## Title: Hazardous Weather and Disaster Preparedness and Prevention

**Grade Level:** 7th  
**Subject:** Science  
**Course:** Weather Goal 3  
**Duration:** Semester  
**Author:** Cassandra Flemming

<table>
<thead>
<tr>
<th><strong>Stage 1</strong></th>
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<tbody>
<tr>
<td><strong>Big idea and desired outcome</strong></td>
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</table>
| • Students will know what natural disasters are, how they occur, and the impact of hazardous weather on a community  
• Students will gain an understanding of the role the American Red Cross and technology plays during times of crisis  
• Students will know how to have a role that encompasses personal responsibility during natural disasters  
|  
| **Essential Questions** (1-2, complex, provocative, ambiguous) |  
| • Where does our weather come from?  
• Explain the formation pattern of weather fronts and air masses?  
|  
| • What types of severe weather affect our community and how are they predicted?  
• What type of disaster plan would we need for hazardous weather?  
|  
| • Predict the effects service learning could have on our community?  
• Explain the history and purpose of the American Red Cross?  
|  
| • What type a service learning project can be completed with the American Red Cross?  
• What did you learn and how they can assist our community after hazardous weather?  
|  
| **Knowledge and Skills** |  
| • Students will need to be able to Identify the major types of Air Masses that control the weather patterns in the United States  
• Students must be able to name the various weather fronts and know the associated weather conditions  
• Students should be able to identify why and how air masses move  

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Service-Learning Unit Plan

- Students need to be able to sequence the formation process for various types of storms
- Students should be able to select which storm affects them on a local level
- Students must be able to explain how hazardous weather is predicted by meteorologist and how they inform the public
- Students are required to format a plan and prepare for disasters

- Students should be able to define, explain, and give the eight factors for service learning
- Students should know the impact that service learning could have on our community and themselves
- Students need to be able to summarize the history of the American Red Cross and list some of its major contributions to communities-locally and internationally

<table>
<thead>
<tr>
<th>NCSCOS Goals/Objectives</th>
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<tbody>
<tr>
<td>7th Grade science Goal 3: The learner will conduct investigations and utilize appropriate technologies and information systems to build an understanding of the atmosphere.</td>
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</table>

**Objective 3.05**

Examine evidence that atmospheric properties can be studied to predict atmospheric conditions and weather hazards:

- Tornados
- Hurricanes
- Floods
- Storms

**Objective 3.06**

Assess the use of technology in studying atmospheric phenomena and weather hazards:

- Satellites
- Weather maps
- Predicting
- Recording
- Communicating information about conditions
There will be opportunities throughout the unit to incorporate the NCSCOS from other curriculum areas such as math, social studies and language arts.

### Stage 2

- Students need to create a table that explains the formation of weather fronts and describes the weather associated with each and the corresponding air mass that also affects each geographic location.
- Students will create flow charts that will dissect the formation process for storms, hurricanes, and tornados. They will also need to create a Venn diagram that compares and contrasts hurricanes and tornados.
- Students will form and complete a poll and survey of parents at the 1st quarter PTA and report card pick up that will provide students with the community’s understanding and preparedness for disasters and hazardous weather. They will perform a similar poll and survey at the end of the unit or year to assess how much information the community learned and retained about disaster prevention and preparedness.
- Students will create a PSA that will cover how to prepare for storms and what to do when severe weather strikes. In addition to the PSA they will need to create brief skits that review weather fronts and how they create storm and severe weather. This will be the students’ weather station reports. Once safety preparedness has been mastered then that aspect can also be added to the skit.
- Students must create a disaster and crisis prevention pamphlet. This will be a tri-fold brochure that will describe one type of severe weather, how to prepare for it-if possible, and what people should do if they are impacted by hazardous weather conditions and where they can go for help.
- With whatever materials they have available in the home, students will develop a first aid kit and a disaster preparedness kit. Students will need to take home the class disposable camera to take a picture of their kit or bring them into class.
- Students need to perform a brief research assignment where they will gather information on the effects severe weather has had on Guilford County. It will need to cover damage, financial issues, and the clean up process.
- Students need to complete the American Red Cross Volunteer Online Orientation Assessment. It will gauge their readiness and capabilities of being able to volunteer with the ARC.
Service-Learning Unit Plan

| Rubrics | Will vary depending on the individual lesson plan. |

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<tr>
<th>Stage 3</th>
<th>Academic Instructional Procedures and Activities</th>
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<tr>
<td>Pre-service Academic Learning Activities</td>
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<tr>
<td>Investigation</td>
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<tr>
<td>Planning and Preparation</td>
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</table>

- Students will create a free write essay that requires them to reflect on a time in which they have been involved in severe weather and what would have happened in the aftermath of the storm if the worst possible scenario occurred. Elaborate on ways in which the ARC could have assisted them or those around them.
- When the unit is complete students will need to turn in their volunteer log that will document the work they completed and the impact it had on themselves and the community. They will also need to turn in their ABC reflection guide that should be worked on throughout the unit.

- Students will describe the location and movements of Air Masses and Fronts². This will provide students with the background knowledge of where severe weather begins. Students will be engaged in diverse lessons that should help them ascertain the formation of weather patterns and fronts. This lesson will contain a lab, teacher demonstration, compare and contrast charts, and from reflective thinking and guided reading practices.
- Students will understand the difference between service learning, community service, and volunteering. It is critical that students have an idea of what service learning is and how it can not only impact their lives but our community.
- Students will now gain knowledge of storms and other various types of severe weather. They will also learn about which types of storms can harm and destroy our community. This will allow them to research how hazardous weather has affected us locally and how could service learning projects aided those in need after severe weather.
- Students will become familiarized with the history

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<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Description</th>
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<tr>
<td>Service Learning</td>
<td>Students will learn about the history and purpose of the American Red Cross. This will be completed per class. They will learn how they themselves can assist the American Red Cross in helping people recover and cope with disasters on a local and international level. They will start with a “Heroes” fundraising campaign so they can learn the importance of helping the grassroots efforts of the ARC, but they will then see where their money goes into the foundation and how it used to help others, especially those in the local community. Students will then break off into groups and select an area of the ARC that interest them and where they would like to volunteer. As they complete different acts to aid those in need they will have to reflect on their deeds of good citizenship.</td>
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<tr>
<td>Service Activities</td>
<td>All students will become volunteers for the American Red Cross for the duration of the school year and/or unit to gain real life experiences in aiding others during disasters and how to become personally responsible for those in their community before hazardous weather by teaching them how to prepare for disasters.</td>
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<tr>
<td>Closing/Demonstration</td>
<td>Students will need to show what disaster preparation and preparedness is and what being an official American Red Cross Volunteer means to them. This will be done by making presentations at PTA meetings, report card pick-ups, health and safety fair and during visits with students from lower grades. They will also turn in a log that will document each individual task and accomplishment they completed during the duration of the unit.</td>
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<tr>
<td>Reflection Activities</td>
<td>At the end of the unit students will complete an ABC reflection that will review how they impacted others, what they learned, and other ways in which they can aid our community with disaster preparedness and prevention. They will also note how they would change this experience for future students.</td>
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<tr>
<td>Materials Needed</td>
<td>View each lesson plan</td>
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</table>
| Resources Available      | 1. Prentice Hall Science Explorer North Carolina Grade 7  
2. GEMS 7th Grade Science Objective 3.05 Air Masses/Storms |
Lesson One Service Learning Unit: Hazardous Weather and Disaster Preparedness and Prevention

Title: What Controls our Weather?

Subject: 7th Grade Science

NCSCOS Objectives: 7th Grade Science Goal 3: The learner will conduct investigations and utilize appropriate technologies and information systems to build an understanding of the atmosphere. Objective 3.05-Examine evidence that atmospheric properties can be studied to predict atmospheric conditions and weather hazards:

- Tornados
- Hurricanes
- Floods
- Storms

Duration: 2, 90min. class blocks

Essential Questions: Where does our weather come from?
Explain the formation pattern of weather fronts and air masses and how they affect weather in the United States?
Identify how and why air masses move.
List the various weather fronts and their associated weather conditions.

Essential Vocabulary:

<table>
<thead>
<tr>
<th>air mass</th>
<th>continental air mass</th>
<th>maritime air mass</th>
<th>Front</th>
<th>Cyclone</th>
</tr>
</thead>
<tbody>
<tr>
<td>tropical air mass</td>
<td>continental polar air mass</td>
<td>maritime polar air mass</td>
<td>cold front</td>
<td>Anticyclone</td>
</tr>
<tr>
<td>polar air mass</td>
<td>continental tropical air mass</td>
<td>maritime tropical air mass</td>
<td>warm front</td>
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<td></td>
<td></td>
<td></td>
<td>stationary front</td>
<td>Troposphere</td>
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<td>occluded front</td>
<td>Front</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>cold front</td>
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Engage:

1. The lesson will begin with students watching a brief weather report on the local or national news channel.
   a. It can be any station that the teacher chooses. Itinerate with students that this questionnaire will not be marked right or wrong and for them to really write down
their honest opinions about what they see on the map. This is an APK that will provide teachers with a baseline for what students know about weather, weather systems, and severe weather warnings.

b. Ask the students to write down what they view on the weather map:
   i. Do they know what a weather system is?
   ii. Do they see any weather systems moving in?
   iii. Are there any warnings or severe weather that we need to worry about in North Carolina or nationally?
   iv. What do they think the L and H stand for on the map?
   v. How are rains, storms, or heat identified?
   vi. What do the red and blue lines mean that move across the map?
   vii. Do you see any other symbols on the map? Do you know what any of them mean?

c. Once the assessment is complete have students to talk about their responses with one another in co-operative pairs or groups. The teacher will need to facilitate the discussions to make sure students are on task. If the classroom is in groups it would be helpful if the groups were scaffold to have learners with different abilities in each group. This will also allow each and every student to be engaged and actively participating in the discussions.

d. The teacher will need to close the discussion and answer the questions about the map and any questions the students might have about what was represented on it.

e. This is a lab from North Carolina Prentice Hall Science Explorer Grade 7 that students can perform:
   **How Do Fluids of Different Densities Behave?** (North Carolina Grade 7 Prentice Hall Science Explorer page 130)

f. This is a lab from GEMS students can perform:

**Air masses**

**Part 1**
1. Fill one cup two thirds full of water.
2. Slowly pour a small amount of oil into one of the cups.
3. Record your observations with words and/or pictures.

**Part 2**
1. Fill the other clear cup two thirds full of water. Pour some oil into the pan and tilt the pan slightly so that the oil runs vertically down to the base of the pan.
2. Pour a small amount of water from the second cup onto the elevated side of the pan.
3. Record your observations with words and/or pictures.

**Conclusion:** How do both cups display what happens when air masses of different temperatures collide?

**Note:** Amounts of oil and water depends on the size of the cup you use. Aluminum pans can be used as a shallow pan.
Explore:

1. The teacher can model Front Formation on page 135 of the North Carolina Grade 7 Prentice Hall Science Explorer textbook. It will give students a visual of how air masses and fronts combine. Students can then draw what they see and interpret the impact this type of weather pattern would have on our local weather.
2. Students can create their own weather map and write a weather report. Students can report their map forecast to other students or the class. They can exchange their maps and have students predict a weather forecast based on others' maps. Then check to see if their forecast is similar to the answer from the student that created the map. This assignment will coincide with “The Weather Tomorrow” project.
3. Students can also collect various weather maps over a period of one week and use their observations and graphing skills to analyze the changes in weather for that week.
   a. The website is listed above where a teacher can go and print of the maps before class time if a computer lab is not readily available during the class period.
   b. Have students to go on the site or the teacher, click on the area that says weather maps. It will then give a present map and maps for the predicted movement.
   c. Have students analyze the maps by answering some of the same questions they were asked during the APK.
4. Students will use all of the combined information and maps from above to produce their own weather station for “The Weather Tomorrow” project.

Explain: The teacher will then explain to students the various types of air masses and fronts. This will also be the time to address the essential questions and vocabulary to ascertain student comprehension. As each term is presented to students have them reflect on the weather/climate of a particular region in the United States or the weather as it changes locally when we are affected by that weather pattern. The information in this section is from NCDPI and GEMS.

1. **Weather fronts** are air masses of different types that collide with each other. The boundaries where the air masses collide may be relatively narrow (10s of km) or rather wide (100s of km). Based on which air mass is moving / not moving determines the specific type of front. Each frontal type has particular characteristics that can be experienced on the ground and represented on a weather map. A couple of definitions will also help with the explanation of the weather map (Engage).

2. **High Pressure** – region of the greatest atmospheric pressure. Winds around a high-pressure system circulate in a clockwise rotation termed “anti-cyclonic.” Represented by “H” on a weather map. They are usually associated with dry and clear weather.
3. **Low Pressure** – region of the lowest atmospheric pressure. Winds around a low-pressure system circulate in a counter-clockwise motion termed “cyclonic.” To help students remember “cyclonic,” remind them that low pressure systems can be associated with large/violent storms and the term “cyclone” is used for both tornadoes and hurricanes (Pacific), both of which rotate in the counter-clockwise direction. Represented by “L” on a weather map.

4. **Maritime Tropical**—Warm, humid air masses that form over tropical oceans. Maritime tropical air masses that form over the Gulf of Mexico and the Atlantic Ocean move first into the southeastern United States. These air masses then move north and northeast, where they influence weather in the central and eastern United States. In the west, maritime tropical air masses form over the Pacific Ocean. They mainly affect the weather on the West Coast. As they cross the coastal mountain ranges, the Pacific air masses lose moisture.

5. **Maritime Polar**—Cool, humid air masses that form over the icy cold North Pacific and North Atlantic oceans. Maritime polar air masses affect the West Coast more than the East Coast. Even in summer, these masses of cool, humid air often bring fog, rain, and cool temperatures to the West Coast.

6. **Continental Tropical**—Hot, dry air masses that form mostly in summer over dry areas of the Southwest and northern Mexico. Continental tropical air masses cover a smaller area than other air masses. They occasionally move northeast, bringing hot, dry weather to the southern Great Plains.

7. **Continental Polar**—Large continental polar air masses that form over central and northern Canada and Alaska. Air masses that form near the Arctic Circle can bring bitterly cold weather with very low humidity. In winter, continental polar air masses bring clear, cold, dry air to much of North America. In summer, the air mass is milder. Storms may occur when continental polar air masses move south and collide with maritime tropical air masses moving north.

8. **A cold front**—A mass of “colder” air that moves under a mass of warmer air at a particular location. As a cold front moves into an area, it pushes the warmer air mass upward at a fairly steep angle. The movement of warm (typically moister air) upward can cause violent storms to occur along the front. Storms may occur ahead of the front as well as along the frontal barrier, but skies tend to clear rather quickly after the passage of a cold front. The local temperature will also drop some. Strong lines of thunderstorms are characteristic of the passage of a cold front. On the weather maps cold fronts are represented as a line of triangles.
9. **Warm fronts** - Warm air, which is naturally less dense, rises slowly above an area of cooler air. Warm fronts move slower than cold fronts the passage of a warm front also causes precipitation, but more typically these areas experience light to moderate continuous rain. The lighter rain is in contrast to the severe thunderstorms associated with the passage of a cold front. The formation of fair weather occurs more gradually with the passage of a warm front. Warm fronts appear on the weather map as a line of semi-circles.

10. A **stationary front** - the moving air mass (warm or cold) does not contain sufficient energy to move the existing air mass. Consequently, what happens is that the front tends to move rather slowly out of a region. A stationary front will often cause precipitation in an area for extended periods of time. Eventually, a new air mass will move in and replace the stationary front. Stationary fronts appear on the map as a line of alternating triangles and semi-circles that face in opposite directions.

11. An **occluded front** - faster moving cold front catches and overtakes an existing warm front. The denser cold front forces itself under the existing warm front causing heavier amounts of precipitation to fall (inches of rain or snow). Occluded fronts appear as a line of alternating triangles and semicircles facing the same direction.

12. Weather patterns in the United States most often move from west to east. Therefore the weather to one’s west (northwest or southwest) is the precursor of what one should expect. Severe weather events like tropical storms vary from this pattern and move from east to west. Students can watch also watch the United Streaming video “Understanding Weather” to enforce what they have started learning and to see the types of impacts weather can have on society, how it is predicted, and how it changes due to differences in atmospheric conditions.

**Elaborate:** Students can track weather conditions such as types of clouds, cloud cover percentage, precipitation amount, temperature, humidity etc. over a period of time. Students will then create a data table and graph their findings and use those findings to predict the next weather pattern (GEMS). This will also allow students to create a dialog between each other on how changes in weather factors can create changes in weather patterns. This can also be the time where the teacher can introduce “The Weather Tomorrow” chapter project which will require students to create their own weather channel, collect data, form hypothesis, and collaborative skills (North Carolina Grade 7 Prentice Hall Science Explorer). This project can be introduced now and explained more during part two or the second day of this lesson. A rubric and handout will be needed to give students an idea on how they will be graded and need to prepare their presentations.

**Evaluate:**

1. Students will illustrate various air masses and fronts on a map of North America to explain weather patterns. This will assist them on their assignment of “Classifying Weather Air Fronts”
Lesson One Service Learning Unit: Hazardous Weather and Disaster Preparedness and Prevention

a. They will need crayons, colored pencils, or makers to categorize the air masses and the locations they affect in the United States. They will need to explain how the air mass causes the climate and weather in a specific location.

2. Students need to create a table, “Classifying Weather Air Fronts”, that explains the formation of weather fronts and describes the weather associated with each
   a. They will create a table that will contain the front name, how it forms, and the type of weather that is associated with it.
   b. The teacher and students can use the example guide on pg.130 in the North Carolina Grade 7 Prentice Hall Science Explorer textbook.
Lesson Two Service Learning Unit: Hazardous Weather and Disaster Preparedness and Prevention

Title: Severe Weather: What’s that?

Subject: 7th Grade Science

NCSCOS Objectives: 7th Grade Science Goal 3: The learner will conduct investigations and utilize appropriate technologies and information systems to build an understanding of the atmosphere. Objective 3.05-Examine evidence that atmospheric properties can be studied to predict atmospheric conditions and weather hazards:

- Tornados
- Hurricanes
- Floods
- Storms

7th Grade Language Goal 1: The learner will use language to express individual perspectives in response to personal, social, cultural, and historical issues. Objective 1.01-Narrate an expressive account which:

- Establishes the significance of events
- Creates a coherent organizing structure appropriate to purpose, audience, and context.
- Orient the reader/listener to the scene, the people, and the events.
- Engages the reader/listener by establishing a context and creating a point of view.

7th Grade Math Goal 4: The learner will understand and use graphs and data analysis. Objective 4.01-Collect, organize, analyze, and display data (including box plots and histograms) to solve problems. Objective 4.02-Calculate, use, and interpret the mean, median, mode, range, frequency distribution, and inter-quartile range for a set of data. Objective 4.05-Solve problems involving two or more sets of data using appropriate statistical measures

Duration: 4, 90 min. class blocks

Essential Questions: What types of natural disasters can impact a community?

Which types of storms affect us locally? How are they predicted? What technology is used by weather forecasters to predict changes in weather and inform the public? Are storms and other types of severe weather preventable?

Develop a disaster plan for hazardous weather that affects us locally. During severe weather assess the precautions you and your family need to take.
Lesson Two Service Learning Unit: Hazardous Weather and Disaster Preparedness and Prevention

**Essential Vocabulary:**

<table>
<thead>
<tr>
<th>Storm</th>
<th>Meteorologist</th>
<th>Be Red Cross Ready*</th>
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<tbody>
<tr>
<td>Thunderstorm</td>
<td>Doppler Radar</td>
<td>Thunder Storm Safety*</td>
</tr>
<tr>
<td>Lighting</td>
<td>weather balloons</td>
<td>Hurricane Safety*</td>
</tr>
<tr>
<td>Tornado</td>
<td>satellites</td>
<td>Flood Safety*</td>
</tr>
<tr>
<td>Hurricane</td>
<td>communication</td>
<td>Returning Home after a Hurricane or Flood*</td>
</tr>
<tr>
<td>Storm Surge</td>
<td>media isobars</td>
<td>Tornado Safety*</td>
</tr>
<tr>
<td>Flood</td>
<td>isotherm</td>
<td>Taking Care of Your Emotional Health after Disaster*</td>
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<tr>
<td>Evacuate</td>
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*These are not vocabulary terms. These are the safety packets from the American Red Cross that need to be reviewed with students once they have mastered the formation process and cause for each type of severe weather. Share these with students so they will gain brief understanding of how to prepare for hazardous weather and what they can do in regards to disaster prevention and preparedness. The booklets will be revisited during lessons three and four.

**Engage:**

1. Students will complete various labs to be introduced to each type of severe weather:
   a. Tornadoes- There is a lab that students can perform in their cooperative groups on page 138, “Can You Make a Tornado”; in the North Carolina Grade 7 Prentice Hall Science Explorer. This lab will allow students to see not only how the winds of a tornado move but how objects can be moved by the winds as well. There is also a brief experiment located here, “Tornado in a Bottle Lesson Plan”. The teacher can also show two video clips from the Discovery Channel show “Storm Chasers”. The first clip will allow students to understand the science behind storm chasing, “Science of Storm Chasing”. The second clip, “Reed’s Top 10” allows students to view storm chasers in action and how they intercept storms.
   b. Hurricanes- Since students cannot build an actual hurricane in the classroom they will need to perform a lab that requires them to study one of the effects of a hurricane, storm surge. Before students perform the lab have them watch the
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United Streaming video “Weather Smart: Hurricanes”. This will provide students with some basic information about how hurricanes form and why they are so dangerous. When they video is complete have students “Make a Model of Storm Surge”. Students will then be able to formulate hypothesis on which locations could be affected by a storm surge and what would they need to do to prevent it. With this assignment I would give students a map of North Carolina and have then place it on their play dough so they can see which cities in North Carolina would be affected directly by a hurricane. The teacher needs to again facilitate discussion or have the students convey their thoughts and ideas in the conclusion of their lab.

c. Floods- When students have read the section “Droughts and Floods” they need to complete “Inferring” on page 121 in the North Carolina Grade 7 Prentice Hall Science Explorer. This will provide students with a visual of a flood and help them begin to hypothesize methods for flood prevention. Students can also view a video on United Streaming entitled “Enviro-Tacklebox: Module 04: Forces in the Environment: Force of Floods”. This will give students in insight to how floods happen and what various government agencies do in response to the needs of the community after a flood hits.

d. Storms- Students will need to view the “Hurricane, Tornados, and Thunderstorms” video on United Streaming. There is a corresponding quiz students can take so you can give a post assessment of how well students have been introduced to the Goal. The teacher can also introduce to students the VORTEX 2, “The Ultimate Science Project” that has an online storm and tornado tracking program for students in the classroom.

e. As each form of severe weather is introduced to students disaster preparedness and prevention also needs to be addressed. This will be the beginning process of students understanding how important it is to be prepared for hazardous weather and what they can individually do for disaster prevention. In the Essential Vocabulary section there are links to the American Red Cross that have information segments on each type of severe weather that is covered. Review this information with students.

Explore: Students will need to complete short descriptive free writes that will have them describe what they think it would be like to be in the various types of severe weather. Each weather factor has a corresponding prompt. Read each one to students after they have completed each mini lab assignment. It can be a required portion of their conclusion for their lab reports. The lab will give them a visual to think about while they are writing. While students are writing play the sound bites that correspond with the correct storm. This will aid auditory learners. This assignment can be changed or extended by having students draw pictures of what they would see during to storm or after. This can also be a short art immersion project. Before they begin writing have students close their eyes.

(1) Prompt Examples:
(a) Tornadoes: Begin to play sound clip. Imagine that you and your family are in your home on a sunny afternoon. Someone turns on the news. You hear a loud beeping noise that means severe weather is your area. You don’t pay it any attention, the news always does this. Suddenly, you hear the first crack of thunder. You look out the window. Flash! A lighting strike. That was close. It nearly blinded you. More thunder and now it begins to rain. You decide to go to your living room to finish watching TV. The rain begins to fall harder. It seems as if it wants to come in the house with you. More thunder. The storm is getting closer now. You can hear the wind knocking trees against your house and windows. You begin to flip through the TV stations. All those watches and warnings are going across the screen, but you don’t read them. Hey, they can’t be that important can they? If they were they would make the words bigger. The rain is falling so hard now that it is like a constant drumming in your head that will not stop. You listen closely. Intently. Something is wrong. The wind is howling now. It’s not just whipping at your house or knocking over the trash cans that you know you will have to pick up later. It is beginning to actually scream at you. All you can hear is the sound of a train barreling down on your home. You panic; you don’t know what to do. You and your family members need to get to safety but you don’t know where to go. You all had not planned for this you were not prepared. You begin to run. But where do you go? What do you do? All you hear is wind and rain the sound of a train. Wind and rain the sound of a train. Now students write about what you are seeing, feeling, and hearing. Explain what is going on. What is happening to you and your family?

(b) Hurricanes: Begin to play sound clip. It has been raining for hours. All it has done for the past day is storm and rain. Storm and rain. This hurricane has been going on forever. But the worst is yet to come. The eye wall. They say when those winds strike it will be like nothing I have ever heard before. We knew the hurricane was coming so we are at a hotel to get out of the way of the water. It floods a lot near our house. What is that sound? What is that terrible, terrible noise? It sounds like the building is in pain. We can feel it swaying with the wind like a swing at the park. But the sound. I will never be able to get this out of my head. It sounds like a freight train whose wheels about to derail because it can’t slow down. The wind is howling at me like a wolf at the moon. Now students write about what you are seeing, feeling, and hearing. Explain what is going on. What is happening to you and your family?

Explain:

1. Students will need to have access to a computer lab to complete this portion of the lesson. Have students to complete a webquest from the NOAA at the National Severe Storms Laboratory. They will also need the guides for each type of severe weather to help them navigate through the web site. The website contains information on thunderstorms, tornados, floods, hail, lighting, damaging winds, and winter weather. In
order for students to complete a webquest on hurricanes they will need to go to here “Weather Wiz Kids”.
   a. Webquest Guides:
      i. Tornadoes
      ii. Hurricanes
      iii. Floods
      iv. Storms
2. In order for students to gain a better understanding of how severe or everyday weather is predicted have a local meteorologist come into the classroom and discuss weather topics and information with the students.
   a. This visit needs to be arranged at the beginning of the school year due to unforeseen issues that could occur with scheduling.
   b. Have the students watch a weather forecast to become familiar with the meteorologist before he enters the classroom and to see how weather is actually reported.
   c. Some of our local meteorologists actually prefer if a question list is prepared for them before they arrive in the classroom. This will allow the teacher to ensure all questions are appropriate and relevant to the visit.
   d. Students can also prepare a welcome sign for the visit and have them decorate it with pictures and symbols that represent weather.

Elaborate:
1. Students will need to create a disaster plan and a disaster preparedness kit for their home.
   a. Have students think about and assess all of the safety measures and precautions that are associated with each storm.
   b. Students will then need to write down what they would do if hazardous weather was about to harm them and their family.
   c. This can be done in list or detailed paragraph
   d. When the students go home have them actually put together the items they would place in a disaster kit and in their paragraph they should explain why they would choose those items.
   e. If possible students would then need to take a picture of the kit they have prepared with the class disposable camera or place the items in a bag and bring them to school to share with their classmates. If this is not feasible have the students just bring their completed list and paragraph.
   f. Once the students have brought their disaster plans and kits back to class the teacher should go back over the disaster preparedness brochures from the American Red Cross to have students complete a think-pair-share on what was is the American Red Cross disaster kits, what were in their kits, would they have been prepared with their kit why or why not, and what changes if any would need to be made to their kits so they are fully prepared for hazardous weather.
2. Students will also complete a Venn diagram comparing and contrasting tornadoes and hurricanes. Depending on the time of year students can use this information to
complete their science benchmarks if the prompt is based off of comparing and contrasting weather elements.

3. Students will also need additional computer lab time to research the effects that severe weather has had on our community. They need to find out how it affected families, what locations, what was the hazardous weather that occurred, how much it cost the local economy to recover, and if possible if any of the damage or negative effects of the weather could have been prevented.

**Evaluate:**

1. Students will present their research findings about local natural disasters to the class. As a class they will find the average, mean, median and mode for the cost of each local disaster they researched. Depending on the time of year this is done it can be paired with a math class objective.

2. Students will need to make a class Venn diagram for tornados and hurricanes. This will allow them to produce formation flow charts for tornados and hurricanes.
   a. The teacher can do this on a dry erase board or a large piece of chart paper and allow students to fill it in individually.
   b. Once the diagram is complete review the contents with students. As the teacher is reviewing the information have students to write the formation process for a hurricane and tornado.
Lesson Three Service Learning Unit: Hazardous Weather and Disaster Preparedness and Prevention

Title: So, what is service learning?

Subject: 7th Grade Science

NCSCOS Objectives: 7th Grade Science Goal 3: The learner will conduct investigations and utilize appropriate technologies and information systems to build an understanding of the atmosphere. Objective 3.05-Examine evidence that atmospheric properties can be studied to predict atmospheric conditions and weather hazards:

- Tornados.
- Hurricanes.
- Floods.
- Storms.

Duration: 1, 90 min. class block periods

Essential Questions: What is service learning?

Compare and contrast volunteering and service learning

Predict the effects service learning could have on our community? What type of service learning projects do you think could help our community?

Essential Vocabulary:

<table>
<thead>
<tr>
<th>Volunteerism</th>
<th>Meaningful Service</th>
<th>Youth Voice</th>
</tr>
</thead>
<tbody>
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<td>Community Service</td>
<td>Science linked</td>
<td>Partnerships</td>
</tr>
<tr>
<td>Service-Learning</td>
<td>Service</td>
<td>Progress</td>
</tr>
<tr>
<td>Community-Based</td>
<td>Reflection</td>
<td>Monitoring</td>
</tr>
<tr>
<td>Learning</td>
<td>Diversity</td>
<td>Duration and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intensity</td>
</tr>
</tbody>
</table>

More service learning resources are located on the National Youth Leadership Council website.

Engage: Students will need to complete a brief activity that will review the key terms for this lesson. “Frequently Confused Terms” will provide students with real world situations to learn the differences between volunteerism, community service, service learning, and community based learning.

Explore: Students will need to be introduced to each serviced learning standard. Here students should be introduced to what service learning is and how it can help them increase self worth, personal responsibility, and community awareness. Students will need to watch a brief video
clip from the Generator School Network, “LIFT Multimedia Tool”. In order for students to view the clip the teacher will need to join the free site. It contains very valuable information in regards developing and implementing service learning projects. Once the video is complete have the students have a class discussion about:

a) What did you see in the video clip?
b) How could you impact your community?
c) What were some of the things the students did to help their community?
d) Did the students you see get to decide what and how they were going to help?
e) Would you want to try a service learning project in science class?

**Explain:**

A. The teacher will need to explain each standard and relate them to students’ perspective, lives, and community:

1. **Meaningful Service**- all students will be engaged in the service learning project and they will know that it matters to their community. The students will also be able to have an attainable and tangible outcome.

2. **Link to Curriculum**- the service learning project will relate to content that is taught in the classroom and the two must merge to give a student the full understanding of why the need is there for them to understand content.

3. **Reflection**- There will be many chances and learning modalities for students before, during, and after the service learning project for students to contemplate the purpose of their project, the impact it will have on their community, how they are personal responsible for contributing to the project, and what the social and civic implications behind their project.

4. **Diversity**- While completing a service learning project there will be many viewpoint and perspectives about the topics surrounding the project and that students will be able to handle the issues when problems arise.

5. **Youth Voice**- Students will and should be able to decide by using the decision making process, how and in what areas their community needs assistance and how they will provide aid.

6. **Partnerships**- Teachers and students should seek out collaborations and community groups who have a shared vision that is aligned with the purpose of the service learning project. Both should be considered resources and assets to the project.

7. **Progress Monitoring**- Throughout the project students need to collect data to determine if expected outcomes in the community have been reached, if the project experience needs to be adjusted, and if themselves and the community are communicating effectively their needs and wants.
8. **Duration and Intensity**- The project should have enough time built into it to effectively address and resolve community needs and to solidify content knowledge.

9. More information about each service learning standard can be found here at the [National Youth Leadership Council](https://www.nationalyouthleadershipcouncil.org) website.

B. The teacher will also need to explain the process of service learning that students will go through during the project:

1. **Investigation**- Students will need to reflect on what areas do our community need help in. How can they as students meet any of these needs? This can be done by making a list of what areas need help and what community partners are available to aid them during the project.

2. **Preparation and Planning**- The teacher and students need to identify what skills they must possess before they start their project. This will also include what content information they will have to master before the service takes place.

3. **Action**- These is where the teacher, students, and community partners all work together and actually perform the service learning project. Students will apply what they have learned in the classroom and use it to assist the community.

4. **Reflection**- This should occur at all times during the service learning project. Students will need to put cognitive, social, and emotional aspects of the experience to help them understand the impact of their actions on the community. Students should be allowed to express their reflective thoughts as they feel most comfortable.

5. **Demonstration**- Here students need to be able to identify what they have accomplished and celebrate that they have done things to aide their community and so they can know that their contributions are appreciated.

**Elaborate:** Have students focus on each standard individually and work with a partner to complete activates for each factor. Have students complete a dump and clump for each standard:

a) First students need to be in their cooperative pairs or groups so multiple learning styles and diversity will be represented in the responses

b) Have eight different pieces of chart paper up around the room. If possible have each standard represented by a different color

c) Students will move around the room and place on the chart paper what each standard means to them and how would they express that trait in a service learning project

d) Inform students that responses cannot repeat, they must be relevant to our community, and they will only have 3 minutes at each station.
Lesson Three Service Learning Unit: Hazardous Weather and Disaster Preparedness and Prevention

**Evaluate:** The students will need to complete a foldable showing they understand and can explain and provide examples for each service learning standard. They will need to list each standard and explain each one and what it means to them. Allow students to pick which foldable format is most comfortable for them. This will allow them to express their creativity on the standards.
Title: The American Red Cross and My Community

Subject: 7th Grade Science

NCSCOS Objectives: 7th Grade Science Goal 3: The learner will conduct investigations and utilize appropriate technologies and information systems to build an understanding of the atmosphere. Objective 3.05-Examine evidence that atmospheric properties can be studied to predict atmospheric conditions and weather hazards:

- Tornados.
- Hurricanes.
- Floods.
- Storms.

7th Grade Math Goal 1: The learner will understand and compute with rational numbers. Objective 1.01- Develop and use ratios, proportions, and percents to solve problems. Objective 1.02- Develop fluency in addition, subtraction, multiplication, and division of rational numbers by: Analyzing computational strategies, describing the effect of operations on size. estimating the results of computations and judging the reasonableness of solutions. Objective 1.03- Develop flexibility in solving problems by selecting strategies and using mental computation, estimation, calculators or computers, and paper and pencil.

Duration: 1, 90min class block

Essential Questions: Explain the history and purpose of the American Red Cross?

Define the organizations’ appropriate usage as it applies to our community?

In what ways do they help our community after severe weather?

Essential Vocabulary:

<table>
<thead>
<tr>
<th>Service to the Armed Forces</th>
<th>Returning Home after a Hurricane or Flood</th>
<th>Be Red Cross Ready</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disaster Services</td>
<td>Tornado Safety</td>
<td>Thunder Storm Safety</td>
</tr>
<tr>
<td>International Services</td>
<td>Taking Care of Your Emotional Health after Disaster</td>
<td>Hurricane Safety</td>
</tr>
<tr>
<td>Health and Safety Services</td>
<td></td>
<td>Flood Safety</td>
</tr>
<tr>
<td>Biomedical Services</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Students will need to be reintroduced to the safety brochures at this time and also the contents of their disaster kits, and the comparisons they made for their disaster plans and kits against those of the American Red Cross

Engage: This lesson will involve scheduling a visit from an American Red Cross worker. Before the presenter comes in have students complete a KWL chart on what they know about the
American Red Cross, what they want to know, and what they learned. They will be able to have a brief presentation for students. Students will watch the short DVD “History and Purpose of the American Red Cross”. This will cover all of the jobs that the ARC does on local and international levels. There are sections of the DVD that students may have questions. It would be helpful if they would take notes or add information to their KWL chart. This will allow any major concepts, theories, ideas, or even more questions students may have about the ARC to be answered. For a director to come to your classroom contact Anne Vestal, Director of Volunteer Resources/Youth at (336)332-6916 or vestal@usa.redcross.org

Explore:

1. If possible have students tour your local ARC branch. While there the engage portion of the lesson can take place. This will allow students to tour the facility and see where some of the grassroots work is done.
2. If the teacher cannot go to the ARC then it will be necessary for the teacher to explain the “Heroes for the American Red Cross”. This is a fundraising program that will allow students to raise money for the ARC. This can be a yearlong project that can involve the school and people in the community. Once $1000 is raised the school and or class will be featured in the local newspaper. Allow the students to come up with incentives for people to donate money. This will allow them to be directly involved with the fundraising and will have them engaged. All money collected will need to be turned in to the ARC and not your school secretary. The ARC will also have ideas for fundraising efforts and will assist students in this effort. This is also the time in which students can reach out to other local community partners for assistance in raising funds or giving a prize that can be raffled off to contributors.

Explain: Students need to gain an understanding of what the money will be used for. Follow the “Heroes Contribution” guide and have students work in their cooperative pairs to develop math word problems that will provide other students with examples of how their money will be used to help those in the local community. Example math word problems can be found on NCDPI. Students will need to turn in an answer key with their word problems. Students can then rotate around the room in a station format and decide which group could help more families based off of the donations the class/school has raised so far.

Elaborate: Students will complete the “Master for Disaster” program. These are simple lessons that will teach students about disaster preparedness and prevention. These lessons will reinforce safety standards, hazardous weather conditions and disaster preparedness. They cover general disaster preparedness, hurricanes, floods, and tornadoes. Students also need to complete the ARC’s “Best Practices” kit and the “American Red Cross Ready” assessment. This will provide the teacher and the ARC with a gauge to see if students are ready and knowledgeable to perform their service learning project.
Evaluate: At the end of the lesson the teacher needs to assess that the students can answer the essential questions. Have students create a survey or poll with their group members to assess how well their families and other members of the community are prepared for hazardous weather and what services the American Red Cross can provide them with after disaster. Students will give these surveys/polls out at a PTA meeting, report card pick-up, any after school activities, and they should be allowed to take a few copies home and give them to people they know to fill out. The teacher should set a deadline as to when the survey/poll is due back at school so students can create data tables and charts that will ascertain how much the community knows about disaster prevention and preparedness and what they need to learn. Have students summarized their findings and think of inventive ways to correct the lack of information the community has. Students should be able to decide on this plan by creating individual dump and clumps for each issue and ways they would fix them. If not they can plan a health and safety fair with the health educators, develop skits or PSA’s that will cover the information they have learned about severe weather, the American Red Cross, and disaster prevention and preparedness. Students should correct their disaster plans and kits after completing the “Masters for Disaster” program. They will also create a crisis prevention pamphlet that will cover one form of severe weather. It will need to include what type of weather is it, how you can prepare for it, and how others should be prepared for it. Follow the rubric for grading.
Lesson Five Service Learning Unit: Hazardous Weather and Disaster Preparedness and Prevention

Title: Depart to Serve

Subject: 7th Grade Science

NCSCOS Objectives: 7th Grade Science Goal 3: The learner will conduct investigations and utilize appropriate technologies and information systems to build an understanding of the atmosphere. Objective 3.05: Examine evidence that atmospheric properties can be studied to predict atmospheric conditions and weather hazards:

- Tornados
- Hurricanes
- Floods
- Storms

Duration: 2, 90min. class blocks and some service components can be a year or semester long

Essential Questions: Construct a service learning project that can be completed with the American Red Cross in regards to their purpose, disaster preparedness, and our community?

Reflect on your experiences with the American Red Cross? What did you learn? Describe how they can assist our community after hazardous weather?

Essential Vocabulary:

<table>
<thead>
<tr>
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<th>Meaningful Service</th>
<th>Youth Voice Partnerships</th>
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<td>Community-Based Learning</td>
<td>Diversity</td>
<td></td>
<td>Health and Safety Services</td>
</tr>
</tbody>
</table>

| | | | Biomedical Services |

Engage: Students should have the pictures of their incorrect and correct disaster kits, their disaster plans, brochures, and the compiled pre survey/poll results.

Explore: Here students will actually perform their service learning projects:

1. Start a school wide American Red Cross Youth Club- Information for this club can be found on the American Red Cross website. The club will need a teacher sponsor and a
dedicated group of students. If any students have not completed “Red Cross Ready” and the “Online Orientation” they will need to at this time.
  a. These students can host a blood drive at the school and also aid your classes in completing the “Heroes for American Red Cross” fundraiser.
  b. The club will need to be registered on the national ARC list
  c. Since students will not be able to donate blood they will need to also participate in the “Future Blood Donors” program which can be introduced by an ARC worker to the club
2. Students will prepare skits and PSA’s (that will serve as commercials during the skits) the will teach the community about severe weather hazards, disaster prevention, and disaster preparedness. The skits should be no longer than 5 minutes and it should have a script. The PSA needs to be 30 seconds to 1 minute but it should convey a very pertinent message. They should be able to decide on the formation of their skits and PSA’s. If it is PSA they will also need to share what would be the best media available to convey their message to the community.
   a. The skits and PSAs need to be shared at the PTA meetings, report card pick up, at the after school programs, local grade schools and at home (have students summarize the general information) Once the skit or PSA has been viewed have the participants complete the post survey to assess how much information they gained from the presentations.
   b. The PSA’s and skits will need to be graded on a rubric.
3. Students will host a health and safety fair at their school. This can be done in collaboration with health classes and teacher, the school nurse, and community partners who would have voice in fulfilling the community’s health needs and safety concerns.
   a. As a class students will need to decide what aspect of severe weather and disaster preparedness and prevention they should focus on. They need to consider the community needs, what they have learned from previous lessons, and even previous health fairs they have attended. They will also need to decide what are the best ways to advertise and inform the community that a health and safety fair is going to occur locally. Students may need some assistance obtaining gifts and resources from local community partners who would like to have souvenirs for the attendees.
   b. Students should then establish two stations that they will man on rotations during the health and safety fair. One should cover severe weather and the other will examine disaster preparedness and prevention.
   c. Students should have copies of their brochures to hand out and have statements prepared as to what they would want to inform the community of. Students should also see if an individual is available to come from the American Red Cross
to answer questions that the students cannot handle and to assist with fundraising.

d. The students should also have their skits and PSAs ready to perform as well.
e. Students could and should also have some of these informational tools available for the community
   i. Charts/Posters
   ii. Photographs
   iii. Skits/Demonstrations
   iv. Infomercials/PSAs
   v. Brochures/Poem/Song

f. After the health fair students should be able to answer these questions:
   i. What are some of the most important safety concerns and issues in our community?
   ii. Overall what can you gauge of the community’s response to the safety portion of the fair?
   iii. Why was this health and safety so important for our community?
   iv. What does it mean to share knowledge? Why is cooperation and teamwork important? Why were all of these aspects important for the health fair?
   v. What other things do you think the community would like to have included at the fair?
   vi. How can we share with our families and others in the community what we have learned about severe weather and disaster preparedness and prevention?

- Students can answer this question by completing a needs and assets T-chart.

**Explain:** Students will need to give out a post survey that will ascertain what people in the community have learned as a result of the students’ service learning projects. Again this will be given out during after school programs, a PTA meeting, people they know in their families and community, and at the end of the community health and safety fair. Upon completion of the survey/poll recipients should receive the prepared disaster plans and kits that students have made. As a class, have students establish similar data charts and graphs as that they compiled did during the pre-service survey/poll. Students should be able to draw statistical conclusions on the data to see if the community is more attuned to disaster prevention, preparedness, and severe weather precautions.

**Elaborate:** Once the students have processed the data they need to postulate why some areas for disaster preparedness improved and other did not. They need to formulate plans to see what else they can do to make sure community awareness improves.
**Lesson Five Service Learning Unit: Hazardous Weather and Disaster Preparedness and Prevention**

**Evaluate:** Students will need to complete an ABC reflection about service learning. The directions for completing this strategy are located on the Guilford County Schools website for summarizing strategies.

1. Have students paired with a partner, and if possible use scaffold Marzano model to receive better responses.
2. Once with their partner, the students need to take a piece of graph paper and write down their ABC’s.
3. Inform students that they will need to write down what was something they learned, experienced, thought was significant, or would even like to change about their service learning experience.