Science in Weather

Science & Technology Branch – Step 2

Purpose

The "Science in Weather" Step provides a basic knowledge of meteorological conditions that affect our everyday lives. Upon completion of this step Trailmen should understand how weather affects us and ways in which you can use weather signs to help plan and prepare.

1. What types of clouds are there and what do they mean?
2. What types of precipitation are there and what should I know about them?
3. How does weather temperature affect me?
4. What is weather pressure and what should I know about it?

Notes to the Trail Guide //

1. The goal is not for the boys to be experts on these topics but to gain an increased knowledge and awareness of the Step.
2. Make it relative to your patrol.
3. Remember, these lessons should build from Fox to Hawk and from Hawk to Mountain Lion.
4. See the Leaders Guide for more information on Steps.

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Skill Progression

	1. Picture matching 2. Identification Game 3. Nomenclature
	1. Identify photos and talk about what each could mean. 2. Weather safety 3. Notification and news
	1. First Aid 2. Protection

Helps

1. What types of clouds are there and what do they mean?
    a. **Goal**: To understand the types of clouds and how to identify them.
    b. **Lesson**: Clouds exist in a variety of shapes, sizes, and colors. Knowing certain varieties of clouds can assist in determining upcoming weather conditions.
    c. **Examples**:
        i. Cirrus
        ii. Alto
        iii. Stratus
        iv. Cumulus
2. What types of precipitation are there and what should I know about them?
    a. **Goal**: To understand that precipitation provides necessary elements to people, plants, and animals. Too much precipitation can be dangerous.
    b. **Lesson**: Most types of precipitation are beneficial and even fun. Unfortunately there are other types that can cause dangerous conditions.
    c. **Examples**
        i. Liquid
            1. Drizzle
            2. Rain
            3. Fog
            4. Sunshower
        ii. Freezing
            1. Freezing Drizzle
            2. Freezing Rain
            3. Rain & Snow mix
        iii. Frozen
            1. Hail
            2. Sleet
            3. Snow
            4. Ice Crystals
        iv. Dangers from Precipitation
            1. Flooding/Flash Floods
            2. Lightning Strikes
            3. Hail
            4. Ice
                - Slick Conditions
                - Driving
                - Build-up on power lines and trees
            5. Mud Slides
            6. Avalanche

3. How does weather temperature affect me?
    a. **Goal**: To understand how weather temperatures fluctuate in different seasons and different areas.
    b. **Lesson**: Temperatures that are too cold or too hot require special knowledge and planning in which to survive.
    c. **Examples**:
        i. Cold
            1. Clothing
            2. Shelter
        ii. Hot
            1. Clothing
            2. Shelter
4. What is weather pressure and what should I know about it?
    a. **Goal**: To understand how pressure (measured with a Barometer) affects the weather and people.
    b. **Lesson**: Learn about atmospheric pressure and how it is used to predict upcoming weather patterns.
    c. **Examples**:
        i. High
        ii. Low
        iii. Climbing
        iv. Falling

Scripture Ideas

Leviticus 26:4

- Fox – God provides for us because he loves us.
- Hawk – God's creation is constructed with systems being reliant upon other systems. The plants are reliant upon the rains to provide necessary water and nutrients. This is important to remember that is we fail to take care of one system then we can fail the others.
- Mt Lion – We all have seasons as well. It is important to remember in times of plenty and in times of need to know that He is in charge and to praise Him.

Activity Ideas

- See the relevant patrol and branch section of the activities
- Or, create your own activity relevant to your troop and region

Game Ideas

- Check the games section online for game ideas
- Or, create a game that works for your patrol
- A couple of ideas are listed below

Name of Group Game: Freeze Tag

Time: 15 - 20 minutes

Summary: Active, fun game for kids. Get away from the people who are "it," or else you'll be frozen!

Goal: Avoid being tagged OR freeze the entire team.

**Note: Before playing, let everyone know the boundaries of the playing/running area. If anyone exceeds those boundaries, they will automatically become frozen. **

How to Play:

1. Ask for two volunteers*. These two people will be "it."
2. When you say "go," the people who are "it" will try to tag as many people as possible. If one of the volunteers tags another person, the tagged person is frozen (and needs to stand still) in his or her place. The only way to "unfreeze" a person is to have an active unfrozen person tag a frozen person. If a person becomes unfrozen, he/she can run again.
3. The people who are "it" tries to freeze the entire team. If the volunteers freeze the entire team, the volunteers win. If at least one person remains unfrozen by the end of 3 minutes, then the team wins, and you can choose two different volunteers.

*You can have more volunteers, depending on the size of your group. You can also add more people who are "it" as the game progresses.

Name of Group Game: Where the Wind Blows

Time: 15 – 20 minutes

Summary: Great icebreaker group game- find out what people have never done before.

Goal: Avoid being the last person standing.

Preparation:

- One person needs to start the game by standing in the middle of the circle
- You will need everyone to sit in chairs arranged in a circle.

How to Play:

1. The person in the middle needs to say a sentence of something they have never done before. For example, "I've never been on an airplane," "I never been to a buffet," "I've never been the Hawaii," "I've never had a pet."
2. If the person's statement applies to someone sitting in the circle, that person must move from his or her seat and sit in a different chair.
3. The person in the middle will need to try to sit down. One person will remain standing. The standing person starts a new round by saying a different statement.

Note: People cannot move to seats on their immediate left or right. For example, they can sit two seats away, but they cannot move to the left or right of their current chairs.

Clouds

Cloud Chart		
Cloud Group	**Cloud Height**	**Cloud Types**
High Clouds = Cirrus	Above 18,000 feet	Cirrus Cirrostratus Cirrocumulus
Middle Clouds = Alto	6,500 feet to 18,000 feet	Altostratus Altocumulus
Low Clouds = Stratus	Up to 6,500 feet	Stratus Stratocumulus Nimbostratus

Figure 1 - Cirrus Clouds

Cirrus Clouds

Detached clouds in the form of white, delicate filaments, mostly white patches, or narrow bands. They may have a fibrous (hair-like) and/or silky sheen appearance.

Cirrus clouds are always composed of ice crystals, and their transparent character depends upon the degree of separation of the crystals.

As a rule, when these clouds cross the sun's disk they hardly diminish its brightness. Before sunrise and after sunset, Cirrus is often colored bright yellow or red. These clouds are lit up long before other clouds and fade out much later.

Figure 2 - Cirrostratus Clouds

Cirrostratus Clouds

Transparent, whitish veil clouds with a fibrous (hair-like) or smooth appearance. A sheet of cirrostratus which is very extensive, nearly always ends by covering the whole sky.

A milky veil of fog (or thin Stratus) is distinguished from a veil of Cirrostratus of a similar appearance by the halo phenomena which the sun or the moon nearly always produces in a layer of cirrostratus.

Figure 3 - Cirrocumulus Clouds

Cirrocumulus Clouds

Thin, white patch, sheet, or layer of clouds without shading. They are composed of very small elements in the form of regularly arranged grains or ripples.

In general, Cirrocumulus represents a degraded state of cirrus and cirrostratus both of which may change into it and is an uncommon cloud. There will be a connection with cirrus or cirrostratus and will show some characteristics of ice crystal clouds.

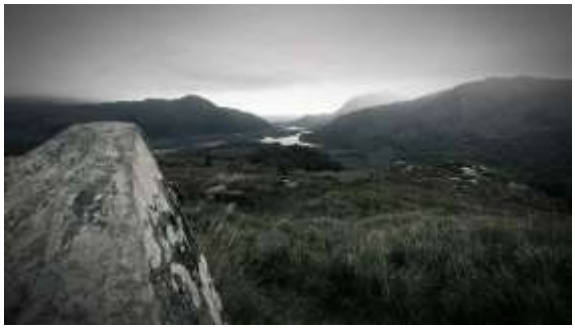

Figure 4 - Altostratus Clouds

Altostratus Clouds

Gray or bluish cloud sheets or layers of striated or fibrous clouds that totally or partially covers the sky. They are thin enough to regularly reveal the sun as if seen through ground glass.

Altostratus clouds do not produce a halo phenomenon nor are the shadows of objects on the ground visible.

Sometime virga is seen hanging from Altostratus, and at times may even reach the ground causing very light precipitation.

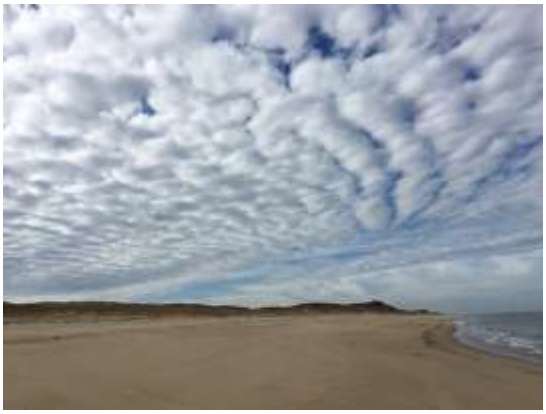

Figure 5 - Altocumulus Clouds

Altocumulus Clouds

White and/or gray patch, sheet, or layered clouds, generally composed of laminae (plates), rounded masses or rolls. They may be partly fibrous or diffuse.

When the edge or a thin semitransparent patch of altocumulus passes in front of the sun or moon, a corona appears. This colored ring has red on the outside and blue inside and occurs within a few degrees of the sun or moon.

The most common mid cloud, more than one layer of Altocumulus often appears at different levels at the same time. Many times, Altocumulus will appear with other cloud types.

Figure 6 - Nimbostratus Clouds

Nimbostratus Clouds

The continuous rain cloud. Resulting from thickening Altostratus, this is a dark gray cloud layer diffused by falling rain or snow. It is thick enough throughout to blot out the sun. The cloud base lowers into the low level of clouds as precipitation continues.

Also, low, ragged clouds frequently occur beneath this cloud which sometimes merges with its base.

Figure 7 - Cumulus Clouds

Cumulus Clouds

Detached, generally dense clouds and with sharp outlines that develop vertically in the form of rising mounds, domes or towers with bulging upper parts often resembling a cauliflower.

The sunlit parts of these clouds are mostly brilliant white while their bases are relatively dark and horizontal.

Overland cumulus develops on days of clear skies, and is due diurnal convection; it appears in the morning, grows, and then more or less dissolves again toward evening.

Figure 8 - Stratus Clouds

Stratus Clouds

A generally gray cloud layer with a uniform base which may, if thick enough, produce drizzle, ice prisms, or snow grains. When the sun is visible through this cloud, its outline is clearly discernible.

Often when a layer of Stratus breaks up and dissipates blue sky is seen.

Figure 9 - Cumulonimbus Clouds

Cumulonimbus Clouds

The thunderstorm cloud, this is a heavy and dense cloud in the form of a mountain or huge tower. The upper portion is usually smoothed, fibrous or striated and nearly always flattened in the shape of an anvil or vast plume.

Under the base of this cloud which is often very dark, there are often low ragged clouds that may or may not merge with the base. They produce precipitation, which sometimes is in the form of virga.

Cumulonimbus clouds also produce hail and tornadoes.

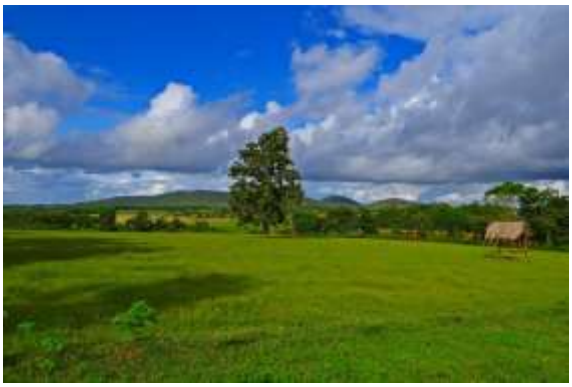

Figure 10 - Stratocumulus Clouds

Stratocumulus Clouds

Gray or whitish patch, sheet, or layered clouds which almost always have dark tessellations (honeycomb appearance), rounded masses or rolls. Except for virga they are non-fibrous and may or may not be merged.

They also have regularly arranged small elements with an apparent width of more than five degrees (three fingers - at arm's length).

Precipitation

Ten Types of Precipitation:

1. Rain
2. Ice Crystal
3. Sleet
4. Freezing Rain
5. Snow
6. Snow Grains
7. Graupel
8. Hail
9. Drizzle
10. Freezing Fog

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