



# ST[EMpower]



SCIENCE, TECHNOLOGY,  
ENGINEERING, AND MATH  
COLORADO STATE UNIVERSITY  
EXTENSION

## WEATHER—LET IT SNOW! Weather Is A-Changing!

### Aligning Standards

#### 2020 Colorado Academic Science Standards

These lessons were not written to specifically meet the new 2020 standards, but to delve deeply into a specific topic. Standards are an attempt to guide teachers into presenting broadcast approach to science. As a scientist, I endeavor to instead provide a profound experience by delving into a topic. Standards are met, to be sure. To best approach this, you will need to use the standards as the guide on what to emphasize in your instruction.

For example, one of the Middle School standards is:

#### GR.MS-S.1-GLE.6

#### S.1 Physical Science

Energy changes to and from each type can be tracked through physical or chemical interactions. The relationship between the temperature and the total energy of a system depends on the types, states and amounts of matter.

As you present these lessons, focus the concepts of energy transfer with weather being the example. The information in the lesson does deal with energy, but it is not specifically stated as such. If you have any questions about best approaches, please contact me (my contact information in in the yellow sidebar).

The lessons are generally written for upper elementary and middle school age youth. If you are teaching younger students, please let me know if I can help you adapt them for your students' age and intellectual development. If I indicated it meets a standards, I have taught those concepts at that grade level.

The current series will explore weather and climate.

- This issue is the first in the series to explore weather instruments, how they work, and basic weather prediction
- The December issue will explore the sun as the driving force for all weather and climate on the planet
- The January issue will explore climate change both now and in Earth's history

As always, each issue will be driven by experiential learning method, activity based, engaging, fun and good science!

## Contact Information

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An elementary teacher has about 110 standards to meet each school year. It requires between 12 and 15 times for cognizant acquisition of new information. So, in order to present all the standards for your students, you must present a new standard every 43 minutes. But, that does not account for recess, lunch, socialization, turning in papers, and testing. Accounting for those needs, it means you have less than 21 minutes to present a new standard. The only way to meet this demand is to teach holistically. These lessons are developed to engage multiple standards.

# Supplemental Information

Grades	Kindergarten		Second	
SC20 - Activity	GR.K-S.3-GLE.1	GR.K-S.3-GLE.2	GR.2-S.1-GLE.1	GR.2-S.3-GLE.1
Science Discipline	S.3 Earth Space	S.3 Earth Space	S.1 Physical Science	S.3 Earth Space
Grade Level Expectations	Patterns are observed when measuring the local weather, including how humans and other organisms impact their environment.	Plants and animals meet their needs in their habitats and impact one another; people can prepare for severe weather.	Matter exists as different substances that have observable different properties.	Some events on Earth occur quickly; others can occur very slowly.
Cloud Formation - 3 Demos				
Hot/Cold Fluids				
Clouds - Temperature				
Clouds - Pressure change				
Cloud Mobile				
Cloud Wheel				
Weather Instruments				
Barometer				
Thermometer				
Amenometer / Wind Vane				
Rain Gauge				
Sling Psychrometer				
Forecasting				
Citizen Science CoCoRaHS				
Education and Careers				

# Supplemental Information

Grades	Third	GR.3-S.3-GLE.1	GR.3-S.3-GLE.2	Fourth
SC20 - Activity	GR.3-S.1-GLE.1	GR.3-S.3-GLE.1	GR.3-S.3-GLE.2	GR.4-S.1-GLE.1
Science Discipline	S.1 Physical Science	S.3 Earth Space Science	S.3 Earth Space Science	S.1 Physical Science
Grade Level Expectations	Patterns of motion can be used to predict future motion.	Climate describes patterns of typical weather conditions over different scales and variations; historical weather patterns can be analyzed.	A variety of weather hazards result from natural process; humans cannot eliminate weather -related hazards but can reduce their impacts.	The faster an object moves the more energy it has.
Cloud Formation - 3 Demos				
Hot/Cold Fluids				
Clouds - Temperature change				
Clouds - Pressure change				
Cloud Mobile				
Cloud Wheel				
Weather Instruments				
Barometer				
Thermometer				
Amenometer / Wind Vane				
Rain Gauge				
Sling Psychrometer				
Forecasting				
Citizen Science CoCoRaHS				
Education and Careers				

# Supplemental Information

Grades	Fourth	GR.4-S.1-GLE.3	GR.4-S.3-GLE.2	GR.4-S.3-GLE.5
SC20 - Activity	GR.4-S.1-GLE.2	GR.4-S.1-GLE.3	GR.4-S.3-GLE.2	GR.4-S.3-GLE.5
Science Discipline	S.1 Physical Science	S.1 Physical Science	S.3 Earth Space Science	S.3 Earth Space Science
Grade Level Expectations	Energy can be moved from place to place.	When objects collide contact forces transfer so as to change objects' motion.	Four major earth systems interact.	A variety of hazards result from natural process; humans cannot eliminate natural hazards but can reduce their impacts' effect.
Cloud Formation - 3 Demos				
Hot/Cold Fluids				
Clouds - Temperature change				
Clouds - Pressure change				
Cloud Mobile				
Cloud Wheel				
Weather Instruments				
Barometer				
Thermometer				
Amenometer / Wind Vane				
Rain Gauge				
Sling Psychrometer				
Forecasting				
Citizen Science CoCoRaHS				
Education and Careers				

# Supplemental Information

Grades	Fifth	Middle School	
SC20 - Activity	GR.5-S.1-GLE.1	GR.MS-S.1-GLE.1	GR.MS-S.1-GLE.6
Science Discipline	S.1 Physical Science	S.1 Physical Science	S.1 Physical Science
Grade Level Expectations	Matter exists as particles that are too small to be seen; measurements of a variety of observable properties can be used to identify particular materials.	The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter and phases changes.	Energy changes to and from each type can be tracked through physical or chemical interactions. The relationship between the temperature and the total energy of a system depends on the types, states and amounts of matter.
Cloud Formation - 3 Demos			
Hot/Cold Fluids			
Clouds - Temperature			
Clouds - Pressure change			
Cloud Mobile			
Cloud Wheel			
Weather Instruments			
Barometer			
Thermometer			
Amenometer / Wind Vane			
Rain Gauge			
Sling Psychrometer			
Forecasting			
Citizen Science CoCoRaHS			
Education and Careers			

When two objects interact, each one exerts a force on the other that can cause energy to be transferred to and from the object.

Energy changes to and from each type can be tracked through physical or chemical interactions. The relationship between the temperature and the total energy of a system depends on the types, states and amounts of matter.

The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter and phases changes.

# Supplemental Information

Grades	Middle School	GR.MS-S.3-GLE.4	GR.MS-S.3-GLE.6	GR.MS-S.3-GLE.7
SC20 - Activity	GR.MS-S.3-GLE.4	GR.MS-S.3-GLE.6	GR.MS-S.3-GLE.6	GR.MS-S.3-GLE.7
Science Discipline	S.3 Earth Space Science	S.3 Earth Space Science	S.3 Earth Space Science	S.3 Earth Space Science
Grade Level Expectations	Energy flows and matter cycles within and among Earth's systems, including the sun and Earth's interior as primary energy sources. Plate tectonics is one result of these processes.	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	Complex interactions determine local weather patterns and influence climate, including the role of the ocean.
Cloud Formation - 3 Demos				
Hot/Cold Fluids				
Clouds - Temperature change				
Clouds - Pressure change				
Cloud Mobile				
Cloud Wheel				
Weather Instruments				
Barometer				
Thermometer				
Amenometer / Wind Vane				
Rain Gauge				
Sling Psychrometer				
Forecasting				
Citizen Science CoCoRaHS				
Education and Careers				

High School Teachers: If you are interested, I am happy to consult with you as you develop dynamic, science courses for your classroom!