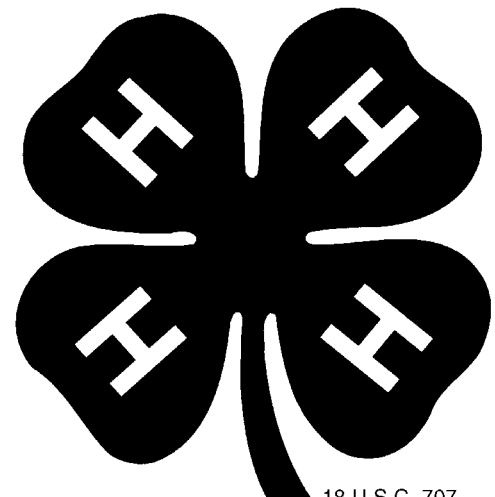


Weather Leader's Guide



Weather is a fascinating subject for youths and adults. Young people learn a lot in a nonformal educational setting (such as 4-H) by working and learning with concerned and caring adults. It is important for us to share our skills and interests, but we must not lose sight of the main goal – to help youths develop into productive, concerned, and caring adults themselves.



Objective

This guide was developed to help volunteer 4-H leaders work with the 4-H Weather Project. It provides “learn-by-doing” activities that teach about weather components, instruments, terminology, and symbols.

Many of the questions in the manual are interpretive; that is, they have no “right” or “wrong” answer.

Who is the weather project for?

Youths in grades 3 – 12 interested in learning more about the weather.

What will youths learn from this project?

The 4-H Weather Project introduces youths to the fascinating subject of weather. Young people conduct experiments to understand weather processes, observe and study weather from a scientific point of view, keep records, and learn about weather forecasting. Youths will study weather, learn how to keep records, make weather instruments, and all about clouds, cloud formation, and weather phenomena. Advanced students learn to make a station model, research advanced concepts, and are encouraged to mentor a younger 4-H'er enrolled in the weather project. The advanced projects are designed to teach the scientific methods and decision-making skills. Advanced weather is structured for youths on an individual basis and includes material for self-planning and evaluation.

How does it work?

Youths may complete this program independently or with the help of a knowledgeable adult or older teen.

For more information about this project or how to exhibit it, contact the Purdue Extension office in your county. A listing of county office contact information is available on the Web at <http://www.ces.purdue.edu/anr/field/fs/countyoffices2.html>.

You can obtain project manuals or materials from the Extension office in your county. You also may contact the Agriculture Communication Service Media Distribution Center toll-free at 888-EXT-INFO (398-4636), by fax at (765) 496-1540, or by e-mail at media.order@purdue.edu.

The Indiana 4-H Weather Project uses four manuals, a poster, and this leader's guide:

Grade	4-H manual
3 rd & 4 th	4-H-346 Weather 1: <i>Weather Watchers</i>
3 rd & 4 th	4-H-346A Weather instruments poster
5 th & 6 th	4-H-379 Weather 2: <i>Storm Spotters</i>
7 th - 9 th	4-H-399 Weather 3: <i>Signs of the Sky</i>
10 th - 12 th	4-H-426 Weather 4: <i>Fronts and Symbols</i>
n.a.	4-H-441-W Weather Leader's Guide (Web only)

These guidelines were adapted and compiled from the 4-H Weather Leader's Guide by Natalie Carroll, Extension Specialist. The work was originally written by William E. Caldwell, Purdue University.

General information about the Indiana natural resource projects, including Frequently Asked Questions and exhibit pictures from the Indiana State Fair are available at:

www.four-h.purdue.edu/natural_resources/

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Introduction

Weather has always been a source of fascination for youth. The study of weather can be adapted to any age level, either within the club or on an individual basis.

Weather can be exciting because youths can:

- Construct the equipment.
- Have fun.
- Ask questions.
- Conduct experiments.

Safety

Safety is an important part of the weather project. Leaders should have these items at their disposal and follow the suggested procedures:

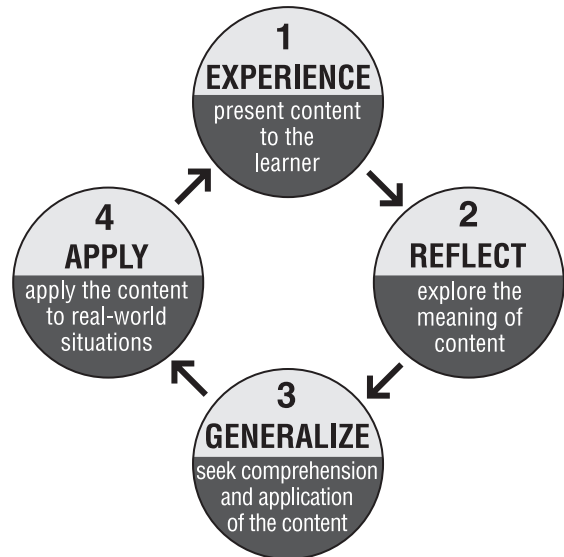
- First aid kit
- Gloves for handling tin when making the weather equipment
- Comfortable hiking shoes and clothes, boots, and raincoats for rain or snowy weather (Do not avoid these conditions of weather. It is a fun time for youths and will stimulate many questions.)
- Parental permission for tours

Youths have different interests, abilities, and learning styles. 4-H and many other nonformal educational programs use *Experiential Learning*, or “learn by doing.”

The following pages describe the intended goals, what youths should learn (understand), and suggest records, tours, additional activities, and resources for each 4-H project manual.

Experiential Learning

Experiential learning distinguishes 4-H youth development education from many formal educational methods. Activities are designed so youth experience a learning activity, reflect on what they did, generalize what they learned, and then apply what they learned to other situations. The 4-H Weather Project fits this model very well, as youths do an activity and think about what they did and what they learned. Many youths go on to use their new knowledge each day by watching or listening to weather reports or just observing the day's weather. Some youths will continue to keep records and learn more about the earth and its natural processes.



Youth Development Stages

Understanding the common physical, mental, social, and emotional development of young people will help you in working with the 4-H'ers in your club. Keep in mind that no two children develop on the same schedule, and transitions are gradual. You can help your club members to grow and mature and help make 4-H a rewarding and fulfilling experience.

Activities at 4-H club meetings are not always as successful as the volunteer had planned. Sometimes youths talk among themselves rather than listening to you; maybe no one came to a planned field trip; or perhaps no one would speak up to answer your questions when you were trying to involve the young people in the discussion. If you are working with a broad age range, the activity may be too simple for the older kids and too difficult for the younger ones. In this situation, consider giving the older 4-H'ers leadership opportunities.

Young people can vary greatly in physical, mental, social, and emotional growth and interests within any age group. These differences are even more marked between age groups. The following information may help you understand how to plan activities for different age groups.

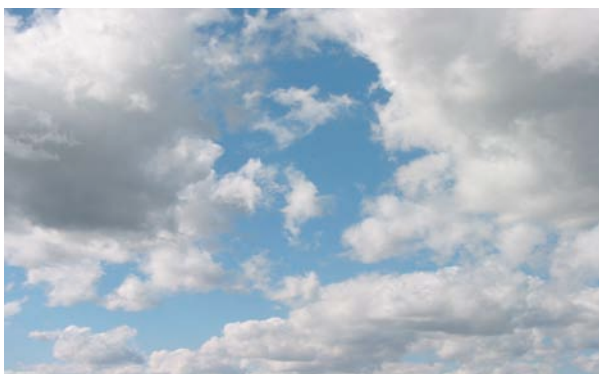
Early Elementary (Mini 4-H)

This is a very active age, so it is important to keep these kids busy. They are concrete thinkers and need to see what you want them to do and how to do it. They are generally more interested in making something than in completing a project (process is more interesting than products). Children in this age group tend to seek adult approval and depend upon adults, although the opinions of their peers are beginning to be important. They do best in small groups with set rules and rituals. Competition is inappropriate for this age group.

Upper Elementary

This is also a very physically active age, so hands-on activities work best. Kids in the upper elementary grades are still fairly concrete thinkers (things are black/white or right/wrong) but are beginning to think logically and symbolically. Because this age group has a strong need to feel accepted, it is best for an adult to evaluate each product, rather than hold competition among peers with only one winner. Children at this age prefer to know how much they have improved against past efforts and how to improve in the future.

These children are beginning to identify with peers but continue to value adult guidance. They are also beginning to discover the benefits of making other people happy, but more for the benefits to themselves rather than the benefit to others. They begin to take responsibility for their actions at this age and are beginning to develop an increased independence of thought, which may allow them to try new things. Letting this age group help in the decisions of the club can help them start to learn about leadership.



Middle School

Middle school youths are beginning to move to more abstract thinking. Justice and equality are important to this age. (Therefore, project judging may now be viewed in terms of what is fair, as well as being regarded as a reflection of the self-worth.) They prefer to find their own solutions, rather than be given a solution by adults. Try to provide supervision without interference.

Independence of thoughts and actions begins to emerge. Avoid comparing middle school youths with each other – their performance should be compared with past accomplishments.

Junior volunteer organizations often are popular with teens toward the end of this age group, particularly if there are opportunities for developing leadership.

High School

Most high school-aged teens know their abilities, interests, and talents. These teens tend to be very concerned with themselves and their peer group. They can understand the feelings of others but tend to be self-absorbed, particularly in the earlier years of high school. Relationship skills are usually fairly well developed. Getting a driver's license increases both independence and dating. Acceptance by members of the opposite sex is very important.

High school-aged youth begin to think about the future and make realistic plans. They enjoy career exploration and preparation. Their vocational goals influence the activities they select.

Projects requiring research and creativity give teens an opportunity to demonstrate how much they have learned and what they can accomplish. Teens set goals based on their personal needs and priorities — goals set by others are generally rejected.

As teens master abstract thinking, they may imagine and try new ideas in ways that confuse adults. Teens can generally initiate and complete tasks without supervision. A leader can help by arranging new experiences in areas of interest to teens but must be sure to allow them plenty of input. The leader should play the role of adviser/coach for independent workers. Club meetings, rituals, and uniforms do not appeal to this group. Many teens enjoy looking back on their achievements in 4-H and appreciate special recognition for leadership activities. By the time they

graduate from high school and begin college or a career, they feel they have reached the stage of full maturity and expect to be treated as such.

Some Final Thoughts

These guidelines give only a brief overview of child and youth development. They are intended as a resource to help you plan your activities as a volunteer. The Purdue Extension publication *Ages and Stages of Child and Youth Development, a Guide for 4-H Leaders*, NCR-292, has more in-depth information and is available from the Purdue Extension office in your county or on the Web at <http://www.ces.purdue.edu/extmedia/NCR/NCR-292.html>.

You, as the club volunteer, are a valuable asset to your community and to the individual members of your club. These guidelines about the stages of child and youth development — in combination with your special skills and interests in youth — will help you plan and carry out a successful 4-H program and make a positive impact on the lives of young people.



WEATHER I: Weather Watchers



Goals

- Observing the weather and keeping records of its changes.
- Making and using simple, inexpensive instruments for observing the weather.
- Developing inquiring minds, the habit of asking questions, and systematic searching for answers.
- Encouraging youth to read supporting materials.
- Learning about the weather, its effects, and what causes it to change.

What Youths Should Understand

A basic understanding of weather can be reached by performing the experiments and activities in the manual. When the members finish this first level, they should understand that:

- The sun is the source of heat and light. Direct rays are warmer than slanting rays, and the slanting accounts for heat differences in various parts of the world (latitudes locations) and the changing seasons.
- Air takes up space, has weight, and exerts pressure. It rises when warm and settles when cooled.
- Water warms and cools slower than air does.
- The earth absorbs the rays of the sun and gives off heat that warms the air. Dark soils absorb more heat than light soils.

Keeping Records

Encourage 4-H'ers to keep their records as they work. These records can include an account of learning experience, the weather information sheet, and the 4-H record sheet.

Special emphasis should be given to the learning experiences, since they emphasize the importance of associating with others and of taking an active part in the club's meetings. The goal is to provide a variety of experiences that encourage the development of 4-H'ers. Teaching them about weather gives us the opportunity to capitalize on their interest.

The weather information sheet begins to acquaint them with the process of collecting data. The accurate weather records of the past are the sources of information used to gain understanding about weather. This project teaches reliance upon accurate records and how they contribute new information in a scientific way each day. These records are also valuable for writing Achievement Records at the end of the 4-H experience.

Tour Suggestions

- Airport — A tour to an airport is recommended as an additional part of the project. Airports depend on up-to-date, accurate information about the weather. This tour will also help explain and help the young people understand the exhibit.
- Weather station — A visit to a local weather station would be an interesting and profitable trip. The local TV or radio station might also be of help in demonstrating the weather instruments used and in relating experiences concerning weather reports.

Activity Suggestions

- Read library books and share information.
- Make a scrapbook of newspaper articles and maps about the weather.
- Collect newspaper articles about floods, tornadoes, hurricanes, etc.
- Watch videos about the atmosphere and the weather (see suggested film list).
- Build a weather station where the club meets and keeps records. By alternating among members, you will be able to check to make sure they are reading the instruments accurately.



WEATHER 2: Storm Spotters

Goals

- Develop inquiring minds, the habit of asking questions, and a systematic searching for answers.
- Observe and study weather from a scientific point of view.
- Understand and appreciate science.
- Keep accurate records.
- Make decisions based upon facts and observations.
- Encourage demonstrations, experimentation, and active participation in club activities.

What Youths Should Understand

Many terms used in weather forecasting may begin to be a part of a youth's daily vocabulary. The concept of record keeping and its contribution to scientific knowledge will become a part of the member's experience.

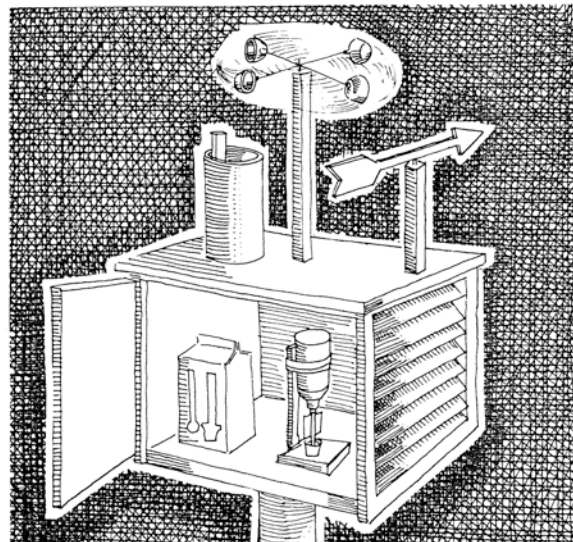
The Weather Station

The 4-H'ers will build (preferred) or purchase the following weather instruments and learn how to use them:

- Rain gauge (top left)
- Anemometer (top center)
- Wind vane (top right)
- Thermometer (bottom left, attached to a milk carton to hold it upright)
- Barometer (bottom right)

If purchases are going to be made, we recommend that a barometer be the first item purchased.

A small shelter should be built to house the instruments. Plans for a shelter are included on pages 23 and 24 of this guide.



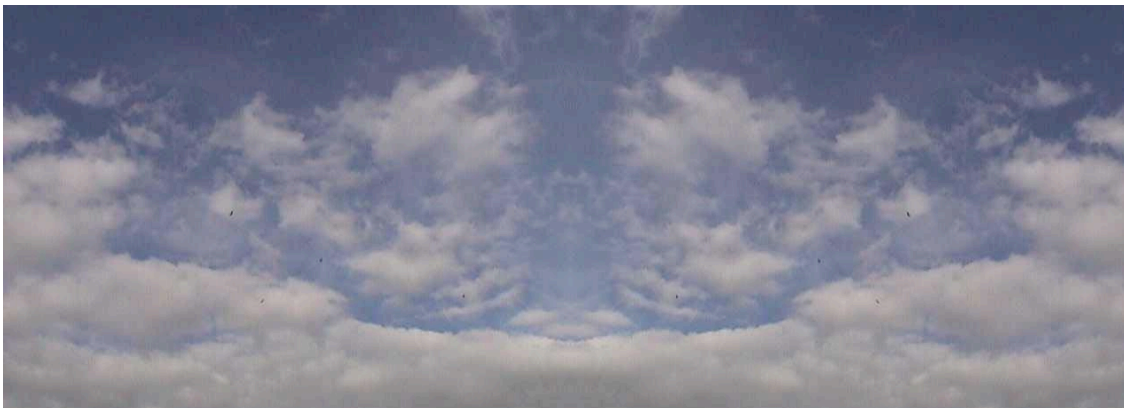
Parents should understand that in building the equipment, the youngsters begin to become acquainted with tools. The project also encourages parents to assist the young person with making the equipment, but not to do it for the 4-H'er.

Keeping Records

Daily record keeping is an important part of the project. A better understanding will result from adequate record keeping.

Activity Suggestions

- Continue or begin a scrapbook of newspaper articles and maps about the weather. Collect articles about unusual weather conditions.
- Show videos on weather (see film list).
- Construct a club weather station.
- Obtain an aneroid barometer to have available at club meetings.
- Do a study of floods and tornadoes in Indiana.
- Obtain pictures that illustrate the Beaufort scale.
- Do a study, collect clippings, etc. on the effects of weather on accidents.
- Invite an airplane pilot to talk to the group about weather and aviation.
- Conduct experiments that will assist the members in understanding the weather.



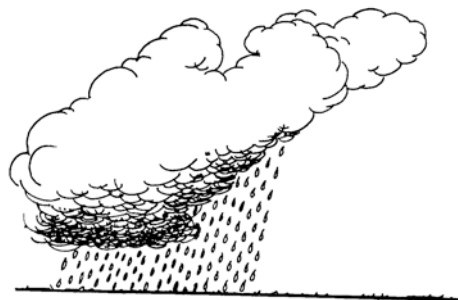
WEATHER III: Signs of the Sky

Goals

- Learn about and understand how other areas of life are related to weather.
- Observe the sky and its relationships to changes in the weather.
- Encourage inquisitive minds in the habit of observation and searching for answers.
- Obtain a better understanding of nature.
- Appreciate the value of weather research and its effect upon daily living.
- Make decisions based upon facts and observations.

Understanding Clouds

Moisture in clouds is the result of vapor in the atmosphere. The process of cloud formation and the various types of clouds should be understood. A beginning understanding of weather symbols will lead to additional interest in weather.



Keeping Records

The study and recording of weather data should continue. The members can use the record sheets in Division II, or they may design their own record.

The *Signs I Have Seen* sheet should be completed periodically and should list several types of clouds observed. Encourage the young people to begin photographing the clouds for their own interests and scrapbooks.

Tour Suggestions

Leaders are encouraged to continue taking the group on tours of new places. A tour of the individual club members' weather stations also might be a good idea. Each of the Purdue Agricultural Centers in Indiana (<http://www.agriculture.purdue.edu/pac/>) also has a large weather station that could provide an interesting tour.

Activity Suggestions

- Study how clouds are seeded.
- Ask crop and fruit growers to talk to the group on growing seasons and how weather affects them.
- Study frost, formation of snow, sleet, and seasons.
- Conduct weather experiments.
- Study clouds and aviation.
- Have each member of the club present weather demonstrations and experiments for other groups.
- Collect pictures of clouds.
- Study the differences in fog and smog. What is being done to reduce smog?
- Study the water cycle.



WEATHER IV: Fronts and Symbols

Goals

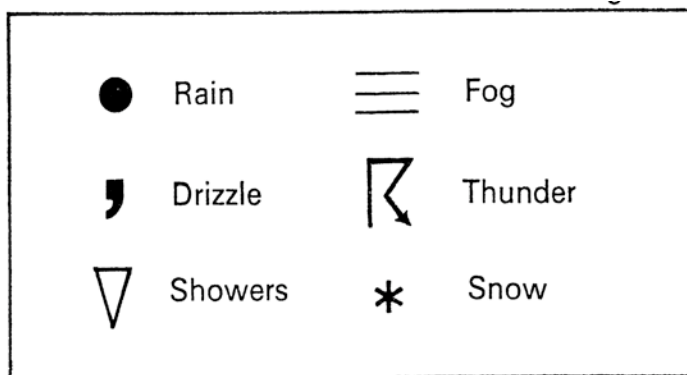
- Become acquainted with weather symbols and maps (data from reporting stations).
- Encourage inquiring minds to form habits of observation.
- Begin to understand and appreciate the laws of nature.
- Provide additional experiments to assist in understanding weather.
- Develop an appreciation for the complexities of weather forecasting.

What Youths Should Understand

The station model represents the weather data collected by each reporting weatherman. The information is placed in an organized fashion using symbols to represent the various aspects of weather. A better understanding of cold, warm, and occluded fronts is accomplished by analyzing experiments.

Air movements are studied by examining weight and pressure. These movements are called highs and lows.

Weather IV is designed to allow the members a choice between studying a sequence of either winter or summer weather. Youths should be encouraged to specialize and expand their areas of interest.



Keeping Records

Notice that the recording of weather information remains an important part of the investigation. Research depends upon accurate recording and collecting of data. The observation form begins to use symbols to acquaint the members with those used in mapping and reporting.

Activity Suggestions

- Continue to expand and improve upon the collections of club materials.
- Subscribe as a club to the U.S. Weather Bureau maps.
- Chart the movements of fronts across the United States.
- Compare the club weather reports with those on television or in the newspaper.
- Do additional weather experiments.
- Show weather films.
- Study the effects of topography on weather. Your group could construct a topographical map of the United States and Canada and demonstrate what happens as air masses move.

Advanced Weather

Goals

- Determine a weather project.
- Prepare a list of potential resources.
Suggestions include:
 - library
 - science teachers
 - meteorologists
 - TV and radio station weather reporters
 - U.S. Weather Bureau
 - local weather observers
 - airports
 - pilots
 - other youths interested in weather
- Outline the process to follow in the investigation.
- Examine individual interests.
- Find resources on the Internet, libraries, newspapers, weather bureaus, etc.
- Identify industries that rely on or are involved in working with weather.



Activity Suggestions

- Mentoring: Help younger 4-H'ers with the weather project.
- Plan for safety in adverse weather situations.
- Arrange field trips for younger members.
- Build a club weather station or a station for another club, such as a Boy or Girl Scout club, etc.
- Demonstrate weather equipment.
- Create games to teach younger 4-H'ers about weather.
- Prepare displays on weather satellites.
- Try amateur forecasting.
- Build a library of materials on weather.
- Conduct evaporation studies.
- Prepare studies and displays on weather out of control (storms, etc.).
- Conduct weather experiments.
- Invite a local radio or TV weather reporter to give a demonstration, perform experiments, or answer questions at a club meeting
- Study El Nino and its effect on the world.
- Determine if and how weather patterns are changing over time.

- Barometric pressure: How does it affect humans and animals?
- Report on a specific weather phenomenon:
 - What are the effects of the moon and tides on weather?
 - Study storms: tornadoes, hurricanes, thunderstorms, blizzards, northern lights, etc.
 - What is global warming or the “greenhouse” effect?
 - How have changes in computer technology helped weather forecasters?

Photographs and other documentation are encouraged.



Suggestions for Volunteer Leaders

Workshops and Clinics

At a workshop or clinic, 4-H members work together to improve their skills or to solve problems under the leadership of a qualified person. Some workshop ideas are:

- How to keep accurate weather records
- Making weather equipment
- Explaining and doing several weather experiments
- Reading weather instruments
- Weather and its effects upon crops
- Constructing a club weather station
- Examining a U.S. weather map
- Plotting weather at various locations on a U.S. map
- Studying about weather satellites
- Learning safety steps for storms, floods, etc.
- Staging a mock demonstration of assisting tornado victims (first aid, etc.)
- Preparing fair exhibits

Group Planning

You will find that weather offers an interesting area in which to plan together. Planning with all the members enrolled in weather, or a representative committee, is an important key to enthusiasm and interest. Meetings will be more interesting, and better programs and trips will result, if members have been involved in the planning. Consider using committees, brainstorming sessions, group discussions, or any other interest finders you can think of to determine your weather topics for discussion and planning of tours.

Invited Speakers

Who in your community can answer your questions about weather? Perhaps it is someone who is not really well-known as a “speaker,” such as a college student, the high school science teacher, or a farmer. You will find that many people are interested in weather.

You need someone who can stretch your understanding of weather; someone who can stimulate the club’s thinking and answer questions for discussion. Many times the members in the club will have ideas and suggestions as to who can do this.

Internet and Libraries

A special committee might be appointed to compile references from the Internet or information from the library dealing with weather. The 4-H manuals list weather-related web sites.

You might make a browsing library and allow members to check out materials to take home and read. Bring materials to club meetings.

Action Demonstrations

Action demonstrations offer an excellent method of teaching and a tremendous way to increase the confidence of 4-H'ers. Club members can do an action demonstration at the county or state fair or exhibit their weather projects at a club meeting for parents, brothers, and sisters. Added interest can be attained if the club makes exhibits for a school or a store window. Even in their first year, members may exhibit at a community, township, or county fair. Other locations for exhibiting include schools, 4-H camps, Boy and Girl Scout camps, etc.

The following list will give you many ideas for weather demonstrations and/or experiments:

- Rain making
- How to construct a:
 - wind vane
 - rain gauge
 - anemometer
 - thermometer
 - hygrometer
 - psychrometer
- Atmosphere
- Sun
- Beaufort scale
- Importance of weather to a pilot
- Weather satellites
- Meaning of a weather map
- Weather industries
- Understanding humidity
- Winds
- Polar winds
- Weather map symbols
- High and low clouds
- Why does it rain, snow, hail, and sleet
- What makes it rain
- Thunder and lightning
- Effects of weather upon the accident rate
- How to construct a weather station
- Reading the clouds
- Formation of frost, dew, snow, rain, etc.
- Season of the year
- Water cycle
- Fog and smog
- How to read weather instruments
- Understanding highs and lows
- How to photograph the clouds
- Movement of fronts
- Topography and the weather
- Adventures of a raindrop
- How a thunderstorm forms
- Air masses
- Haze and smoke
- Radar
- Earth's atmosphere
- Tropical weather
- Polar weather
- Air conditioning
- Radiosonde

Action Demonstration Guidelines

Question: What is an action demonstration (action demo)?

Answer: An action demo is a fun way to share what you have learned in your 4-H project with others. It's a kind of "Show and Tell" but with more action. Action means that you can't just show the audience what you are doing, you must get the audience involved. An action demo is not like a regular demonstration where the audience sits and listens to a prepared talk. An action demo gets the audience involved.

Action demonstrations can be given anywhere there are a lot of people, such as a county or state fair, shopping mall, street fair, or any 4-H event. Your job as a demonstrator is to interest the audience in your topic so that they stop and learn something new or try their hand at what you are doing.

Question: How do I choose a topic for my action demo?

Answer: Suggestions for weather topics are given on the previous page. The topic should be something that you enjoy and are knowledgeable about. Consider the following questions when choosing a topic:

- Can you complete the action demonstration in three to five minutes?
- Can it easily be repeated over and over again to fill the assigned time?
- Is your action demo showing something that would interest the general public?
- Is there a good way to involve your audience in your action demo (“hands-on” or answering questions)?
- Can the supplies for the “hands-on” section be used over and over again, or will they need to be replaced? (Remember – if the materials must be replaced, it will cost more to do the demonstration.)
-

Question: How can I get the audience involved?

Answer: The first thing you need to do is be enthusiastic and attract people’s attention as they walk by your table. You might have a colorful tablecloth or poster to spark their interest. You might ask them a question, like: “Would you like to play this game?” or “Have you ever made pretzels? Would you like to try?” The best way to attract their attention is to have people around your table doing something. People love to do hands-on activities, so once you get a few people at your table, they will attract others.

Involve your audience by having them:

- Do what you are doing
- Do a “hands-on” section
- Judge the quality of various items
- Play a game
- Answer questions
- Remember – the key to a good action demo is getting your audience involved

Question: How long does my action demo have to be?

Answer: Your action demo may vary in length. But the demonstration itself should last only 3 to 5 minutes, because most people do not like to stop to watch very long presentations. Be prepared to repeat your action demo over and over again with different people during your assigned time.



Checklist for a Good Action Demo

Topic	Yes	No
Was the topic interesting to the general public, causing them to stop, watch, or participate?		
Did the topic stimulate questions from the audience?		
Was the topic of suitable length?		
Did the topic include something “hands-on” for the audience to do?		
Organizing the Content	Yes	No
Was the topic organized into short “show and tell” segments, which are done repeatedly?		
Were segments presented in logical order?		
Were segments explained so that the audience understands “why?”		
Was it evident that the 4-H'er was knowledgeable about the subject and could answer questions?		
Did visuals, pictures, posters, or actual objects clarify the important ideas?		
Presenting the Demonstration	Yes	No
Did the 4-H'er seem enthusiastic?		
Did the 4-H'er encourage the audience to become involved in the demonstration?		
Did the 4-H'er speak directly to the audience?		
Did the 4-H'er show evidence of practice and experience?		
Did the 4-H'er show that she/he enjoys talking to the audience?		
Did the 4-H'er show enthusiasm, friendliness, and a business-like manner?		
Did the 4-H'er tell about what they learned through this 4-H project?		
COMMENTS:		

Conducting Field Trips

Most 4-H members in weather enjoy hiking and collecting. Field trips are a method of sharing with others and of expanding your interests. You must be sure that your county Extension educator knows and approves of the field trip, and that the date and place for the field trip are on the county Extension calendar.

Safety is a major concern on all field trips. Safety is an important part of the weather project. Leaders should have these items at their disposal when on a field trip:

- First aid kit
- Comfortable hiking shoes and clothes, boots and raincoats for rain or snowy weather. (Do not avoid these conditions of weather. It is a fun time for youth and will stimulate many questions.)
- Written parental permission for tours

Preparation

Be sure you know the area well so you can stop for demonstrations and experiments. Point out things of interest. Make plans for moving from place to place.

Make sure authorities or owners give permission for the trip. Check for places of interest to explain. The space must be large enough for the group. Be sure to plan for rest stops. A tired group is more likely to have accidents.

It is always advisable to collect information, facts, materials, and information on parts of the field trip. Human interest items about the weather all help make a trip more interesting.

Checklist

- Be sure you have completed advance preparations.
- Walk or drive the trip beforehand and make plans for stops.
- Secure permission from authorities or landowners.
- Plan for safety.
- Be ready to begin ahead of time.
- Start on time.
- Set a good pace in walking to the observation stop.
- Talk in a loud voice and stop walking when talking to the group.
- Be sure that everyone can see the objects you are demonstrating or experimenting with.
- Make use of rest periods:
 - Conduct experiments.
 - Encourage questions.
 - Pass objects around so everyone can see.
- Be alert for things which happen that are of interest but not planned.
- Keep the group close together.
- Remain enthusiastic about the experiments, specimens and demonstrations.
- Encourage everyone on the trip to participate.
- At the conclusion of the trip, summarize the main points of the trip.

Suggestions for Field Trips

- Proper use and methods of using weather instruments
- Photography — stop to learn techniques for photographing clouds, etc.
- How an airport works
- How radar works
- Use of radiosonde
- Local observer's techniques
- How radio and TV stations arrive at a forecast
- Weather maps and symbols

Guide Sheet

It is always advisable to use a field trip guide sheet, as it can give an outline of your trip. However, care must be used to avoid using it as a check list and for not being aware of other things in the area or unexpected learning opportunities. A good guide can be used to:

1. Ask questions.
2. List directions for brief individual investigation or experiments.
3. Point out special things of interest.
4. Define words or give descriptive drawing.
5. Generate thought and discussion.
6. Call attention to safety practices.
7. Note problems and challenges.
8. Serve as a reference for future trips.

Report

You can gain from a brief report filled out by each member. Here's a guide:

Name _____ Date _____
Area or location of trip:
Observations:
Summary:
Suggestions for future trips, club meetings, etc.:

Construction of a Weather Station

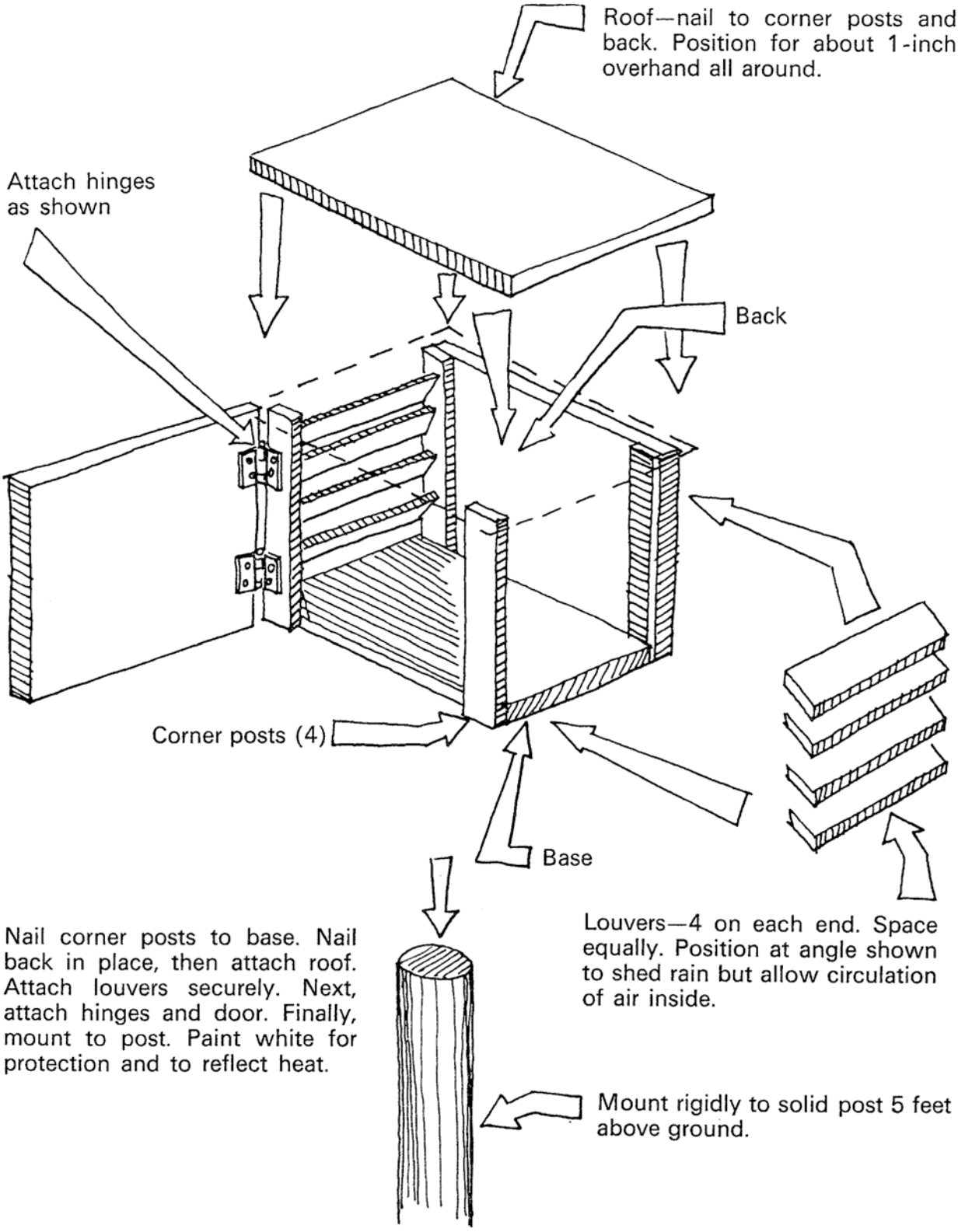
Weather instruments need protection from the various weather conditions. Rain might ruin some, while wind and sun may damage others. Here is a list of materials and a diagram for assembling the station shown on the next page:

Side	Lumber needed
bottom	1 piece 3/4-inch plywood (12 inches by 20 inches)
top	1 piece 1/2-inch plywood (14 inches by 22 inches)
front and back	2 pieces of 1/2-inch plywood (15 inches by 20 inches)
side posts	4 pieces of 1 by 2's (15 inches long)
side louvers	8 pieces of 1 by 2's (10 and 3/4 inches long)
Hardware needed:	
1 pair hinges 1/2-inch flathead wood screws as needed for hinges 1 hook and eye 1/2 lb. of #8 (common) nails white exterior paint	

Credit: Building a Weather Station, Norton Stromman, State Climatologist, ESSA

Locating your weather station

The location of a weather station can affect the readings of the instruments. The area you choose for your station should be on level soil or near the crest of a slope. Do not locate the station in a slight depression if you can prevent it. Locate the station at a distance from major obstructions such as buildings and trees, equal to two or three times the obstruction's height. Grass cover is best. Keep the grass neatly clipped at all times.



Nail corner posts to base. Nail back in place, then attach roof. Attach louvers securely. Next, attach hinges and door. Finally, mount to post. Paint white for protection and to reflect heat.

Louvers—4 on each end. Space equally. Position at angle shown to shed rain but allow circulation of air inside.

Mount rigidly to solid post 5 feet above ground.



Careers that Require a Knowledge of Weather

A degree or interest in meteorology (weather) can be combined with a degree in another major subject for interesting careers. Among these subject areas are:

- Aerospace engineering — Aircraft and spacecraft design problems.
- Agriculture — Weather and climate applied to the growing of crops, including forests.
- Agricultural engineering — Engineering solutions in agriculture.
- Astronomy — Studies of planetary atmospheres and related problems in astrophysics.
- Biology — Study of effects of atmosphere on living things, including the physiological and psychological effects of “weather” on man. This broad field is called *biometeorology*.
- Civil engineering — Studies in water resources and environmental engineering.
- Electrical engineering — Instrument design problems in atmospheric science; radio and radar meteorology.
- Geology — Studies in paleoclimatology (early climates) ; wind and water deposition of sediments; weathering effects on geological structures.
- Journalism — Responsible and knowledgeable reporting of studies in atmospheric science; editing; abstracting; information retrieval.
- Mathematics — Computer programming; objective analysis and numerical forecasting.
- Oceanography — Studies of air-sea interactions.



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