



Quarrybrook

EXPERIENTIAL EDUCATION CENTER

Program Title: **Predicting the Weather**

Audience: 6th-8th grade students

Program Theme: Weather is something that we are all familiar with, and which greatly affects our day-to-day lives. Often, “checking the weather” on the news is the first or last thing we do in our day. Students will learn how to use basic weather instruments to make their own weather predictions.

Program Goals: Students will learn how to correctly use a variety of weather instruments. Students will conduct experiments to better understand weather phenomena. Students will collect data to answer questions relating to the weather. Students will make weather predictions based on their data.

Next Generation/Common Core Connections:

Topic: MS-ESS2 Earth’s Systems

Dimensions: Planning and Carrying Out Investigations

Program Outline:

Activity 1: WEATHER STATION EXPLORATION (15 min.) – Students will investigate weather instruments such as wet- and dry-bulb thermometers, rain gauges, wind direction vanes, anemometers, and barometers.



Teachers are always welcome to make any classroom-connecting comments that contribute to student understanding.

Objective: Students will be introduced to a variety of weather instruments and how they work.

Intended Outcome: Students will be able to use the weather instruments later in the field class.

Activity 2: THE WEIGHT ON OUR SHOULDERS (15 min.) – Students will conduct an experiment to show that air has weight, helping us understand much of how weather changes.



Teachers and other adults will be helpful in keeping students focused and on task.

Objectives: Students will conduct an experiment with air. Students will discuss what the outcome shows us about how weather changes.

Intended Outcomes: Students will have observed that air has weight. Students will be able to answer questions as a group regarding how high or low pressure affects weather.

Activity 3: MOLECULE MOTION DEMO (15 min.) – This role-playing activity will give students the chance to model what it is like to be an air molecule, during different atmospheric conditions. The information modeled will help us understand changes in weather.



Teachers and other adults can join in to help keep students engaged in the activity.

Objectives: Students will model how air molecules react to different temperatures. Students will learn that temperature and pressure are directly proportional.

Intended Outcomes: Students will have modeled air pressure changes due to changing temperatures. Students will be able to explain the direct relationship between temperature and air pressure.

Activity 4: HOW ARE CLOUDS FORMED? (30 min.) – Students will test what conditions are needed to form a cloud.



Teachers and other adults will be helpful in keeping students focused and on task while working within their small groups.

Objective: Students will perform an experiment to observe and learn how clouds form.

Intended Outcome: Students will have completed an experiment showing that cloud formation requires particles in the atmosphere when the pressure drops and temperatures cool.

Activity 5: CLOUD IDENTIFICATION (15 min.) – Using a field guide, students will learn how to identify common cloud formations and what they can tell us about the weather.



Teachers and other adults can assist in identifying the clouds, and keeping students on task.

Objectives: Students will learn how to identify basic cloud patterns. Students will learn how to use their cloud formation observations to make weather predictions. Students will understand how atmospheric conditions impact cloud formation.

Intended Outcomes: Students will be able to identify the current clouds using a field guide. Students will be able to describe how clouds can form in different ways.

Activity 6: WEATHER PREDICTION (30-45 min.) – Our final step will be to use all of the previous information to make a weather prediction. Students will use the equipment and their scientific knowledge to develop a prediction for the following day's weather. Then students will compare their prediction to a reputable source's own weather prediction.



Teachers and other adults will be helpful in working with small groups to ensure that equipment is being cared for and used correctly, and by assisting with student questions.

Objective: Students will use weather instruments to make a weather prediction for the current day and the following day.

Intended Outcome: In small groups, students will have made a weather prediction using instruments, math, and observations.

Conclusion/Wrap-up: We'll discuss the importance of weather predictions and what limitations they have. We'll think about why it is important for Quarrybrook to have accurate weather predictions, with students learning outside every day!

Successful completion of this program will help support your students' proficiency in NGSS

Performance Expectations:

MS-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.

MS-ESS2.D: Weather and Climate

Because these patterns are so complex, weather can only be predicted probabilistically.

Science and Engineering Practice: Planning and Carrying Out Investigations

Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions.

CCSS.MATH.CONTENT.7.Ratios & Proportional Relationships

Analyze proportional relationships and use them to solve real-world and mathematical problems.