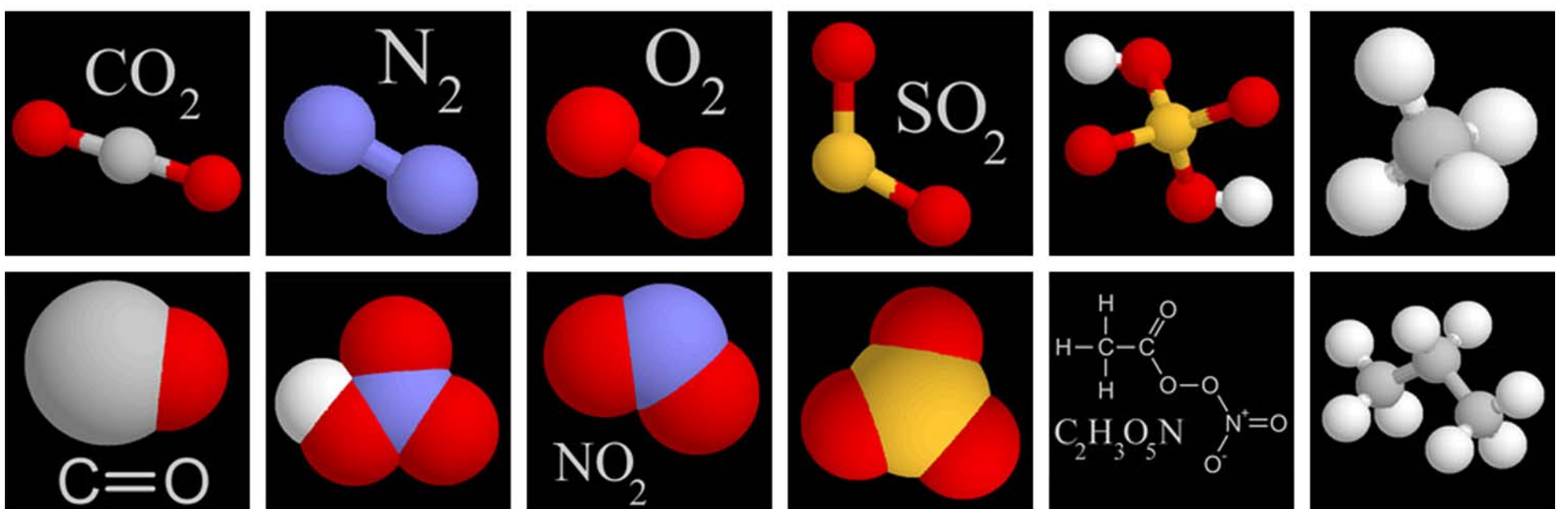
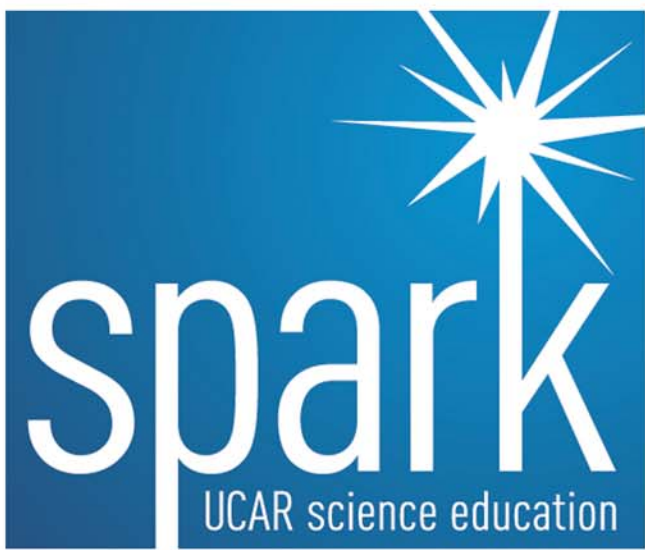


Games and Simulations for Climate, Weather and Atmospheric Science Education

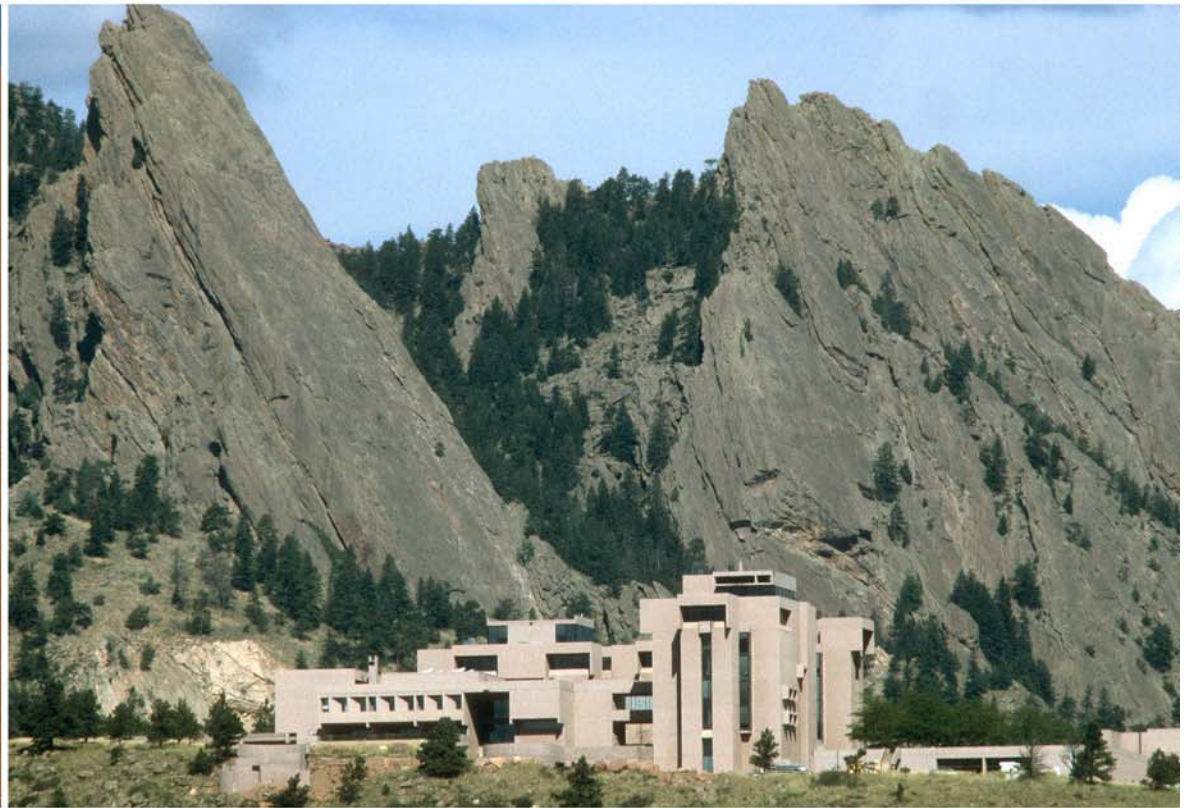


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Spark is the K-12 Education Group at NCAR in Boulder



spark.ucar.edu

MAKE A THUNDERSTORM

Can you adjust the atmosphere to make a thunderstorm?
Thunderstorms only happen under certain conditions.

What do temperature and humidity need to be like up high and near the ground to make a storm?

What happens when temperature near the ground is different than temperature up high?

Why does humidity matter?

To get a storm, surface air needs to be humid. When humid air rises, it cools a little, forms clouds, but stays warmer than dry air. Warmer air is more likely to continue rising and grow into a thunderstorm.

High Level Temperature: Very Cold, Cold, Cool
Humidity: High, Moderate, Low
Low Level Temperature: Cold, Cool, Warm

Reset Go

Congratulations! You've made a big storm! Choose other combinations to make a smaller thunderstorm.

FORECAST A HURRICANE

The hurricane is in the Atlantic Ocean. Where will it go?
Select an upper-level high (H) and low (L), then press Go.
Select other high/low combinations and see how the paths differ.

What is a hurricane?
Why do hurricanes take different tracks?
Hurricanes are steered by bands of upper level winds. But regions of highs and lows in the upper atmosphere can turn them in other directions.

What's an upper-level low?
What's an upper-level high?

hide winds Go Try again Predict a path (part 2)

Create a Snowstorm

The high pressure system is bringing air from the north, while the low pressure system is bringing air in from the south and east.

Choose the temperatures and moisture source on the map to make a storm.

Nice job! You chose the right ingredients and made an upslope snow storm.

Choose an arrow for the source of moisture, then press Go.

Choose an air temperature in the north: Colder, Warmer (than freezing)
Choose an air temperature in the south: Colder, Warmer (than freezing)

What's an upslope snow storm?
Upslope snow storms develop when air flows upslope toward the mountains. As cold moist air rises, it cools and condenses, and snow forms. Areas with very moist upslope flow are prone to very heavy snowfall.

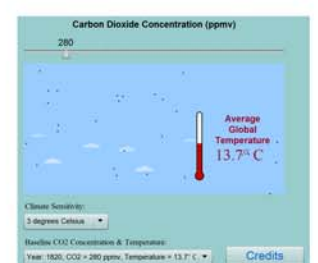
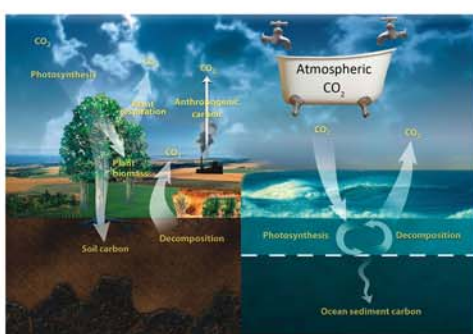
What's a high pressure system?
What's a low pressure system?

Reset Go

Touch a Cloud to Learn More

Instructions
Launch Balloon
New Flight
Flights left: 0
Start Recording Altitude: 25 km
Altitude Recording Interval: 5 km
Show Pressure
New Game
Change Settings
Credits

Altitude (km) vs Temperature (degrees Celsius) graph showing a balloon's path.



Review/List of Games and Simulations covering Weather, Climate and Atmospheric Science Topics

Links to numerous games, simulations and virtual labs from many different sources

- think of it as a “one-stop shopping” compendium or like a lit review or consumer reports listing
- each entry includes a screenshot, brief description, link, source, and cost (if any... most are free!)
- coming soon: sorting, rating, and commenting features

Example entries:

NOAA Games “Planet Arcade”



Description: a large collection (25 items as of January 2013) of games and puzzles from the U.S. National Oceanic and Atmospheric Administration (NOAA)

URL: games.noaa.gov

Creators: NOAA Ocean Service Education

Cost: free

Disaster Dynamics: Hurricane Landfall



Description: role-playing strategy game teaches about interactions between natural hazards and human decisions in a Gulf Coast barrier island community.

URL: www.dd.ucar.edu

Creators: National Center for Atmospheric Research (NCAR)

Cost: free

MANY more available online, including:



Bill Nye's Climate Lab



BYU Virtual Chemlab



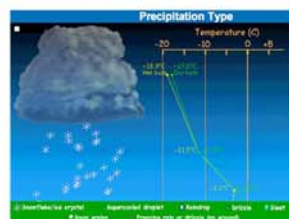
EdGCM



COMET/MetEd



ExploreLearning Gizmos



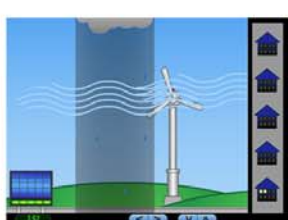
WeatherWise



Global Carbon Budget app



PhET



NASA Climate Kids



WikiWatershed



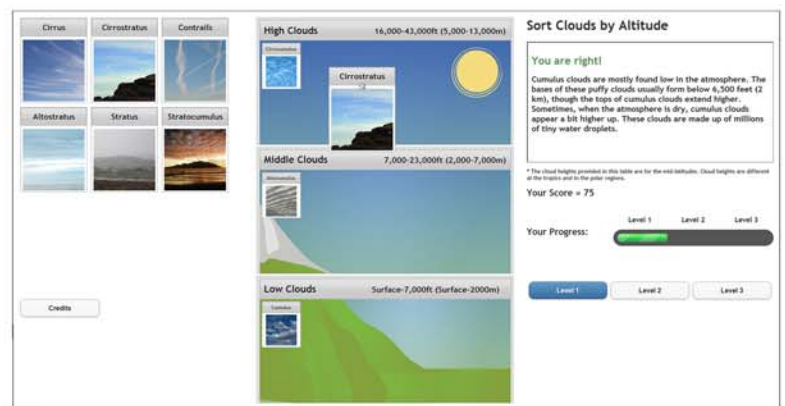
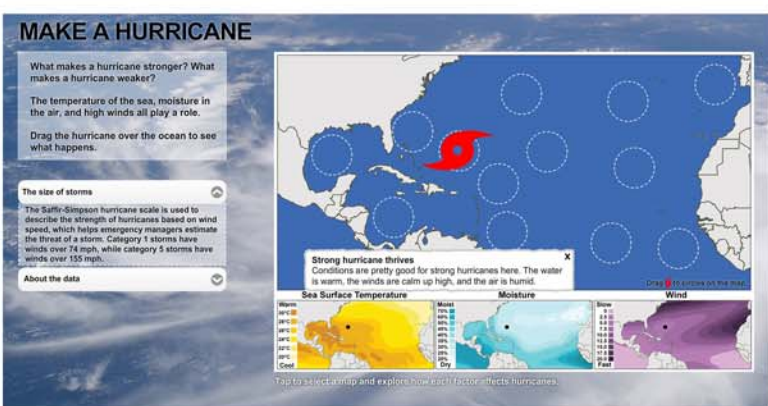
EPA Recycle City



Jason Project: Resilient Planet



Interactives in use on large touchscreen displays in public visitor exhibits in NCAR's Mesa Lab in Boulder



spark.ucar.edu/interactives
spark.ucar.edu/games