

# Phoenixville Area School District Understanding by Design (UbD) Science

**Grade Level: Grade 1**

**Unit Name: Air and Weather**

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Stage 1 Desired Results		
<p><b>Overarching NGSS &amp; PA Standards:</b></p> <p><b>3.3.1.A</b> Use observations of the sun, moon, and stars to describe patterns that can be predicted.</p> <p><b>3.3.1.B</b> Make observations at different times of year to relate the amount of daylight to the time of year.</p>	<b>Transfer</b>	
	<p><i>Students will be able to independently use their learning to...</i></p> <ol style="list-style-type: none"> <li>1. <i>Ask questions and/or define problems</i></li> <li>2. <i>Develop and/or use models</i></li> <li>3. <i>Plan and/or carry out investigations</i></li> <li>4. <i>Analyze and interpret data using computational thinking</i></li> <li>5. <i>Obtain, evaluate, and communicate information (supported by evidence)</i></li> <li>6. <i>Construct explanations and design solutions</i></li> </ol>	
<p><b>STEM</b></p> <p><i>K-2 ETS1-1</i> <i>K-2 ETS1-2</i> <i>K-2 ETS1-3</i></p> <p><b>REVISIT</b></p>	<b>Meaning-Making</b>	
	<p><i>Students will understand that...</i></p> <ol style="list-style-type: none"> <li>1. <i>Air is matter and matter can push objects around.</i></li> <li>2. <i>They can observe phenomena in the sky, i.e., weather and clouds, the sun, and the moon to identify its characteristics</i></li> <li>3. <i>Phenomenon that they observe over time – i.e., moon phases, the amount of daylight, weather conditions, etc. can be used to predict patterns.</i></li> </ol>	<p><b>ESSENTIAL QUESTIONS</b> <i>Students will keep considering...</i></p> <ol style="list-style-type: none"> <li>1. <i>Where is air and what can it do? (Investigation 1)</i></li> <li>2. <i>When you look up at the sky, what do you see and how does it change? (Investigation 2)</i></li> <li>3. <i>How do we observe and describe the wind? (Investigation 3)</i></li> <li>4. <i>How do daylight and weather change through the seasons? (Investigation 4)</i></li> </ol>
<b>Knowledge and Skills Acquisition</b>		
<p><b>UNDERSTANDINGS</b></p> <p><i>Students will be able to...</i></p> <ol style="list-style-type: none"> <li>1. <i>Observe, describe, and predict patterns of the motion of the sun, moon, and stars in the sky.</i></li> <li>2. <i>Observe, describe, and predict seasonal patterns of sunrise and sunset.</i></li> <li>3. <i>Describe where air is and what it can do.</i></li> <li>4. <i>Observe and describe the wind.</i></li> </ol>	<p><i>Students will be skilled at...</i></p> <ol style="list-style-type: none"> <li>1. <i>Organize and interpret data as well as identify relationships of the sun, moon, and stars.</i></li> <li>2. <i>Plan and carry out investigations to answer</i></li> </ol>	

<p>K-ESS2-1 K-ESS3-3</p> <p><i>INTRODUCE</i></p> <p>2-PS1-1</p> <p>Which branch(es) of science apply:</p> <p><b>E&amp;SS</b></p>	<p style="text-align: center;">KEY VOCABULARY</p> <p>Investigation 1: <b>air, air resistance, compress</b>, distance, <b>engineer, gas, matter</b>, move, <b>pressure</b>, push, rocket, submerge, system, <b>wind</b></p> <p>Investigation 2: change, cirrus, <b>cloud</b>, cold, cool, cumulus, day, Celsius, Fahrenheit, describe, hot, measure, <b>meteorologist</b>, moon, night, overcast, partly cloudy, <b>pattern</b>, rain gauge, rainy, record, snowy, star, stratus, sun, sunny, sunrise, sunset, symbol, <b>temperature, thermometer</b>, warm, water vapor, <b>weather</b>, weather conditions, <b>weather instrument</b></p> <p>Investigation 3: <b>anemometer</b>, calm, <b>direction</b>, north, south, strong breeze, west, wind speed, wind vane</p> <p>Investigation 4: fall, graph, hibernate, migrate, <b>season</b>, spring, summer, winter</p>	<p><i>questions or test solutions about sunrise and sunset.</i></p> <p>3. <i>Plan and carry out investigations that involve air (parachutes and balloon rockets) and wind (bubbles, wind vanes, and kites).</i></p>
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**Stage 2 – Evidence**

**Assessment Evidence**

<p>What criteria will be used in each assessment to evaluate attainment of the desired results?.</p> <p>Teacher observations notes and rubrics</p>	<p style="text-align: center;">PERFORMANCE TASK(S):</p> <p>I. Design, construct, test, and modify a model to create wind that is strong enough to knock over a whiteboard marker standing on one of its ends using various materials including, but not limited to: paper, craft sticks, tape, empty plastic water bottles, paper clips, pencils, rulers, pencil boxes, etc.</p> <ol style="list-style-type: none"> <li>a. Draw a design of first model prototype</li> <li>b. Build model</li> <li>c. Test model</li> <li>d. Make changes</li> <li>e. Retest, repeat as necessary</li> <li>f. Tell which of the given materials were useful in creating wind, and which were not</li> </ol> <p>II. Define problems that can exist in places that get small amounts of sunlight per day. Once a problem is defined, students will write a letter to the mayor of the town to help solve the problem. (ex: the plants in the gardens do not have enough sunlight to grow and we do not have fresh vegetables... we will build greenhouses in the town to increase growth)</p> <ol style="list-style-type: none"> <li>a. Define problem</li> <li>b. Create solution</li> <li>c. Analyze and interpret given data</li> <li>d. Communicate information showing evidence through illustration on poster (Assesses 1-ESS1-1).</li> </ol> <p>III. Investigations</p> <ol style="list-style-type: none"> <li>1. <b>Task(s):</b> Students explore the phenomenon that air is matter and it can push objects around. Using tools students explore more aspects of air,</li> </ol>	<p>For labs, consider that some students may wish to:</p> <ul style="list-style-type: none"> <li>• explain verbally instead of in a written format</li> <li>• draw their responses</li> <li>• write in their first language</li> </ul> <p>If challenges arise with the complexity of the task(s), some students may need:</p> <ul style="list-style-type: none"> <li>• more incremental steps</li> <li>• an alternative activity</li> </ul> <p>Other considerations:</p> <ul style="list-style-type: none"> <li>• When grouping students consider matching different skills sets</li> <li>• When asking students to describe a model, give them</li> </ul>
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discovering that it takes up space and can be compressed, and that compressed air builds up pressure (that can push objects around). They also construct and compare other objects that use air for movement (i.e., parachutes, etc.)

**Product:** Investigation 1, Part 2 – Parachute fish cracker challenge – design a parachute with given materials to land a cup (carrying 8 fish crackers) gently enough to not spill.

**Assessment:** Investigation 1 I-Check

2. **Task(s):** Students observe phenomena in the sky—weather, clouds, the Sun, and the Moon, etc., in order to record how they change over time. Students also measure air temperature at different times of day. They learn about sunrise and sunset, and they learn how to record the number of daylight hours each day. They observe the movement of clouds in the sky. They find the Moon and begin to record its shape each day for a month. These exercises are all meant for them to appreciate the patterns in nature.

**Product:** Investigation 2, Part 2 – Students will demonstrate that they can read a thermometer and record temperature accurately, as well as locate and record the position of the sun in the sky.

**Assessment:** Investigation 2 I-Check

3. **Task(s):** Students investigate the phenomenon of air in motion. They observe and describe wind speed using anemometers, and a wind scale. They construct wind vanes to find the wind's direction. Students' objects like bubbles, kites, etc., to observe and feel the strength of the wind and the direction it is moving.

**Product:** Investigation 3, Part 1 – Students will show air movement with bubbles, as well as explain the relationship between air movement and bubbles.

Investigation 3, Part 3 – Using a teacher led interview, students will describe what the movement of their pinwheel can tell about wind.

**Assessment:** Investigation 3 I-Check

4. **Task(s):** Students look for patterns in phenomena they observe over time—Moon phase, amount of daylight, and weather conditions. Students organize monthly weather data, using graphs to describe weather trends. They continue to monitor weather throughout the year, comparing the seasons and looking for weather patterns. Students use the observations they have recorded on the calendar to look for monthly patterns of the Moon and annual patterns of daylight hours.

**Product:** Investigation 4, Part 1 – Using data gathered throughout lessons, students will create a bar graph to show data. They will interpret the data to describe weather patterns and observations.

**Assessment:** Investigation 4 I-Check

the opportunity to draw or write it, as well.

- Teacher can scribe written responses for students

<p>Rubrics</p>	<p style="text-align: center;">OTHER EVIDENCE:</p> <ul style="list-style-type: none"> <li>• Checklists of collaborative behaviors in labs and activities</li> <li>• Checklists of collaborative behaviors in class discussions</li> <li>• Journal entries</li> </ul>	<p>Differentiation Considerations:</p> <p>For journal entries, consider that some students may wish to:</p> <ul style="list-style-type: none"> <li>• draw instead of write entries</li> <li>• write in their first language</li> <li>• explain verbally</li> </ul> <p>If challenges arise with the complexity of the task(s), some students may need:</p> <ul style="list-style-type: none"> <li>• more incremental steps</li> <li>• an alternative activity</li> </ul>