

Weather PBS Unit

PBS Unit Plan

Brooke Bradley

Grade Level: 2

Duration: 26 lessons (9 weeks)

Driving Question for the Unit: How do we know what to wear to school tomorrow?

Overview:

This long-term weather unit addresses all of the new second grade Ohio content standards for the topic “The Atmosphere.” Students plan their own driving question (although they may be guided towards something similar to “How do we know what to wear to school tomorrow?”). Students digitally record a daily weather report that begins very simply with measuring temperature. However, the weather reports become longer and more detailed as students design and create their own weather instruments and decide more information that they would like to include in their report. The weather report is uploaded online daily for other classes in the building (or district) to watch. All of the 5E’s in this inquiry-based unit are connected to learning about how students know what to wear for the weather.

Standards/Grade Level Indicators:

Grade 2 New Ohio Content Standards

Grade Band Theme: Observations of the Environment

Science Inquiry and Application:

- Observe and ask questions about the natural environment.
- Plan and conduct simple investigations.
- Employ simple equipment and tools to gather data and extend the senses.
- Use appropriate mathematics with data to construct reasonable explanations.
- Communication about observations, investigations, and explanations.
- Review and ask questions about the observations and explanations of others.

Content Standards:

- The atmosphere is made up of air.
- Water is present in the air.
- Long- and short-term weather changes occur due to changes in energy.

Learner Outcomes for the Unit:

- D1 Formulates driving questions. (Synthesis)
 - S1.1 Recall previous knowledge about weather. (Knowledge)
 - S1.2 Identify what students want to learn about weather. (Knowledge)
 - S1.3 Generate possible driving questions for weather unit. (Synthesis)
 - S1.4 Create brainstorming web about information needed to answer driving question. (Synthesis)

- D2 Knows how to use scientific notebook binder. (Knowledge)
 - S2.1 Identify how to use scientific notebook binder. (Knowledge)
- D3 Comprehends weather. (Comprehension)
 - S3.1 Identify that the atmosphere is made of air. (Knowledge)
 - S3.2 Recall different types of weather. (Knowledge)
 - S3.3 Label weather types. (Knowledge)
 - S3.4 Summarize what causes changes in weather. (Comprehension)
- D4 Analyzes weather. (Analysis)
 - S4.1 Record temperature. (Knowledge)
 - S4.2 Record cloud data. (Knowledge)
 - S4.3 Record wind direction. (Knowledge)
 - S4.4 Record wind speed. (Knowledge)
 - S4.5 Predict temperature of items. (Comprehension)
 - S4.6 Use a thermometer. (Application)
 - S4.7 Determine appropriate clothes to wear in today's weather. (Analysis)
 - S4.8 Analyze temperature data. (Analysis)
- D5 Gives weather report. (Synthesis)
 - S5.1 Create weather report. (Synthesis)
- D6 Judges temperature experiments. (Evaluation)
 - S6.1 Recall what an infrared thermometer is. (Knowledge)
 - S6.2 Identify claim, evidence, and reasoning. (Knowledge)
 - S6.3 Conduct weather experiments. (Application)
 - S6.4 Analyze temperature data. (Analysis)
 - S6.5 Design a temperature experiment. (Synthesis)
 - S6.6 Create a claim, evidence, reasoning poster. (Synthesis)
 - S6.7 Criticize peer posters. (Evaluation)
- D7 Judges weather. (Evaluation)
 - S7.1 Draw and label cloud types. (Knowledge)
 - S7.2 Generate a hypothesis for GLOBE investigation. (Comprehension)
 - S7.3 Summarize cloud information. (Comprehension)
 - S7.4 Use GLOBE to enter cloud data. (Application)
 - S7.5 Conduct cloud experiment (Application)
 - S7.6 Present weather report to a scientist. (Application)
 - S7.7 Analyze temperature data. (Analysis)
 - S7.8 Analyze ways to improve weather report. (Analysis)
 - S7.9 Design an experiment that utilizes GLOBE data. (Synthesis)
 - S7.10 Formulate questions for further inquiry. (Synthesis)
 - S7.11 Create a claim, evidence, reasoning sheet. (Synthesis)
 - S7.12 Re-design weather report based on scientist's suggestions. (Synthesis)

- S7.13 Create a brochure storyboard about Ohio weather in a particular season. (Synthesis)
- S7.14 Create brochure about Ohio weather in a particular season. (Synthesis)
- S7.15 Re-design brochure storyboard based on peer-evaluation. (Synthesis)
- S7.16 Justify agreement/disagreement with cloud statements. (Evaluation)
- S7.17 Justify “reasoning” on claim, evidence, reasoning sheet. (Evaluation)
- S7.18 Self-assess information learned throughout weather unit. (Evaluation)
- S7.19 Evaluate a peer’s brochure storyboard. (Evaluation)
- S7.20 Evaluate Ohio weather brochure. (Evaluation)
- D8 Judges wind. (Evaluation)
 - S8.1 Describe wind as a renewable energy. (Knowledge)
 - S8.2 Identify cardinal directions. (Knowledge)
 - S8.3 Describe a wind vane that represents your culture. (Knowledge)
 - S8.4 Explain how to measure wind direction. (Comprehension)
 - S8.5 Summarize how wind affects what we wear outside. (Comprehension)
 - S8.6 Build wind vane. (Application)
 - S8.7 Construct wind turbine. (Application)
 - S8.8 Analyze wind speed data. (Analysis)
 - S8.9 Deduce which direction the wind makes a pinwheel spin fastest. (Analysis)
 - S8.10 Design a wind vane. (Synthesis)
 - S8.11 Re-design wind vane. (Synthesis)
 - S8.12 Formulate a plan for lighting bulb on wind turbine. (Synthesis)
 - S8.13 Design a wind turbine. (Synthesis)
 - S8.14 Support your wind vane design. (Evaluation)
 - S8.15 Grade your own wind vane using rubric provided. (Evaluation)
 - S8.16 Criticize wind vane design. (Evaluation)
 - S8.17 Compare student anemometer data to online ODT data. (Evaluation)
 - S8.18 Compare and contrast renewable energy with non-renewable energy. (Evaluation)
 - S8.19 Support wind turbine designs. (Evaluation)
- D9 Judges air mass. (Evaluation)
 - S9.1 Describe wind sock. (Knowledge)
 - S9.2 Summarize air mass information. (Comprehension)
 - S9.3 Explain results of air mass experiments. (Comprehension)
 - S9.4 Conduct air mass experiment. (Application)
 - S9.5 Generate a hypothesis for your experiment. (Synthesis)
 - S9.6 Design an air mass experiment. (Synthesis)

- S9.7 Justify experimental design. (Evaluation)
- S9.8 Make conclusions about what was learned, difficulties, and possible improvements that could be made to experiment. (Evaluation)
- D10 Judges water cycle. (Evaluation)
 - S10.1 Describe water cycle. (Knowledge)
 - S10.2 Label parts of the water cycle. (Knowledge)
 - S10.3 Summarize water cycle information. (Comprehension)
 - S10.4 Generate a hypothesis for experiment. (Comprehension)
 - S10.5 Summarize previous knowledge about water cycle. (Comprehension)
 - S10.6 Predict what will happen in water cycle bottle. (Application)
 - S10.7 Construct water cycle bottle. (Application)
 - S10.8 Conduct water cycle experiment. (Application)
 - S10.9 Produce an acrostic poster that illustrates important aspects of the water cycle. (Application)
 - S10.10 Diagram the water cycle. (Analysis)
 - S10.11 Design an experiment where pollution gets in the water cycle. (Synthesis)
 - S10.12 Justify experimental design. (Evaluation)
 - S10.13 Justify your reasoning on your claim, evidence, and reasoning sheet. (Evaluation)
- D11 Judges precipitation. (Evaluation)
 - S11.1 Explain how precipitation affects what you wear outside. (Comprehension)
 - S11.2 Design a rain gauge. (Synthesis)
 - S11.3 Justify rain gauge design. (Evaluation)
 - S11.4 Compare and contrast types of precipitation. (Evaluation)
- D12 Analyzes weather fronts. (Analysis)
 - S12.1 Identify information provided in news weather reports. (Knowledge)
 - S12.2 Summarize weather map information. (Comprehension)
 - S12.3 Summarize long or short term changes in weather that occur at specific weather fronts. (Comprehension)
 - S12.4 Analyze weather map data. (Analysis)
- D13 Recognizes long and short term weather changes. (Analysis)
 - S13.1 Identify weather changes. (Knowledge)
 - S13.2 Summarize long and short term temperature changes. (Comprehension)
 - S13.3 Analyze temperature data. (Analysis)
- D14 Judges differences in weather. (Evaluation)
 - S14.1 Identify two cities with the same latitude but different elevations. (Knowledge)

- S14.2 Explain how elevation affects what clothing to wear outside. (Comprehension)
- S14.3 Compare weather between two cities. (Evaluation)
- D15 Judges claim, evidence, and reasoning. (Evaluation)
 - S15.1 Identify claim, evidence and reasoning regarding driving question. (Knowledge)
 - S15.2 Self-evaluate claim, evidence, and reasoning posters. (Evaluate)

Assessments for the Unit:

Pre-Assessment [if using a test, include the test in the appendix]

- Weather KWL
 - Complete “K” and “W” (What do you already know about weather? What do you want to learn about weather?) on Day 1

Post Assessment

- Unit Assessment
- Weather KWL
 - Complete “L” (What have you learned about weather?) on Day 24

Formative Assessment

- Daily Lab sheets
- Scientific notebook binder
- Brainstorming webs
- Types of weather poster
- Thermometer clicker quiz
- Claim, evidence, reasoning poster
- Concept cartoons
- Wind vane artifact
- Wind turbine artifact
- First word
- Water cycle diagrams
- Paint the picture
- Last word
- Rain gauge artifact
- Travel brochure artifact
- Annotated student drawing
- Student self-assessments
- “Three, Two, One” responses
- Daily weather report
- Weather mural

Overall Plan: [PBS Unit at a glance](#)

Materials needed for this unit:

Day 1

- Scientific notebook binder
- Flip camera
- Weather KWL lab sheet
- SmartBoard
- Computer
- Projector
- Paper
- Pencils

Day 2

- Art instructor for Sofia Quintero Arts and Cultural Center
- Scientific notebook binder
- Flip camera
- Weather book: Oh Say Can You Say What's the Weather Today? By Tish Rabet and Artistides Ruiz
- Poster/mural paper
- Crayons
- Pencils
- SmartBoard
- Computers
- Kidpiration Software

Day 3

- Scientific notebook binder
- Flip camera
- SmartResponse clickers
- Temperature clicker quiz
- IRT
- IRT lab sheet
- Various classroom items chosen by students

Day 4

- Examples of Weather Lore
- Scientific notebook binder
- Flip camera
- Digital camera
- Printer
- Computer
- Construction paper
- Blank bulletin board
- Charting temperature lab sheet

Day 5

- Scientific notebook binder
- Flip camera
- IRT
- Heating Up and Cooling Down by Darlene R. Stille
- Notebook paper
- Pencils
- Temperature lab sheet
- Poster rubric
- Computer
- Inspiration software
- Printer
- Charting temperature lab sheet

Day 6

- Scientific notebook binder
- Flip camera
- Cloud statements
- Leveled books about clouds
- Cloud comprehension lab sheet
- Computers
- GLOBE protocols
- Science Formative Assessment by Keeley

Day 7

- Scientific notebook binder
- Flip camera
- Cloud concept cartoons
- Computer
- GLOBE lab sheets
- Blank paper
- Pencils
- Crayons
- Images of artwork from Harold Newton and Iñigo Manglano-Ovalle
- Pictures and biographies of Harold Newton and Iñigo Manglano-Ovalle's

Day 8

- Scientific notebook binder
- Paper
- Push pins
- Straws
- Hair dryer
- SmartBoard
- Leveled reading books about wind

- Temperature/clouds lab sheet
- Science Formative Assessment by Keeley

Day 9

- Scientific notebook binder
- Flip camera
- Wind vane images (including image of Greek Triton wind vane)
- Wind vane rubric
- Pencils
- Crayons
- iPad with digital compass
- Wind vane materials indicated in student designs (straws, push pins, tissues boxes, TP rolls, milk cartons, construction paper, tape, glue)
- Temperature/clouds lab sheet

Day 10

- Scientific notebook binder
- Flip camera
- Computer
- Projector
- Student-created wind vanes
- Weather lab sheets

Day 11

- Scientific notebook binder
- Flip camera
- Anemometer materials (Protractor, string, ping-pong balls)
- Computer
- Recording weather lab sheet

Day 12

- “The Boy Who Harnessed the Wind (picture book)” by William Kamkwamba & Bryan Mealer, Illustrated by Elizabeth Zunon
- Scientific notebook binder
- Flip camera
- Computer
- Projector
- Kid Wind turbines
- Leveled energy books
- Energy lab sheets
- Blank Venn Diagrams
- Paper
- Pencils
- Crayons

- Recording weather lab sheet

Day 13

- Scientific notebook binder
- Flip camera
- Computer
- Projector
- Materials from student wind turbine designs (possibly paper towel rolls, tape, paper, cups, push pins)
- Wind leveled readers
- Recording weather lab sheets

Day 14

- Scientific notebook binder
- Flip camera
- Air is All Around You by Franklyn Mansfield
- Air mass lab sheet
- Weather lab sheet
- Wind sock materials: construction paper, tissue paper, tape, hold punch, yarn
- Computer
- Skype software
- Paper
- Pencil
- Air mass lab sheet
- Recording weather lab sheet
- Scientist available via Skype

Day 15

- Scientific notebook binder
- Flip camera
- Computer
- Projector
- PowerPoint
- Recording weather lab sheet
- Air mass lab sheet
- Student selected materials for air mass investigation

Day 16

- Scientific notebook binder
- Flip camera
- Paper
- Pencils
- Markers
- 2-liter bottles

- Water
- String
- Ice
- Leveled water cycle books
- Water cycle diagram worksheet
- Science Formative Assessment by Page Keeley
- Bottle Biology by Wisconsin Fast Plants Program

Day 17

- Scientific notebook binder
- Flip camera
- Computer
- Projector
- SmartBoard
- Paper
- Pencil
- Water cycle investigation lab sheet
- Crayons
- Recording weather lab sheet
- Science Formative Assessment by Page Keeley

Day 18

- Scientific notebook binder
- Flip camera
- Student chosen materials for rain/snow tire designs
- Paper for tread designs
- Employees from Bob's Tire and Auto
- Computers
- Recording weather lab sheet
- Paper
- Pencils
- Crayons
- Science Formative Assessment by Page Keeley

Day 19

- Scientific notebook binder
- Flip camera
- Paper
- Pencils
- Leveled books about wind
- Weather lab sheets
- Paper cut in shape of t-shirt (or real t-shirts)
- Markers
- Recording weather lab sheet

- Computer
- Projector
- Manager from Titgemeier's Feed and Garden Store

Day 20

- Scientific notebook binder
- Flip camera
- Computer
- Projector
- Weather fronts PowerPoint
- Recording weather lab sheets

Day 21

- Scientific notebook binder
- Flip camera
- Eye Wonder: Weather by John Fardon and Lorrie Mack
- Computer
- Weather changes lab sheets
- Recording weather lab sheets

Day 22

- Scientific notebook binder
- Flip camera
- Computer
- Google Earth
- Recording weather lab sheet

Day 23

- Scientific notebook binder
- Flip camera
- Examples of travel brochures
- Travel brochure rubric
- Paper
- Pencils
- Crayons

Day 24

- Scientific notebook binder
- KWL lab sheet from day 1
- Computer
- Microsoft Word Software
- Printer
- Paper

- Pencils

Day 25

- Claim, evidence, reasoning posters from Day 5 of unit
- Paper
- Crayons
- Pencils
- Claim, evidence, reasoning poster rubrics

Day 26

- Unit test
- Scientist/meteorologist
- Claim, evidence, reasoning posters
- Paper
- pencils

Long Term Project:

- Daily weather report (digitally video recorded) that gets more complex as students design and create their own weather instruments and they decide how to upgrade their weather unit. The weather report is uploaded online daily for other classes in the building (or district) to watch.

Day 1: Weather Introduction

Inquiry Standard:

- Observe and ask questions about the natural environment.

Content Standard:

- Long and short-term weather changes occur due to changes in energy.

Description:

- KWL (What do you know about weather? What do you want to know about weather?)
- Students plan driving question for weather unit

Learner Outcomes:

- D1 Formulates driving questions. (Synthesis)
 - S1.1 Recall previous knowledge about weather. (Knowledge)
 - S1.2 Identify what students want to learn about weather. (Knowledge)
 - S1.3 Generate possible driving questions for weather unit. (Synthesis)
- D2 Knows how to use scientific notebook binder. (Knowledge)
 - S2.1 Identifies how to use scientific notebook binder. (Knowledge)

Evidence of Student Learning:

- Lab Sheet: KWL for scientific notebook

Engage:

- KWL – Weather (Use SmartBoard KWL template); Complete “K” (What do you know about weather?) with the whole class

Explore:

- Students split into small groups and make a list of their own open ended Driving Questions about weather

Explain:

- Small groups share lists of possible driving questions for the unit from their list of brain-stormed ideas
- Write possible questions in the “W” (What do you want to know about weather?) section of the KWL.
- Help students choose an appropriate driving question for the weather unit, such as “How do we know what to wear to school tomorrow?”

Extend:

- Introduce Scientific Notebook Binders

Evaluate:

- Lab Sheet: KWL for scientific notebook

Closure:

- Share your KWL chart with a partner

Materials:

- Scientific notebook binder
- Flip camera
- Weather KWL lab sheet
- SmartBoard
- Computer
- Projector
- Paper
- Pencils

Day 2: Weather Introduction**Inquiry Standard:**

- Plan and conduct simple investigations.

Content Standard:

- Long and short-term weather changes occur due to changes in energy.

Description:

- Use prior knowledge to recall different types of weather.
- Students decide what information they need to collect in order to answer their driving question.

Learner Outcomes:

- D3 Comprehends weather types. (Comprehension)
 - S3.1 Recall different types of weather. (Knowledge)
 - S3.2 Label weather types. (Knowledge)
 - S3.3 Summarize what causes changes in weather. (Comprehension)
- D4 Compiles ideas regarding how to answer our driving question. (Synthesis)
 - S4.1 Outline information needed in order to answer driving question. (Analysis)
 - S4.2 Create brainstorming web about information needed to work on driving question. (Synthesis)

Evidence of Student Learning:

- Kidspiration Software: Brainstorming web about information students need to gather to help them decide what to wear outside.
- Student created poster: Types of Weather
- Weather lab sheet for scientific notebook

Engage:

- Discussion: What's the weather like today here in Toledo?
- Read aloud: Oh Say Can You Say What's the Weather Today? By Tish Rabet and Artistides Ruiz

Explore:

- Art instructor from Sofia Quintero Art and Cultural Center on Broadway visits our classroom.
- Art instructor guides the students in making a poster/art project of all the different weather types that students already know.
- Class discussion: What types of weather did you already know about?
- Art instructor leads the class creating a weather mural. (Students will continue to work on the weather report whenever they have "extra" time throughout the remainder of the weather unit.)

Explain:

- What types of information should we gather about weather that will help us decide what to wear outside? (Guide students towards temperature, wind, rain, snow, and clouds)
- PowerPoint Presentation: Changes in weather are due to changes in energy.

Extend:

- Students use “Kidspiration” software to make a brainstorming web about the information we need to gather to help us decide what to wear outside

Evaluate:

- Students label the types of weather that they have drawn on their posters. Hang up posters.
- Weather lab sheet for scientific notebook: What causes changes in weather?

Closure:

- Students do a gallery walk of the weather posters.

Materials:

- Scientific notebook binder
- Flip camera
- Weather book: Oh Say Can You Say What's the Weather Today? By Tish Rabet and Artistides Ruiz
- Poster/mural paper
- Crayons
- Pencils
- SmartBoard
- Computers
- Kidpiration Software

Day 3: Temperature**Inquiry Standard:**

- Employ simple equipment and tools to gather data and extend the series.

Content Standard:

- The atmosphere is made up of air.

Description:

- Reading a thermometer; Charting temperature

Learner Outcomes:

- D5 Analyzes temperature. (Analysis)
 - S5.1 Record temperature. (Knowledge)
 - S5.2 Predict temperature of items. (Comprehension)
 - S5.3 Use a thermometer. (Application)
 - S5.4 Analyze temperature data. (Analysis)
- D6 Knows atmosphere. (Knowledge)
 - S6.1 Identify that the atmosphere is made of air. (Knowledge)

- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)

Evidence of Student Learning:

- Reading a thermometer clicker quiz
- IRT lab sheet
- Charting temperature lab sheet for scientific notebook

Engage:

- Discussion: What have we used in math class to measure temperature?
- Introduce IRT (infrared thermometer)

Explore:

- Students use IRT to take temperatures of various items of their choosing
- Students share findings with the class
- IRT lab sheet:
 - Students list items that they are going to take the temperature of on their lab sheet
 - Comprehension Strategy: Predictions – Record the temperature you expect each item to be
 - Record the actual temperature of each item
 - Data Analysis: Answer comprehension questions about the exploration – e.g., Which item was warmest? Why?

Explain:

- PowerPoint: The atmosphere is made of air; How to read a thermometer
- Go outside and take temperature with traditional thermometers and IRT

Extend:

- Discuss: What temperature information should we include in our weather report?
- Plan today's weather report

Evaluate:

- Charting temperature lab sheet
- Clicker Quiz: Reading a thermometer; Atmosphere is made of air

Closure:

- Use flip camera to record today's weather report
- Upload weather report

Materials:

- Scientific notebook binder
- Flip camera
- SmartResponse clickers
- Temperature clicker quiz

- IRT
- IRT lab sheet
- Various classroom items chosen by students

Day 4: Weather Lore

Inquiry Standard:

- Communicate about observations, investigations, and explanations.

Content Standard:

- The atmosphere is made up of air.
- Recount stories, including fables and folktales from diverse cultures, and determine their central message, lessons, or moral.

Description:

- Students create dolls of themselves on a weather bulletin board that they can update daily with clothing that fits weather
- Identifying cool, cold, warm, and hot temperatures

Learner Outcomes:

- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Determine appropriate clothes to wear in today's weather. (Analysis)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)

Evidence of Student Learning:

- Appropriately dressed dolls for the weather
- Charting temperature lab sheet
- Temperature lab sheet

Engage:

- Read aloud an example of Mexican weather lore.
- Class discussion:
 - What are your thoughts about the story?
 - What do you think weather lore is?

Explore:

- Split class into small groups
- Provide each group with a written copy of a weather folklore story from a different country
- Students read the weather lore and discuss it with their small group

- Each group decides on a product that they would like to create that will help them teach the rest of the class about the weather lore they were assigned (for example, students may create a skit reenact the story, draw a picture illustrating it, write a song about it, etc.)
- Each group discusses their plan with the teacher before they begin
- Students work in small groups to complete their weather lore project
- Students share their weather lore project with the rest of the class
- Class discussion about weather lore:
 - What are the similarities and differences between the different weather folktales?
 - What are some weather folktales that you know that we didn't discuss?
 - Why does weather lore exist?
 - What did you learn about the traditional beliefs of yourself and others?
 - Why is it important to learn about these traditional beliefs?

Explain:

- What do you wear outside at a certain temperature? (Students share ideas with people in their group.)
- Discuss air temperature: Which temperatures are hot, warm, cold, cool?

Extend:

- Show digital camera; Discuss: What kind of a camera is this? How is this different from a camera with film?
- Teach students how to take pictures, download, and print pictures
- Technology: Students take a digital picture of his/herself and print it out
- Students create a little doll of themselves using a digital picture of themselves
- Students create different pieces of clothing, props (umbrellas, sunglasses, etc.) that they can later use to dress themselves up as (Teacher laminates for durability)
- Create a bulletin board where students update their doll for the clothes to coordinate with the weather outside
- Students make weather observations and then place the appropriate clothing on the doll. Students explain to the team why the clothing they chose was appropriate for today's weather.

Evaluate:

- Charting temperature lab sheet
- Discussion: Which clothes feel best with which temperatures?

Closure:

- Use flip camera to record today's weather report

Materials:

- Examples of Weather Lore
- Scientific notebook binder

- Flip camera
- Digital camera
- Printer
- Computer
- Construction paper
- Blank bulletin board
- Charting temperature lab sheet

Day 5: Temperature

Inquiry Standard:

- Employ simple equipment and tools to gather data and extend the senses.
- Plan and conduct simple investigations.

Content Standard:

- The atmosphere is made up of air.

Description:

- Students design their own temperature experiment
- Introduce claim, evidence, and reasoning

Learner Outcomes:

- D9 Judges temperature experiments. (Evaluation)
 - S9.1 Recalls what an infrared thermometer is. (Knowledge)
 - S9.2 Identify claim, evidence, and reasoning. (Knowledge)
 - S9.3 Conduct weather experiments. (Application)
 - S9.4 Analyzes temperature data. (Analysis)
 - S9.5 Design a temperature experiment. (Synthesis)
 - S9.6 Create a claim, evidence, reasoning poster. (Synthesis)
 - S9.7 Criticizes peer posters.
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Determine appropriate clothes to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Claim, evidence, and reasoning poster
- Temperature investigation lab sheet
- Charting temperature lab sheet

Engage:

- Show students infrared thermometer. Ask, “What does this IRT measure?”
- Read aloud: Heating Up and Cooling Down by Darlene R. Stille

Explore:

- Students individually brainstorm ideas about who they could design an investigation that involves temperature.
- Students split into groups of 4.
- Each student chooses two roles that they would like to have for today’s group work (encourager, praiser, cheerleader, gatekeeper, coach, question commander, checker, focus keeper, recorder, reflector, quiet captain, and/or materials monitor).
- Students share their ideas for a temperature investigation with their group.
- Students work in groups to design an investigation that involves temperature (ex. Which outside area of our school has a higher surface temperature – east or west? Playground or grass?)
- Temperature investigation lab sheet: Make a hypothesis for your investigation

Explain:

- Introduce claim, evidence, reasoning technique
- Review rubric for claim, evidence, and reasoning poster

Extend:

- Conduct student designed weather experiments
- Complete temperature investigation lab sheet
- Data Analysis: What did you learn from the temperature data you gathered?
- Discussion: Based on the data you gathered, what new questions do you have that you would like to investigate further?

Evaluate:

- Technology: Students use Inspiration software to create claim, evidence, and reasoning poster
- Peer Review: Peers review the posters of their classmates. Peers “grade” each other using provided rubrics that they complete and discuss with each other.
- Charting temperature lab sheet

Closure:

Use flip camera to record today’s weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- IRT
- Heating Up and Cooling Down by Darlene R. Stille
- Notebook paper

- Pencils
- Temperature lab sheet
- Poster rubric
- Computer
- Inspiration software
- Printer
- Charting temperature lab sheet

Day 6: Clouds

Inquiry Standard:

- Observe and ask questions about the natural environment.

Content Standard:

- Water is present in the air.

Description:

- Students identify cloud types
- Introduce GLOBE Protocols

Learner Outcomes:

- D10 Judges weather. (Evaluation)
 - S10.1 Summarizes cloud information. (Comprehension)
 - S10.2 Uses GLOBE to enter cloud data. (Application)
 - S10.3 Analyzes temperature data. (Analysis)
 - S10.4 Justifies agreement/disagreement with cloud statements. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Determine appropriate clothes to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Cloud data entered on GLOBE
- Charting temperature lab sheet
- Clouds comprehension lab sheet for scientific notebook

Engage:

- Formative Assessment: Agreement Circles* p. 51
 - Read a statement about clouds
 - Meet up into circles of people who agree/disagree
 - Students participate in a discussion to defend their thinking

Explore:

- Discussion: Do clouds affect what you wear outside? Why or why not?

Explain:

- Comprehension strategy: Using Table of Contents
- Students split into reading groups to read leveled books about clouds.
- Students complete comprehension questions on individualized lab sheets (lab sheets are individualized for each group)
- Teacher circulates, asks questions, and helps where needed
- Possible questions on lab sheet: What are clouds made of? What are the different cloud types?
- Students share and discuss their findings with the class.

Extend:

- GLOBE: Cloud protocols (Enter cloud data on GLOBE)

Evaluate:

- Charting temperature lab sheet
- Data Analysis: Write three statements you learned from your temperature data.

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Cloud statements
- Leveled books about clouds
- Cloud comprehension lab sheet
- Computers
- GLOBE protocols
- Science Formative Assessment by Keeley

Day 7: Clouds**Inquiry Standard:**

- Plan and conduct simple investigations.

Content Standard:

- Water is present in the air.

Description:

- Students design an experiment that uses GLOBE cloud data

Learner Outcomes:

- D11 Judges weather. (Evaluation)
 - S11.1 Draw and label cloud types. (Knowledge)
 - S11.2 Generate a hypothesis for your experiment. (Comprehension)
 - S11.3 Conduct cloud experiment (Application)
 - S11.4 Design an experiment that utilizes GLOBE data. (Synthesis)
 - S11.5 Formulate questions for further inquiry. (Synthesis)
 - S11.6 Create a claim, evidence, reasoning sheet. (Synthesis)
 - S11.7 Justify “reasoning” on claim, evidence, reasoning sheet. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Explain how cloud information can be added to weather report. (Comprehension)
 - S7.2 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Determine appropriate clothes to wear in today’s weather. (Analysis)

Evidence of Student Learning:

- Lab sheet: claim, evidence, and reasoning
- Charting temperature and clouds lab sheet
- Annotated student drawings

Engage:

- Students look at different paintings by landscape painter Harold Newton.
- As students look at each painting, ask students to share with the class which cloud types they see (cumulus, cirrus, or stratus).
- Read Harold Newton’s bio to the class (*founding member of the group of African American artists known as the Florida Highwaymen*) and show students his picture.
- Students look at different cloud sculptures by Iñigo Manglano-Ovalle and try to identify which cloud types they see in the sculptures.
- Read Iñigo Manglano-Ovalle’s bio to the class (*Latin American artist born in Madrid, Spain who currently teaches in Chicago*) and show students his picture.
- Class discussion:
 - What are the similarities and differences between art and science?
 - What did you think about the cloud paintings?
 - Are only certain races talented artists/scientists, or can people of all races be artists and scientists? How do you know?

Explore:

- Design an investigation that uses GLOBE cloud data

- GLOBE Lab Sheet: Make a hypothesis for your investigation.

Explain:

- Technology: How to access GLOBE Cloud data
- Comprehension Strategy: Think-Pair-Share - How can cloud information be added to our weather report?
 1. Think individually about the question
 2. Discuss the question with your partner
 3. Discuss the question with your group

Extend:

- Conduct GLOBE Cloud investigation
- Student Self Assessment:
 - Write what you learned from this experiment
 - Add possible improvements
 - Describe difficulties
 - Options to raise new and further inquiry questions

Evaluate:

- GLOBE Lab sheet: Claim, evidence, and reasoning from investigation
- Charting temperature and clouds lab sheet
- Formative Assessment: Annotated Student Drawing* p. 53
 - Draw and label cloud types

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Cloud concept cartoons
- Computer
- GLOBE lab sheets
- Blank paper
- Pencils
- Crayons
- Images of artwork from Harold Newton and Iñigo Manglano-Ovalle
- Pictures and bios of Harold Newton and Iñigo Manglano-Ovalle

Inquiry Standard:

- Observe and ask questions about the natural environment.

Content Standard:

- The atmosphere is made up of air.

Description:

- Students identify cardinal directions
- Students identify wind direction

Learner Outcomes:

- D12 Recognizes properties of wind. (Analysis)
 - S12.1 Describe wind. (Knowledge)
 - S12.2 Identify cardinal directions. (Knowledge)
 - S12.3 Deduce which direction the wind makes a pinwheel spin fastest. (Analysis)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Explain how wind affects what we wear outside. (Comprehension)
 - S8.3 Determine appropriate clothes to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Wind Comprehension lab sheet
- Charting temperature and clouds lab sheet

Engage:

- Discussion: What do you already know about pinwheels? What makes pinwheels spin?
- Students make a pinwheel.

Explore:

- Explore which direction the wind (a hair dryer) makes the pinwheel spin fastest.

Explain:

- SmartBoard: Point out cardinal directions.
- Comprehension strategy: Highlighted Words
 - Students split into reading groups to read leveled books about wind.
 - Students complete comprehension questions on individualized lab sheets (lab sheets are individualized for each group)
 - Teacher circulates, asks questions, and helps where needed
 - Possible questions on lab sheet: What is wind? Why do we have wind?
 - Students share and discuss their findings with the class.

Extend:

- Discussion: Does wind affect what we wear outside?

Evaluate:

- Charting temperature and clouds lab sheet
- Formative assessment: Three, two, one* p. 197
 - Students write responses to three different prompts about wind.
 - Provide three responses to the first prompt, two responses to the second prompt, and one response to the third prompt

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Paper
- Push pins
- Straws
- Hair dryer
- SmartBoard
- Leveled reading books about wind
- Temperature/clouds lab sheet
- Science Formative Assessment by Keeley

Day 9: Wind**Inquiry Standard:**

- Employ simple equipment and tools to gather data and extend the senses.

Content Standard:

- The atmosphere is made up of air.

Description:

- Students design a weather vane that represents your culture.

Learner Outcomes:

- D13 Judges wind. (Evaluation)
 - S13.1 Describe a wind vane. (Knowledge)
 - S13.2 Explain how to measure wind direction. (Comprehension)
 - S13.3 Build wind vane. (Application)
 - S13.4 Design a wind vane that represents your culture. (Synthesis)
 - S13.5 Support your wind vane design. (Evaluation)
 - S13.6 Grade your own wind vane using rubric provided. (Evaluation)
- D7 Gives weather report. (Synthesis)

- S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Determine appropriate clothes to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Wind vane artifact; Science journal: Cloud type, temperature
- Charting temperature and clouds lab sheet

Engage:

- Show students various images of wind vanes, including the Greek Triton wind vane on the Tower of the Winds
- Class Discussion:
 - What are wind vanes and what do they do?
 - Why do you think wind vanes are often referred to as "Rooftop Artistry?"
 - How does the Greek Triton wind vane represent Greek Culture?
 - What kind of a wind vane may represent your culture?

Explore:

- Introduce wind vane rubric.
- Students individually draw a wind vane design that both measures wind direction and artistically represent their cultures.
- Students write a rationale explaining why they are planning to use specific materials in their wind vane and how the wind vane represents their culture.

Explain:

- Measuring wind direction; Use digital compass application for iPad
- Comprehension Strategy: Think-Pair-Share – How can we accurately measure wind direction?
 - Think individually about the question
 - Discuss the question with your partner
 - Discuss the question with your group

Extend:

- Students individually build their wind vanes.
- Students test their wind vanes outdoors.
- Students share the results with the class.
- Discuss whether wind direction information be added to weather report

Evaluate:

- Charting temperature and clouds lab sheet
- Self Assessment: Students use rubric to grade their wind vane

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Wind vane images (including image of Greek Triton wind vane)
- Wind vane rubric
- Pencils
- Crayons
- iPad with digital compass
- Wind vane materials indicated in student designs (straws, push pins, tissues boxes, TP rolls, milk cartons, construction paper, tape, glue)
- Temperature/clouds lab sheet

Day 10: Wind

Inquiry Standard:

- Review and ask questions about the observations and explanations of others.

Content Standard:

- The atmosphere is made up of air.

Description:

- Students re-design weather vane, Measuring wind direction

Learner Outcomes:

- D14 Judges wind. (Evaluation)
 - S14.1 Re-design wind vane. (Synthesis)
 - S14.2 Criticize wind vane design. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Determine appropriate clothes to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Revamped weather vane artifact
- Charting temperature and clouds lab sheet

Engage:

- Video Clip: “Miami Extreme Wind” www.youtube.com/watch?v=xygc_Hcg404
- Discussion: Have you ever been outside on a very windy day? What did it feel like?

Explore:

- Discussion: How can we determine whether our wind vanes are accurate?
- Students test out wind vanes.

Explain:

- Comprehension Strategy: Think-Pair-Share – Wind vane re-design: What changes do you need to make so that your wind vane will work more effectively?
 1. Think individually about the question
 2. Discuss the question with your partner
 3. Discuss the question with your group

Extend:

- Re-design/improve wind vanes
- Re-build wind vanes
- Share weather vane designs with class
- Take outside to test wind vanes
- Teams compare and discuss results with each other

Evaluate:

- Charting temperature, clouds, and wind direction lab sheet

Closure:

- Use flip camera to record today’s weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Computer
- Projector
- Student-created wind vanes
- Weather lab sheets

Day 11: Wind**Inquiry Standard:**

- Use appropriate mathematics with data to construct reasonable explanations.

Content Standard:

- The atmosphere is made up of air.

Description:

- Measuring wind speed

Learner Outcomes:

- D15 Judges wind information. (Evaluation)
 - S15.1 Summarize how wind affects what we wear outside. (Comprehension)
 - S15.2 Compare student anemometer data to online ODT data. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothing to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Charting temperature, clouds, and wind direction lab sheet

Engage:

- Discussion: How can we measure wind speed?

Explore:

- Create an anemometer
- Test anemometer
- Compare our anemometer to online wind speed at ODT

Explain:

- Wind speed (How long is a mile? How fast do we drive?)

Extend:

- Brainstorm: Does wind speed affect what we wear outside?

Evaluate:

- Recording weather lab sheet

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Anemometer materials (Protractor, string, ping-pong balls)
- Computer
- Recording weather lab sheet

Day 12: Wind

Inquiry Standard:

- Observe and ask questions about the natural environment.

Content Standard:

- The atmosphere is made up of air.

Description:

- Students design a wind turbine; Identify wind as a renewable source of energy

Learner Outcomes:

- D16 Judges wind energy. (Evaluation)
 - S16.1 Formulate a plan for lighting bulb on wind turbine. (Synthesis)
 - S16.2 Design a wind turbine. (Synthesis)
 - S16.3 Compare and contrast renewable energy with non-renewable energy. (Evaluation)
 - S16.4 Support wind turbine designs. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
 - D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothing to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Wind turbine designs
- Charting temperature, clouds, and wind direction lab sheet
- Renewable Energy lab sheet for scientific notebook

Engage:

- Read aloud biography, “The Boy Who Harnessed the Wind (picture book)” by William Kamkwamba & Bryan Mealer, Illustrated by Elizabeth Zunon
- YouTube: *Moving Windmills: The William Kamkwamba Story*
- Class Discussion:
 - How did William Kamkwamba use the scientific process and construct his own knowledge about building a wind turbine?
 - How did William Kamkwamba collaborate with others to construct his knowledge about wind turbines?
 - How can you relate William’s situation to your own lives?
 - Where are your third spaces that you use scientific processes to construct your knowledge about a topic?

Explore:

- Students explore how to light a light bulb using Kid Wind Turbines

Explain:

- Comprehension strategy: Compare and Contrast
 - Students split into reading groups to read leveled books about energy.
 - Students complete energy lab sheets, using Venn Diagrams to compare and contrast renewable energy with non-renewable energy.
 - Teacher circulates, asks questions, and helps where needed.
 - Students share and discuss their Venn Diagrams with the class.

Extend:

- Students work in small groups to draw a wind turbine design.
- Teacher asks each group to provide a rationale about why they are going to use specific materials and why they made their designs the way they did.

Evaluate:

- Recording weather lab sheet

Closure:

- Use flip camera to record today’s weather report; Update clothing on weather doll bulletin board

Materials:

- “The Boy Who Harnessed the Wind (picture book)” by William Kamkwamba & Bryan Mealer, Illustrated by Elizabeth Zunon
- Scientific notebook binder
- Flip camera
- Computer
- Projector
- Kid Wind turbines
- Leveled energy books
- Energy lab sheets

- Blank Venn Diagrams
- Paper
- Pencils
- Crayons
- Recording weather lab sheet

Day 13: Wind

Inquiry Standard:

- Observe and ask questions about the natural environment.

Content Standard:

- The atmosphere is made up of air.

Description:

- Students design a wind turbine; Identify wind as a renewable source of energy

Learner Outcomes:

- D16 Judges wind energy. (Evaluation)
 - S16.1 Formulate a plan for lighting bulb on wind turbine. (Synthesis)
 - S16.2 Design a wind turbine. (Synthesis)
 - S16.3 Compare and contrast renewable energy with non-renewable energy. (Evaluation)
 - S16.4 Support wind turbine designs. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothing to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Wind turbine designs
- Charting temperature, clouds, and wind direction lab sheet
- Renewable Energy lab sheet for scientific notebook

Engage:

- YouTube: Moving Windmills: The William Kamkwamba Story
www.youtube.com/watch?v=arD374mfk4w

Explore:

- Students explore how to light a light bulb using Kid Wind Turbines

Explain:

- Comprehension strategy: Compare and Contrast
 - Students split into reading groups to read leveled books about energy.
 - Students complete energy lab sheets, using Venn Diagrams to compare and contrast renewable energy with non-renewable energy.
 - Teacher circulates, asks questions, and helps where needed.
 - Students share and discuss their Venn Diagrams with the class.

Extend:

- Students work in small groups to draw a wind turbine design.
- Teacher asks each group to provide a rationale about why they are going to use specific materials and why they made their designs the way they did.

Evaluate:

- Recording weather lab sheet

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Computer
- Projector
- Kid Wind turbines
- Leveled energy books
- Energy lab sheets
- Blank Venn Diagrams
- Paper
- Pencils
- Crayons
- Recording weather lab sheet

Day 14: Air Mass**Inquiry Standard:**

- Plan and conduct simple investigations.

Content Standard:

- The atmosphere is made up of air.

Description:

- Students design an experiment that shows that air has mass/takes up space

Learner Outcomes:

- D18 Judges air mass. (Evaluation)
 - S18.1 Describe wind sock. (Knowledge)
 - S18.2 Summarize air mass information. (Comprehension)
 - S18.3 Generate a hypothesis for experiment. (Synthesis)
 - S18.4 Design an air mass experiment. (Synthesis)
 - S18.5 Justify experimental design. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothing to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Air mass experiment design
- Air mass experiment lab sheet
- Recording weather lab sheet

Engage:

- Discussion: What is air?
- Read aloud: Air is All Around You by Franklyn Mansfield

Explore:

- Discussion: What is a wind sock? What do they do? What do they look like?
- Students build a wind sock

Explain:

- Technology: Skype with a scientist about air and air mass
- Students summarize what they learned from the scientist on kidblog.org

Extend:

- Students work in teams to brainstorm ideas for an investigation that shows that air has mass/takes up space

- Teacher asks each group to provide rationale about why they are going to use specific materials and why they designed their investigation in the way that they did.
- Air mass lab sheet: Students make hypotheses about their investigations

Evaluate:

- Charting temperature, clouds, and wind direction lab sheet

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Air is All Around You by Franklyn Mansfield
- Air mass lab sheet
- Weather lab sheet
- Wind sock materials: construction paper, tissue paper, tape, hold punch, yarn
- Computer
- Skype software
- Paper
- Pencil
- Air mass lab sheet
- Recording weather lab sheet
- Scientist available via Skype

Day 15: Air Mass

Inquiry Standard:

- Plan and conduct simple experiments.

Content Standard:

- The atmosphere is made up of air.

Description:

- Students conduct the air mass investigations that they designed yesterday

Learner Outcomes:

- D19 Judges air mass. (Evaluation)
 - S19.1 Explain results of air mass investigations. (Comprehension)
 - S19.2 Conduct air mass investigations. (Application)

- S19.3 Make conclusions about what was learned, difficulties, and possible improvements that could be made to experiment. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothing to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Claim, evidence, and reasoning poster
- Recording weather lab sheet
- Air mass investigation lab sheet

Engage:

- YouTube Video Clip: Bill Nye the Science Guy – “Fresh Air” Music Video
www.youtube.com/watch?v=tjklzeklkiw

Explore:

- Conduct air mass investigations students designed yesterday

Explain:

- Share results, discuss air mass experiments

Extend:

- Students create PowerPoint slides about their investigations using claim, evidence, and reasoning

Evaluate:

- Charting temperature, clouds, wind speed, and wind direction lab sheet
- Air mass investigation lab sheet for scientific notebook
- Self Assessment:
 - Write what you learned from this experiment
 - Add possible improvements
 - Describe difficulties
 - Options to raise new and further inquiry questions

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Computer
- Projector
- PowerPoint
- Recording weather lab sheet
- Air mass lab sheet
- Student selected materials for air mass investigation

Day 16: Water Cycle

Inquiry Standard:

- Observe and ask questions about the natural environment.

Content Standard:

- Water is present in the air.

Description:

- Students build water cycle bottles
- Water cycle diagram

Learner Outcomes:

- D20 Demonstrates water cycle. (Application)
 - S20.1 Label water cycle. (Knowledge)
 - S20.2 Describe water cycle. (Knowledge)
 - S20.3 Summarize previous knowledge about water cycle. (Comprehension)
 - S20.4 Predicts what will happen in water cycle bottle. (Application)
 - S20.5 Construct water cycle bottle. (Application)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothing to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Water cycle diagram Worksheet
- Recording weather lab sheet

- Formative Assessment: First Word
- Water cycle comprehension lab sheet for scientific notebooks

Engage:

- Formative Assessment: First Word* Science Formative Assessment p. 88 “Water Cycle”
 - Students write “Water Cycle” vertically down their paper
 - Students create an acrostic for “water cycle.” Students write statements about the water cycle that start with the letters w-a-t-e-r-c-y-c-l-e.

Explore:

- Discuss predictions about what will happen in the water cycle bottle
- Create Bottle Biology: Water Cycle Bottles

Explain:

- Comprehension strategy: Reading charts and graphs
 - Students split into reading groups to read leveled books about the water cycle.
 - Students complete comprehension questions on individualized lab sheets (lab sheets are individualized for each group)
 - Teacher circulates, asks questions, and helps where needed
 - Students share and discuss their findings with the class.

Extend:

- Water Cycle Diagram Worksheet

Evaluate:

- Recording weather lab sheet

Closure:

- Use flip camera to record today’s weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Paper
- Pencils
- Markers
- 2-liter bottles
- Water
- String
- Ice
- Leveled water cycle books
- Water cycle diagram worksheet

- Science Formative Assessment by Page Keeley
- Bottle Biology by Wisconsin Fast Plants Program

Day 17: Water Cycle

Inquiry Standard:

- Plan and conduct simple investigations.

Content Standard:

- Water is present in the air.

Description:

- Students research water cycle
- Students design investigation where pollution gets in the water cycle

Learner Outcomes:

- D21 Judges water cycle. (Evaluation)
 - S21.1 Label parts of the water cycle. (Knowledge)
 - S21.2 Summarize water cycle information. (Comprehension)
 - S21.3 Generate a hypothesis for experiment. (Comprehension)
 - S21.4 Diagram the water cycle. (Analysis)
 - S21.5 Design an experiment where pollution gets in the water cycle. (Synthesis)
 - S21.6 Justify experimental design. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothing to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Formative Assessment: Paint the Picture
- Recording weather lab sheet
- Water cycle investigation lab sheet

Engage:

- SmartBoard: Water cycle video clip
http://teacher.scholastic.com/activities/studyjams/water_cycle

Explore:

- Technology: Students do online research to get information about the water cycle
- Students share water cycle information with their peers

Explain:

- SmartBoard Water Cycle: Move words to label the different parts of the water cycle

Extend:

- Design an investigation where pollution gets in the water cycle
- Water cycle investigation lab sheet: Students create hypotheses for investigations
- Teacher asks each group to provide a rationale about why they are going to use specific materials and why they made their designs the way they did.

Evaluate:

- Formative Assessment: Paint the Picture* Science Formative Assessments p. 145
 - Students draw a picture of the water cycle without using annotations
- Charting temperature, clouds, wind speed, and wind direction lab sheet

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Computer
- Projector
- SmartBoard
- Paper
- Pencil
- Water cycle investigation lab sheet
- Crayons
- Recording weather lab sheet
- Science Formative Assessment by Page Keeley

Day 18:Water Cycle

Inquiry Standard:

- Plan and conduct simple investigations.

Content Standard:

- Water is present in the air.

Description:

- Students design rain/snow tires.

Learner Outcomes:

- D22 Judges water cycle. (Evaluation)
 - S22.1 Design rain/snow tires. (Application)
 - S22.2 Produce an acrostic poster that illustrates important aspects of the water cycle. (Application)
 - S22.3 Justify your reasoning on your claim, evidence, and reasoning sheet. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothes to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Recording weather lab sheet
- Water cycle investigation lab sheet with claim, evidence, and reasoning
- Formative Assessment: Last word (Compare to First word on Day 16)

Engage:

- Water Cycle Song: www.youtube.com/watch?v=okzbiy_IdBA

Explore:

1. Class discussion:
 - a. Which part of the water cycle would rain and snow fall under?
 - b. Have you ever been in a car when it was raining or snowing outside? What was it like?

Explain:

1. Students design a tire that works better in the rain or snow (design tread, etc.). Students create both a paper with the new tread design (which will end up looking like art work) and a physical model of the new tire design.

Extend:

- Students walk across the street, bringing their art and model to Bob's Tire and Auto on Broadway.
- Students share their tire designs with the employees at Bob's Tire and leave the artwork for the employees to hang up and display at Bob's Tire and Auto.

Evaluate:

- Students grade themselves on their tire design.
- Formative Assessment: Last Word* Science Formative Assessments p. 88 Water Cycle
 - Students write the words "water cycle" vertically.
 - Students wrote about the water cycle that begins with each letter of the words "water cycle."

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Student chosen materials for rain/snow tire designs
- Paper for tire tread designs
- Employees from Bob's Tire and Auto
- Computers
- Recording weather lab sheet
- Paper
- Pencils
- Crayons
- Science Formative Assessment by Page Keeley

Day 19: Precipitation

Inquiry Standard:

- Employ simple equipment and tools to gather data and extend the senses.

Content Standard:

- Water is present in the air.

Description:

- Students design a rain gauge; Students identify types of precipitation

Learner Outcomes:

- D23 Judges precipitation. (Evaluation)
 - S23.1 Explain how precipitation affects what you wear outside. (Comprehension)
 - S23.2 Design a rain gauge. (Synthesis)
 - S23.3 Justify rain gauge design. (Evaluation)
 - S23.4 Compare and contrast types of precipitation. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothes to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Rain gauge artifact
- Recording weather lab sheet
- Precipitation compare and contrast lab sheet for scientific notebook

Engage:

- Class discussion:
 - Is there only one "correct" way to make a rain gauge?
 - Are there multiple ways of looking at rain gauge design, or should you just design the rain gauge like ones you may have seen in the past because that is "the way" to make it?
 - Are your ideas and designs valuable or do only the ideas of professional adult scientists "count"?
- Students work in groups to draw a rain gauge design.
- Teacher asks each group to provide a rationale about why they are going to use specific materials and why they made their designs the way they did.
- Students build their rain gauges.
- Class discussion:
- How does designing your own rain gauge help you construct your own knowledge about measurement and precipitation?

Explore:

- Students work in groups to draw a rain gauge design

- Teacher asks each group to provide a rationale about why they are going to use specific materials and why they made their designs the way they did.
- Students build their rain gauges

Explain:

- Comprehension strategy: Compare and Contrast
 - Students split into reading groups to read leveled books about wind as a renewable source of energy.
 - Students use lab sheets to compare and contrast the types of precipitation.
 - Teacher circulates, asks questions, and helps where needed
 - Possible questions on lab sheet: What is wind? Why do we have wind?
 - Students share and discuss their findings with the class.

Extend:

- Manager of Titegemeier's Feed and Garden (a local business within walking distance of our school) visits our classroom.
- Students share with him/her their rain gauge designs and ask for feedback on their rain gauges and suggestions for improvements/redesigns
- Students explain why rain gauges would be beneficial to a garden store and persuade him/her to sell rain gauges at Titgemeier's.

Evaluate:

- Scientific Notebook: Charting wind direction, wind speed, temperature, cloud type
- Peer Evaluation: Discuss your rain gauge with a peer; Discuss suggestions for improving weather vanes

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Paper
- Pencils
- Leveled books about wind
- Weather lab sheets
- Paper cut in shape of t-shirt (or real t-shirts)
- Markers
- Recording weather lab sheet
- Computer
- Projector
- Manager from Titgemeier's Feed and Garden Store

Day 20: Weather Fronts

Inquiry Standard:

- Observe and ask questions about the natural environment.

Content Standard:

- Long and short-term weather changes occur due to changes in energy.

Description:

- Students identify changes in weather that occur at weather fronts.

Learner Outcomes:

- D24 Analyzes weather fronts. (Analysis)
 - S24.1 Identify information provided in news weather reports. (Knowledge)
 - S24.2 Summarize weather map information. (Comprehension)
 - S24.3 Summarize long or short term changes in weather that occur at specific weather fronts. (Comprehension)
 - S24.4 Analyze weather map data. (Analysis)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothing to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Charting temperature, clouds, and wind direction lab sheet

Engage:

- Discussion: Have you ever watched a weather report on the news? What was in the report?
- YouTube: Weather Songs – Warm Fronts, Cold Fronts
www.youtube.com/watch?v=yyu5ge4dc8c

Explore:

- Read online weather maps
- Analyze data: Use the weather map to write three statements about weather

Explain:

- PowerPoint: Weather fronts

Extend:

- Comprehension Strategy: Think-Pair-Share – What are the long or short-term changes in weather that occur at specific weather fronts?
 1. Think individually about the question
 2. Discuss the question with your partner
 3. Discuss the question with your group
- Discussion: How can we use weather fronts and weather maps to predict tomorrow's weather?

Evaluate:

- Recording weather lab sheet

Closure

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board
- Include tomorrow's forecast in all future weather reports

Materials:

- Scientific notebook binder
- Flip camera
- Computer
- Projector
- Weather fronts PowerPoint
- Recording weather lab sheets

Day 21: Long and Short Term Weather Changes

Inquiry Standard:

- Use appropriate mathematics with data to construct reasonable explanations.

Content Standard:

- Long and short-term weather changes occur due to changes in energy.

Description:

- Students monitor long and short-term weather changes.

Learner Outcomes:

- D25 Recognizes long and short term weather changes. (Analysis)
 - S25.1 Identify weather changes. (Knowledge)
 - S25.2 Summarize long and short term temperature changes. (Comprehension)
 - S26.2 Analyze temperature data. (Analysis)

- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothing to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Charting temperature, clouds, and wind direction lab sheet
- Weather changes lab sheet

Engage:

- Read aloud - Eye Wonder: Weather by John Fardon and Lorrie Mack

Explore:

- Comprehension Strategy: Prediction
 - On your weather changes lab sheet, predict the changes that you expect to see in weather in your city over different days/months
- Weather Underground.com: Look at weather history of your city and explore changes in weather over different days/months

Explain:

- Comprehension Strategy: Brainstorming
 - Students create a brainstorming web of different types of long and short term weather changes

Extend:

- Students choose a city to monitor on weatherunderground.com
- Students record monthly temperature averages for previous 2 years
- Analyze Data: Use your data to write three statements about temperature in your city

Evaluate:

- Ask students at recess to talk to older students about what they think causes changes in weather.
- Students will be asked to report back the following day and report how many students they asked and what the responses were.
- Ask students to invite the older students to our class during science class to further discuss the topic.
- Recording weather lab sheet

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Eye Wonder: Weather by John Fardon and Lorrie Mack
- Computer
- Weather changes lab sheets
- Recording weather lab sheets

Day 22: Long and Short Term Weather Changes

Inquiry Standard:

- Review and ask questions about the observations and explanations of others.

Content Standard:

- Long and short-term weather changes occur due to changes in energy.

Description:

- Students identify long and short-term weather changes in different cities

Learner Outcomes:

- D26 Judges differences in weather. (Evaluation)
 - S26.1 Identify two cities with the same latitude but different elevations. (Knowledge)
 - S26.2 Explain how elevation affects what clothing to wear outside. (Comprehension)
 - S26.3 Compare weather between two cities. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothing to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Charting temperature, clouds, and wind direction lab sheet

Engage:

- Introduce Google Earth

Explore:

- Students explore Google Earth to find two cities with the same latitude but different elevations.

Explain:

- Students use weatherunderground.com to compare weather between the two cities with the same latitude and different elevations used in the “Explore” activity.
- Students report findings to the class

Extend:

- Discussion: How does elevation affect what clothing to wear?

Evaluate:

- Recording weather lab sheet

Closure:

- Use flip camera to record today’s weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera
- Computer
- Google Earth
- Recording weather lab sheet

Day 23: Travel Brochure**Inquiry Standard:**

- Review and ask questions about the observations and explanations of others.

Content Standard:

- Long and short-term weather changes occur due to changes in energy.

Description:

- Students create brochure storyboard describing weather in a specific Ohio season

Learner Outcomes:

- D27 Judges weather information. (Evaluation)
 - S27.1 Explain the purpose of brochures. (Comprehension)

- S27.2 Create a brochure storyboard about Ohio weather in a particular season. (Synthesis)
- S27.3 Re-design brochure storyboard based on peer-evaluation. (Synthesis)
- S27.4 Evaluate a peer's brochure storyboard. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothing to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Travel Brochure storyboard

Engage:

- Discussion: What are travel brochures? What are they used for?
- Show examples of travel brochures

Explore:

- Discuss travel brochure rubric
- Make a travel brochure storyboard on paper about Ohio during a specific season
 - Include pictures of what Ohio looks like outside during this season and what clothing people should bring with them on their visit

Explain:

- Share your brochure storyboard with your partner

Extend:

- Peer Evaluations: Discuss any suggestions for changes and re-design with your peer

Evaluate:

- Make changes to storyboard based on peer evaluation

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- Flip camera

- Examples of travel brochures
- Travel brochure rubric
- Paper
- Pencils
- Crayons

Day 24: Travel Brochure

Inquiry Standard:

- Review and ask questions about the observations and explanations of others.

Content Standard:

- Long and short-term weather changes occur due to changes in energy.

Description:

- Students create storyboards that describe weather in a specific Ohio season

Learner Outcomes:

- D28 Judges weather information. (Evaluation)
 - S28.1 Identify what was learned in weather unit. (Knowledge)
 - S28.2 Identify people in the community who may benefit from the Ohio brochure. (Knowledge)
 - S28.3 Create brochure about Ohio weather in a particular season. (Synthesis)
 - S28.4 Evaluate Ohio brochure. (Evaluation)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothing to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Travel Brochure
- Lab Sheet: KWL
- Letter to local agency regarding brochure

Engage:

- Lab Sheet: KWL – Complete from first day of unit

Explore:

- Use storyboard from yesterday to create a travel brochure about Ohio during a specific season using Microsoft Word brochure template; Print

Explain:

- Students share brochures with class

Extend:

- Students determine a person or group who may like to have copies of the Ohio travel brochure (local park? local travel agency?)
- Students write a letter to the group who may like to have the brochure (students include a copy of the brochure with their letters)

Evaluate:

- Self Assessment: Students grade their own travel brochures using rubric provided

Closure:

- Use flip camera to record today's weather report; Update clothing on weather doll bulletin board

Materials:

- Scientific notebook binder
- KWL lab sheet from day 1
- Computer
- Microsoft Word Software
- Printer
- Paper
- Pencils

Day 25: Unit Closure**Inquiry Standard:**

- Review and ask questions about the observations and explanations of others.

Content Standard:

- Long and short-term weather changes occur due to changes in energy.

Description:

- Create claim, evidence, reasoning posters based on driving question, "How do we know what to wear to school tomorrow?"

Learner Outcomes:

- D29 Judges claim, evidence, and reasoning. (Evaluation)
 - S29.1 Identify claim, evidence and reasoning regarding driving question. (Knowledge)
 - S29.2 Evaluate peer claim, evidence, and reasoning poster. (Evaluate)
 - S29.3 Self-evaluate claim, evidence, and reasoning poster. (Evaluate)
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothing to weather in today's weather. (Analysis)

Evidence of Student Learning:

- "How do we know what to wear to school tomorrow?" poster

Engage:

- Gallery walk of Claim, Evidence, Reasoning Posters from Day 5 of Unit

Explore:

- Students design a rough draft claim, evidence, reasoning poster based on the driving question, "How do we know what to wear to school tomorrow?"

Explain:

- Students share with small group the rough draft of claim, evidence, reasoning posters about driving question.

Extend:

- Peer Evaluations: Discuss any suggestions for changes and re-design posters with your peer

Evaluate:

- Update and finalize claim, evidence, and reasoning posters

Closure:

- Self Assessment: Rubric from claim, evidence, and reasoning posters

Materials:

- Claim, evidence, reasoning posters from Day 5 of unit
- Paper
- Crayons

- Pencils
- Claim, evidence, reasoning poster rubrics

Day 26: Unit Closure

Inquiry Standard:

- Communicate about observations, investigations, and explanations.

Content Standard:

- The atmosphere is made up of air.
- Water is present in the air.
- Long- and short-term weather changes occur due to changes in energy.

Description:

- Students share weather report with scientist/meteorologist
- Unit assessment

Learner Outcomes:

- D30 Judges weather. (Evaluation)
 - S30.1 Understand weather concepts. (Comprehension)
 - S30.2 Present weather report to a scientist. (Application)
 - S30.3 Analyze ways to improve weather report. (Analysis)
 - S30.4 Re-design weather report based on scientist's suggestions. (Synthesis)
 - S30.5 Self-assess information learned throughout weather unit. (Evaluation)
 -
- D7 Gives weather report. (Synthesis)
 - S7.1 Create weather report. (Synthesis)
- D8 Analyzes weather. (Analysis)
 - S8.1 Record temperature. (Knowledge)
 - S8.2 Record cloud data. (Knowledge)
 - S8.3 Record wind direction. (Knowledge)
 - S8.4 Record wind speed. (Knowledge)
 - S8.5 Determine appropriate clothes to wear in today's weather. (Analysis)

Evidence of Student Learning:

- Unit test
- Re-designed weather reports

Engage:

- Students share their weather report with a local scientist or meteorologist.

Explore:

- Discuss with scientist/meteorologist ways that weather report could be updated/revised

Explain:

- Share claim, evidence, reasoning posters about driving question: “How do we know what to wear to school tomorrow?”

Extend:

- Re-design weather report based on suggestions from local scientist/meteorologist
- Send updated weather report to scientist

Evaluate:

- Parents come to school to see the students’ weather mural and to watch examples of the students’ daily digital weather reports.
- Self Assessment Reflection:
 - Write about what you have learned throughout the unit
 - Describe difficulties you have had throughout the unit
 - Raise new inquiry questions

Closure:

- Unit Test

Materials:

- Unit test
- Scientist/meteorologist
- Claim, evidence, reasoning posters
- Paper
- pencils

PBS Unit At A Glance**Daily:**

- Students discuss updates that should be made to weather report
- Film and upload weather report
- Identify how today’s learning helps us answer our driving question

Note: If lessons take longer than anticipated, complete lessons on Tuesdays and/or Fridays in order to stay on schedule for the week.

Week 1				
Monday: Date	Tuesday	Wednesday	Thursday	Friday
Day 1: Weather KWL; Students plan weather unit's driving question		Day 2: Students decide what information they need to collect for their Driving Question	Day 3: Reading a thermometer; Charting temperature	
Week 2				
Monday: Date	Tuesday	Wednesday	Thursday	Friday
Day 4: Weatherlore; Create dolls of themselves for "What should I wear outside?" bulletin boards		Day 5: Students design their own temperature investigation. Introduce claim, evidence, and reasoning	Day 6: Students identify cloud types; GLOBE Protocols	
Week 3				
Monday: Date	Tuesday	Wednesday	Thursday	Friday
Day 7: Cloud art; Students design an experiment that uses GLOBE cloud data		Day 8: Students identify cardinal directions; Students identify wind direction	Day 9: Students design a weather vane	
Week 4				

Monday: Date	Tuesday	Wednesday	Thursday	Friday
Day 10: Students redesign weather vane; Measuring wind direction		Day 11: Measuring wind speed	Day 12: Students design a wind turbine; Identify wind as a renewable energy	
Week 5				
Monday: Date	Tuesday	Wednesday	Thursday	Friday
Day 13: Students build their wind turbines		Day 14: Students design an experiment that shows air has mass/takes up space	Day 15: Students conduct the air mass experiment they design yesterday	
Week 6				
Monday: Date	Tuesday	Wednesday	Thursday	Friday
Day 16: Water cycle bottles; Water cycle diagram		Day 17: Design an investigation where pollution gets in water cycle	Day 18: Design rain/snow tires	
Week 7				
Monday: Date	Tuesday	Wednesday	Thursday	Friday

Day 19: Students design a rain gauge; Students identify types of precipitation/ Visit from manager of Titegemeier's		Day 20: Students identify changes in weather that occur at weather fronts.	Day 21: Students monitor long and short-term weather changes; Student mentoring at recess	
Week 8				
Monday: Date	Tuesday	Wednesday	Thursday	Friday
Day 22: Students identify long and short-term weather changes.		Day 23: Students create a brochure story about weather in a specific Ohio season.	Day 24: Students complete weather brochure.	
Week 9				
Monday: Date	Tuesday	Wednesday	Thursday	Friday
Day 25: Students create claim, evidence, reasoning posters based on Driving Question		Day 26: Students share weather report with scientist; Unit Assessment; Parents visit		

Appendix

- [Unit Test](#)
- [Image references](#)
- [Wind Vane Rubric](#)
- [Examples of student Lab Sheets](#)

Name: _____

Date: _____

“How do I know what to wear to school tomorrow?”

Unit Assessment

Directions: Read each question and the possible answers. Circle the letter of the answer that best fits the question. Each question is worth 2 points.

1. What does a thermometer measure?

- A. cloud cover
- B. rainfall
- C. temperature
- D. wind direction

2. Look at the picture below. What does this weather instrument measure?

- A. cloud cover
- B. rainfall
- C. temperature
- D. wind direction



3. What is the atmosphere made of?

- A. air
- B. dirt
- C. light
- D. smoke

4. What cloud type is pictured below?

- A. cirrus
- B. cumulus
- C. stratus

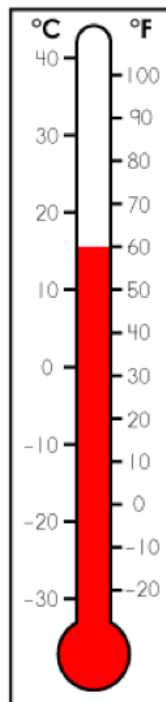


Directions: Read each question. Write the answers on the lines provided.

5. List the cardinal directions. (4 points)

6. What temperature is shown on the thermometer below? (2 points)

_____ ° F



7. What clothing would be appropriate to wear outside in today's weather?
Write three details that support your answer. (6 points)

8. List two different types of precipitation. Explain two ways that these precipitation types are similar. Explain two ways that these precipitation types are different. (6 points)

9. Our principal is deciding whether or not she should build a wind turbine at our school. She has asked the students for their ideas and suggestions about wind energy. Write a letter to the principal explaining how a wind turbine works. Provide at least 3 reasons the principal should or should not build a wind turbine at our Toledo school. (6 possible points)

10. Draw and label a diagram of the water cycle. (6 points)

Image References:

Wind vane image:

<http://2.bp.blogspot.com/-KB5zFFMP-pY/ThrXngO3ORI/AAAAAAAAAY/7g8wvMQ67xY/s1600/windvane.jpg>

Cloud image:

http://www.clipartpal.com/_thumbs/pd/weather/2_clouds.png

Thermometer image:

http://www.superteacherworksheets.com/measurement/fahrenheit-easy_TZTFT.pdf

Wind Vane Rubric

Authentic Task:

Design your own wind vane. Orally explain to the class all parts of your wind vane. Create a diagram that includes a drawing of your wind vane. Label all parts of the wind vane on the diagram. Design a chart to record date/wind direction data. Write two recommendations about how your wind vane design could be improved. Must be completed within 5 class periods. (24 points possible)

Criteria for the Task:

- Design
- Explanation
- Diagram Drawing
- Diagram Labels
- Design Recommendations
- Cultural Relevance

Rubric:

1. Design	
5 pts	Correctly measures wind direction at least 4 out of 5 attempts.
3 pts	Correctly measures wind direction 2-3 out of 5 attempts.
0 pts	Correctly measures wind direction 0-1 out of 5 attempts.
2. Explanation	
5 pts	Correctly explains all parts of wind vane design.
3 pts	1-2 parts of wind vane explanation missing or incorrect.
0 pts	3 or more parts of explanation missing or incorrect.
3. Diagram Drawing	
2 pts	Drawing correctly shows all parts of wind vane.
1 pt	1-2 parts of drawing do not match wind vane.
0 pts	3 or more parts of drawing do not match wind vane.
4. Diagram Labels	

2 pts	All parts of wind vane diagram labeled correctly.
1 pt	1-2 parts of wind vane diagram not labeled correctly.
0 pts	3 or more parts of wind vane diagram not labeled correctly.
5. Design Recommendations	
5 pts	Includes two or more recommendations for improving design.
3 pts	Includes one recommendation for improving design.
0 pts	Does not include any recommendations for improving design.
6. Cultural Relevance	
5 pts	Wind vane clearly represents the students' culture.
3 pts	Wind vane attempts to represent the students' culture.
0 pts	Wind vane does not represent the students' culture.

Score: _____ / 24 points

Comments:

?

[illegible]

Name _____

Date _____

Weather Lab Sheet

What causes changes in weather?

List 4 different types of weather.

1. _____
2. _____
3. _____
4. _____

P P P P P P P P

Recording Temperature Lab Sheet

[illegible]

Name _____

Date _____

Temperature Investigation Lab Sheet 1

Describe your temperature investigation.

Hypothesis: _____

Name _____

Date _____

Temperature Investigation Lab Sheet 2

Evidence:

What were the results of your investigation?
