

SEVERE WEATHER AWARENESS

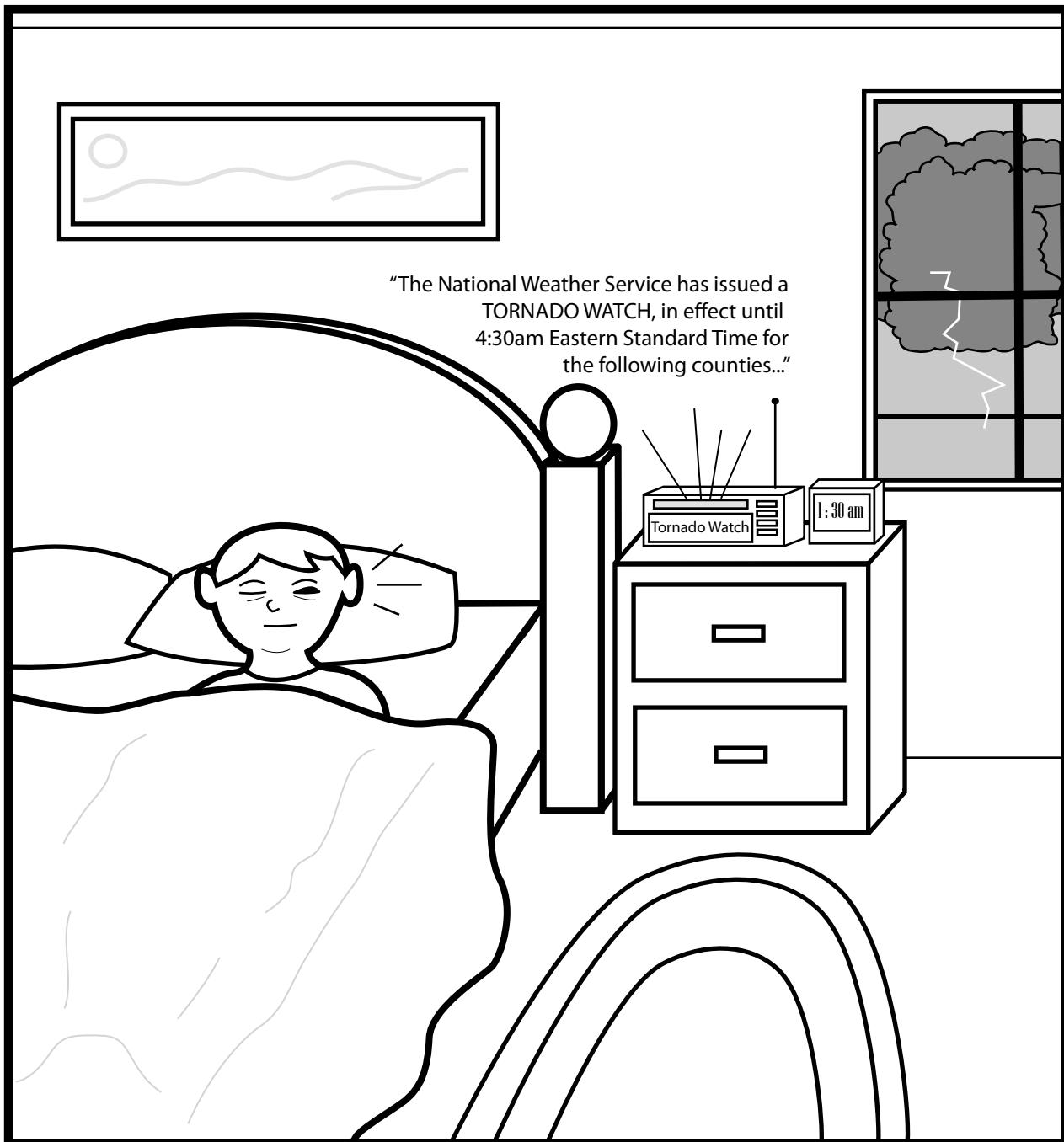
CHILDREN'S ACTIVITY BOOK



**STAY INFORMED
ABOUT THE STORM**



**INDIANA DEPARTMENT OF
HOMELAND SECURITY**



NOAA Weather Radios

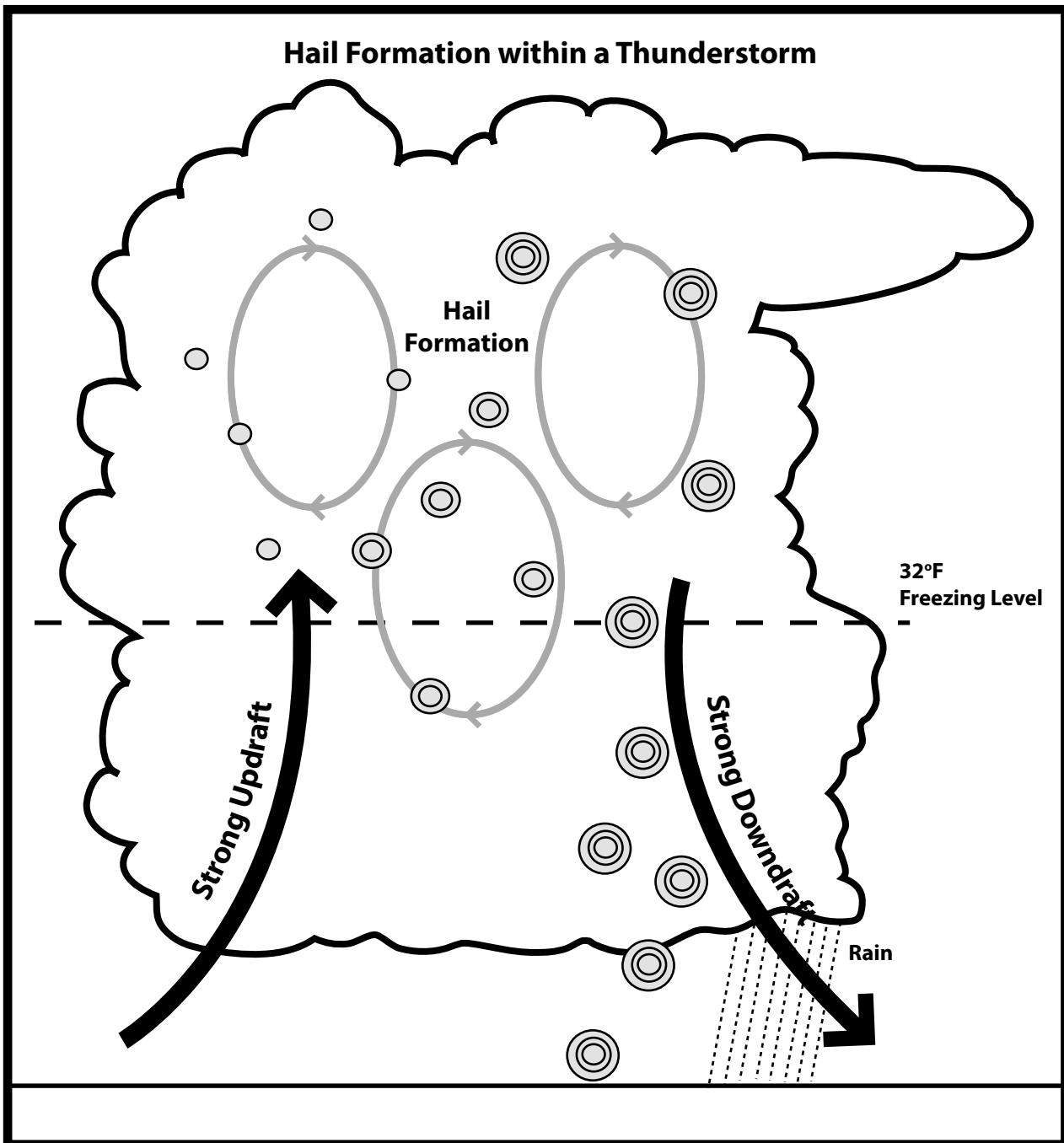
A NOAA weather radio (or all-hazard radio) is a great way to stay informed about the changing conditions around you. The radios can be programmed to alert you and your family about possible threatening conditions where you live. Weather radios are especially good to have around when you are asleep and unable to hear important messages that might be broadcast on TVs and radios. There are NOAA weather radios available that allow you to receive watches and warnings for counties you specifically select - look for radios that use the S.A.M.E. system. Weather radios are another way to be sure you and your family are safe - every household should have one!

EASY



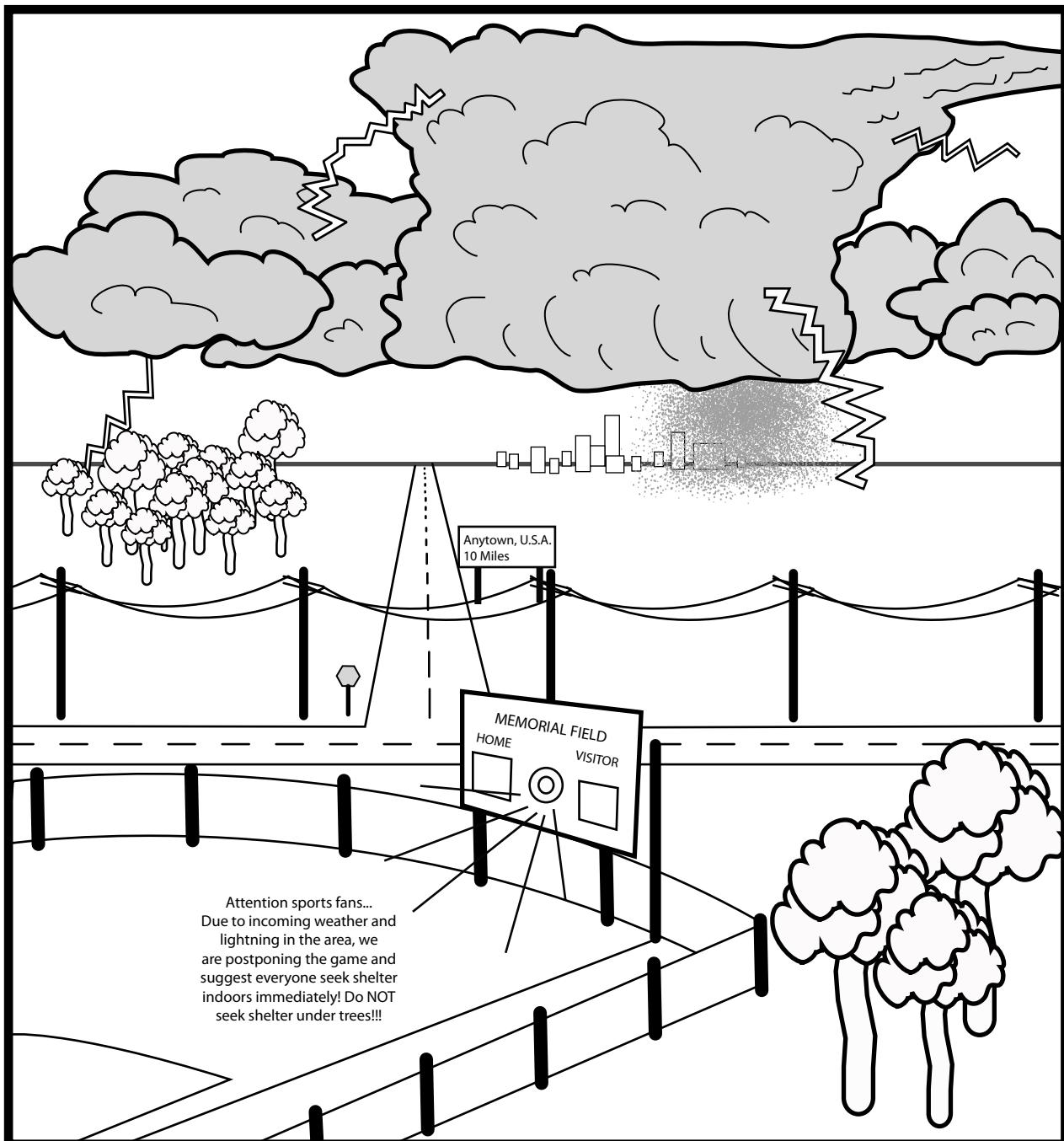
FIND THE WORDS LISTED BELOW IN THE PUZZLE ABOVE.
WORDS CAN BE FOUND UP, DOWN AND STRAIGHT ACROSS. GOOD LUCK!

ANVIL	LIGHTNING	SEVERE	THUNDERSTORM
CLOUD	LOW	SHELTER	TORNADO
FEMA	NWS	SKY	WARNING
HAIL	RADAR	SPOTTER	WATCH
HIGH	RAIN	SUPERCELL	WEATHER
HUMIDITY	SAFETY	THUNDER	WIND



Hail Formation

Hail can be dangerous and damaging. Hail causes about \$1,000,000,000 (1 billion) in crop and property damages each year in the United States! Hail forms inside strong thunderstorms that have strong updrafts and strong downdrafts (updrafts and downdrafts refer to strong currents of air). Tiny water droplets can get picked up by the updraft and carried above the freezing level (where water changes to ice) and the droplet freezes. The hailstone can continue to pick up additional mass as it passes back and forth from warm to cold air inside the storm. In the warmer layers of air raindrops coat the hailstone and freeze as it is carried back up above the freezing level by the updraft. This process can happen many times, each time adding another layer of ice to the hailstone. Once the hailstone becomes too heavy to be supported by the updraft it will fall to the ground. You can often see several rings or layers of ice on hailstones.



Lightning Safety

Lightning is very dangerous! There are an estimated 25,000,000 lightning strikes each year in the United States! When you are outdoors be sure to watch for developing thunderstorms. If you can hear thunder you are close enough to be struck by lightning! Lightning can travel as far as 10 miles away from the thunderstorm that produced it. If you are outdoors go inside and stay away from corded phones, computers and other electronic devices that are connected to power. Stay out of swimming pools, bath tubs, showers and other water and away from plumbing. Never seek shelter under trees! If you cannot get to a shelter stay low to the ground on the balls of your feet with your head tucked, but NOT laying flat. Wait at least 30 minutes after the last lightning strike before going outdoors again. If a person is struck by lightning call 9-1-1 immediately!

UNSCRAMBLE THE WEATHER-RELATED WORDS. THEN MATCH THE HIGHLIGHTED LETTER FROM EACH WORD WITH THE CORRECT NUMBERED BOX AT THE BOTTOM TO SPELL OUT THE MESSAGE.

1 TTDH RROESNUM

2 NIWD

3 TIINNGGLH

4 DRARA

5 OTONDRA

6 RHSTLEE

7 LIHA

8 STSERADI TKI

9 GROOOTMYEEL

10 UNREHTD

11 NROODAT YLLEA

12 NRSIE

13 TACHW

14 NIR A

15 GRWNNAI

16 ETRAHWE ODRIA

17 YTFESA

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12

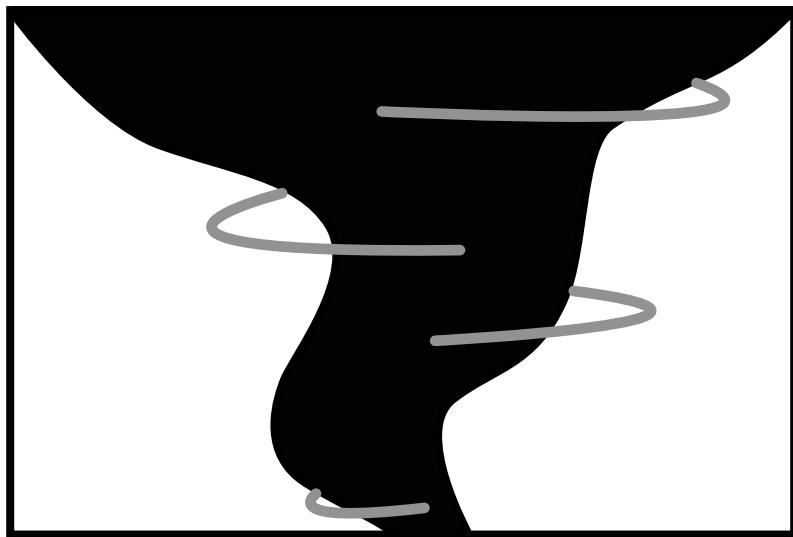
3

16

15

9

SEVERE WEATHER



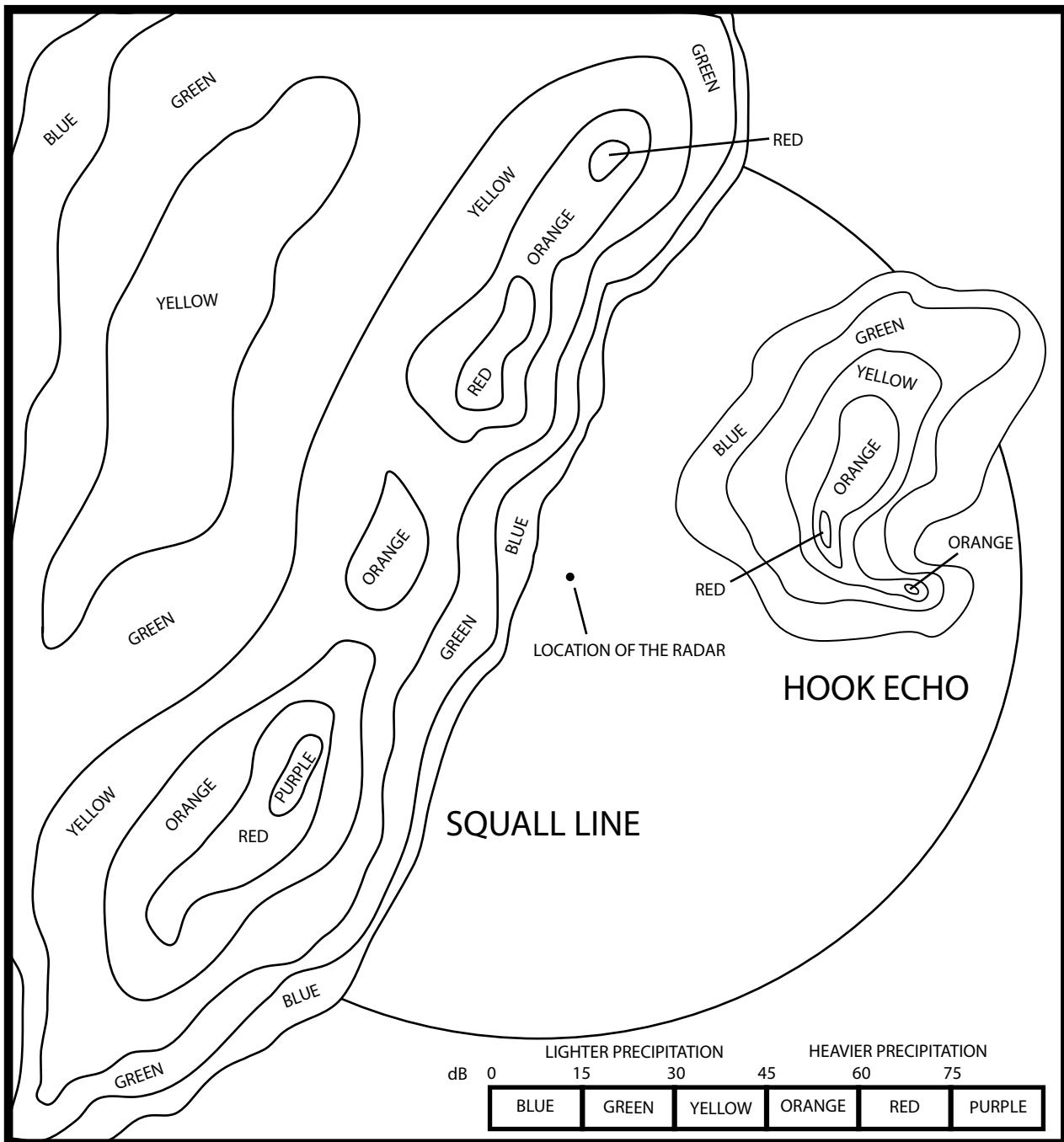
SHELTER AREA

Shelters in Public Places

Severe weather doesn't always happen when you are at home or school. Most large public facilities have severe weather plans as well as shelters or locations within them for your safety. Some places, such as shopping malls, have signs posted that are similar to the one above showing you the way to the severe weather shelter. The next time you are out in a public building like a mall or museum, look around and see if you can locate the severe weather shelter.

If there is no sign posted for a shelter, where do you think the safest place would be?

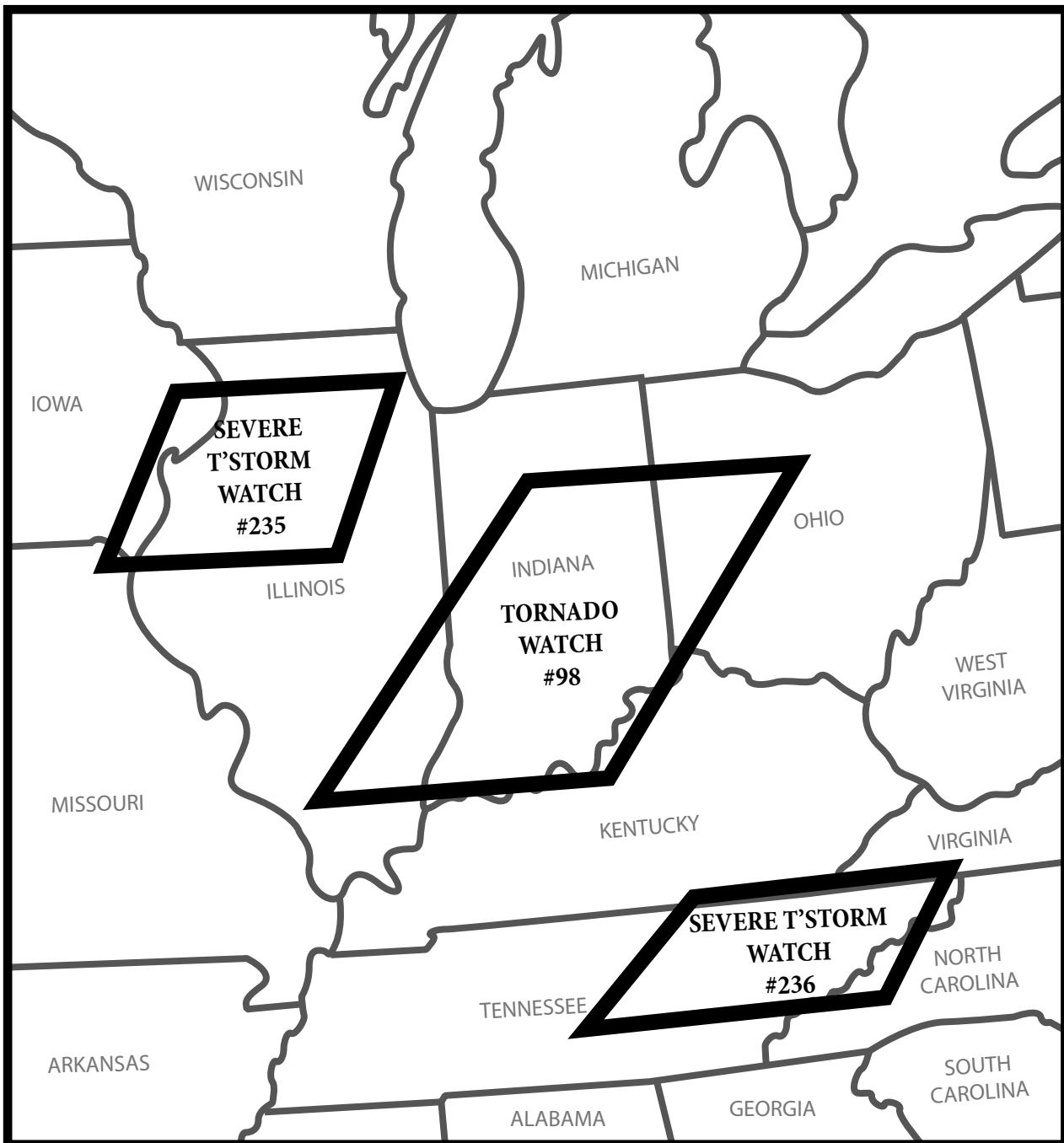
Write your answer here: _____



Color the Radar

Radar is used by the National Weather Service to help detect precipitation. Precipitation is another word for water or liquid. For example, precipitation may fall from clouds as rain or snow. Radar measures precipitation as reflected energy and measures the energy in a unit called decibels (or dB for short). Radar can help detect incoming severe weather. Squall lines and hook echoes can produce severe weather and tornadoes. The National Weather Service uses radar everyday to help issue watches and warnings.

Can you color in the pictures above by matching the colors correctly? When you are done you will be able to see examples of what squall lines and hook echoes might look like on radar.

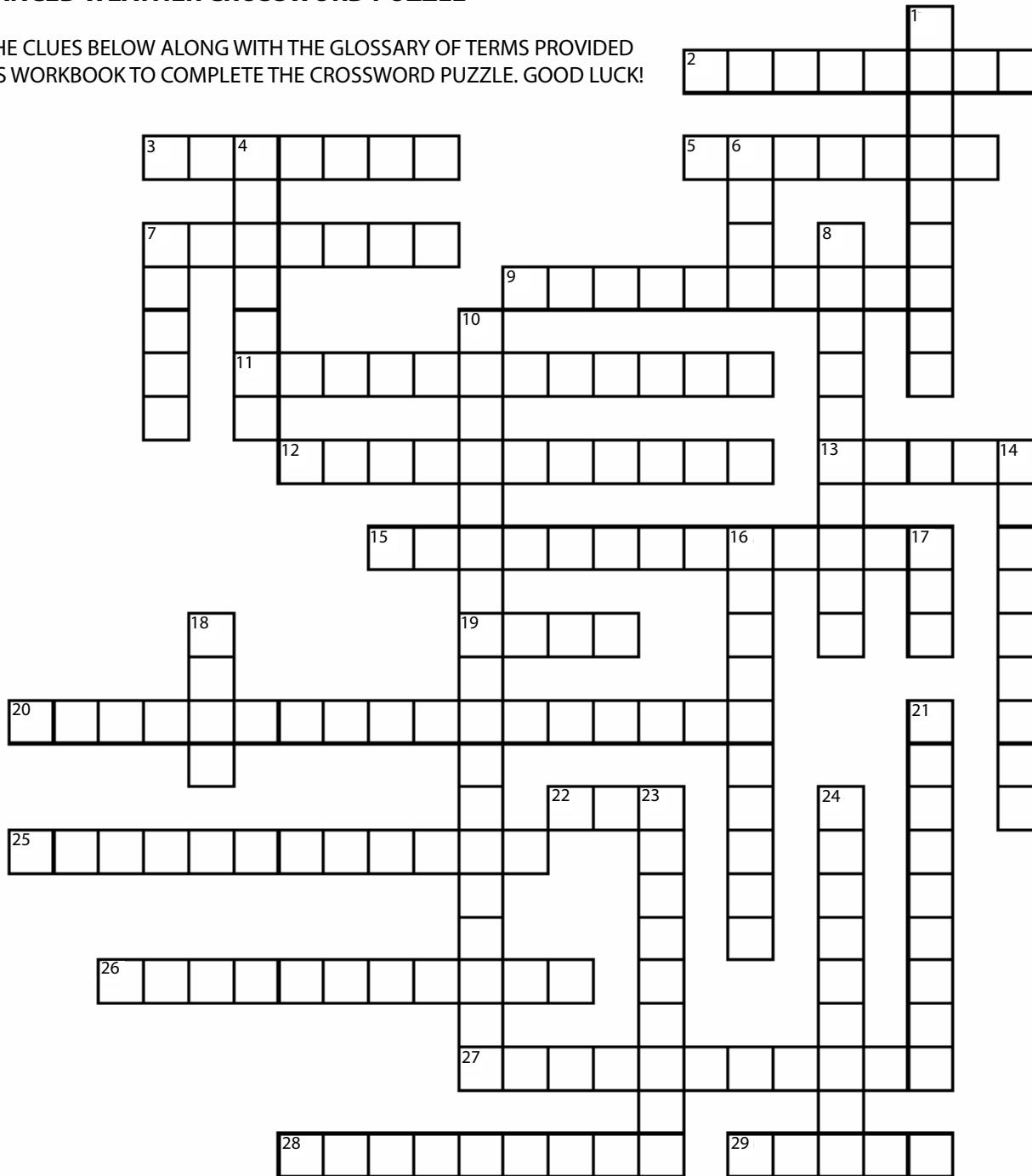


Watches

The Storm Prediction Center (SPC) is the agency responsible for issuing severe thunderstorm and tornado watch boxes in the United States. Watch boxes identify areas that are at risk for hazardous weather; however the exact timing and location of the event is still uncertain. Watch boxes are intended to make the public aware of the risk for hazardous weather and provide lead time for those who need to prepare for such an event. Watch boxes are given their own number as an identifier. Each watch box is accompanied by a text message that gives details about the watch. You can receive details about a watch either online (by going to www.spc.noaa.gov or www.nws.noaa.gov), by listening to a NOAA all-hazard radio, by tuning to your local television weather station or news station(s), or by listening to a local radio station (most media outlets alert the public when there is a threat for hazardous weather).

ADVANCED WEATHER CROSSWORD PUZZLE

USE THE CLUES BELOW ALONG WITH THE GLOSSARY OF TERMS PROVIDED IN THIS WORKBOOK TO COMPLETE THE CROSSWORD PUZZLE. GOOD LUCK!



ACROSS

- 2 Known as the force exerted by the interaction of the atmosphere and gravity.
- 3 Air that flows outward from a thunderstrom.
- 5 Sound produced when lightning heats the air causing it to rapidly expand.
- 7 This is issued by the National Weather Service when a hazard is imminent or already happening.
- 9 A _____ may extend for hundreds of miles.
- 11 _____ determines whether atmospheric motion is toward or away from the radar.
- 12 This rotating, cone-shaped column of air extends downward from the base of a thunderstorm.
- 13 You would find this elongated cloud shape at the top of a thunderstorm.
- 15 _____ can be liquid or solid water particles.
- 19 Also known as an 'anticyclone'.
- 20 These can cause damage in a straight line instead of a more circular pattern like tornadoes.
- 22 Also known as a 'cyclone'.
- 25 A storm with lightning and thunder.
- 26 The rotating updraft in a thunderstorm.
- 27 The study of the atmosphere and atmospheric phenomena, or events.
- 28 The forward edge of a mass of cold air intruding into an area of warmer air.
- 29 Radio Detection and Ranging.

DOWN

- 1 This type of thunderstorm can take on a "hook-like" shape.
- 4 A _____ does not require the visible presence of a funnel cloud from cloud base to ground.
- 6 This type of showery precipitation falls from a cumulonimbus cloud.
- 7 This forecast is issued in advance to alert the public of the possibility of a particular hazard.
- 8 Working to lessen risk by lowering its chances of occurring or by reducing its effects if it does occur.
- 10 Wind gusts greater than 58 miles per hour and/or hail equal to or larger than 1" in diameter.
- 14 An electrical discharge from a thunderstorm.
- 16 This is made up of mostly oxygen and nitrogen.
- 17 National Weather Service.
- 18 Liquid water droplets that fall from the atmosphere.
- 21 Federal _____ Management Agency.
- 23 The forward edge of a mass of warm air intruding into an area of cooler air.
- 24 This indicates the updraft of or the inflow into a thunderstorm.

Anvil - A flat, elongated cloud formation at the top of a thunderstorm.

Atmosphere - The gaseous envelope surrounding the earth, made up of mostly oxygen and nitrogen.

Cold front - The forward edge of a mass of cold air intruding into an area of warmer air. The cold front forces the warmer air to rise, where its moisture cools, condenses and forms rain.

Doppler radar - A type of weather radar that determines whether atmospheric motion is toward or away from the radar. It uses something called the "Doppler effect" to measure the speed, or velocity, of particles suspended in the atmosphere.

Federal Emergency Management Agency (FEMA) - The federal agency responsible for providing leadership and support to reduce the loss of life and property and to protect our institutions from all types of hazards.

Funnel cloud - A rotating, cone-shaped column of air extending downward from the base of a thunderstorm, but not in contact with the ground. When it reaches the ground it is then called a tornado.

Hail - Showery precipitation in the form of circular or irregular-shaped lumps of ice more than 5 millimeters in diameter and falling from a cumulonimbus cloud.

High - The center of an area of high pressure, accompanied by anticyclonic (or clockwise turning) and outward wind flow in the northern hemisphere. Also known as an anticyclone.

Lightning - An electrical discharge from a thunderstorm.

Low - The center of an area of low pressure, accompanied by cyclonic (or counterclockwise) and inward wind flow in the northern hemisphere. Also known as a cyclone.

Mesocyclone - The rotating updraft (upward rising of air) in a thunderstorm.

Meteorology - The study of the atmosphere and atmospheric phenomena or events.

Mitigation - Working to lessen risk by lowering its chances of occurring or by reducing its effects if it does occur.

National Weather Service (NWS) - One of six scientific agencies that make up the National Oceanic and Atmospheric Administration (NOAA) of the US government. NWS is responsible for issuing hazardous weather products such as watches, warnings and advisories in order to protect the public.

Outflow - Air that flows outward from a thunderstorm.

Precipitation - Liquid or solid water particles that fall from the atmosphere and reach the ground.

Pressure - The force exerted by the interaction of the atmosphere and gravity. Also known as atmospheric pressure.

Radar - An instrument used to detect precipitation by measuring the strength of the signal that is reflected back by the particles in the atmosphere. RADAR = RAdio Detection And Ranging.

Rain - Liquid water droplets that fall from the atmosphere.

Severe thunderstorm - A strong thunderstorm with wind gusts greater than 58 miles per hour and/or hail equal to or larger than 1" in diameter.

Squall line - A solid or nearly solid line of thunderstorms or strong winds that may extend for hundreds of miles.

Straight line winds - Thunderstorm winds most often found with the gust front, or leading edge of a thunderstorm downdraft. They can cause damage which occurs in a "straight line" instead of in a more circular pattern like tornadoes might cause.

Supercell - A highly organized thunderstorm with a rotating updraft, known as a mesocyclone. It poses a high threat to life and property and often produces large hail, strong winds and tornadoes. Some supercell thunderstorms take on a "hook like" shape.

Thunder - The sound produced as lightning heats the air causing it to rapidly expand.

Thunderstorm - A storm with lightning and thunder. It is usually associated with gusty winds, heavy rain and sometimes hail and tornadoes.

Tornado - A violently rotating column of air below the base of a thunderstorm and in contact with the ground. A tornado does not require the visible presence of a funnel cloud from cloud base to ground.

Wall cloud - A cloud lowering beneath the base of a thunderstorm. Wall clouds indicate the updraft (or rising of air) of, or the inflow into, a thunderstorm.

Warm front - The forward edge of a mass of warm air intruding into an area of cooler air.

Warning - A warning is issued when a particular hazard is "imminent" or already happening. Examples would include tornado warnings and severe thunderstorm warnings.

Watch - A forecast issued in advance to alert the public of the possibility of a particular hazard. Examples would include a tornado watch and severe thunderstorm watch.



FIND THE WORDS LISTED BELOW IN THE PUZZLE ABOVE.

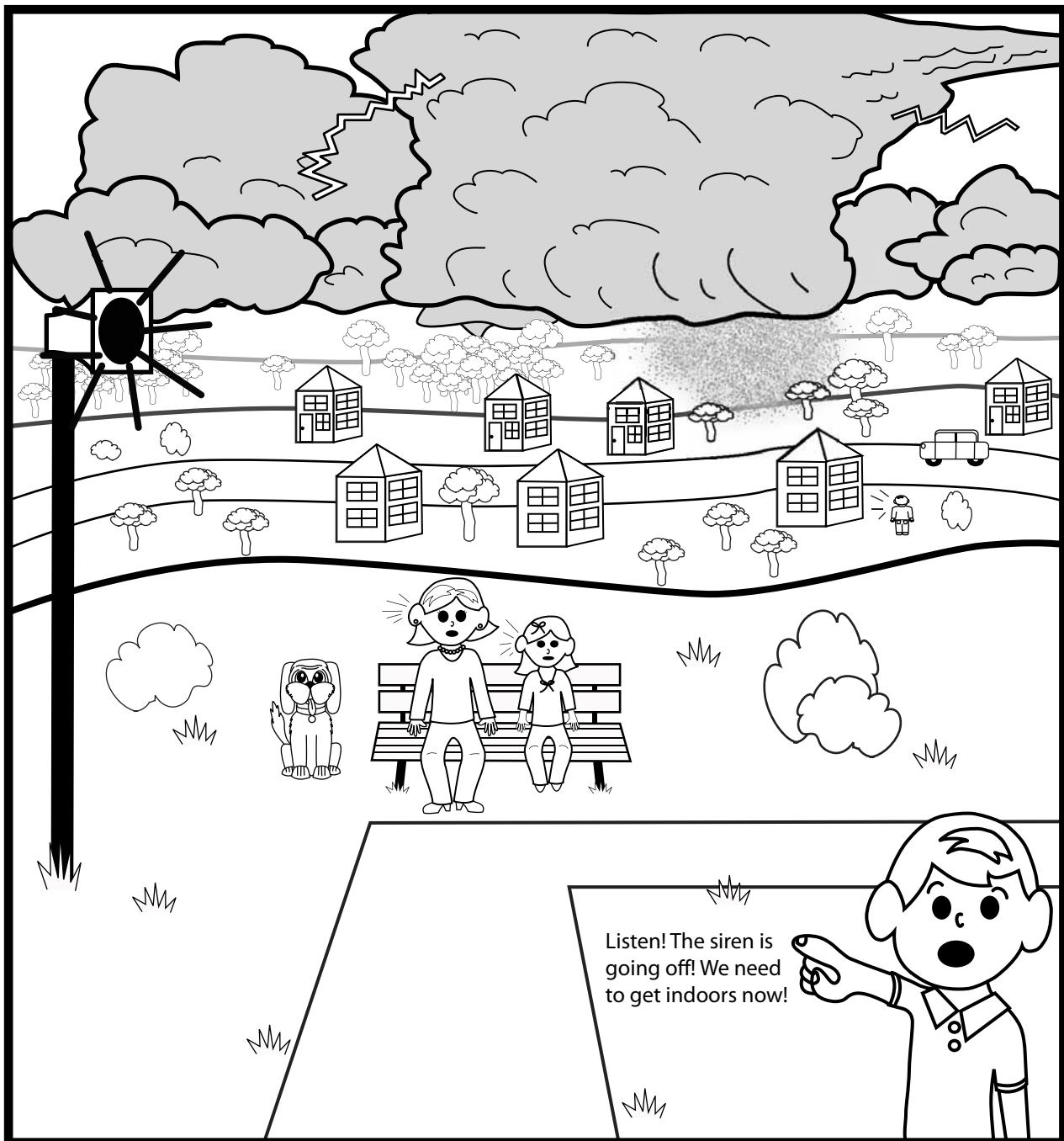
WORDS CAN BE FOUND UP, DOWN, STRAIGHT ACROSS OR DIAGONALLY. GOOD LUCK!

ANVIL	FEMA	OUTBREAK	SUPERCELL
AWARENESS	FLASH	PETS	TELEVISION
BICYCLE HELMET	GREEN SKY	RAIN	THUNDER
CLOUDS	HAIL	REPORT	THUNDERSTORM
COLD FRONT	INTERIOR ROOM	SAFETY	TORNADO
DAMAGE	LIGHTNING	SEVERE	WALL CLOUD
DEBRIS	MICROBURST	SHELTER	WARM FRONT
DITCH	MITIGATE	SQUALL LINE	WARNING
ELECTRICITY	NATIONAL WEATHER SERVICE	STORM PREDICTION CENTER	WATCH
FAMILY DISASTER KIT	NOAA WEATHER RADIO	STRAIGHTLINE WIND	WEATHER



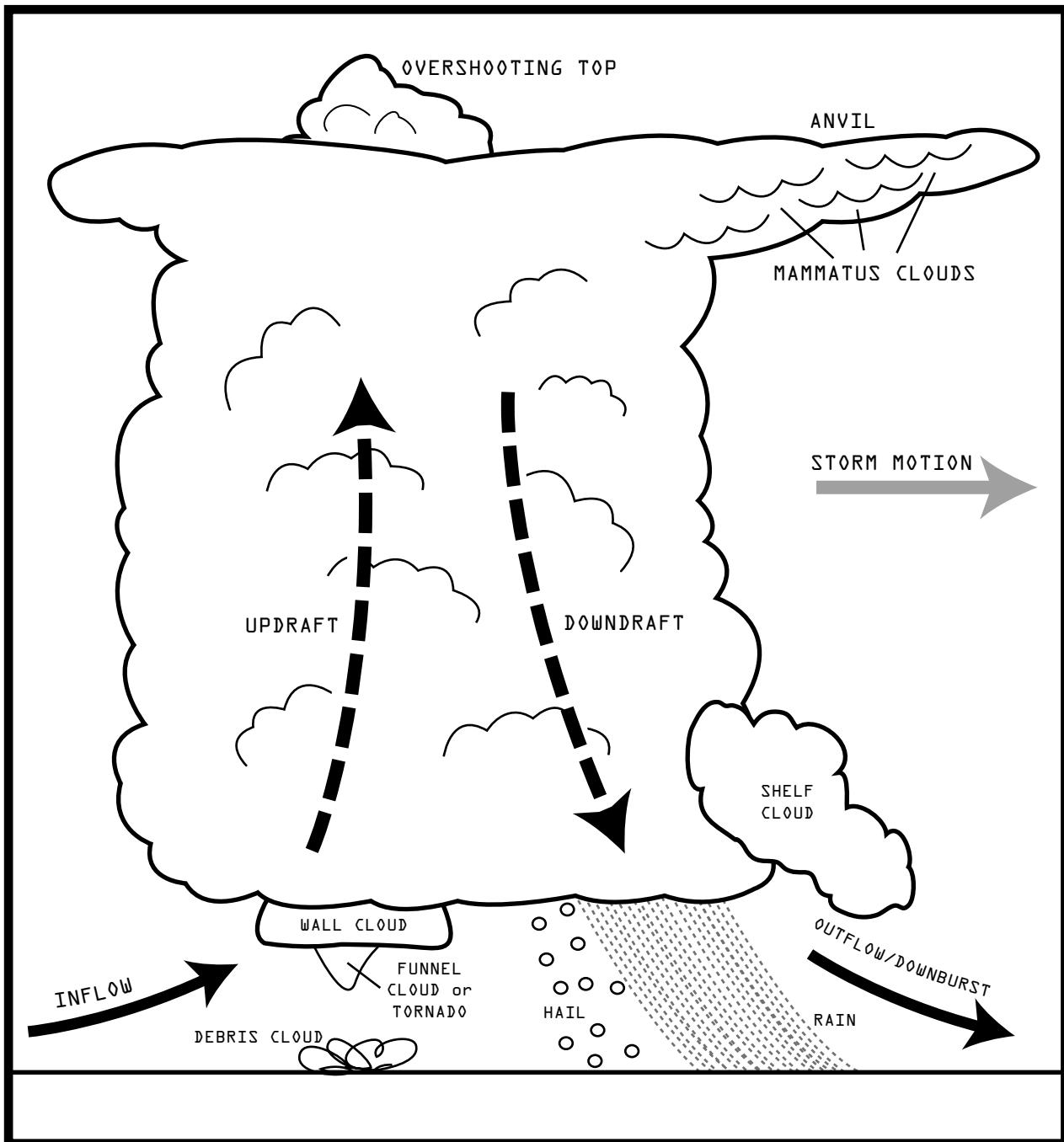
Tornadoes

Tornadoes are violently rotating columns of air with a circulation that reaches the ground. Tornadoes almost always begin as a funnel that forms under a wall cloud. Some say that tornadoes sound like a "freight train" (or other loud roaring noise). On a local scale, tornadoes are the most destructive type of atmospheric event. There were 1092 confirmed tornadoes in the United States in 2007 according to the Storm Prediction Center (SPC). It is important that you seek shelter in the safest place possible during a tornado. Most deaths that are associated with tornadoes are the result of being struck by flying debris. Be sure to review your emergency plan and know where the safest place is in your home as well as the buildings you visit frequently, like schools and shopping malls.



Outdoor Warning Sirens

Most communities have outdoor warning sirens. You may even hear them being tested on a regular basis to ensure they work properly. Outdoor warning sirens are meant to warn those who are outdoors and cannot see or hear important messages, such as warnings issued by the National Weather Service that may come across radios or televisions. If you are outdoors and hear a siren going off, you should seek shelter immediately and monitor conditions around you - turn on your radio or television, or check your NOAA all-hazard radio if you have one. Outdoor warning sirens are NOT meant to warn those indoors. Sometimes, you can hear them indoors if you are close enough, but do NOT rely on outdoor warning sirens as your primary method of getting warnings when you are inside. Be alert and monitor weather conditions regularly!

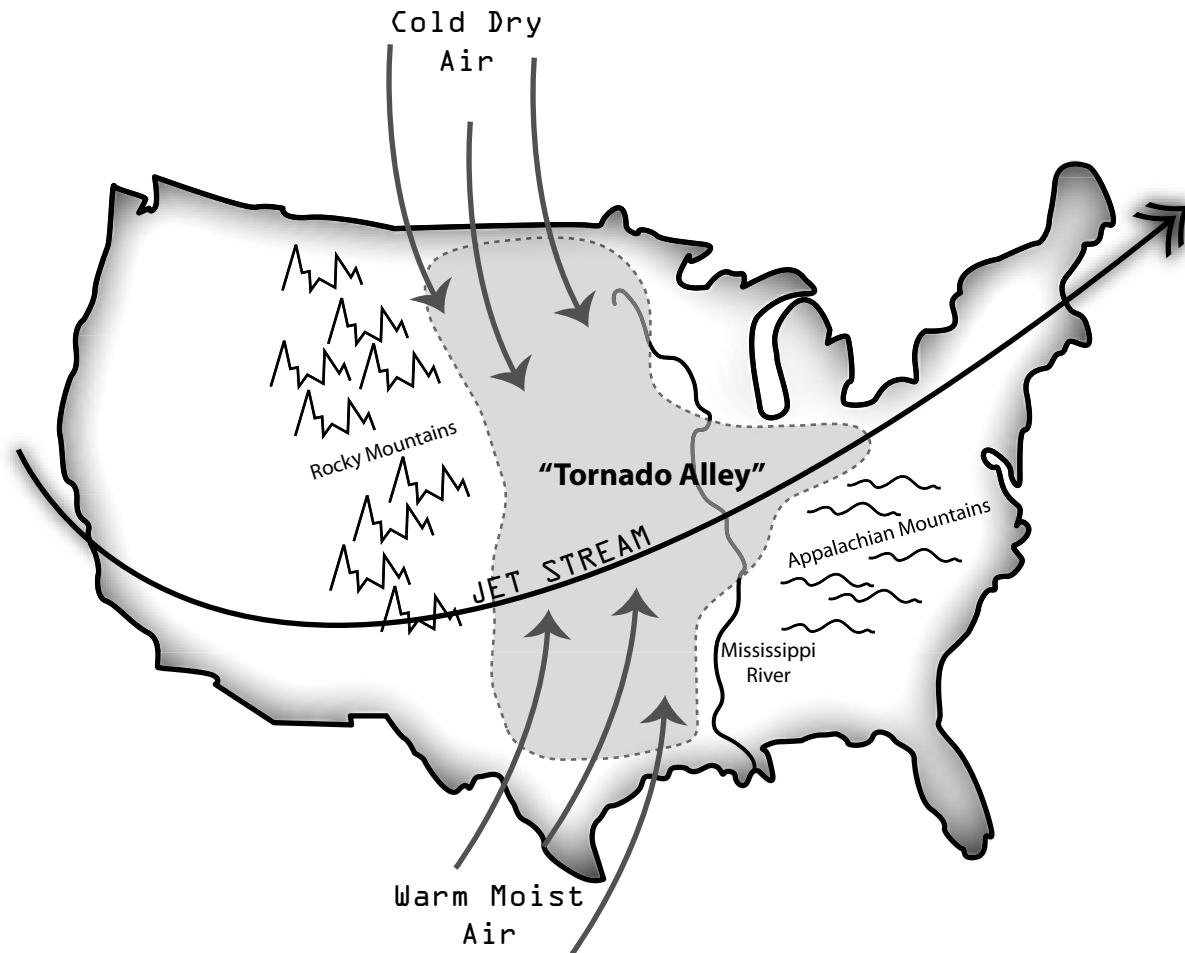


Thunderstorms

Tens of thousands of thunderstorms occur each year in the United States. There are three main types of thunderstorms: single-cell thunderstorms (like "pulse" thunderstorms), multi-cell thunderstorms/multi-cell clusters (like squall lines), and supercell thunderstorms. Most thunderstorms are not severe in nature. Supercell thunderstorms produce nearly all the significant tornadoes that occur in the United States. The diagram above shows what a supercell thunderstorm looks like.

In order for a thunderstorm to be considered "severe" by the National Weather Service, it must either produce hail that is 1" or larger in diameter, have winds of 58 miles per hour or stronger, or produce a tornado.

Classic "Tornado Alley" did not include portions of the Midwest extending east of the Mississippi River. Today, some scientists consider these areas part of the current "Tornado Alley" region.



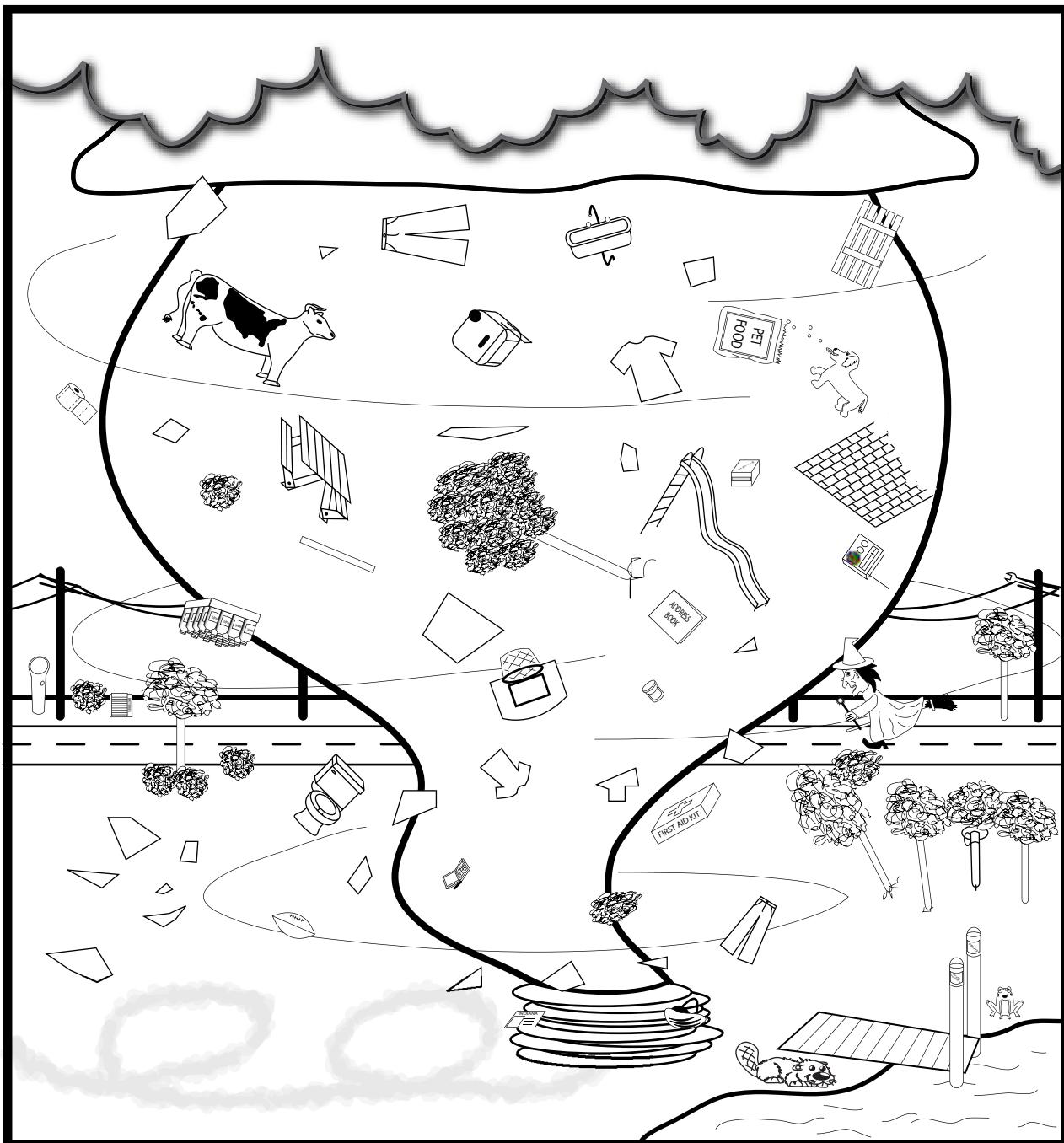
Enhanced Fujita (EF) Scale for Tornado Damage
(3-second wind gusts measured in miles per hour (mph))

<u>EF 0</u>	<u>EF 1</u>	<u>EF 2</u>	<u>EF 3</u>	<u>EF 4</u>	<u>EF 5</u>
65 - 85	86 - 110	111 - 135	136 - 165	166 - 200	Over 200

"Tornado Alley"

Tornadoes typically occur when cool, dry air from Canada moves down the front range of the Rocky Mountains and meets with warm, moist air being drawn north from the Gulf of Mexico. The high speed, high altitude winds, or jet stream, play an important role in formation and movement of weather.

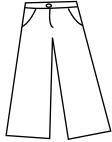
"Tornado Alley" most commonly refers to the area in the central United States where the highest frequency of tornadoes occur. Although no state is immune to tornadoes, most tornadoes typically touchdown between the Rocky Mountains and the Appalachian Mountains. Tornadoes have occurred in every month of the year. Tornado strength, or intensity, is determined by using the Enhanced Fujita Scale for tornado damage.



Can You Find the Family Disaster Kit Supplies in the Tornado?



Be sure to have at least one change of clothes for each person in your family. (Find 2 shirts and 2 pairs of pants.)



Be sure you have plenty of water for everyone.



Be sure to have an identification card.



Be sure to have a first aid kit.



Have plenty of food for everyone (Find 2 cans of food.)



Bicycle helmets are a great way to protect your head from flying debris.



Keep at least one flashlight handy.



Don't forget the extra batteries!



It's a good idea to have candles ready in case power goes out.



Keep some matches in a water-proof bag.



A wrench comes in handy when there's a gas leak.



Every home should have a NOAA Weather Radio to get the latest weather information.



Don't forget about your pets! Be sure they have food, too!



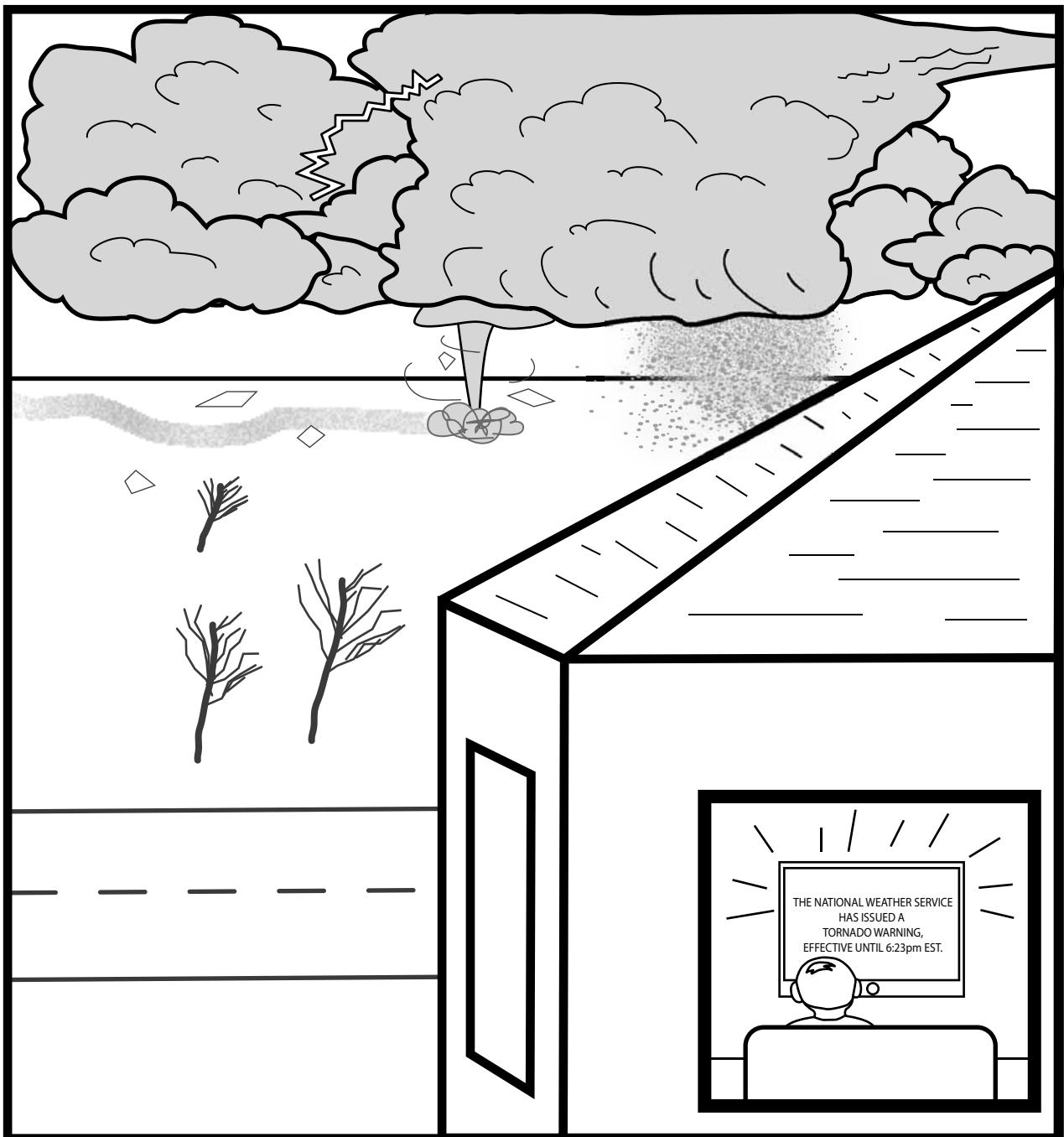
An address book with emergency contact information in it is great!



A cellular phone is helpful if power goes out.

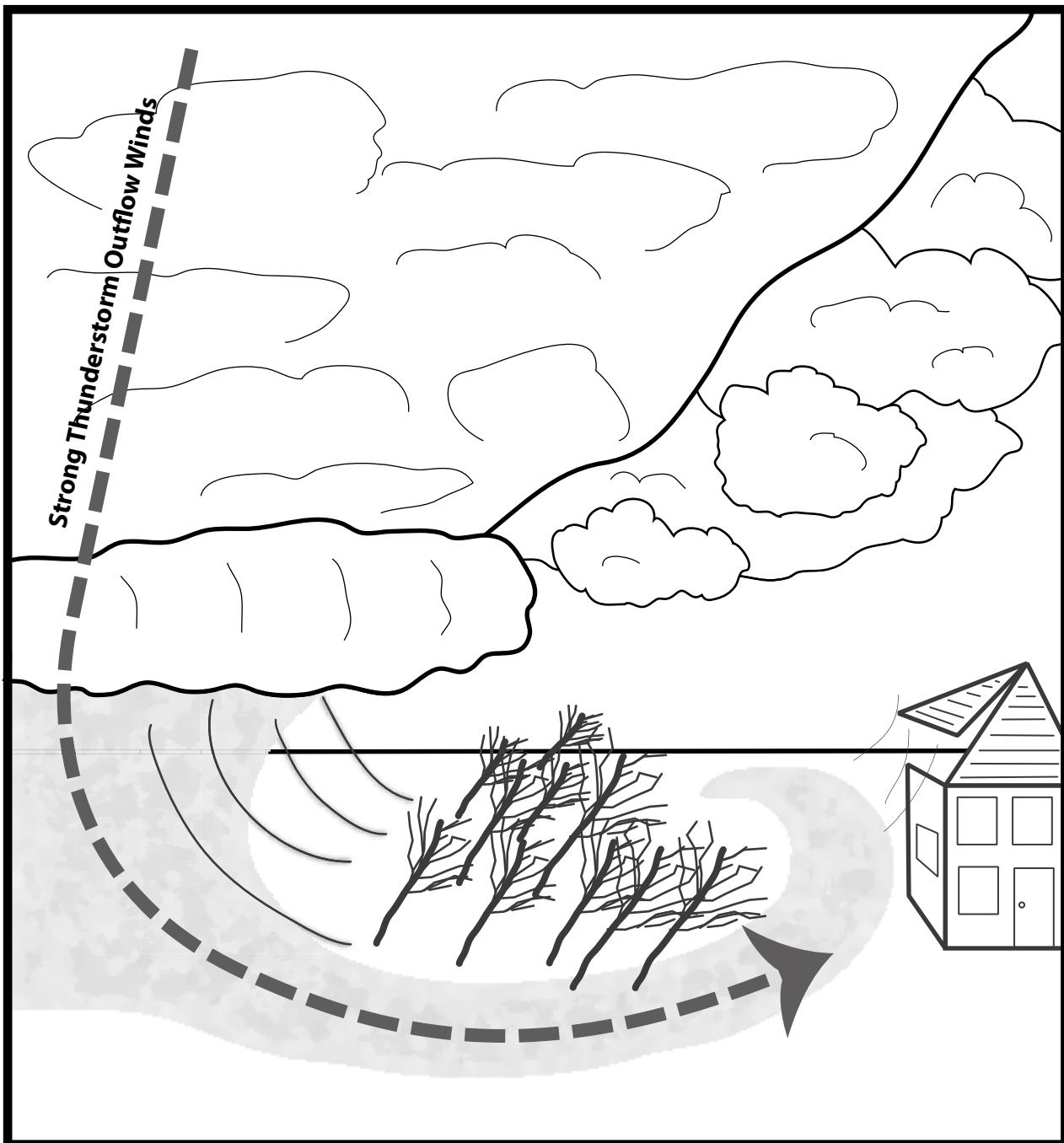


Don't forget to keep an extra supply of prescription medications in your kit.



Warnings

The National Weather Service (NWS) issues severe thunderstorm and tornado warnings. A warning means that a particular hazard is imminent or already happening. Warnings are issued for events that pose a threat to life or property. If you hear that a severe thunderstorm or tornado warning has been issued, seek shelter immediately! Implement your emergency plan and take shelter on the lowest level of the building or house you are in. If you don't have a basement seek shelter in an interior room with no windows, putting as many walls between you and the outside as possible. If you are outdoors or in a car and cannot seek shelter indoors, lay face-down in a ditch and cover your head and neck with your arms and hands. Do NOT seek shelter under highway overpasses!



Straight-line Winds

Straight-line winds are the cause of most thunderstorm wind damage - not tornadoes. Strong outflow winds from a thunderstorm can reach speeds of over 100 miles per hour! Winds that strong can cause serious damage over a large area. Downbursts are one type of straight-line wind; downbursts are pockets of rain-cooled air flowing out of a thunderstorm that upon hitting the ground spread out. Straight-line winds are often associated with squall lines (lines of thunderstorms) too. Meteorologists often look for a "bow" shape, or curvature in the squall line to identify areas of stronger winds. Straight-line winds can be very dangerous - in fact they can be just as dangerous as tornadoes!

What Should YOU Do?

Use this page to reference what you should do for each situation.

Severe Thunderstorm or Tornado WATCH:

Turn on your television or radio, check your NOAA weather radio, or go online to www.spc.noaa.gov or www.nws.noaa.gov to find out the details of the watch that was issued. Be alert of changing weather conditions.

Severe Thunderstorm or Tornado WARNING:

Act NOW! Hazardous weather is ongoing. Implement your family plan and seek shelter immediately. If you have a radio, television or NOAA weather radio that is accessible in your shelter/safe room you should monitor the situation and wait for the "all clear" that the weather has passed to resume activities.

Thunder and Lightning:

If you can hear thunder you are close enough to be struck by lightning! If you are outdoors seek shelter in a sturdy building. Do not seek shelter in small sheds, under trees, or in convertible automobiles. Stay out of water (like swimming pools & lakes). If you are outdoors and cannot seek shelter indoors be sure to stay away from tall objects like towers, fences, light poles and trees and stay low to the ground on the balls of your feet with your hands over your ears and your head tucked between your knees - DO NOT lie down; a hard-top automobile with the windows rolled up can provide some protection if needed. If you are indoors stay away from plumbing (for example do not take a shower or bath), stay off the telephone and computer, and turn off/unplug all non-essential appliances that are not needed for gathering weather information. Wait at least 30 minutes after the last lightning strike before going outdoors.

Hail:

If hail begins to fall, seek shelter indoors in a sturdy building. A hard-top automobile can also serve as shelter from hail if you cannot get indoors. Avoid convertible automobiles as shelter as hail can puncture through the soft top. Stay tuned to local media and your NOAA weather radio for possible warnings associated with the storm.

Straight-line Wind:

Seek shelter indoors in a sturdy building. Turn on your radio, television, or NOAA weather radio to hear further details. In some cases you may need to seek shelter in your "safe room" or designated shelter area.

If You Hear an Outdoor Siren:

Go indoors and turn on your radio, television, or NOAA weather radio to get details about the possible hazardous weather event in your area.

Family Disaster Kit

The following items are recommendations about what you should have in your family disaster kit.

Don't forget you can photocopy and complete the Red Cross' Emergency Contact Card on the last page of this booklet for each member of your family! Keep it with you in your wallet, purse or backpack!

Food & Water (Store water in clean, plastic containers):

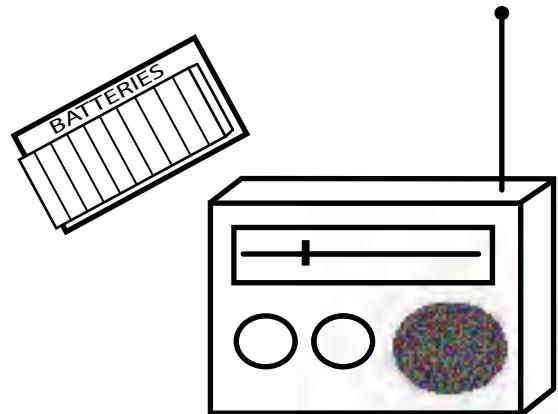
- 1 gallon of drinking water per person, per day for at least 3 days (consider extra water for a more long-term kit)
- Extra water for cooking and sanitary needs

- Non-perishable food items like protein bars, canned meats, crackers, peanut butter, etc.
- Food and water for pets (if applicable)
- Baby formula and food (if applicable)

First Aid Kit:

- Latex gloves
- Scissors
- Tweezers
- Petroleum jelly
- Sterile dressing
- Band aids
- Thermometer
- Soap or hydrogen peroxide

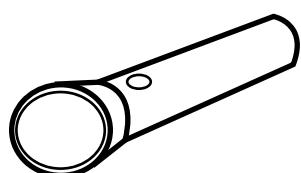
- Antibiotic ointment
- Sunscreen
- Prescription medication supplies
- Over-the-counter pain reliever
- Anti-diarrhea medication
- Antacid
- Laxatives



Other Items:

- Wrench to shut off gas and water
- Can opener (manual)
- Eating utensils
- Paper cups, plates and towels
- Flashlight with extra batteries (avoid candles as an open flame may cause an explosion if there is a gas leak)
- Battery powered or hand-crank radio (preferably a NOAA Weather Radio)
- Local maps
- Dust masks for each member of the family
- Plastic sheeting
- Duct tape
- Garbage bags
- Fire extinguisher
- Shampoo, soap, deodorant
- Toothbrush and toothpaste

- Matches in a waterproof case
- Blankets
- Important documents in a waterproof case (i.e. birth certificates, social security cards, deeds, bonds, etc.)
- Chlorine bleach (9 drops of water to 1 drop of bleach is a usable disinfectant; 16 drops of regular (no scents, color safe, or cleaners) bleach per gallon of water to make non-commercial water drinkable)
- Cash (keep small bills in case there is no power and ATMs are not operational)
- Clothes (strong shoes, long sleeve shirt, jeans, extra socks, etc.)
- Entertainment for kids (if applicable)
- Extra baby supplies like diapers (if applicable)
- Toilet paper
- Sanitary products



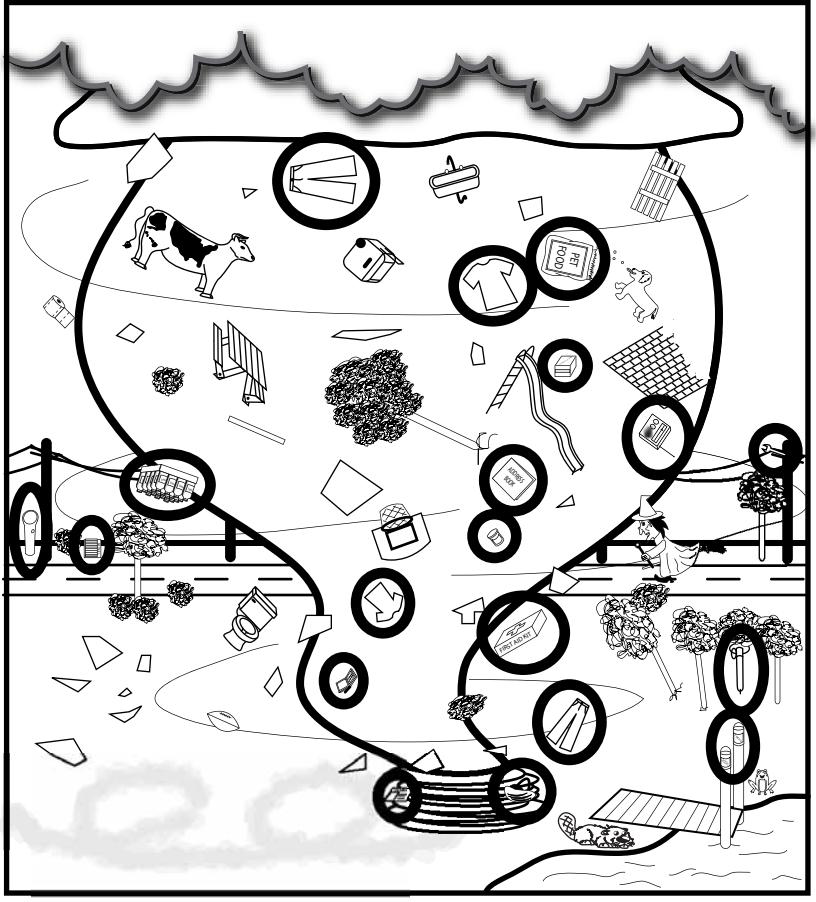
KEEP YOUR KIT HANDY IN SOMETHING LIKE A BACKPACK OR TOTE AND PUT IT SOMEPLACE THAT IS EASILY ACCESSIBLE BY THE WHOLE FAMILY AND CAN BE REACHED QUICKLY. KEEP AN EYE ON ANY EXPIRATION DATES ON ITEMS IN YOUR KIT AND REPLACE THEM IF NEEDED!



CROSSWORD PUZZLE

ACROSS	DOWN
2. PRESSURE	1. SUPERCELL
3. OUTFLOW	4. TORNADO
5. THUNDER	6. HAIL
7. WARNING	7. WATCH
9. SQUALL LINE	8. MITIGATION
11. DOPPLER RADAR	10. SEVERE
12. FUNNEL CLOUD	THUNDERSTORM
13. ANVIL	14. LIGHTNING
15. PRECIPITATION	16. ATMOSPHERE
19. HIGH	17. NWS
20. STRAIGHT LINE WINDS	18. RAIN
22. LOW	21. EMERGENCY
25. THUNDERSTORM	23. WARM FRONT
26. MESOCYCLONE	24. WALL CLOUD
27. METEOROLOGY	
28. COLD FRONT	
29. RADAR	

TORNADO PICTURE SEARCH



WORD SCRAMBLE

1. THUNDERSTORM	10. THUNDER
2. WIND	11. TORNADO ALLEY
3. LIGHTNING	12. SIREN
4. RADAR	13. WATCH
5. TORNADO	14. RAIN
6. SHELTER	15. WARNING
7. HAIL	16. WEATHER RADIO
8. DISASTER KIT	17. SAFETY
9. METEOROLOGY	

SECRET PHRASE: STAY INFORMED OF THE STORM

ADVANCED WORD SEARCH



EASY WORD SEARCH



<p>Important Phone Numbers</p> <p>Emergency Contact Card</p> <p> American Red Cross</p> <p><i>Together, we can save a life</i></p> <p>Name: _____</p> <p>Home Address: _____ _____</p> <p>Household Members Contact Information</p> <p>_____ _____ _____ _____ _____</p> <p>Out-of-town contact: _____ _____</p> <p>Family meeting place outside the neighborhood: _____ _____</p>	
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American Red Cross Emergency Contact Card

Directions:

1. Make a copy of this card for each household member.
2. Cut out the card along the dotted lines.
3. Write in the contact information for each household member, such as work, school and cell phone numbers. If you need additional space, use the back side of the card.
3. Fold the card so it fits in your pocket, wallet or purse.
4. Carry your card with you so it is available in the event of a disaster or other emergency when you will want to contact each other.

For more information on creating a family disaster plan and a disaster supplies kit, as well as other valuable disaster preparedness information, visit www.redcross.org.