

Grade 6 Science

Unit 3: Weather, Climate, and Water Cycling

Driving question: Why does a lot of hail, rain, or snow fall at some times and not others?

30 lessons (investigations and weekly readings) and a words quiz. Use this pack with the unit's **Teacher Guide**, **Student Procedure Guide**, **Student Work Pages** and **Science Literacy Student Reader** (download them once from the course) to teach the whole unit without the internet.

What is in this pack

- A plan for each lesson: the lesson question, how many class days it takes, the Teacher Guide pages to follow, and the student pages to print.
- For each weekly reading: the Student Reader pages, words to know and the exercise page.
- The words quiz, ready to print, with its key at the back.

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Lesson schedule

Each investigation lesson takes the number of class days shown (about 45 minutes a day). Do each reading over a week alongside the lessons. Tick each one off as you go.

	Lesson	Days	Student pages
☐	Reading: Science Literacy Preface: Put Yourself in This Scene	1 week	—
☐	Lesson 1: What causes this kind of precipitation event to occur?	3	4 to print
☐	Lesson 2: What are the conditions like on days when it hails?	1.5	4 to print
☐	Lesson 3: How does the air higher up compare to the air near the ground?	1.5	1 to print
☐	Reading: Science Literacy Collection 1: Weather Concepts	1 week	1 to print
☐	Lesson 4: Why is the air near the ground warmer than the air higher up?	2.5	3 to print
☐	Lesson 5: What happens to the air near the ground when it is warmed up?	2.5	3 to print
☐	Reading: Science Literacy Collection 2: Energy and Surfaces	1 week	1 to print
☐	Lesson 6: How can we explain the movement of air in a hail cloud?	2.5	2 to print
☐	Lesson 7: Where did all that water in the air come from, and how did it get into the air?	2	4 to print
☐	Lesson 8: What happens to water vapor in the air if we cool the air down, and why?	2	2 to print
☐	Reading: Science Literacy Collection 3: Water in and out of the Air	1 week	1 to print
☐	Lesson 9: Why don't we see clouds everywhere in the air, and what is a cloud made of?	1	2 to print
☐	Lesson 10: Why do clouds or storms form at some times but not others?	2	5 to print
☐	Lesson 11: Why don't water droplets or ice crystals fall from the clouds all the time?	2	3 to print

	Lesson	Days	Student pages
☐	Reading: Science Literacy Collection 4: All About Clouds	1 week	1 to print
☐	Lesson 12: What causes more lift in one cloud versus another?	2	5 to print
☐	Lesson 13: Why do some storms produce (really big) hail and others don't?	3	4 to print
☐	Lesson 14: What causes a large-scale precipitation event like this to occur?	2	3 to print
☐	Reading: Science Literacy Collection 5: Convection, Hail, and Other Events	1 week	1 to print
☐	Lesson 15: What happens with temperature and humidity of air in large storms?	2	2 to print
☐	Lesson 16: How do warm air masses and cold air masses interact along the boundaries between them?	2	4 to print
☐	Lesson 17: Is there a relationship between where the air is rising and where precipitation falls?	1	4 to print
☐	Lesson 18: How can we explain what is happening across this storm (and other large-scale storms)?	2	3 to print
☐	Reading: Science Literacy Collection 6: A Closer Look at Weather	1 week	1 to print
☐	Lesson 19: Are there patterns to how air masses move that can help predict where large storms will form?	1	1 to print
☐	Lesson 20: How do oceans affect whether a place gets a lot or a little precipitation?	2	2 to print
☐	Lesson 21: Why is there less precipitation further inland in the Pacific Northwest than further inland from the Gulf Coast?	2	2 to print
☐	Lesson 22: How can we explain differences in climate in different parts of the world?	1	2 to print
☐	Reading: Science Literacy Collection 7: Weather and Climate	1 week	1 to print
☐	Words quiz	—	—

Page numbers are PDF page numbers of each file, so they match what your PDF reader shows.

Reading: Science Literacy Preface: Put Yourself in This Scene

Words to know

- **accuracy** — how close a measurement is to the true value
- **precipitation** — rain, snow, sleet, or hail that falls to the ground
- **probability** — the chance or likelihood that something will occur
- **science literacy** — the ability to read, hear, and comprehend information about scientific topics and demonstrate understanding in discussion and through writing

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 32–35: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Preface: “Put Yourself in This Scene”: PDF pages 6–7. Look at the pictures and maps together.

Check for understanding

- Use one of today's words in a sentence of your own.

Lesson 1: What causes this kind of precipitation event to occur?

LESSON QUESTION

What causes this kind of precipitation event to occur?

Plan about **3 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 36–56: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 7–11
- Initial Model — Student Work Pages, PDF pages 7–8
- Representing Particle-Level Changes in the System — Student Work Pages, PDF pages 9–10
- Reference: Hailstone Images — Student Procedure Guide, PDF page 75

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
What causes this kind of precipitation event to occur?

Lesson 2: What are the conditions like on days when it hails?

LESSON QUESTION

What are the conditions like on days when it hails?

Plan about **1.5 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 57–70: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 12–14
- Reference: Hail Frequency Map — Student Procedure Guide, PDF page 74
- Reference: Weather Data for Fort Scott — Student Procedure Guide, PDF pages 76–77
- Reference: Weather Data from Seven Hailstorm Sites — Student Procedure Guide, PDF pages 78–91

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
What are the conditions like on days when it hails?

Lesson 3: How does the air higher up compare to the air near the ground?

LESSON QUESTION

How does the air higher up compare to the air near the ground?

Plan about **1.5 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 71–84: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 15–17

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How does the air higher up compare to the air near the ground?

Reading: Science Literacy Collection 1: Weather Concepts

Words to know

- **atmospheric pressure** — the pressure applied by the weight of the atmosphere, which is roughly 14.7 pounds per square inch at sea level
- **climate** — the weather conditions prevailing in an area in general or over a long period
- **density** — the quantity of mass per unit of volume; for example, the density of water is about 1 gram per cubic centimeter
- **fluid** — matter that can flow and does not retain its shape, as in liquids and gases
- **latitude** — the measure of a point's distance north or south of the equator
- **longitude** — the measure of a point's distance east or west of the prime meridian
- **mean** — an average; the central value in a set of numbers, calculated by adding the values and dividing that sum by the number of values
- **precipitation** — rain, snow, sleet, or hail that falls to the ground
- **pressure** — the force applied per unit area of a surface
- **prime meridian** — the line at zero longitude, which passes through Greenwich, England
- **probability** — the chance or likelihood that something will occur
- **severe weather** — weather conditions with the potential to cause damage

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 85–90: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 1: “Weather Concepts”: PDF pages 8–17. Look at the pictures and maps together.

Student pages to print

- Exercise Page 1 — Student Work Pages, PDF pages 117–118

Check for understanding

- Use one of today's words in a sentence of your own.

Lesson 4: Why is the air near the ground warmer than the air higher up?

LESSON QUESTION

Why is the air near the ground warmer than the air higher up?

Plan about **2.5 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 91–107: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 18–20
- Sunlight and Temperature Investigation — Student Work Pages, PDF pages 11–14
- Reference: Sunny Day: Sample Data for Colorado Springs — Student Procedure Guide, PDF pages 92–118

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
Why is the air near the ground warmer than the air higher up?

Lesson 5: What happens to the air near the ground when it is warmed up?

LESSON QUESTION

What happens to the air near the ground when it is warmed up?

Plan about **2.5 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 108–134: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 21–28
- Heated Balloon Investigation — Student Work Pages, PDF pages 15–16
- Soap Bubble and Bottle Investigation — Student Work Pages, PDF pages 17–18

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
What happens to the air near the ground when it is warmed up?

Reading: Science Literacy Collection 2: Energy and Surfaces

Words to know

- **climate** — the weather conditions prevailing in an area in general or over a long period
- **density** — the quantity of mass per unit of volume; for example, the density of water is about 1 gram per cubic centimeter
- **evaporation** — the conversion of a liquid to a gas
- **fluid** — matter that can flow and does not retain its shape, as in liquids and gases
- **glacier** — a long-lasting mass of dense ice that gradually moves downhill
- **heat island** — an urban area that retains heat because of its built environment and is warmer than its surrounding natural or rural area
- **ice sheet** — a stationary mass of ice that covers a large region of terrain
- **irradiance** — the intensity of light shining on a surface, which varies with the angle at which the light strikes the surface
- **mean** — an average; the central value in a set of numbers, calculated by adding the values and dividing that sum by the number of values
- **pressure** — the force applied per unit area of a surface
- **transpiration** — the release of water vapor through the stomata of plants
- **water cycle** — the continuous movement of water above and below Earth's surface

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 135–141: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 2: “Energy and Surfaces”: PDF pages 18–27. Look at the pictures and maps together.

Student pages to print

- Exercise Page 2 — Student Work Pages, PDF pages 119–120

Check for understanding

- Use one of today's words in a sentence of your own.

Lesson 6: How can we explain the movement of air in a hail cloud?

LESSON QUESTION

How can we explain the movement of air in a hail cloud?

Plan about **2.5 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 142–153: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 29–30
- Tracking Air Movement in Cloud Formation — Student Work Pages, PDF pages 19–20

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How can we explain the movement of air in a hail cloud?

Lesson 7: Where did all that water in the air come from, and how did it get into the air?

LESSON QUESTION

Where did all that water in the air come from, and how did it get into the air?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 154–166: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 31–33
- Model for How Water Gets into the Air — Student Work Pages, PDF pages 21–22
- Self-Assessment — Student Work Pages, PDF pages 23–24
- Sources of Water in the Air — Student Work Pages, PDF pages 25–26

For the teacher

- Teacher Reference — Teacher Guide, PDF pages 436–444

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
Where did all that water in the air come from, and how did it get into the air?

Lesson 8: What happens to water vapor in the air if we cool the air down, and why?

LESSON QUESTION

What happens to water vapor in the air if we cool the air down, and why?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 167–181: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 34–37
- Elements Map and Results for Investigation C — Student Work Pages, PDF pages 27–28

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: What happens to water vapor in the air if we cool the air down, and why?

Reading: Science Literacy Collection 3: Water in and out of the Air

Words to know

- **adhesion** — the process of sticking to or clinging to another substance
- **climate** — the weather conditions prevailing in an area in general or over a long period
- **cohesion** — the tendency of a substance to cling together or stick to itself
- **condensation** — the conversion of a gas to a liquid
- **drought** — a prolonged period of unusually low precipitation, leading to a shortage of water
- **evaporation** — the conversion of a liquid to a gas
- **humidity** — the amount of water vapor in a region of the atmosphere
- **precipitation** — rain, snow, sleet, or hail that falls to the ground
- **snowpack** — a mass of snow that is compressed and hardened under its own weight
- **surface tension** — the property of a liquid's surface causing it to resemble a stretched membrane
- **transpiration** — the release of water vapor through the stomata of plants
- **water cycle** — the continuous movement of water above and below Earth's surface

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 182–188: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 3: “Water in and out of the Air”: PDF pages 28–37. Look at the pictures and maps together.

Student pages to print

- Exercise Page 3 — Student Work Pages, PDF pages 121–122

Check for understanding

- Use one of today's words in a sentence of your own.

Lesson 9: Why don't we see clouds everywhere in the air, and what is a cloud made of?

LESSON QUESTION

Why don't we see clouds everywhere in the air, and what is a cloud made of?

Plan about **1 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 189–196: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 38–39
- Explaining a Related Phenomenon — Student Work Pages, PDF pages 29–30

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
Why don't we see clouds everywhere in the air, and what is a cloud made of?

Lesson 10: Why do clouds or storms form at some times but not others?

LESSON QUESTION

Why do clouds or storms form at some times but not others?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 197–208: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 40–42
- BlankSimulationtoReviseMakea Thunderstorm — Student Work Pages, PDF pages 31–32
- Data Table for Making a Thunderstorm — Student Work Pages, PDF pages 33–34
- Explaining Relationships in Storm Development — Student Work Pages, PDF pages 35–36
- Gotta-Have-It Checklist — Student Work Pages, PDF pages 37–38

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: Why do clouds or storms form at some times but not others?

Lesson 11: Why don't water droplets or ice crystals fall from the clouds all the time?

LESSON QUESTION

Why don't water droplets or ice crystals fall from the clouds all the time?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 209–229: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 43–45
- Predicting and Explaining the Effects of Opposing Forces — Student Work Pages, PDF pages 39–40
- Weather Log — Student Work Pages, PDF pages 41–42

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
Why don't water droplets or ice crystals fall from the clouds all the time?

Reading: Science Literacy Collection 4: All About Clouds

Words to know

- **cloud seeding** — the practice of dispersing substances into the air that promote the formation of precipitation in clouds
- **condensation** — the conversion of a gas to a liquid
- **cyclone** — a tropical storm rotating around a center of very low pressure
- **drought** — a prolonged period of unusually low precipitation, leading to a shortage of water
- **evaporation** — the conversion of a liquid to a gas
- **heat island** — an urban area that retains heat because of its built environment and is warmer than its surrounding natural or rural area
- **mean** — an average; the central value in a set of numbers, calculated by adding the values and dividing that sum by the number of values
- **nucleus** — the small, dense region forming the center of a mass
- **precipitation** — rain, snow, sleet, or hail that falls to the ground
- **snowpack** — a mass of snow that is compressed and hardened under its own weight
- **stratosphere** — the second layer of Earth's atmosphere, located above the troposphere
- **troposphere** — the lowest region of the atmosphere, occurring between Earth's surface (below) and the stratosphere (above)

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 230–236: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 4: "All About Clouds": PDF pages 38–47. Look at the pictures and maps together.

Student pages to print

- Exercise Page 4 — Student Work Pages, PDF pages 123–124

Check for understanding

- Use one of today's words in a sentence of your own.

Lesson 12: What causes more lift in one cloud versus another?

LESSON QUESTION

What causes more lift in one cloud versus another?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 237–252: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 46–47
- Air Movement in Different Conditions — Student Work Pages, PDF pages 43–44
- Convection in Fluids — Student Work Pages, PDF pages 45–46
- Convection Investigation Plan — Student Work Pages, PDF pages 47–48
- Explaining Convection in the Air Outside — Student Work Pages, PDF page 49

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
What causes more lift in one cloud versus another?

Lesson 13: Why do some storms produce (really big) hail and others don't?

LESSON QUESTION

Why do some storms produce (really big) hail and others don't?

Plan about **3 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 253–263: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 48–50
- Final Hail Model — Student Work Pages, PDF page 50
- Gotta-Have-It Checklist — Student Work Pages, PDF pages 51–52
- Revisiting Our Driving Question Board — Student Work Pages, PDF pages 53–54

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
Why do some storms produce (really big) hail and others don't?

Lesson 14: What causes a large-scale precipitation event like this to occur?

LESSON QUESTION

What causes a large-scale precipitation event like this to occur?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 264–273: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 51–52
- Evaluating Connections to Our Previous Model — Student Work Pages, PDF pages 55–56
- Initial Model — Student Work Pages, PDF pages 57–58

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
What causes a large-scale precipitation event like this to occur?

Reading: Science Literacy Collection 5: Convection, Hail, and Other Events

Words to know

- **actuary** — a person who analyzes data to calculate risks and determine what insurance should cost
- **climate** — the weather conditions prevailing in an area in general or over a long period
- **condensation** — the conversion of a gas to a liquid
- **convection** — the cyclical movement within a fluid of warmer, less dense matter upward and cooler, denser matter downward
- **density** — the quantity of mass per unit of volume; for example, the density of water is about 1 gram per cubic centimeter
- **downdraft** — a downward current of air
- **evaporation** — the conversion of a liquid to a gas
- **fluid** — matter that can flow and does not retain its shape, as in liquids and gases
- **jet stream** — a fast-flowing, narrow current of air in the atmosphere
- **mean** — an average; the central value in a set of numbers, calculated by adding the values and dividing that sum by the number of values
- **precipitation** — rain, snow, sleet, or hail that falls to the ground
- **pressure** — the force applied per unit area of a surface

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 274–281: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 5: “Convection, Hail, and Other Events”: PDF pages 48–57. Look at the pictures and maps together.

Student pages to print

- Exercise Page 5 — Student Work Pages, PDF pages 125–126

Check for understanding

- Use one of today's words in a sentence of your own.

Lesson 15: What happens with temperature and humidity of air in large storms?

LESSON QUESTION

What happens with temperature and humidity of air in large storms?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 282–294: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 53–55
- AirTemperatureatTimePoints1-11 — Student Work Pages, PDF pages 59–70

For the teacher

- Teacher Reference — Teacher Guide, PDF pages 445–455

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
What happens with temperature and humidity of air in large storms?

Lesson 16: How do warm air masses and cold air masses interact along the boundaries between them?

LESSON QUESTION

How do warm air masses and cold air masses interact along the boundaries between them?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 295–313: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 56–58
- RelativeHumidityatTimePoints1-11 — Student Work Pages, PDF pages 71–82
- Relative Humidity Data — Student Work Pages, PDF pages 83–86
- Warm and Cold Water Interactions — Student Work Pages, PDF pages 87–90

For the teacher

- Teacher Reference — Teacher Guide, PDF pages 456–475

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How do warm air masses and cold air masses interact along the boundaries between them?

Lesson 17: Is there a relationship between where the air is rising and where precipitation falls?

LESSON QUESTION

Is there a relationship between where the air is rising and where precipitation falls?

Plan about **1 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 314–322: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 59–60
- Air Pressure Maps — Student Work Pages, PDF pages 91–102
- Air Pressure Prediction and Map Analysis — Student Work Pages, PDF pages 103–104
- Explaining Patterns and Predictions in the Forecast — Student Work Pages, PDF pages 105–106

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: Is there a relationship between where the air is rising and where precipitation falls?

Lesson 18: How can we explain what is happening across this storm (and other large-scale storms)?

LESSON QUESTION

How can we explain what is happening across this storm (and other large-scale storms)?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 323–336: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 61–64
- Comparing Ideas Used Between Explanations — Student Work Pages, PDF pages 107–108
- Progress Tracker: Ideas Needed in Our Consensus Explanation — Student Work Pages, PDF pages 109–110

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: How can we explain what is happening across this storm (and other large-scale storms)?

Reading: Science Literacy Collection 6: A Closer Look at Weather

Words to know

- **atmospheric pressure** — the pressure applied by the weight of the atmosphere, which is roughly 14.7 pounds per square inch at sea level
- **barometer** — an instrument that measures atmospheric pressure
- **cyclone** — a tropical storm rotating around a center of very low pressure
- **density** — the quantity of mass per unit of volume; for example, the density of water is about 1 gram per cubic centimeter
- **front** — the borderline where two different air masses meet
- **millibars** — (mb) a measure of atmospheric pressure; one thousandth of a bar
- **occluded front** — the boundary where a cold front overtakes a warm front
- **precipitation** — rain, snow, sleet, or hail that falls to the ground
- **pressure** — the force applied per unit area of a surface
- **stationary front** — the boundary where air masses meet and neither moves the other

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 337–342: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 6: “A Closer Look at Weather”: PDF pages 58–69. Look at the pictures and maps together.

Student pages to print

- Exercise Page 6 — Student Work Pages, PDF pages 127–128

Check for understanding

- Use one of today's words in a sentence of your own.

Lesson 19: Are there patterns to how air masses move that can help predict where large storms will form?

LESSON QUESTION

Are there patterns to how air masses move that can help predict where large storms will form?

Plan about **1 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 343–355: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 65–66

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
Are there patterns to how air masses move that can help predict where large storms will form?

Lesson 20: How do oceans affect whether a place gets a lot or a little precipitation?

LESSON QUESTION

How do oceans affect whether a place gets a lot or a little precipitation?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 356–370: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 67–69
- PrecipitationinCoastalCitiesofthe UnitedStates — Student Work Pages, PDF pages 111–112

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How do oceans affect whether a place gets a lot or a little precipitation?

Lesson 21: Why is there less precipitation further inland in the Pacific Northwest than further inland from the Gulf Coast?

LESSON QUESTION

Why is there less precipitation further inland in the Pacific Northwest than further inland from the Gulf Coast?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 371–382: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 70–71
- Profile Views: Pacific Northwest and Gulf Coast — Student Work Pages, PDF pages 113–114

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: Why is there less precipitation further inland in the Pacific Northwest than further inland from the Gulf Coast?

Lesson 22: How can we explain differences in climate in different parts of the world?

LESSON QUESTION

How can we explain differences in climate in different parts of the world?

Plan about **1 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 383–387: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 72–73
- Revisiting Our Driving Question Board — Student Work Pages, PDF pages 115–116

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How can we explain differences in climate in different parts of the world?

Reading: Science Literacy Collection 7: Weather and Climate

Words to know

- **climate** — the weather conditions prevailing in an area in general or over a long period
- **evaporation** — the conversion of a liquid to a gas
- **front** — the borderline where two different air masses meet
- **humidity** — the amount of water vapor in a region of the atmosphere
- **jet stream** — a fast-flowing, narrow current of air in the atmosphere
- **longitude** — the measure of a point's distance east or west of the prime meridian
- **mean** — an average; the central value in a set of numbers, calculated by adding the values and dividing that sum by the number of values
- **pressure** — the force applied per unit area of a surface
- **probability** — the chance or likelihood that something will occur
- **rain shadow** — an area of reduced rainfall on the leeward side of a mountain
- **tornado** — a mobile, destructive vortex of violently rotating winds having the appearance of a funnelshaped cloud and advancing beneath a large storm system
- **water cycle** — the continuous movement of water above and below Earth's surface

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 388–394: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 7: “Weather and Climate”: PDF pages 70–83. Look at the pictures and maps together.

Student pages to print

- Exercise Page 7 — Student Work Pages, PDF pages 129–133

Check for understanding

- Use one of today's words in a sentence of your own.

WORDS QUIZ

Weather, Climate, and Water Cycling

Name: _____ Date: _____

Circle the letter of the best answer.

- 1.** Which word means “a stationary mass of ice that covers a large region of terrain”?
 - a) rotation
 - b) ice sheet
 - c) density
 - d) millibars
- 2.** Which word means “the property of a liquid’s surface causing it to resemble a stretched membrane”?
 - a) science literacy
 - b) adhesion
 - c) surface tension
 - d) pressure
- 3.** Which word means “the force applied per unit area of a surface”?
 - a) precipitation
 - b) pressure
 - c) nucleus
 - d) occluded front
- 4.** Which word means “(mb) a measure of atmospheric pressure; one thousandth of a bar”?
 - a) irradiance
 - b) ice sheet
 - c) millibars
 - d) rain shadow
- 5.** Which word means “a tropical storm rotating around a center of very low pressure”?
 - a) stationary front
 - b) mean
 - c) cyclone
 - d) irradiance
- 6.** Which word means “a prolonged period of unusually low precipitation, leading to a shortage of water”?
 - a) drought
 - b) heat island
 - c) barometer
 - d) atmospheric pressure

7. Which word means “a mass of snow that is compressed and hardened under its own weight”?

- a) stationary front
- b) nucleus
- c) snowpack
- d) pressure

8. Which word means “an average; the central value in a set of numbers, calculated by adding the values and dividing that sum by the number of values”?

- a) fluid
- b) climate
- c) mean
- d) stratosphere

9. Which word means “a factor that is able to change or be changed”?

- a) millibars
- b) variable
- c) heat island
- d) cloud seeding

10. Which word means “the tendency of a substance to cling together or stick to itself”?

- a) variable
- b) heat island
- c) cohesion
- d) snowpack

11. Which word means “the chance or likelihood that something will occur”?

- a) ice sheet
- b) probability
- c) barometer
- d) surface tension

12. Which word means “a person who analyzes data to calculate risks and determine what insurance should cost”?

- a) pressure
- b) probability
- c) latitude
- d) actuary

FOR THE TEACHER

Answers

Unit quiz key

1. b 2. c 3. b 4. c 5. c 6. a 7. c 8. c 9. b 10. c 11. b 12. d