

## 4-H Weather and Climate Youth Learning Lab | Materials List

### Activity One

- Basic weather station
  - Purchase at <https://www.enasco.com/p/Upright-Weather-Station%2BSB42175?searchText=weather+station>
- Weather data collection sheets
  - Ten sheets are included with the weather station. We suggest laminating them for durability and reuse.
- Weather report examples (4 per state, total of 16)
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.
- Wet erase markers
- Screen Interface Handout (one per participant)
  - Found on page 11 of the Leader's Guide; download at [https://store.msuetension.org/Products/4-H-Weather-and-Climate-Youth-Learning-Lab-Leaders-Guide-\(Download-Only\)-5351\\_5351.aspx](https://store.msuetension.org/Products/4-H-Weather-and-Climate-Youth-Learning-Lab-Leaders-Guide-(Download-Only)-5351_5351.aspx)
- Markers
- Paper towels and water to clean data sheets
- Optional: device (phone, tablet, computer) with weather apps installed or websites loaded (for example, www.weather.gov, www.weather.com, Accuweather app)

### Activity Two

#### Part I

- Access to Wunderground website (www.wunderground.com); prior to or during activity
- Access to a printer
- Example weather data (one per state, total of four)
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.
- Reusable graph boards
  - Purchase at [https://www.amazon.com/gp/product/B00PEF845Y/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o07\\_s02?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B00PEF845Y/ref=ppx_yo_dt_b_asin_title_o07_s02?ie=UTF8&psc=1)
- Colored dry erase markers
- Erasers

#### Part II

- Season charts (four per participant, one of each season)
  - Found on pages 23-26 of the Leader's Guide; download at [https://store.msuetension.org/Products/4-H-Weather-and-Climate-Youth-Learning-Lab-Leaders-Guide-\(Download-Only\)-5351\\_5351.aspx](https://store.msuetension.org/Products/4-H-Weather-and-Climate-Youth-Learning-Lab-Leaders-Guide-(Download-Only)-5351_5351.aspx)
- Pencils
- Monthly climate data for different cities in MT, CO, WY and SD or any other location
  - Download at <https://www.usclimatedata.com/>
  - We suggest laminating for durability and reuse

## Part III

- *Factors That Can Influence Climate* presentation
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.
- Climographs for different cities in MT, CO, WY, and SD or any other location
  - Download at <https://www.usclimatedata.com/>
  - We suggest laminating for durability and reuse
- Köppen-Geiger Climate Classification maps for MT, CO, WY, and SD
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.
- Wet erase markers
- Infrared thermometers
  - Purchase at [https://www.amazon.com/HOLDPEAK-Non-Contact-Thermometer-Temperature-Instant-read/dp/B019TRGYW2/ref=lp\\_9931459011\\_1\\_14?s=industrial&ie=UTF8&qid=1563481183&sr=1-14](https://www.amazon.com/HOLDPEAK-Non-Contact-Thermometer-Temperature-Instant-read/dp/B019TRGYW2/ref=lp_9931459011_1_14?s=industrial&ie=UTF8&qid=1563481183&sr=1-14)
  - Recommended number of thermometers is three; battery included but may not be connected; see battery replacement instructions at [https://www.youtube.com/watch?v=C\\_tXx8kmzZY](https://www.youtube.com/watch?v=C_tXx8kmzZY)
- Paper
- Pencils

## Activity Three

- *Wild Weather* books (hailstorms, hurricanes, snowstorms, thunderstorms, dust storms, tornadoes)
  - Order at <https://www.enasco.com/p/Wild-Weather-Book-Set%2BBL15173?searchText=wild+weather>
- *Extreme Weather* book
  - Order at [https://www.amazon.com/gp/product/1426318111/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o02\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/1426318111/ref=ppx_yo_dt_b_asin_title_o02_s01?ie=UTF8&psc=1)
- Extreme Event cards
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.
- Extreme Event mats
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.

## Activity Four

- Cloud chart poster
  - Purchase at <https://www.homesciencetools.com/product/cloud-chart-poster/>
- *How Weather Forecasting Works* presentation
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.
- State weather map sets
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.
- Wet erase markers
- Access to a device or computer to find (and print, if desired) current Area Forecast Discussion

- Visit [www.weather.gov](http://www.weather.gov).
- Scroll over the “Forecast” tab and from the drop-down menu select “local.”
- In the “Enter location” box at the top left, enter your city and state or zip code and click “go.”
- When your local forecast page loads, scroll down to the “Additional Forecasts and Information” section. Here, click on the “Forecast Discussion” link.
- Keep this link open or print the first page or two of the discussion.

## Activity Five

### Part I

- Google Earth software or app
  - Download at [www.google.com/earth/versions/](http://www.google.com/earth/versions/)
- Google Maps .kml file (CRUTEM4-2018-06\_gridboxes.kml)
  - Download at <https://crudata.uea.ac.uk/cru/data/crutem/ge/>. Use a more recent .kml file from the same website if available
- Example CO2 data
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.
- Laminated example temperature data for MT, WY, CO and SD
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.
- Wet erase markers

### Part II

- Effervescent tablets (3 tablets) or baking soda
- Clear 2-liter bottles
- Bottle labels
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.
- Stoppers with hole in the center (2)
- Digital probe thermometers (2)
  - Purchase at [https://www.thomasci.com/Instruments/Digital-Thermometers/\\_/THOMAS-TRACEABLE-LONG-STEM-AND-EXTRA-LONG-STEM-DIGITAL-THERMOMETERS?q=9329H01](https://www.thomasci.com/Instruments/Digital-Thermometers/_/THOMAS-TRACEABLE-LONG-STEM-AND-EXTRA-LONG-STEM-DIGITAL-THERMOMETERS?q=9329H01)
- Heat lamp and red 110V/100W lightbulb
  - Purchase lamp at [https://www.amazon.com/gp/product/B01E9IY6US/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o04\\_s00?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B01E9IY6US/ref=ppx_yo_dt_b_asin_title_o04_s00?ie=UTF8&psc=1)
- Timer
- Graphing boards
  - Purchase at [https://www.amazon.com/gp/product/B00PEF845Y/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o07\\_s02?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B00PEF845Y/ref=ppx_yo_dt_b_asin_title_o07_s02?ie=UTF8&psc=1)
- Dry erase markers
- Pencils
- Notebook or paper
- Water

## Activity Six

- Laminated tree cookie images
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.
- Pencils
- Paper

## Activity Seven

### Part I

- 1-liter beakers (2)
  - Purchase at <https://www.homesciencetools.com/product/beaker-polypropylene-1000-ml/>
- Food coloring
- Golf balls (2)
  - Must be good quality for experiment to work. Can be purchased at [https://www.amazon.com/gp/product/B01MUEUWSS/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o07\\_s02?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B01MUEUWSS/ref=ppx_yo_dt_b_asin_title_o07_s02?ie=UTF8&psc=1)
- Spoon
- Water
- 2/3 cup non-iodized salt

### Part II

- Notebooks or paper
- Light meter
  - Purchase at [https://www.amazon.com/gp/product/B075DC6X25/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o07\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B075DC6X25/ref=ppx_yo_dt_b_asin_title_o07_s01?ie=UTF8&psc=1)
- Infrared thermometer
  - Purchase at [https://www.amazon.com/HOLDPEAK-Non-Contact-Thermometer-Temperature-Instant-read/dp/B019TRGYW2/ref=lp\\_9931459011\\_1\\_14?s=industrial&ie=UTF8&qid=1563481183&sr=1-14](https://www.amazon.com/HOLDPEAK-Non-Contact-Thermometer-Temperature-Instant-read/dp/B019TRGYW2/ref=lp_9931459011_1_14?s=industrial&ie=UTF8&qid=1563481183&sr=1-14)
  - Recommended number of thermometers is three; battery included but may not be connected; see battery replacement instructions at [https://www.youtube.com/watch?v=C\\_tXx8kmzZY](https://www.youtube.com/watch?v=C_tXx8kmzZY)
- If conducting activity indoors: squares of white and black poster board
- If conducting activity outdoors: snow-covered and adjacent cleared (soil or pavement) surfaces
- Optional: squares of reflective and non-reflective surfaces (for example, aluminum foil, dark cloth or carpet, etc.)

### Part III

- Notebooks or paper
- Online access to <https://scied.ucar.edu/simple-climate-model>. (The leader should test this link.)
- Instructions for *Very, Very Simple Climate Model*
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.

- Example climate model graphs (3)
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.

## Activity Eight

- 60 (or more) identical paper tickets or equivalent small item.
- Timer
- Notebook or paper

## Activity Nine

### Part I

- Access to online carbon footprint calculators, such as U.S. EPA Carbon Footprint
  - Calculator found at <https://www3.epa.gov/carbon-footprint-calculator/>
- Copy of carbon footprint report
  - We suggest you run a sample report ahead of time and laminate it for durability and reuse
- Copy of *How Can I Reduce My "Carbon Footprint"?* from NASA Kids
  - Download from [http://msucommunitydevelopment.org/4hweatherandclimate\\_resources.html](http://msucommunitydevelopment.org/4hweatherandclimate_resources.html)
  - We suggest laminating for durability and reuse.

### Part II and Part III

- Notebook or paper

## Other

- *What is Climate Change*
  - Purchase at [https://www.amazon.com/gp/product/1524786152/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o01\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/1524786152/ref=ppx_yo_dt_b_asin_title_o01_s01?ie=UTF8&psc=1)
- *The Problem of the Hot World*
  - Purchase at [https://www.amazon.com/gp/product/1514648547/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o07\\_s00?ie=UTF8&psc=1](https://www.amazon.com/gp/product/1514648547/ref=ppx_yo_dt_b_asin_title_o07_s00?ie=UTF8&psc=1)
- *How We Know What We Know About Our Changing Climate: Scientists and Kids Explore Global Warming*
  - Purchase at [https://www.amazon.com/Know-What-About-Changing-Climate/dp/1584691034/ref=sr\\_1\\_1?crid=3B5SBF4RBNH18&keywords=how+we+know+what+we+know+about+our+changing+climate&qid=1563384347&s=books&sprefix=How+we+know+what+%2Cstripbooks%2C232&sr=1-1](https://www.amazon.com/Know-What-About-Changing-Climate/dp/1584691034/ref=sr_1_1?crid=3B5SBF4RBNH18&keywords=how+we+know+what+we+know+about+our+changing+climate&qid=1563384347&s=books&sprefix=How+we+know+what+%2Cstripbooks%2C232&sr=1-1)