

Module E

Unit 2

Lesson 2

Exploration 2

Explaining the accuracy  
of weather  
prediction

# Objective

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- Explore why weather can be predicted
- Analyze the cause and effect relationships that produce weather

# Do Now:

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Log onto your student Ebook and complete the Lesson Opener, “Can You Explain It Activity” at the beginning of Lesson 2

**HOW DO  
METEOROLOGISTS  
CREATE WEATHER  
FORECASTS?**

# Weather Prediction

- is a prediction about the state of the atmosphere at a given place and time
- commonly provided using maps and weather charts.
- include predictions about temperature, wind, precipitation, cloud cover, and humidity.



THREE-DAY FORECAST		
TODAY	FRIDAY	SATURDAY
 <b>North:</b> Cloudy, outbreaks of rain, sunny spells Max 23C (73F) Min 8C (46F)	 <b>North:</b> Dry, warm and sunny Max 23C (73F) Min 9C (48F)	 <b>North:</b> Dry, warm and sunny Max 26C (79F) Min 9C (48F)
 <b>South:</b> Cloudy, mainly dry Max 24C (75F) Min 8C (46F)	 <b>South:</b> Dry, warm and sunny Max 25C (77F) Min 8C (46F)	 <b>South:</b> Dry, warm and sunny Max 28C (82F) Min 11C (52F)

# Importance of Forecasts

- Provide warnings about severe weather, such as blizzards and hurricanes.
- Pilots also rely on forecasts to navigate the planes we fly in
- help people plan their day



# Do now:

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Complete Weather Prediction Chart and questions in the student Ebook



# Data used in Weather Predictions

- Past and current weather conditions are considered.
- The current locations and movements of air masses, fronts, and high- and low-pressure systems.
- Such as
  - wind speed
  - air pressure
  - Humidity
  - cloud cover
  - Precipitation
  - Temperature

	Predictors				Response
	Outlook	Temperature	Humidity	Wind	Class
					Play=Yes
Day1	Sunny	Hot	High	Weak	No
Day2	Sunny	Hot	High	Strong	No
Day3	Overcast	Hot	High	Weak	Yes
Day4	Rain	Mild	High	Weak	Yes
Day5	Rain	Cool	Normal	Weak	Yes
Day6	Rain	Cool	Normal	Strong	No
Day7	Overcast	Cool	Normal	Strong	Yes
Day8	Sunny	Mild	High	Weak	No
Day9	Sunny	Cool	Normal	Weak	Yes
Day10	Rain	Mild	Normal	Weak	Yes
Day11	Sunny	Mild	Normal	Strong	Yes
Day12	Overcast	Mild	High	Strong	Yes
Day13	Overcast	Hot	Normal	Weak	Yes
Day14	Rain	Mild	High	Strong	No

With a partner, use a left side page to explain why you agree or disagree with the decision to play outside over the two week period.

Day #	Forecast	Temperature	Humidity	Play outside
Day 1	sunny	hot	high	yes
Day 2	sunny	hot	high	yes
Day 3	cloudy	hot	high	no
Day 4	rainy	mild	high	no
Day 5	rainy	cool	normal	no
Day 6	rainy	cool	normal	no
Day 7	cloudy	cool	normal	yes
Day 8	sunny	mild	high	yes
Day 9	sunny	cool	normal	no
Day 10	rainy	mild	normal	no
Day 11	sunny	mild	normal	yes
Day 12	cloudy	mild	high	no
Day 13	cloudy	hot	normal	yes
Day 14	rainy	mild	high	no

# Do now:

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Explore the interactive 3 day forecast using the student's Ebook after Data used in Weather Prediction section

# Mathematical Models



- Can be used to make predictions. They can predict how something might work under different conditions.
- Can also help predict an event at a future time.
- Predictions can be shown on maps, graphs, and other displays.

# Weather Forecast Models

- Are mathematical models that are made up of many related equations that are based on the physical laws that determine how the atmosphere works and forecast models are very complex
- In the early 1900s, the first weather forecast model was used
  - It took so long to do the calculations by hand that, by the time the forecast was ready, the weather had already happened.
- By the 1950s, computers could do these calculations, Today, supercomputers do them even faster.

41 Action NEWS  
BREAKING NEWS LEADER

41 Action NEWS

## WHAT IS WEATHER?

- **Weather** is: What is happening right now.
- Sunshine, clouds, wind, temperature, humidity & more
- We can't control the weather, but we can control how we control us!

41 Action NEWS  
BREAKING NEWS LEADER

# Accuracy of Predictions

- Five-day forecasts can be made with about the same accuracy as a two-day forecast could thirty years ago.
- This is due to the continual improvement of weather forecast models and the speed of supercomputers.
- Many predictions are given as a chance or percentage for a general area, because it is hard to predict exactly what will happen in an exact location.
- Meteorologists and forecasters analyze weather forecast model results before the results are shared with the public.

# Do Now



Create a left side page to show your understanding of how Meteorologist us mathematical models, charts, and maps to predict the weather

# Do now

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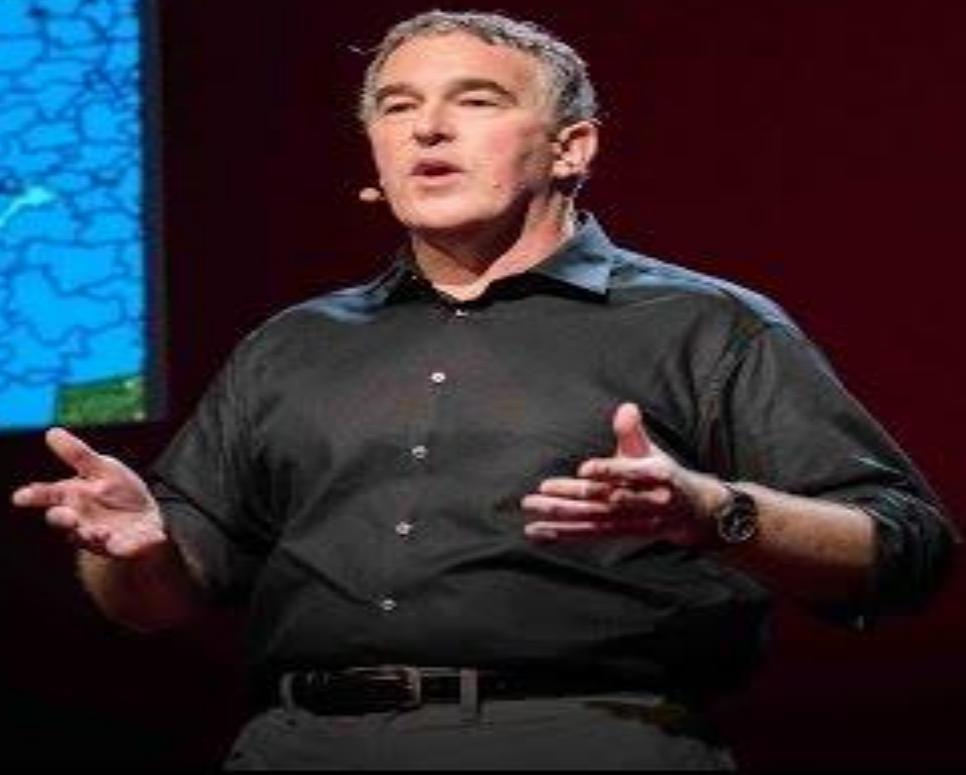
1. Student Ebook activity, Weather Forecast Maps
2. With a partner create a news forecast for the weather in Amarillo based on the maps from the activity.
  - a. Be sure to describe the movement of the fronts and precipitation

# Limitations of Weather Forecast Models

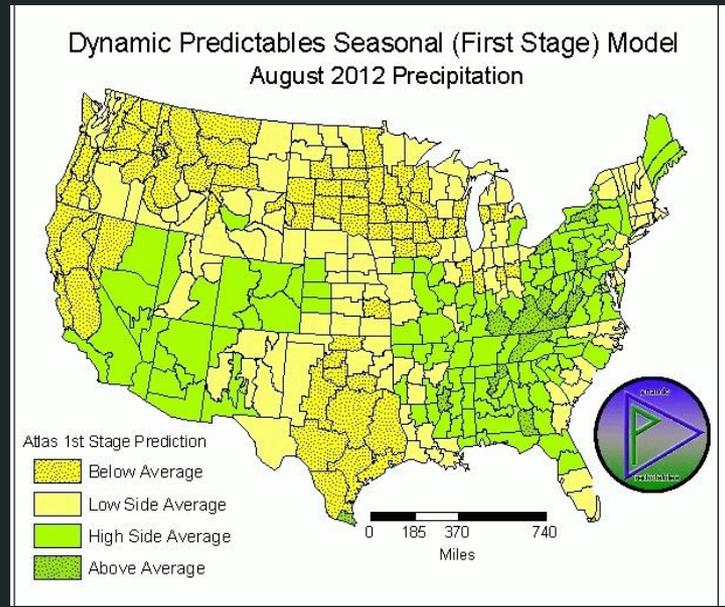
- All weather predictions contain some degree of uncertainty—that is, they are rarely 100% accurate.
- One small change, such as wind direction or ocean circulation, can impact many other factors and result in different weather conditions.
- For this reason weather predictions are often given as a range or as a percentage of certainty.
- Predictions are compared to what actually happens with the weather
- Models are constantly improved to make predictions more accurate.

# Checking the Accuracy of Models- For Example

- A forecast predicted the temperature on Friday, the actual temperature is compared to the prediction. This process would be followed for many days.
  - If the predictions mostly match the recorded temperatures, then the model is a good predictor of temperature.
  - If the model often predicts that it will be warmer or cooler than it actually is, adjustments are made to improve the model.



# Do now



1. Student Ebook activity, Weather Observation in Amarillo

# Do Now

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Create a left side page to show your understanding of why models have limitations and why they are still useful to people.

# Do now

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1. Student Ebook activity, Analyze Weather Forecasts at the end of exploration #2

A weather map with purple lightning bolts and a green banner containing the text "WHAT DOES '50% CHANCE OF RAIN' MEAN?". The map shows isobars and other weather symbols. The banner is a dark green rectangle with white text. The background is a purple-tinted weather map with several bright purple lightning bolts striking across it. In the bottom left corner, there is a logo that says "Sci-Fi" in a stylized green font.

**WHAT DOES  
"50% CHANCE OF RAIN"  
MEAN?**

Sci-Fi

# Do now

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1. Students should complete pgs 115-117 in their workbook as review for the quiz