

GRC: Template Developing Lessons Alignment to Standards Three-Dimensional Science Performance

3D-Student Science Performance

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Grade - Kindergarten

Lesson Title

Lesson Topic: Weather

Do you want to go to the beach?

Performance Expectations (Standard) from State Standards or NGSS:

K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.* [*Clarification Statement: Emphasis is on local forms of severe weather.*]

Lesson Performance Expectations:

- **Develop questions** to gather information about why weather forecasting can help us prepare for the weather.
- Class **communicates** how people prepare for, and respond to, severe weather.

Student Science Performance

Phenomenon: Knowing about the weather helps us know if we should go to the beach.

Gather

1. Students share stories about how the weather has **affected** them over the last week.
2. Students **develop questions** to gather information about why weather forecasting can help us prepare for the weather.
3. Students **obtain information** from a class reading about how weather is different than severe weather. **(class reading)**

Reason

4. Students **develop a model** to show how weather is different than severe weather.
5. Students as a class **communicate** how people prepare for, and respond to, severe weather.

Class Discussion:

Questions to initiate Discussion:

Q: How does the rain affect ocean water? What happens? Would you swim or surf in dirty water?

Q: What is perfect for family beach picnic weather?

Q: How do big dark clouds affect your plans different than the blue sky with white fluffy clouds?

Q: What would you want to see in the sky if you were planning a picnic at the beach?

Q: How does the weather forecast affect your plans to go to the beach?

*(Teaching Suggestions: Use an analogy to compare how we would behave depending on the weather. For example: go to the beach: sunny day: staying home: rainy day. Use a Bridge Thinking Map strategy. Students will draw a picture of what activity they could do on a sunny day and a picture of an activity they would do on a rainy day. Mention that scientists called Meteorologists are responsible for informing us about the weather. * Ask meteorologists from NOAA or TV station to share with us about their job with the weather.*

Communicate Reasoning

6. Students **develop a model** (class T chart) to identify ways to prepare for and respond to severe weather.

(Teaching Suggestions: Example of t-chart is in Appendix C)

Engage

Explore

Explain

*The core idea that is addressed in this lesson is **natural hazards**.*

Formative Assessment for Student Learning



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Elicit Evidence of Learning: Students *use a model* (class T chart) to identify ways to prepare for and respond to severe weather.

<p>Evidence of Student Proficiency</p> <p><i>Weather can affect human lives. We can't stop the weather but we can take steps to avoid severe weather. Scientists forecast the weather and help the community prepare for and respond to the weather.</i></p>	<p>Range of Typical Student Responses</p> <p>Full understanding: <i>Students are able to draw and label or write words to tell at least 1 way to show what they would do to prepare for severe weather and how they would respond to severe weather.</i></p> <p>Partial understanding: <i>Students are able to draw and label or write words to tell either a way to show what they would do to prepare or how they would respond or needs some guidance to help them think of ways to respond.</i></p> <p>Limited understanding: <i>Students are able to only draw or write 1 way to show a way to prepare and respond. Or student needs guidance questions for both.</i></p>	<p>Acting on Evidence of Learning</p> <ul style="list-style-type: none"> • <i>Action for students who display a partial or limited understanding:</i> <ul style="list-style-type: none"> ◦ <i>Roleplay the job as a forecaster and an audience, act out what we might do for different scenarios. For example, if the forecaster says there will be rain we can pretend to put up our umbrellas, or if it is sunny we can put on our imaginary sunscreen and sunglasses.</i> • <i>Extensions of learning for students who display a full understanding:</i> <ul style="list-style-type: none"> ◦ <i>They can be the directors on the role play mentioned above.</i> ◦ <i>They can draw pictures of different scenarios.</i> ◦ <i>If able, they can write a story about a kid that had to make a decision based on the weather forecast.</i>
<p><i>SEP, CCC, DCI Featured in Lesson</i></p>	<p>Science Essentials (<i>Student Performance Expectations From Appendix C, D, E</i>)</p>	
<p>Science Practices</p>	<p>Identify questions relevant to science or engineering problems.</p>	
<p>Asking questions</p>		
<p>Crosscutting Concepts</p>	<p>Identify and describe the causes of phenomena. Justify predictions using cause and effect relationships.</p>	
<p>Cause and Effect</p>		
<p>Disciplinary Core Ideas</p>	<p>Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that communities can prepare for and respond to these events.</p>	
<p>ESS3.B: Natural Hazards</p>		

Appendix A - Student Prompts for the Lesson

Phenomenon: Knowing about the weather helps us know if we should go to the beach.

Group Performances:

1. Share stories about how the weather has **affected** you over the last week.
2. What **questions** can help us find information about how weather forecasting helps.
3. **Obtain information** from a class reading about how weather is different than severe weather.
4. Let's **develop a model** to show how weather is different than severe weather.
5. Now let's **communicate (show)** how people prepare for, and respond to, severe weather.

Class Discussion

6. **Use the model** (class T chart) to identify ways to prepare for and respond to severe weather.

(Teaching Suggestions: You may wish to show each line one at a time and read it to the students OR you may wish to just read each step to the students as they do each step. The lesson is done as a class with the teachers moving students through each performance and building the T-Chart on the board. Some teachers use pictures and student place cutouts of the action on the chart in the category.)

Google Slides Presentation

Appendix B- 1 - Reading 1

Weather is what is happening outside with the sky and air. It can be cold and cloudy or hot and sunny. The weather is more than just wind or rain. In Hawaii, we can also have severe weather like hurricanes or thunderstorms.





khon2weather **PROJECTED PATH**

GUILLERMO
TROPICAL STORM
 Moving WNW at 11 mph
 Winds: 45 mph
 Gusts: 58 mph
 2019 mi. ESE of Hilo, HI

7:53
2

Our lives are affected by the weather.

The weather has always affected our lives. Our Hawaiian ancestors did not have tools or computers to help them predict weather and storms. They relied on what they saw and noticed in nature. Their observations can be found in the olelo no'eau about the Iwa, Noio, and Nai'a.



Iwa (frigate bird)



Noio (Hawaiian Noddy)

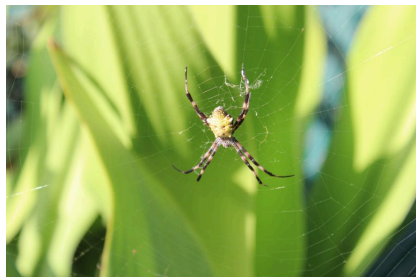
Lele ka 'iwa, malie kai ko'o: "When the 'iwa [frigate bird] flies [out to sea], the rough sea will be calm." (Pukui 'Olelo No'eau, No. 1979)

"Kīkaha ka 'iwa he lā makani" means "When the 'iwa bird soars on high, it's going to be windy."

Ua ho'i ka noio 'au kai i uka, ke 'ino nei ka moana: "When the noio bird returns from sea to land, the sea will be stormy." (Pukui 'Olelo No'eau, No. 2787)

"Ina 'au ka nai'a ma Hilo, 'a, e malie ana ke kai. Ke 'au ka nai'a ma Ka'u, 'a, e 'ino'ino ana ka moana: "If dolphins swim toward Hilo, the sea will be calm; if the dolphins swim toward Ka'u, the ocean will be rough" (Pukui 'Olelo No'eau, No. 61)

They also noticed that the weather affects the behavior of some insects. Perhaps you have noticed these things, too.



The Garden Spider

When the weather's going to be fair- the spider stays in the middle of his web; but if wind and rain threatened, the spider leaves its web to find something more solid.



Red Ants

When the red ants are going back to their nests with food and blocking their doors with sand; expect bad weather. But when the red ants swarm out, leaving their doors wide open; expect good weather.

Are there animals or insects that you have noticed and used to help predict the weather?

Source: <http://www.hokulea.com/education-at-sea/polynesian-navigation/polynesian-non-instrument-wayfinding/non-instrument-weather-forecasting/>

Reading 2

Weather and Severe Weather

Weather is what is happening outside in the sky and air.

The weather is always changing.

It can be rainy and windy in the morning and sunny in the afternoon.

It could be cloudy all day.

We do not control the weather, but we can **prepare** for it.

On a rainy day, I might use an umbrella.

On a sunny day, I might use a hat.

What other weather do you **prepare** for?

Sometimes the **weather** is **severe**.

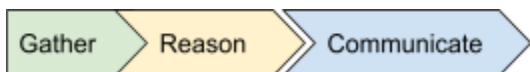
Severe weather is the weather we need to be very careful of.

Meteorologists can forecast when **severe** storms will affect us. This helps us to **prepare**.

When we **prepare**, we get ready for the storm.

For all types of **severe** weather, you can **prepare** with an emergency kit.

An emergency kit will have supplies for you and your family to survive for a few days if you get stuck or the power goes out. An emergency kit can have things like bandaids, food, a



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flashlight, extra batteries, a radio, and water. What else would you add to your emergency kit?

In Hawaii, we sometimes have flooding and thunderstorms. In April of 2018, a **severe** flood damaged many homes and roads in our islands. We can prepare for these storms by staying in a safe place. Being outside is not safe during a **severe** storm.

It's okay if it's a little windy and rainy, but a **severe** wind and rain storm is called a hurricane. Every year in Hawaii, we have a few hurricane warnings.

Hurricanes form over the ocean and move towards our islands.

Meteorologists carefully track the storm to predict when it will affect us.

Most of the time, a hurricane storm over the ocean becomes just a bad thunderstorm with flooding when it gets to the islands. We have not had a **severe** hurricane in Hawaii since 1992.

You do not want to be outside in a hurricane. Hurricane winds are so strong they can move a house!

How would you prepare if there was a hurricane in your area?

Appendix B-2

Student Reading - Weather Happens

Weather happens outside.

Weather can be predicted.

*Weather can **cause** people to change plans.*

*Weather **affects** our lives.*

*How has weather **affected** your life?*

Appendix B3- T-chart



Severe Weather

<i>Ways to Prepare</i>	<i>Ways to Respond</i>
<i>Listen to the forecast/news</i>	<i>Stay home if hurricane forecasted</i>

<i>Watch the skies/clouds</i>	<i>Go to the beach if sunny and clear skies</i>
<i>Watch the Iwa (frigate bird)</i>	<i>Go to the beach when the Iwa flies way out over the ocean</i>

Appendix B-3: Common weather terms

Connecting lesson: [Wherever the Ribbon Blows Lesson](#)

Weather term	Meaning
<i>kau</i>	<i>May- October- when the sun is almost directly overhead and tradewinds are most reliable</i>
<i>ho'oilo</i>	<i>November- April when it is cooler and we have more rainfall and more variable winds</i>
<i>ao (clouds)</i> 	<p><i>Cloud Descriptions-</i></p> <ul style="list-style-type: none"> • <i>opua'a-</i> scattered, cotton-puff trade wind cumulus clouds <ul style="list-style-type: none"> ◦ <i>Pua'a</i> means pig, and thus a row of cumulus clouds reminded Hawaiians of a mother pig with a train of piglets following her. These clouds mean fair weather for the near future. • <i>'opua-</i> a bank of <i>opua'a</i> • <i>aopehupehu,-</i> When cumulus clouds <i>pehu</i> (swell) up, or grow upward, it usually means rainfall. • Clouds are also named after colors, with <ul style="list-style-type: none"> ◦ <i>'ele'ele</i> referring to black clouds ◦ <i>ke'oke'o</i> to white clouds • <i>ho'omalumalu -a</i> sheltering cloud is called • <i>ho'oweliweli.-</i> a threatening cloud
<i>lani (sky)</i> 	<ul style="list-style-type: none"> • <i>Pauli-</i> very dark sky in the sunset direction forecasts high surf or <i>kaiko'o</i>. • <i>po'ipu-</i> completely overcast sky without wind <ul style="list-style-type: none"> ◦ If the overcast sky is extremely dark <i>Kulanihako'i</i> (the source of thunder, lightning, and other severe weather) is present.
<i>Ua (rain)</i>	<i>There are over 200 names given to rain, Ua is the common name for rainfall, but there are many terms for precipitation.</i>

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- 'awa refers to a cold mountain fog or mist.
- ua loa - extended rainstorm with very little wind
- ua poko - short rain spell
- Ua ho'okina is continuous rain,
- ua lanipili is a torrential rain
- kualau- rainfall over the open ocean.
- Local names were also given such as ua Kuahine, what is now commonly called Manoa mist, and ua lani ha'aha'a for rainfall in Hana, Maui.
- Anuenue - a rainbow, the sign of good fortune
- Uahea- cold rain
- hau- ice and snow.

makani (wind)



There are many, many wind words.

- makani polua - variable winds
- olu'olu-fair winds '
- Trade winds have many names such as Moa'e, A'e, A'e Loa, Moa'e Lehua, and Mao'e pehu.
- Ho'olua.- strong north winds

Ka Lâ (The Sun)



- lâ- sun, sun heat; sunny, solar; also, means day, date
- kahikole- early morning sun
- kahikû-before noon sun
- kau i ka lolo- sun at noontime
- napo`o ana o ka lâ- sunset
- aka'ula- red sunset means the end of rain



Name: _____ Date: _____

Preparing for Severe Weather

The Meteorologist on the news said a hurricane is near our islands.

What will you do to prepare for the hurricane?

1. Draw a picture of what you will do.

2. Label the things you did to prepare.

1.