sunny**	 **Feels mild (62 degrees)**
3				
4				
5				

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Investigation 1: What are the daily weather patterns in Chicago?
Lesson 1.3: Analyzing Classroom Weather Data

Lesson Description

35 minutes

In small groups, students will use the completed class weather chart to observe and describe weather patterns over the course of the week and send their analysis to Basil. Students will analyze different parts of the weather chart and communicate the most common morning and afternoon weather.

Objective

Students will be able to analyze the class weather chart and communicate observable patterns in the weather.

Guiding Questions

Did our weather follow a pattern?

Materials

Per class

- Class weather chart with (at least) a week of recorded weather

Per group of 3-4 students

- One set of weather icons that corresponds to the observed morning weather, morning temperature, afternoon weather, and afternoon temperature

Per student

- Student Resource 1.3.A

Materials Preparation

- Review the completed class weather chart.
- Make a class set of copies of the weather icons that correspond to the observed weather in the morning (use the weather icons from **Teacher Resource 1.2.B)**. For example, if your class observed that on Monday, Tuesday, and Wednesday it was sunny in the morning, on Thursday it was cloudy, and on Friday it was rainy; prepare a set of weather icons that includes three sunny icons, one cloudy icon, and one rainy icon. Do the same for the morning temperature, afternoon weather, and afternoon temperature. Each student will have four separate set of icons to sort and analyze. *Alternatively, create these sets for each small group.*
- Make copies of **Student Resource 1.3.A**

New Vocabulary

Pattern - something that happens again and again or in a consistent way

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Investigation 1: What are the daily weather patterns in Chicago?
Lesson 1.3: Analyzing Classroom Weather Data

Engage — 5 minutes

1. Display the completed class weather chart. Tell students they will look closely at the weather data they collected so they're ready to share that information with Basil.
2. Ask students what they notice about the weather for the whole week. Ask students to notice if the weather was the same every day, all day, and if there were any types of weather that happened multiple times.
3. Ask students how they could figure out what weather types were the most common over the whole week (for example, they could count all of the weather icons to notice if there were more of one type than another).

Investigate — 20 minutes

1. Pass out **Student Resource 1.3.A**, as well as one set of morning weather ("looks like") icons to each student. Tell students to look at the weather icons and make groups out of the pictures they see.
2. Have students record the number of days of each type of weather they saw in the morning on **Student Resource 1.3.A**. Students will compare the numbers in their recorded data and determine which type of weather occurred the most frequently.
3. Pass out a set of morning temperature ("feels like") icons to each student and guide them through the analysis process above to determine which temperature occurred the most in the past week.
4. Repeat this process with the afternoon weather ("looks like) icons, and finally the afternoon temperature ("feels like") icons.

Reflect and Share — 5 minutes

1. Direct students to look at their completed **Student Resource 1.3.A** sheets, along with the weather chart. Ask students what they notice about the weather they have recorded and analyzed. Ask students which types of weather were most common in the morning and afternoon.
2. Ask students if they have any new questions or wonderings after analyzing their weather data. Add any new questions to "Questions We Have" chart paper from Lesson 1.1.
3. Remind students that they will send this information to Basil to give him a better understanding of what the weather looks and feels like in Chicago. Ask students if they have any additional information that they think would be helpful for Basil to know about the weather now in Chicago (for example: clothing or gear to pack, activities they could do during the weather, places to look for the forecast, etc.). Record student ideas on chart paper.

Student Resource 1.3.A **Weather Chart Analysis**

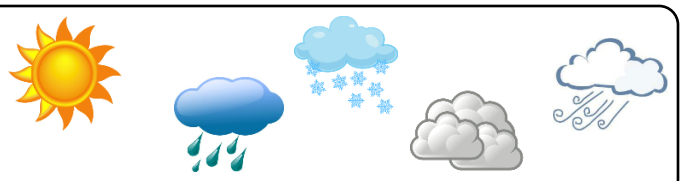
Names(s): _____

How many **mornings** were…

 Sunny	
 Rainy	
 Snowy	
 Cloudy	
 Windy	

In the **morning**, it felt…

 Cold	
 Hot	
 Mild	

In the morning, weather usually **looks:** 	
In the morning, weather usually **feels:** 	

Student Resource 1.3.A **Weather Chart Analysis**

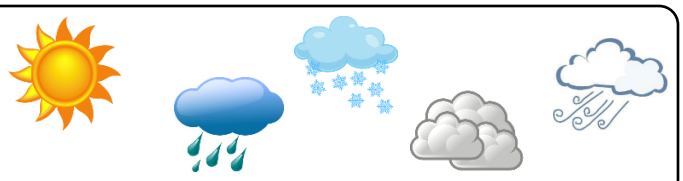
Name: _____

How many **mornings** were…

 Sunny	
 Rainy	
 Snowy	
 Cloudy	
 Windy	

In the **morning**, it felt…

 Cold	
 Hot	
 Mild	

In the morning, weather usually **looks:** 	
In the morning, weather usually **feels:** 	

Student Resource 1.3.A **Weather Chart Analysis**

Name: _____

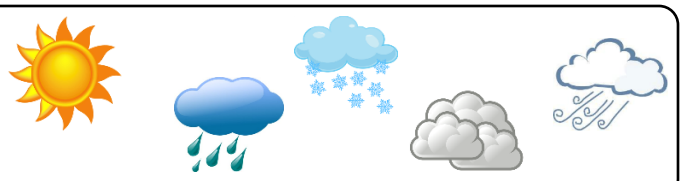
How many **afternoons** were…

 Sunny	
 Rainy	
 Snowy	
 Cloudy	
 Windy	

In the **afternoon**, it felt…

 Cold	
 Hot	
 Mild	

In the afternoon, weather usually **looks:**



In the afternoon, weather usually **feels:**

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Investigation 2: What are winter weather patterns in Chicago?
Lesson 2.1: Observing Winter in Chicago

Lesson Description

20 minutes

Students will engage in a guided observational discussion of an image of a winter scene as a way to gather information and practice asking questions based on observations. Students will brainstorm what they know about winter weather in Chicago. Students will share questions or wonderings they have about how people prepare for and respond to winter weather.

Objective

Students will be able to identify prior knowledge and questions about winter weather.

Guiding Questions

Will the weather in winter follow the same pattern as the current weather?

Materials

Per class

- Teacher Resource 2.1.A
- Teacher Resource 2.1.B
- Teacher Resource 2.1.C, Snowy Playground Image

Materials Preparation

- Prepare to project Teacher Resource 2.1.C

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Investigation 2: What are winter weather patterns in Chicago?
Lesson 2.1: Observing Winter in Chicago

Engage — 5 minutes

1. Ask students to recall what they found out and shared with Basil about the weather by tracking it over time.
2. Tell students that Basil has sent another letter asking for more information about winter weather in Chicago. Read **Teacher Resource 2.1.A**, the new letter from Basil, aloud to students.
3. Repeat Basil's question: "Does your weather follow the same pattern for the whole year?" Ask students to share how they think they could find the answer to this question.
4. Repeat Basil's second question, "What do you think the weather will be like in the winter?" Ask students to think-pair-share a prediction they have about winter weather.

Investigate — 10 minutes

1. Tell students that they will practice making observations of weather from an image of winter in Chicago. Ask students what they think it means to make an observation, and guide students to understand that *observing* means *looking closely*. When making observations, students should talk about what they can actually see.
2. Display **Teacher Resource 2.1.C**. Give students a quiet moment to observe.
3. Guide students through a modified Visual Thinking Strategies (VTS) discussion of the image (see **Teacher Resource 2.1.B**).

Reflect and Share — 5 minutes

1. Ask students what new questions they have about the scene in the picture and record their responses on the "Questions We Have" chart paper.
2. Allow students to share ideas about how they could find answers to their questions.

Teacher Resource 2.1.A
Letter #3 from Basil

Dear Kindergarten,

Thank you for working so hard to record your weather for me! It's very helpful to see that the weather can change during the day. I think it's also interesting that you noticed that even though the weather changes during a day, it looks like there is a pattern, or you got the same type of weather over and over during the week.

Does your weather follow this same pattern for the whole year? I talked to my family and friends, and we're thinking about moving in the winter. What do you think the weather will be like in the winter? I want to make sure I am prepared and know what to expect. Please send pictures!

Thanks for all of your help!

Yours fully,

—Basil

Teacher Resource 2.1.B
Visual Thinking Strategies (VTS) Overview

Visual Thinking Strategies (VTS)

Adapted from the Milwaukee Art Museum Teacher VTS Resource

Visual Thinking Strategies (VTS) is an inquiry-based teaching strategy for all grade levels. The goal of VTS is to encourage students to observe independently and back up their comments with evidence.

How to do VTS

1. Project the Visual Thinking Strategy focus (a map, photograph, painting, data set, etc).
2. Ask students to look closely and silently at it for a minute or two.
3. Ask three questions to guide the discussion:

- Open with: **"What's going on here?"**
  Summarize student responses using conditional language ("Raoul thinks this could be…"). This keeps the conversation open to other interpretations by other students.
  - *If you say, "What do you see?" – it directs students to point out only evidence, not construct meaning from how the components of the image work together.*
- If appropriate: **"What do you see that makes you say that?"**
  This encourages students to back up their statements with things they see in the focus piece.
- Ask the group: **"What more can we find?"**
  This continues the conversation.
  - *If you say, "What else can you find?" – that can invalidate some responses or make it seem as though the facilitator is looking for a specific response.*

Tips for doing VTS

- During discussion, link responses together—compare and contrast what different students have said.
- Avoid inserting information. Let students look closely and reason out their responses rather than discussing the facts. If a student comes to a factually incorrect conclusion, gently correct if absolutely necessary afterwards during your classroom lesson, *not* during the VTS conversation.
- Allow the conversation to go where it will, even if it gets off topic. Remember, the goal is not to share information, but to encourage critical thinking.
- At the end of the conversation, continue with your lesson, linking the content with comments that students made.

For more information about Visual Thinking Strategies, visit their website, **vtshome.org**.

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Teacher Resource 2.1.C
Winter Photo

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Investigation 2: What are winter weather patterns in Chicago?
Lesson 2.2: Describing Winter in Chicago

Lesson Description

35 minutes

Students will make drawings based on their observations of winter scenes. Students will record what they notice about the weather on a postcard to send to Basil.

Objective

Students will be able to record observations of what is present and absent during the winter in Chicago.

Guiding Question

What does winter in Chicago look like?

Materials

Per class

- Teacher Resource 2.2.A

Per student

- Student Resource 2.2.A
- Pencil
- Winter Pictures
- Winter Books

Materials Preparation

- Print Student Resource 2.2.A (front and back) for each student

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Investigation 2: What are winter weather patterns in Chicago?
Lesson 2.2: Describing Winter in Chicago

Engage — 5 minutes

1. Tell students that they will write a postcard to Basil to tell him about winter weather in Chicago.
2. Show students **Student Resource 2.2.A.** Tell students that they will decorate the front of their postcard with a drawing of a winter scene in Chicago. On the back, they will write down information about winter, such as how it feels, what they see, and what they don't see much of in winter. Ask students why they think it is important to notice what is *not* there in the winter.
3. Pass out **Student Resource 2.2.A** and a pencil to each student.

Investigate — 20 minutes

1. Show students pictures of winter scenes from **Teacher Resource 2.2.A**. Have students discuss what they see and think about the pictures. Record student observations.
2. Optionally, read a winter book from the suggested reading list (see **Teacher Resource 2.2.B**) to give students more information about winter weather.
3. Give students time to draw a winter scene on the front of the postcard. When students have finished their drawings, support them in completing the information on the back.

Reflect and Share — 10 minutes

1. Pair students and have them share what they drew and wrote. Collect the completed postcards.
2. Tell students that you will send all the postcards to Basil so that he knows more about what to expect in winter in Chicago.

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Teacher Resource 2.2.A
Winter Scenes in Chicago

Teacher Resource 2.2.B
Suggested Winter Book List

Winter is for Snow by Robert Neubecker

Snow by Sam Usher

Snowy Day by Eza Jack Keats

Millions of Snowflakes by Mary Mckinna Siddals

Snow by Erin Edison

Snow Sounds by David Johnson

Snow by Uri Shulevtiz

Perfect Snow by Barbara Reid

Snow by Grace Hansen

Snow Day! by Lester L Laminack

Snow is Falling by Fanklyn M Branley

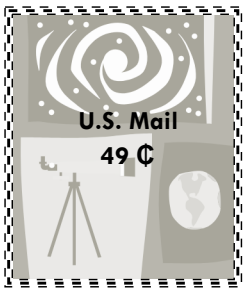
Snow on Snow on Snow by Cheryl Chapman

Student Resource 2.1.A **Weather Chart Analysis**

Name: _____

Greetings from Chicago in Winter!

Think about Winter in Chicago. **Draw** what it looks like.



Dear Basil,

We are learning all about winter in Chicago.

It feels:

_____

There is a lot of:

_____

In winter, I like to:

_____

Write soon!

From,

_____

Basil Macaroni
24 Meat Street
Small Coastal Town
60615

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Investigation 3: What happens during snowstorms in Chicago?
Lesson 3.1: Chicago Snowfall Analysis

Lesson Description

35 minutes

Using a bar graph, students will analyze Chicago annual snowfall patterns and formulate questions based on their observations.

Objective

Students will be able to analyze snowfall data to describe patterns in winter weather in Chicago.
Students will be able to identify questions and possible resources for finding out what happens during a snowstorm

Guiding Questions

What is the typical snowfall in Chicago in the winter? What happens when Chicago gets more snow than usual?

Materials

Per Student

- Student Resource 3.1.A - Snowfall Graph
- Teacher Resource 3.1.A - Letter from Basil

Per Class

- Chart paper labeled "What We Want to Know About Snowstorms"

Materials Preparation

- Print **Student Resource 3.1.A** for each student or plan to project for the class

New Vocabulary

Meteorologist - a scientist who observes and predicts the weather
Snowstorm - heavy snowfall with wind and cold temperatures

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Investigation 3: What happens during snowstorms in Chicago?
Lesson 3.1: Chicago Snowfall Analysis

Engage — 5 minutes

1. Prompt students to recall and share what they drew in the winter pictures that were sent to Basil. Be sure students emphasize that snow is a big part of winter in Chicago.
2. Read the new letter from Basil (see **Teacher Resource 3.1A)** aloud. Restate that Basil wants to find out about severe weather during winter in Chicago.

Investigate — 15 minutes

1. Display **Student Resource 3.1.A,** the Chicago Snowfall Graph. Explain that this type of diagram shows important information without using words. This bar graph shows how much snow fell in Chicago over the last six winters. Point out the bars on the graph and tell students that the height of each bar shows the amount of inches of snow that Chicago got during that year.
2. Give students a moment to observe the bar graph. Ask students to think about and share what they notice.
3. Point out the dotted average yearly snowfall line and tell students that this line shows how much snow Chicago usually gets every winter. To figure out the amount of snow that Chicago usually gets, scientists look at years and years of weather data and look for patterns in that data. Then, they make observations of weather to make predictions.
4. With students, count how many years Chicago got more snow than the average amount. Ask students to generate ideas as to why those years have more snow.

Reflect and Share — 10 minutes

1. Explain that even though the weather can be tracked, certain places have weather that is very different from the regular pattern. In Chewandswallow, Basil and his friends were used to breakfast, lunch, and dinner coming from the sky, but then that pattern changed. When the pattern of weather changed in Chewandswallow, they got big food storms and had to leave town. When the weather pattern changes during the winter in Chicago, there can be big snowstorms.
2. Explain that in the next lesson, students will investigate what happens during big snowstorms and what people can do to prepare and stay safe. Ask students to think about what questions they have or what they wonder about snowstorms and how people respond. Record student questions on the "Questions We Have" chart paper.
3. Ask students to brainstorm where they might look to find the answers to their questions (such as books, the Weather Channel, an expert, videos, etc.).

Teacher Resource 3.1.A
Letter #4 from Basil

Dear Kindergarten,

Thank you for sending me information about what to expect during the winter in Chicago. You said it gets cold; I am glad I have a coat, hat, mittens, and boots. The snow looks so pretty and fluffy. I can't wait to touch the snow and make a snowman!

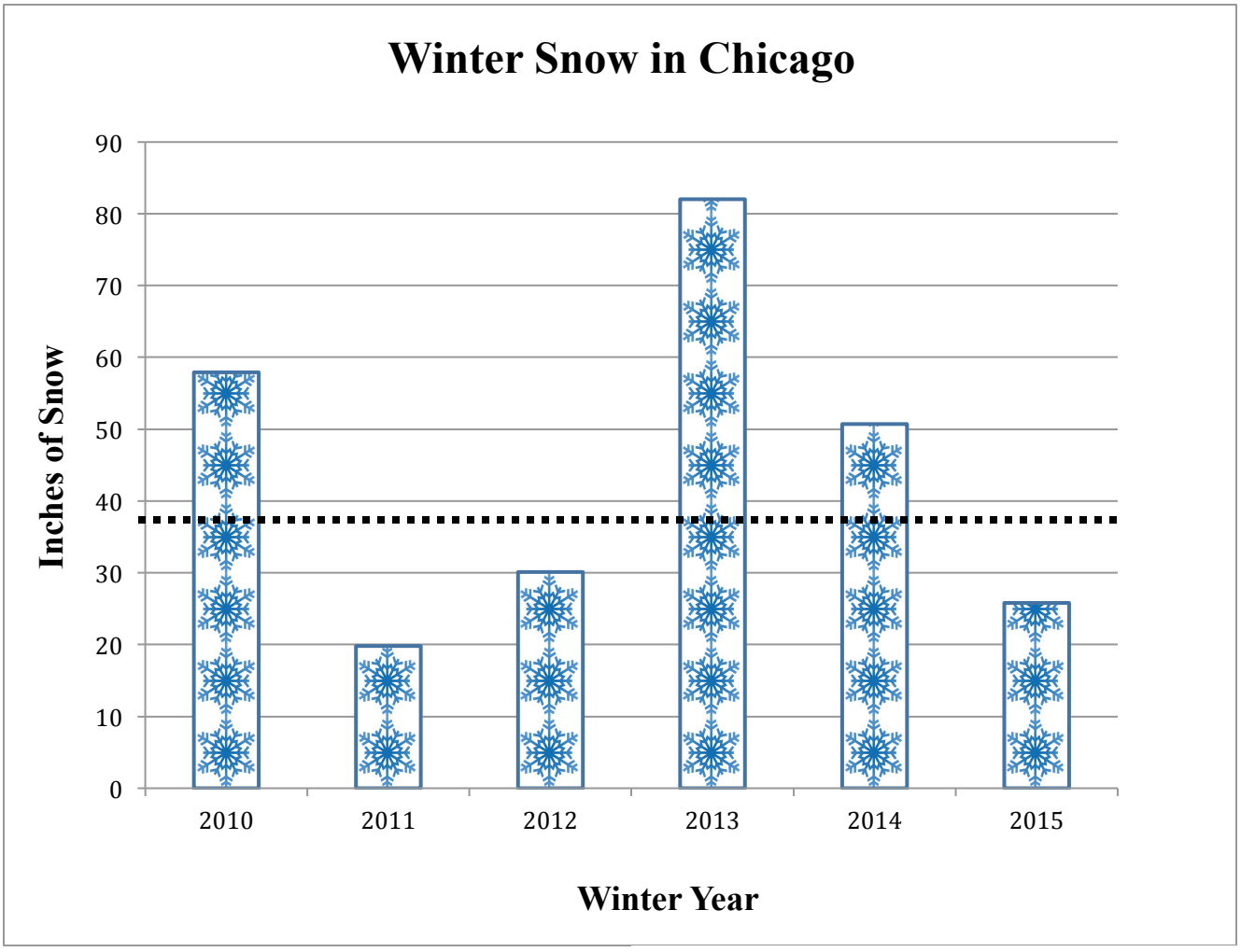
I would love to know if you ever get a lot of snow all at once. Do you know when snow is coming? How do you get ready for snow? What happens after it snows? I can't wait to hear back from you.

Thanks again for all of your help!

Yours fully,

—Basil

Student Resource 3.1.A **Weather Chart Analysis**



Weather **Earth and Space Science** **Kindergarten**

Investigation 3: What happens in Chicago during snowstorms?
Lesson 3.2: Snowstorm Forecast and Response

Lesson Description

20 minutes

Using videos and images of local forecasts, snowstorm footage, and snowstorm cleanup, students will gather information about how weather forecasting can help people in Chicago prepare for and respond to snowstorms.

Objective

Students will be able to obtain information about what happens during a snowstorm and how people in Chicago can prepare for and respond to snowstorms.

Guiding Questions

What can we do in a snowstorm?

Materials

Per Class

- "What We Want to Know" chart from Lesson 3.1
- Teacher Resource 3.2.A

Materials Preparation

Review Teacher Resource 3.2.A and choose resources to share with the class. Load selected videos.

Weather — Earth and Space Science — Kindergarten

Investigation 3: What happens in Chicago during snowstorms?
Lesson 3.2: Snowstorm Forecast and Response

Engage — 5 minutes

1. Display the class "What We Want to Know About Snowstorms" chart with students' wonderings about snowstorms, and read student questions.
2. Ask students if they have any more questions or wonderings about what snowstorms are, how people know snowstorms are coming, and what people should do during snowstorms. Record any new questions on the chart paper.

Investigate — 5-7 minutes

1. Tell students they will learn more about what to do before, during, and after a big snowstorm in Chicago. Tell students that even though snowstorms don't happen all of the time, there are certain things that meteorologists, or scientists who study weather, look for to figure out if a big snowstorm is coming.
2. Choose at least one of the "Snowstorm Preparation" videos from **Teacher Resource 3.2.A** and watch with students. After viewing together, ask students what they notice about preparation for a snowstorm. Record student observations.
3. Choose at least one of the "During a Snowstorm" videos from **Teacher Resource 3.2.A**. After viewing together, ask students to reflect on what they noticed during the snowstorm, and record their responses.
4. Choose at least one of the "Snowstorm Response" videos from **Teacher Resource 3.2.A**. After viewing together, ask students to reflect on what they saw or heard people doing around the city after the snowstorm. Record what students noticed after the snowstorm.

Reflect and Share — 5 minutes

1. Review students' ideas about what they noticed and what they could expect before, during, and after a snowstorm in Chicago.
2. Ask students how they could share this information with Basil so he knows what to expect.

Teacher Resource 3.2.A
Snowstorm Resource List

Photos
Chicago's Winter Arrives. Chicago Tribune photo gallery of the 2013-2014 winter. Gallery includes photos of snow and people interacting with the snow around Chicago.

}

Videos - Descriptions and links to videos of what Chicagoans do before, during, and after snowstorms.

Snowstorm Preparation
Snow Clearing: Winter of 2015-2016, Chicago Winter Prep. Department of Streets and Sanitation in Chicago discusses the importance of preparing fleets of snowplows for the winter storms. Video shows snow plows in action as well as the technology that the clean up teams use to decide where to send the plows. Full video is 2:39 minutes long:

}

Winter Weather Prep: Behind the Scenes. Similar video to above, but this video from the Office of the Mayor talks briefly about the preparation that the Department of Sanitation takes in the summer to prepare for winter storms to keep Chicagoans safe. Images of contrast between Chicago summers and Chicago winters. Full video is 2:43 minutes long: }

During the Snowstorm
Chicago Paralyzed by Snowstorm, CNN. News clip discusses and depicts effects of the snowstorm in 2013. In particular, the video shows snowy roads, discusses flight cancellations, school closings, and transportation. Full video is 1:23 minutes long: }

Chicago Snowstorm in 2011 in 2 minutes (time lapse). Neighborhood time-lapse video depicting snow accumulation over one day. In the video, one can see how the landscape changes as more snowfalls and plants and cars become covered with snow. Full video is 2:03 minutes long: { HYPERLINK "https://safeshare.tv/x/E3hgdf7HVrY" }

Snowstorm Responses
Chicago Shovels Program video. Video shows snowplow tracker. Discussion of Adopt-a-Sidewalk and helping neighbors with mobility concerns begins at 00:45. Full video is 2:42 minutes long:

}

Chicago Blizzard Clean Up in Lakeview. Video shows snowy streets, snow cleanup, and interviews of people around Lakeview talking their experiences with the 2015 snowstorm. Full video is 1:29 long:

}

Books (not an exhaustive list)
National Geographic Kids Weather by Kristin Baird Rattini
50 Things You Should Know About Wild Weather by Anna Claybourne (pgs. 6-7 weather, pg. 52 snowstorms)
What Will the Weather Be? A Let's-Read-and-Find-Out Book Written by Lynda DeWitt and illustrated by Carolyn Croll
Weather Words and What They Mean by Gail Gibbons
Weather Forecasting by Gail Gibbons

Weather **Earth and Space Science** **Kindergarten**

Teacher Resource 3.2.B
Snowstorm Resource List

Dear Families,

We have been discussing snowstorms in class this week. Your student has learned about the supplies that are helpful to have in your home. Please take a few minutes to look around your house with your child to locate the supplies you use during snowstorms.

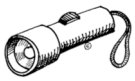
Do you have:

Shovel  _____

Sidewalk Salt 

_____

Bottled Water  _____

Flashlight  _____

Car window scraper  _____

Where could you go to get any supplies that you might need?

Draw a picture of some other items you have at home that your family uses during storms.

Weather **Earth and Space Science** **Kindergarten**

Investigation 3: What happens in Chicago during snowstorms?
Lesson 3.3: Class Performance Task

Lesson Description

30 minutes

In small groups, students will demonstrate their growth in the practices of asking observation-based questions and obtaining & communicating information. Students will create a Chicago snowstorm preparation and safety guide for Basil to demonstrate what they learned after obtaining information from videos, texts, and photos. Students will also generate new questions and wonderings they have after learning more about snowstorms in Chicago.

Objective

Students will be able to ask observation-based questions about snowstorms.
Students will be able to communicate information about what people do before, during, and after snowstorms in Chicago.

Guiding Questions

What did we find out about snowstorms in Chicago? Based on what we found out, what more do we want to find out about snowstorms in Chicago?

Materials

Per Class

- Chart paper
- Markers
- Teacher Resource 3.3.C

Per Small Group

- Teacher Resource 3.3.B

Per Student

- Student Resource 3.3.A
- Teacher Resource 3.3.D

Materials Preparation

- Print Teacher Resource 3.3.B for each small group.
- Print Teacher Resource 3.3.A and Teacher Resource 3.3.D for each student.

Weather — Earth and Space Science — Kindergarten

Investigation 3: What happens in Chicago during snowstorms?
Lesson 3.3: Class Performance Task

Engage — 5 minutes

1. Reread the third letter from Basil (**Teacher Resource 3.1.A**). Explain that students will create a snowstorm safety guide to help Basil prepare for his move to Chicago.
2. Prompt students to think about one thing they remember about how people prepare for a snowstorm or where they look to find information before a snowstorm. Then, pair students to share their thinking.

Investigate — 20 minutes

1. Give each student a copy of **Student Resource 3.3.A**. Remind students that they will share the information they have learned with Basil by creating a safety guide. It will be helpful for him to know how he can find out about snowstorms, what snowstorms are like once they happen, and what people in Chicago do after a snowstorm is over.
2. Have the students draw what Basil should do before, during, and after a snowstorm. Encourage students to write an explanation of their drawing or dictate their responses. Use **Teacher Resource 3.3.A** for sample responses.
3. Explain that you will mail the guides to Basil so that he can have this information to help him decide if he wants to move to Chicago.
4. Ask students to share any new questions or curiosities they have about snowstorms in Chicago that they would like to learn about and possibly share with Basil. Use the guiding questions and notes section on **Teacher Resource 3.3.B** to guide student discussion and record student information.

Reflect and Share — 5 minutes

1. Ask students to share how they think they could figure out the answers to their questions.
2. Use **Teacher Resource 3.3.D** to assess each student's performance.
3. In a day or two, read the final letter from Basil (see **Teacher Resource 3.3.C**).

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Teacher Resource 3.3.A
Snowstorm Guide – Example

Before the Snowstorm How or where would Basil find out if a snowstorm is coming? How would he prepare?	**During the Snowstorm** What should Basil do during a snowstorm? Why?	**After the Snowstorm** What should Basil do after the snowstorm to stay safe?
Basil could watch the weather report on the news.  He would need to get some milk and bread at the grocery store. He should also get some salt and shovel for the snow. 	Basil should stay inside because it will be very cold. The sidewalks and the streets will be very icy and full of snow. Schools may be closed. 	Basil should stay home until the roads are cleared. He should go out and shovel and salt his sidewalk. 

Student Resource 3.3.A **Performance Task - Snowstorm Guide**

Name: _____

Make a guide to prepare Basil for snowstorms in Chicago. **Draw** what Basil should do Before, During, and After the storm. **Write** or **tell** your teacher about your pictures.

Before the Snowstorm How or where would Basil find out if a snowstorm is coming? How would he prepare?	**During the Snowstorm** What should Basil do during a snowstorm? Why?	**After the Snowstorm** What should Basil do after the snowstorm to stay safe?

Weather **Earth and Space Science** **Kindergarten**

Teacher Resource 3.3.B
Questions we Have About Snowstorms

Guiding Questions	Answer Components	Potential student responses
What more do you want to know about snowstorms? What information did you learn about snowstorms that you still wonder about?	☐ Questions are focused on weather patterns, forecasting, snowstorms, or other severe weather Students:_____ ☐ Questions are based on observations from the videos, snowstorm photos, or information from books Students:_____	What other places get snowstorms? What if the weatherman predicts the weather wrong? Can meteorologists tell how many days the snowstorm will last?

Teacher Resource 3.3.C
Letter #5 from Basil

Dear Kindergarten,

Wow! You've learned a lot about the weather you have in Chicago. Thank you for sending me information about what to expect during the winter in Chicago—it looks like I will need to be prepared for snowstorms! That will be a change from flying food, but snow looks fun, especially now that I know how to be prepared and safe in it.

I'm glad I chose to write to you--you certainly are a class full of science and weather experts. I hope to see you in Chicago!

Yours fully,

—*Basil*

Weather **Earth and Space Science** **Kindergarten**

Teacher Resource 3.3.D
Snowstorm Guide Rubric

Question	**2 points / Meets Standard** (Drawing and written or dictated response)	**1 point / Developing**	**0 points / Does Not Approach**
Q1. How or where would Basil find out if a snowstorm was coming?	Student will give more than one response. **Correct responses include**: any news or media source (i.e. TV, radio, paper, online), look outside, ask someone else, etc.	At least one response is correct.	Incorrect or blank response.
Q2. How would he prepare?	Student will give more than one response. **Correct responses include**: shovel, wear warm clothes, buy supplies (food, water, candles, matches, flashlights, batteries), stay inside/stay home, etc.	At least one response is correct.	Incorrect or blank response.
Q3. What should Basil do during a snowstorm? Why?	Student will give more than one response. **Correct responses include**: stay inside, wear warm clothes **because it will be** snowy, windy, cold, low visibility, streets and sidewalks slippery, icicles, frozen lake, etc.	At least one response is correct.	Incorrect or blank response.
Q4. What should Basil do after the snowstorm to stay safe?	Student will give more than one response. Correct responses include: stay at home until roads are clear; snow plow and salt to clear the roads, shovel or salt sidewalks, driveways, cars, etc.	At least one response is correct.	Incorrect or blank response.
Q5. What more do you want to know about snowstorms? OR What information did you learn about snowstorms that you still wonder about?		Students ask at least one question.	No questions.

Weather	Earth and Space Science	Kindergarten
Glossary		

Forecast - a prediction of what the weather will be like

Observe - to look closely and carefully as a way to gather information

Meteorologist - a scientist who observes and predicts the weather

Pattern - something that happens again and again or in a consistent way

Predict - use observations to guess what might happen in the future

Temperature - how hot or cold something is (can be measured)

Snowstorm - heavy snowfall with wind and cold temperatures

Weather - the mix of sunlight, wind, snow or rain, and temperature in one location at one time