

Brandon Valley School District  
District Learning Plan  
March 30 - April 3, 2020

Grade 6 Science



## Brandon Valley School District Distance Learning Plan

LESSON/UNIT: WEATHER/CLIMATE

SUBJECT/GRADE: Science/6th

DATES: March 30 - April 3



<p>What do students need to do?</p> <p><a href="#"><u>Link to BV instructional video for week of March 30 - April 3, 2020</u></a></p>	<p><b>For Science this week, you will read two NEWSLA articles and complete three worksheets.</b></p> <p>Monday (3/30):</p> <ul style="list-style-type: none"> <li>● Read <i>Newsela article, Relationship between convection and weather</i> and answer the four questions on <b>ANSWER DOCUMENT</b></li> </ul> <p>Tuesday (3/31):</p> <ul style="list-style-type: none"> <li>● Read <i>Newsela article, Big Question: What causes Windy Weather</i> and answer the four questions on <b>ANSWER DOCUMENT</b></li> </ul> <p>Wednesday (4/1):</p> <ul style="list-style-type: none"> <li>● <b>SEA &amp; LAND BREEZE</b> (<i>Worksheet</i>) Read the worksheet and complete the answers on the <b>ANSWER DOCUMENT</b></li> </ul> <p>Thursday (4/2):</p> <ul style="list-style-type: none"> <li>● <b>CORIOLIS EFFECT</b> (<i>Worksheet</i>) Read the worksheet and complete the answers on the <b>ANSWER DOCUMENT</b></li> </ul> <p>Friday (4/3):</p> <ul style="list-style-type: none"> <li>● <b>UNEVEN HEATING</b> (<i>Worksheet</i>) Read the worksheet and complete the answers on the <b>ANSWER DOCUMENT</b></li> </ul>
<p>What do students need to bring back to school?</p>	<p>Answer Document (Choose one method for submission)</p> <ol style="list-style-type: none"> <li>1. Complete answer document by paper and pencil and return to BVIS</li> <li>2. Complete answer document and submit electronically through GOOGLE CLASSROOM</li> </ol>
<p>What standards do the lessons cover?</p>	<p>MS-ESS2-4 Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.</p> <p>MS-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions</p> <p>MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.</p> <p>(All Days)</p> <p>MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment</p> <p>MS-ESS3-5 Ask questions to clarify evidence of the factors that may have caused a change in global temperatures over the past century</p>
<p>What materials do students need? What extra resources can students use?</p>	<p>Need:</p> <ol style="list-style-type: none"> <li>1. Two Newsela articles (PDF or Online)</li> <li>2. Three worksheets (PDF or Online)</li> <li>3. Answer document (PDF or on Google Classroom)</li> <li>4. Paper and Pencil</li> </ol> <p>Extra:</p> <ol style="list-style-type: none"> <li>1. <a href="https://my.mheducation.com/login">https://my.mheducation.com/login</a> (Student online textbook- Chapter 14)</li> <li>2. <a href="http://studyjams.scholastic.com/studyjams/jams/science/index.htm">http://studyjams.scholastic.com/studyjams/jams/science/index.htm</a> (Weather &amp; Climate)</li> </ol>

<p>What can students do if they finish early?</p>	<p><b>(Optional- With parent or guardian permission and supervision)</b>  <b>PICK A TOPIC FROM THE WEEK AND CREATE A SIMPLE EXPERIMENT:</b></p> <ol style="list-style-type: none"> <li>1. Create a <b>PROBLEM</b>: What question are you trying to answer</li> <li>2. Create a <b>HYPOTHESIS</b>: Come up with an educated guess for the question</li> <li>3. Create an <b>EXPERIMENT</b>: What are the Materials needed and Procedures for the experiment</li> <li>4. What are the <b>RESULTS</b>: What data or information were you able to collect</li> <li>5. <b>CONCLUSION</b>: Was your hypothesis right or wrong? What did you learn based on the data?</li> <li>6. Send a picture to your Science Teacher</li> </ol>
<p>Who can we contact if we have questions?</p>	<p><b><u>Brandon Valley Intermediate School</u></b>  <b>Principal-</b> Mr. Skibsted- <a href="mailto:Nick.Skibsted@k12.sd.us">Nick.Skibsted@k12.sd.us</a>  <b>Assistant Principal-</b> Mr. Pearson- <a href="mailto:Rick.Pearson@k12.sd.us">Rick.Pearson@k12.sd.us</a>  <b>Science Teachers:</b>  Mr. Putnam- <a href="mailto:Mike.Putnam@k12.sd.us">Mike.Putnam@k12.sd.us</a> (blue team)  Ms. Grieve- <a href="mailto:Tami.Grieve@k12.sd.us">Tami.Grieve@k12.sd.us</a> (silver team)  Ms. Schindling- <a href="mailto:Kayla.Schindling@k12.sd.us">Kayla.Schindling@k12.sd.us</a> (red team)  Mr. VanHeel- <a href="mailto:Jeremy.VanHeel@k12.sd.us">Jeremy.VanHeel@k12.sd.us</a> (white team)</p>
<p><b>Notes:</b> If you have any questions or would be looking for additional supplemental learning activities, please do not hesitate to reach out.</p>	

***Instructional materials are posted below (if applicable)***

*Brandon Valley School District*

# The relationship between convection and weather

By Tiffany Means, ThoughtCo.com, adapted by Newsela staff on 11.04.19

Word Count **565**

Level **780L**



Image 1. Cumulus clouds are visible forms of convection, which is the vertical transport of heat and moisture in the atmosphere. Photo by: Artur R. Mazurek, EyeEm/Getty Images

Have you ever heard the term "convection"? You may have heard a meteorologist use the word to explain weather events. Convection describes how heat and moisture move upward through the atmosphere. The atmosphere is an envelope of gases that surrounds the Earth.

The word "convection" is sometimes used in place of the word "thunderstorms." However, convection and thunderstorms are not the same thing. Thunderstorms are a result of convection.

Convection happens in the atmosphere, but it also takes place in everyday life. Let's look at an example — a boiling pot of water. Before the water boils, the water at the bottom of the pot heats up first. It rises to the surface, where the water is cooler. This creates steam on the surface. It also creates bubbles. When the bubbles rise to the surface, they transfer heat from hot water at the bottom of the pot. The heat is transferred to the cooler water at the top.

This example is similar to convection in the atmosphere. When you boil water, hot water rises from the bottom of the pot. This is similar to how warm air rises from the ground into the

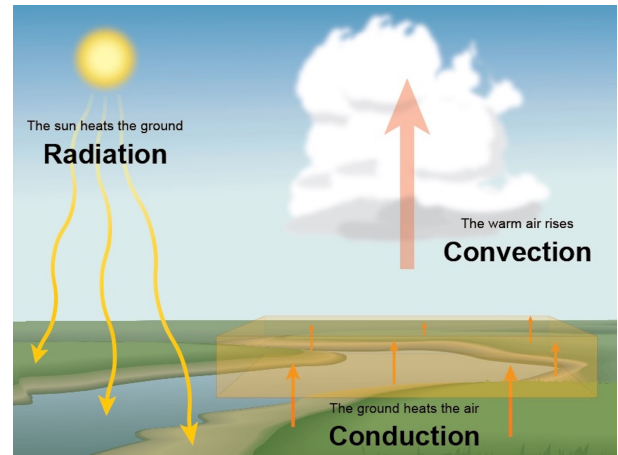
atmosphere. The air rises from a warm area at the ground surface to a cooler area above.

## The Convection Process

Let's look at a step-by-step process of atmospheric convection.

The process of convection usually begins at sunrise. It continues as follows:

1. The sun's radiation strikes the ground and heats it.
2. As the ground's temperature warms, the ground heats the layer of air above it. This process is known as conduction. Conduction is the transfer of heat from one substance to another. In this case, heat is transferred from the ground to the air.
3. Certain surfaces warm faster than others. The surfaces that warm quickly are ones that do not have much plant life. These surfaces include sand, rocks, soil and pavement. Surfaces that are covered by water or plant life warm more slowly.



These different surfaces warm at different rates. As a result, the air near the surface heats unevenly. This is why some pockets of air warm faster than others.

4. When a pocket of air receives enough heat from the Earth's surface, it expands. The warm air becomes less dense than the cooler air around it. This means that the warm air becomes larger and lighter.

## Warm Air Rises, Cool Air Sinks

We can look at convection at the molecular level. Air is made of molecules, which are made up of atoms. Atoms are the building blocks of all matter. When air is heated, the molecules in the air take up more space. The molecules in the warm air rise while the molecules in the cool air sink.

The currents of warm air that rise are called "thermals." As the air rises, heat and moisture rise with it. They are transported upward into the atmosphere.

After convection is complete, several scenarios can happen. Each of these scenarios results in a different type of weather. For example, clouds can form as a result of convection. So can precipitation, like rain or snow. Winds can also form as a result of convection. A meteorologist might call this type of wind "convective wind."

## Quiz

1 Read the introduction [paragraphs 1-4].

Select the detail from the section that shows how convection occurs in homes.

- (A) Have you ever heard the term "convection"? You may have heard a meteorologist use the word to explain weather events.
- (B) Convection describes how heat and moisture move upward through the atmosphere. The atmosphere is an envelope of gases that surrounds the Earth.
- (C) The word "convection" is sometimes used in place of the word "thunderstorms." However, convection and thunderstorms are not the same thing.
- (D) This example is similar to convection in the atmosphere. When you boil water, hot water rises from the bottom of the pot.

2 Read the following paragraph from the section "Warm Air Rises, Cool Air Sinks."

*After convection is complete, several scenarios can happen. Each of these scenarios results in a different type of weather. For example, clouds can form as a result of convection. So can precipitation, like rain or snow. Winds can also form as a result of convection. A meteorologist might call this type of wind "convective wind."*

Which of the following is an accurate explanation of what this paragraph means?

- (A) Convection is caused when there are big weather events.
- (B) Many weather events can happen because of convection.
- (C) Convection can cause rain but not the formation of clouds.
- (D) Many weather events are stopped as a result of convection.

3 Read the following paragraph from the section "The Convection Process."

*1. When a pocket of air receives enough heat from the Earth's surface, it expands. The warm air becomes less dense than the cooler air around it. This means that the warm air becomes larger and lighter.*

Which phrase from the paragraph helps the reader to understand the meaning of "expands"?

- (A) a pocket of air receives
- (B) the Earth's surface
- (C) the cooler air around it
- (D) becomes larger and lighter

4 The word "convection" is essential to understanding the article.

Which sentence from the article explains what "convection" means?

- (A) This is similar to how warm air rises from the ground into the atmosphere.
- (B) Let's look at a step-by-step process of atmospheric convection.
- (C) As the ground's temperature warms, the ground heats the layer of air above it.
- (D) The surfaces that warm quickly are ones that do not have much plant life.



# Big Questions: What causes windy weather?

By Andrew B. Watkins, The Conversation, adapted by Newsela staff on 06.12.18

Word Count **614**

Level **MAX**



Image 1. Watch out for wind! Windy weather is caused by changes in air pressure. Photo by Getty.

**Question:** What causes windy weather?

**Answer:** Wind is just moving air, and air is a collection of different gases. It's mostly one type of gas, called nitrogen, but also lots of others, including oxygen – which we need to live.

When air is under pressure, it starts to move – and that causes wind. I'll explain what I mean by "under pressure."

Imagine you are blowing up a balloon. As you blow more air into the balloon, the pressure builds inside. If the pressure gets too great, the balloon could pop because the air has nowhere to move.

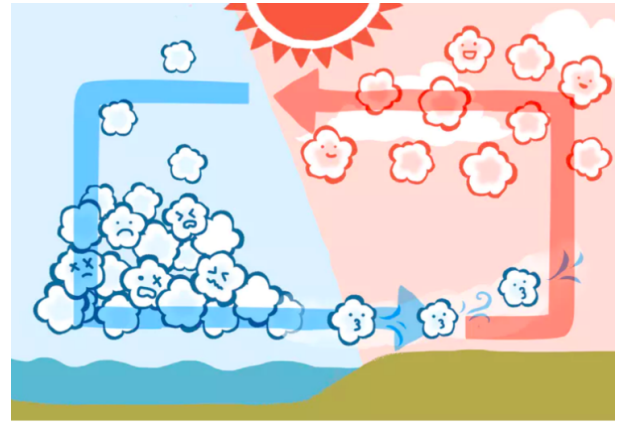
Just like the balloon, we don't like to be under pressure, either. Think of when your brother or sister or slightly annoying cousin gives you a great big bear hug. You feel pressure because you're getting squeezed. Sometimes that can be nice but when the squeezing gets too much, the best way to get comfortable again is to break free and run. It's the same with air: When it's under pressure, it tries to escape.

When the air inside a balloon is under pressure and you take your fingers off the neck part of it, the air rushes out – often with a bit of an embarrassing farty noise. Well, that air rushing out is wind. (And, let's be honest, it's why another name for a fart is "breaking wind").

In the atmosphere, the same thing happens. When pressure builds up in one place, the air rushes to another place where there is less pressure.

But what is causing this pressure in the atmosphere?

Well, as the sun heats up the surface of the earth, some areas get warmer and others stay cooler. On the whole globe, for instance, the north and south poles are really cold. This is because sunbeams pass over the top, so not much sunlight actually hits the ground. Compare this to the equator, where temperatures are really warm, because the sunbeams are hitting it from directly above.



As you may know, warm air rises -- just like when you see hot steam seeping out the top of your kettle or a cooking pot at home.

My old teacher used to say: "you don't get something for nothing!" What he meant was that if air goes up in one place, it must come down in another place. That other place will be where the air is not rising, and that's typically where the cool areas are.

As this happens and the air comes down, it hits the ground and starts to build up. When that air piles up too much, that pile of air will collapse and spread out, just like air rushing out of a balloon.

That air will rush towards the area that doesn't have a big mound of air built up, and that will usually be a warm place where the air is rising.

You can feel this happening at the beach in summer, where the sun heats up the sand more than the water. As heat builds up the air rises over the land and starts to fall over the ocean. Soon there is more air over the ocean than the land, and a breeze starts as that air pile collapses.

So, put simply: wind is just air moving from one place where there is high pressure to another place where there is low pressure (a smaller pile of air).

Often, that's from where it is cooler to where it is hotter. And, thankfully, it rarely makes that farty sound.



## Quiz

- 1 What would you expect to happen as air pressure builds up in one place?
- (A) Air will remain in the same place. Its movement is not determined by pressure.
  - (B) Air will rush to another place where there is less pressure.
  - (C) Air will rush to a place where there is more pressure.
  - (D) Air will remain in the area with the most pressure.
- 2 Which piece of evidence BEST explains the cause of cool breezes on a warm day at the beach?
- (A) Well, as the sun heats up the surface of the earth, some areas get warmer and others stay cooler.
  - (B) Compare this to the equator, where temperatures are really warm, because the sunbeams are hitting it from directly above.
  - (C) That air will rush towards the area that doesn't have a big mound of air built up, and that will usually be a warm place where the air is rising.
  - (D) You can feel this happening at the beach in summer, where the sun heats up the sand more than the water.
- 3 What causes the nice breeze you might feel at the beach?
- (A) Beach sand is heated quicker than water. Cool air rises over the beach sand and falls over the ocean. The warmer air over the ocean builds up pressure and moves in toward the beach.
  - (B) Water at the beach is heated quicker than the sand. Warm air rises over the water and falls over the sand. The cooler air over the sand builds up pressure and moves out toward the ocean.
  - (C) Beach sand is heated quicker than water. Hot air rises over the beach sand and falls over the ocean. The cooler air over the ocean builds up pressure and moves in toward the beach.
  - (D) Water at the beach is heated quicker than the sand. Cool air rises over the water and falls over the sand. The warmer air over the sand builds up pressure and moves out toward the ocean.

- 4 Read the list of details from the article.

1. *Just like the balloon, we don't like to be under pressure, either. Think of when your brother or sister or slightly annoying cousin gives you a great big bear hug.*
2. *You feel pressure because you're getting squeezed. Sometimes that can be nice but when the squeezing gets too much, the best way to get comfortable again is to break free and run.*
3. *When the air inside a balloon is under pressure and you take your fingers off the neck part of it, the air rushes out – often with a bit of an embarrassing farty noise.*
4. *When pressure builds up in one place, the air rushes to another place where there is less pressure.*

Which two details taken together provide the BEST evidence to support the idea that air moves from a place of high pressure to a place of low pressure?

- (A) 1 and 2
- (B) 1 and 4
- (C) 2 and 3
- (D) 3 and 4

- 5 What causes pressure to build up in the atmosphere?
- (A) cool air coming down to the ground and building up
  - (B) warm air coming down to the ground and building up
  - (C) both warm and cool air rising and building up
  - (D) cool air rising and building up
- 6 Why does the author include the information about balloons?
- (A) to give the readers a comparison that will help them understand how air and pressure work
  - (B) to show why warm air rises and why cool air stays closer to the surface of the Earth
  - (C) to prove that air that goes up somewhere must always come down somewhere else
  - (D) to suggest the author's teacher was incorrect when he said "you don't get something for nothing"
- 7 What is the main reason why some areas of Earth are much warmer than others?
- (A) Sunlight hits the poles and equator indirectly.
  - (B) Sunlight passes over the top of the north and south poles. Sunlight at the equator is more direct.
  - (C) Sunlight is more direct at the north and south poles and indirect at the equator.
  - (D) Sunlight hits the poles and equator directly.

- 8 Read the selection from the beginning of the article.

*Wind is just moving air, and air is a collection of different gases. It's mostly one type of gas, called nitrogen, but also lots of others, including oxygen – which we need to live.*

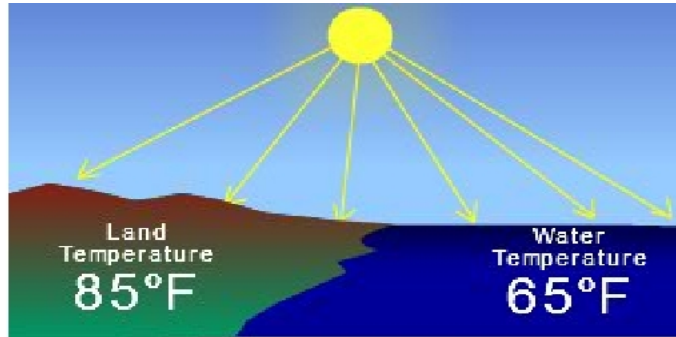
How does this selection contribute to the entire article?

- (A) It describes how pressure effects windy weather.
- (B) It explains what wind is and what makes it up.
- (C) It proves that air moves based on the temperature.
- (D) It shows that wind moves to smaller piles of air.

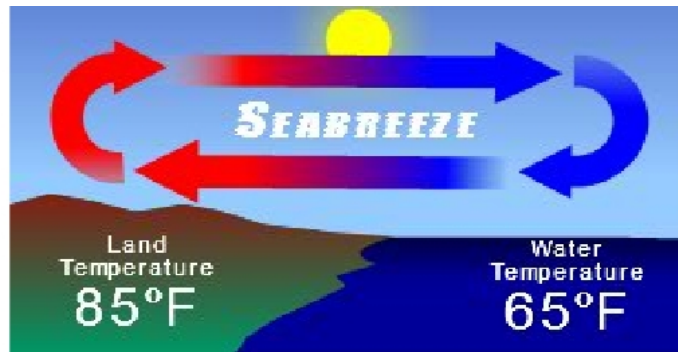
Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

Land and water absorb heat differently. Land heats up and cools down faster than water. This uneven heating creates Sea and Land breezes. Sea and Land breezes are examples of heat transfer by convection! Remember, Convection is one of the major ways that heat is transferred. It occurs because hotter liquids and gasses have a tendency to rise, while colder liquids and gasses have a tendency to sink.

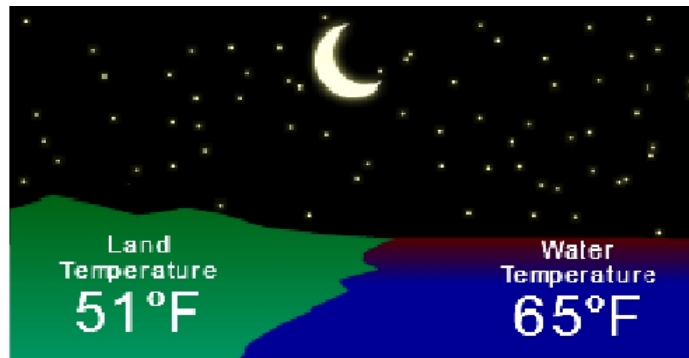
**Step 1:** Throughout the morning, the Sun rises and warms the land. The surface of the land becomes warmer relative to the surface of the ocean



**Step 2:** By the afternoon, warm air over the land begins to rise upward, while cooler heavier air over the ocean moves in over the land creating a Seabreeze. A Seabreeze develops during the day due to the uneven heating of land and water; as a result wind flows from ocean on to land.



**Step 3:** In the evening, the Sun goes down and the land begins to cool down. The surface of the land is now cooler relative to the surface of the ocean.



**Step 4:** By midnight, warm air over the ocean begins to rise upward, while cooler, heavier air over the land moves out to sea; creating a Landbreeze. A Landbreeze develops at night due to the uneven heating of land and water; as a result wind flows from land to ocean.



1. What is a Land Breeze? Explain how it is formed.

**2. Illustrate a Land Breeze. What should be in your illustration?  
(Moon, Convection Arrows, Temp of land and water)**



**3. What is a Sea Breeze? Explain how it is formed.**

**4. Illustrate a Sea Breeze. What should be in your illustration?  
(Sun, Convection Arrows, Temp of land and water)**

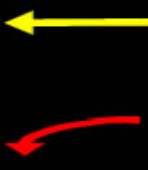


Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

# Coriolis Effect

Ever wonder why the water spirals down your drain in clockwise fashion? The reason why water, wind, and any other free-moving objects appear to curve, or spiral is due to the Coriolis Effect. The Coriolis Effect is the apparent "curve" or deflection of all free moving objects (such as airplanes, wind, missiles, and ocean currents) moving in a straight path relative to the earth's surface. Wind is just one of many of these free moving objects. Hurricanes, and tornados all spiral COUNTER CLOCKWISE in the Northern Hemisphere. Typhoons (hurricane in the Southern Hemisphere) spiral in a CLOCKWISE motion.

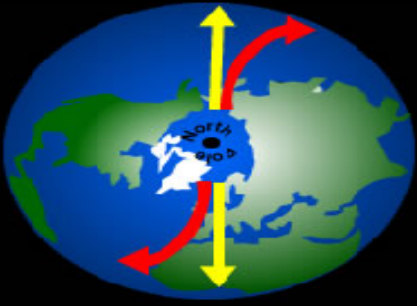
If the Earth wasn't spinning, wind, airplanes and any free moving object would travel in a straight line or path. But, as we all we know, the Earth does spin, and as a result of the Coriolis Effect, all free moving objects (wind in this case) takes on a curved or deflected path.



= path without the Coriolis effect

= path with the Coriolis effect

In the Northern Hemisphere, wind is deflected to the right and spirals in a counter-clockwise direction. In the diagram to the right, the yellow arrow shows the path of wind if the Earth wasn't spinning. The red arrow shows the actual path of wind with the Coriolis effect. This path is curved or deflected to the right.

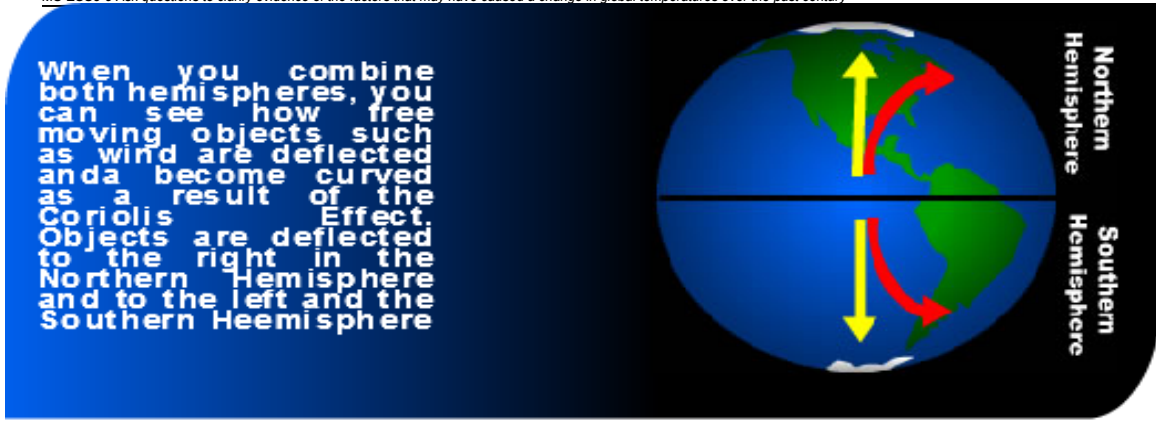


Northern Hemisphere

In the southern hemisphere, wind is deflected to the left and spirals in a clockwise direction. In the diagram to the right, the yellow arrow shows the path of wind if the Earth wasn't spinning. The red arrow shows the actual path of wind with the Coriolis effect. This path is curved or deflected to the left.

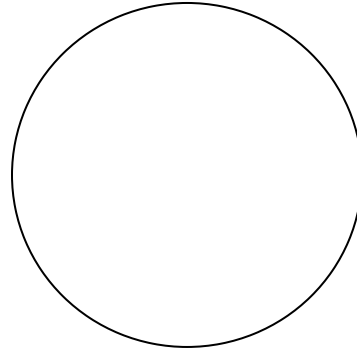


Southern Hemisphere

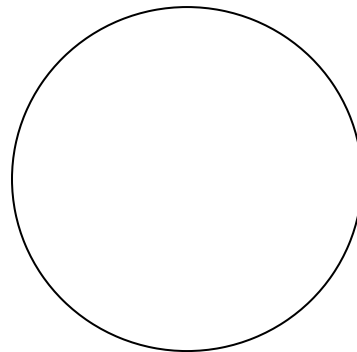


1. What is the Coriolis Effect?

2. Which direction do hurricanes spin or spiral in the Northern Hemisphere? Illustrate a model.



3. Which direction do typhoons spin or spiral in the Southern Hemisphere??? Illustrate a model.



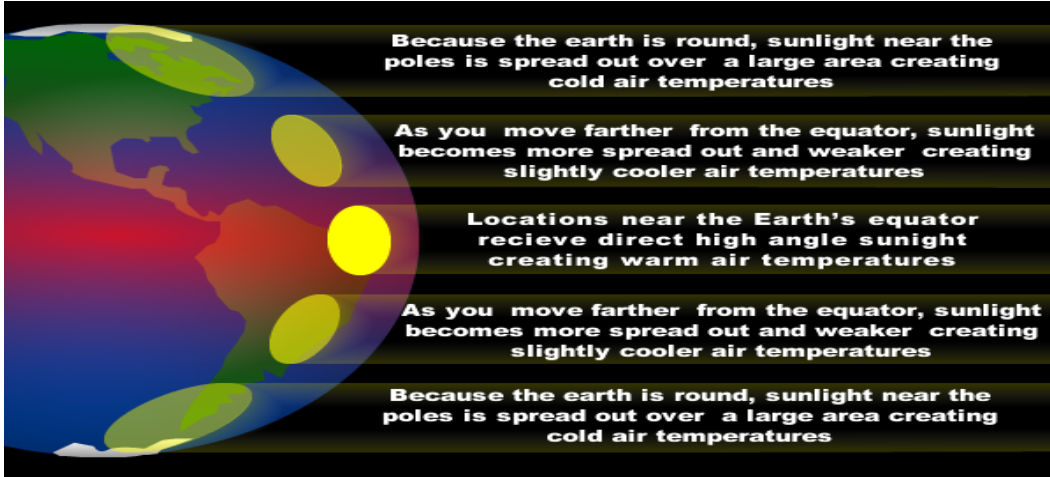


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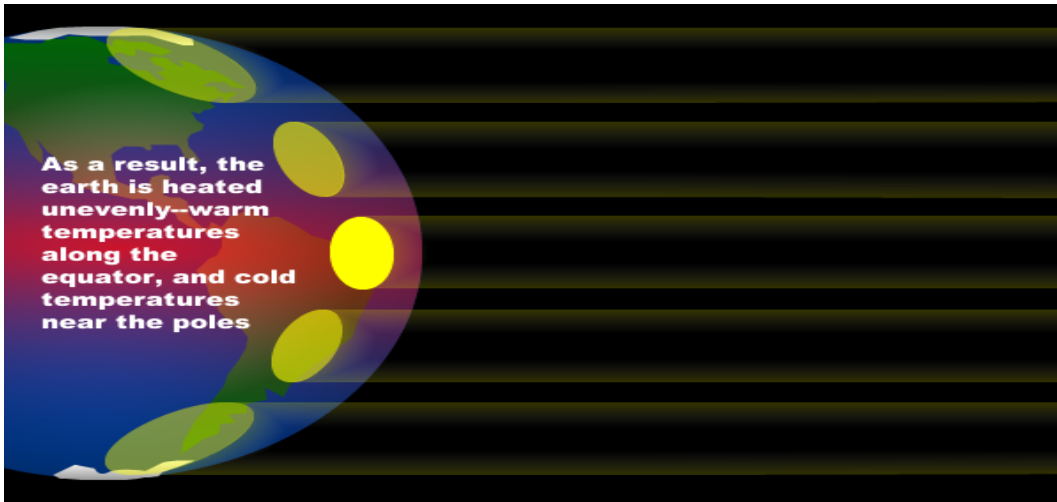
# Uneven Heating

We learned how the uneven heating between land and water create Sea and Land Breezes. However, uneven heating also occurs on global scale. Therefore, equatorial regions have warmer temperatures and the polar regions have colder temperatures. Follow the steps below to learn how the uneven heating on a worldwide scale create winds that flow from the equatorial regions to the polar regions.

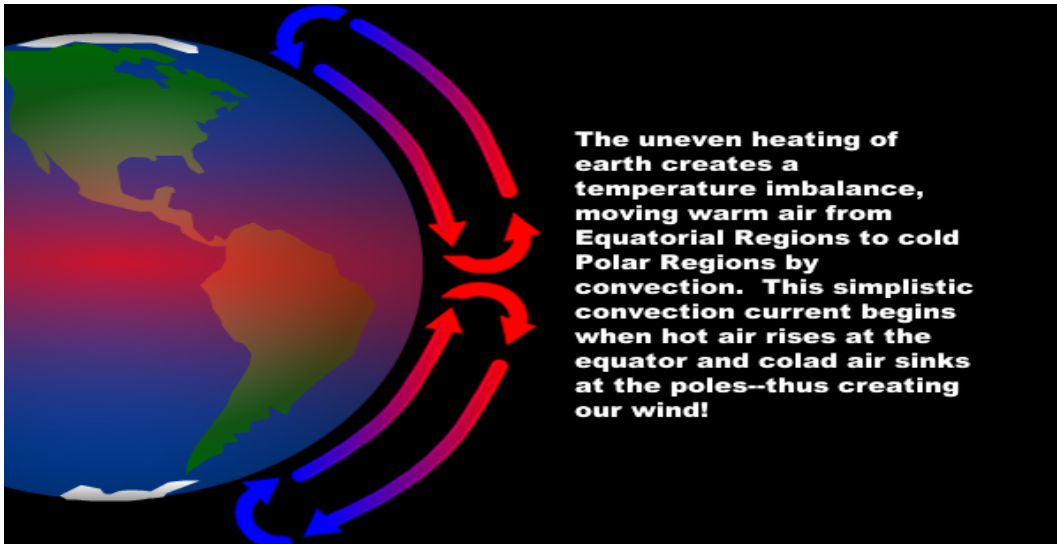
## STEP 1:



## STEP 2:



## STEP 3



1. How does Earth receive sunlight near the equator?
  
2. How does this affect air temperatures near the equator?
  
3. What happens to sunlight as you move farther from the equator?
  
4. How does this affect air temperatures?
  
5. Why is sunlight near the Poles spread out over a large area?
  
6. How does this affect air temperatures near the poles?
  
7. Complete the table below:

	<i>Indirect sunlight, Direct sunlight, Moderate sunlight?</i>	<i>Low angle sunlight, high angle sunlight, moderate angle sunlight?</i>	<i>Cold air temperatures, Warm air temperatures, Moderate temperatures?</i>
Sunlight at the Equator			
Sunlight at The poles			
Sunlight between The equator and poles			

MS-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions

MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

MS-ESS3-5 Ask questions to clarify evidence of the factors that may have caused a change in global temperatures over the past century

**Monday, March 30- (NEWSLA- Relationship between convection and weather)**

Directions- After reading the article answer the questions and circle the letter that correlates with the response you chose.

- |    |   |   |   |   |
|----|---|---|---|---|
| 1. | A | B | C | D |
| 2. | A | B | C | D |
| 3. | A | B | C | D |
| 4. | A | B | C | D |

**Tuesday, March 31- (NEWSLA- Big Questions: What causes windy weather?)**

Directions- After reading the article answer the questions and circle the letter that correlates with the response you chose.

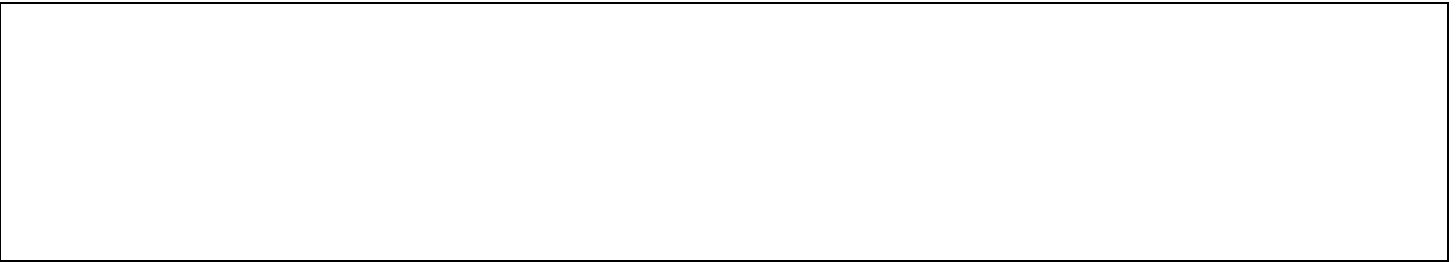
- |    |   |   |   |   |
|----|---|---|---|---|
| 1. | A | B | C | D |
| 2. | A | B | C | D |
| 3. | A | B | C | D |
| 4. | A | B | C | D |
| 5. | A | B | C | D |
| 6. | A | B | C | D |
| 7. | A | B | C | D |
| 8. | A | B | C | D |

**Wednesday, April 1st - (Sea and Land Breeze Worksheet)**

Directions- After reading the information on Sea and Land breezes, answer the following questions below.


1. What is a Land Breeze? Explain how it is formed.

**2. Illustrate a Land Breeze. What should be in your illustration?  
(Moon, Convection Arrows, Temp of land and water)**



**3. What is a Sea Breeze? Explain how it is formed.**

**4. Illustrate a Sea Breeze. What should be in your illustration?  
(Sun, Convection Arrows, Temp of land and water)**

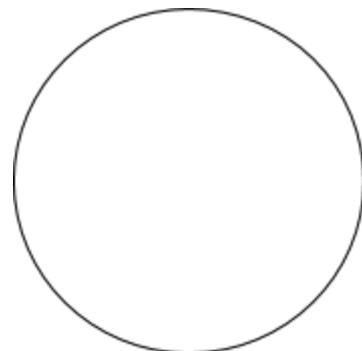


**Thursday, April 2nd - (Coriolis Effect Worksheet)**

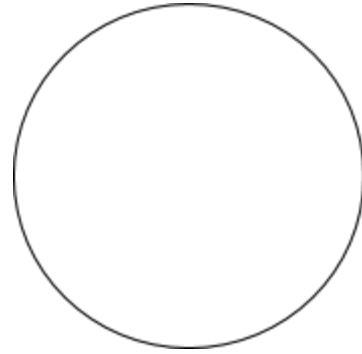
Directions- After reading the information on the Coriolis Effect, answer the following questions below.

1. What is the Coriolis Effect?

2. Which direction do hurricanes spin or spiral in the Northern Hemisphere? Illustrate a model.



3. Which direction do typhoons spin or spiral in the Southern Hemisphere???. Illustrate a model.



**Friday, April 3rd - (Uneven Heating Worksheet)**

Directions- After reading the information on the Uneven Heating, answer the following questions below.

1. How does Earth receive sunlight near the equator?
2. How does this affect air temperatures near the equator?
3. What happens to sunlight as you move farther from the equator?
4. How does this affect air temperatures?
5. Why is sunlight near the Poles spread out over a large area?
6. How does this affect air temperatures near the poles?
7. Complete the table below:

	<i>Indirect sunlight, Direct sunlight, Moderate sunlight?</i>	<i>Low angle sunlight, high angle sunlight, moderate angle sunlight?</i>	<i>Cold air temperatures, Warm air temperatures, Moderate temperatures?</i>
Sunlight at the Equator			
Sunlight at The poles			



Sunlight between The equator and poles			
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