

The WeatherCycler

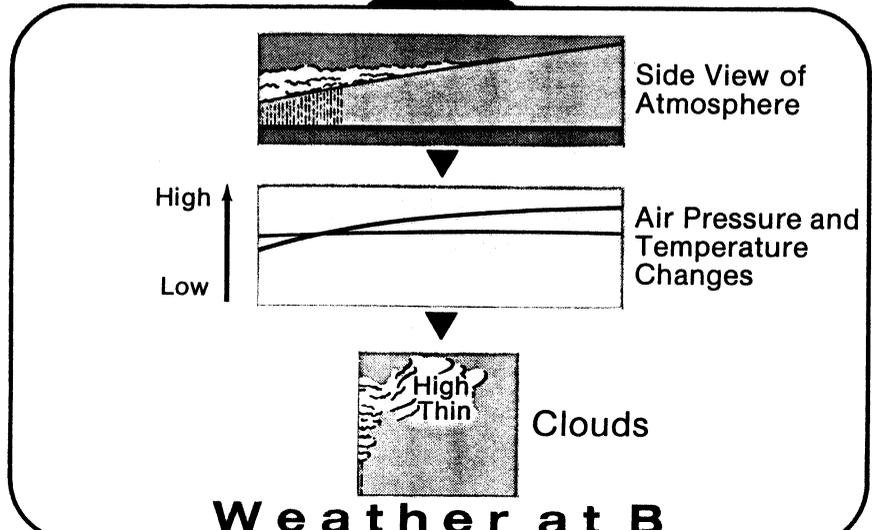
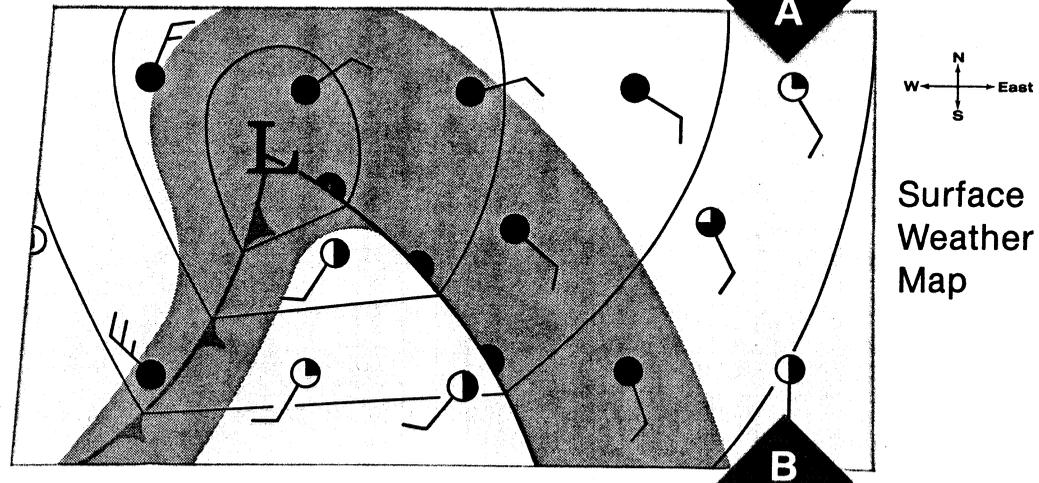
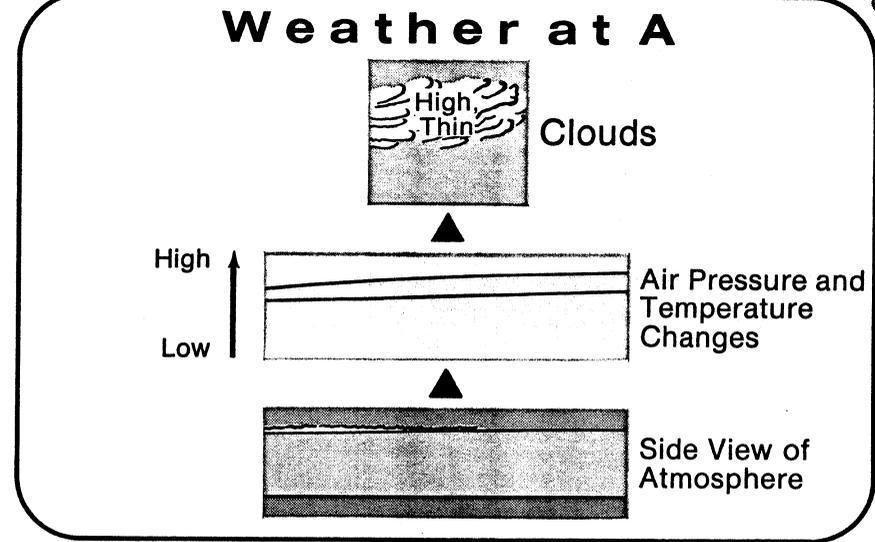
For Interpreting and Forecasting Your Weather

The Weather School
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INSTRUCTIONS:

Consult the latest television or newspaper weather map and pull the slide until A or B points to the station best showing your location in the HIGH or LOW affecting your weather. The Surface Weather Map and the windows above it describe your weather if Point A indicates your location in the HIGH or LOW. Use the windows below if Point B indicates your position.

To forecast your weather, pull the slide out slowly to represent movement of HIGH or LOW. Your changing map location shows how your weather will develop. The next plotted position shows what your weather may be in about 12 hours. Check your forecasts by following the instructions on back.



COMMON WEATHER MAP SYMBOLS

WEATHER STATION:

Indicates direction from which wind is blowing.

Describes WIND SPEED. Feathers are totaled:
1/2 = 5 Knots
1 = 10 Knots

Amount of Cloud Cover:
○ No Clouds ● 1/2
⊙ 1/10 or less ● 3/4
◐ 1/4 ● Completely Overcast

EXAMPLE: Northeast wind at 15 Knots. Overcast.

ISOBARS give form to HIGHS and LOWS and connect places with the same air pressure.

SHADED AREAS indicate precipitation—rain or snow.

Center of LOW

FRONTS form the boundary between neighboring air masses (HIGHS). Important and rapid weather changes occur across fronts. Symbols indicate kind of front and direction of movement:

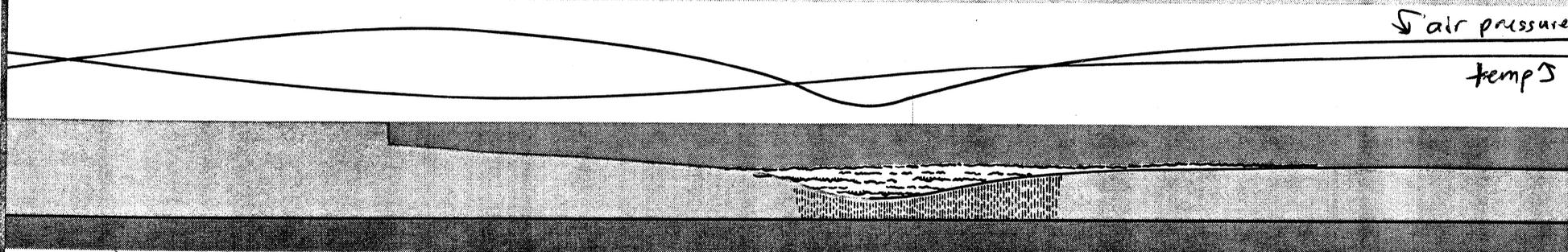




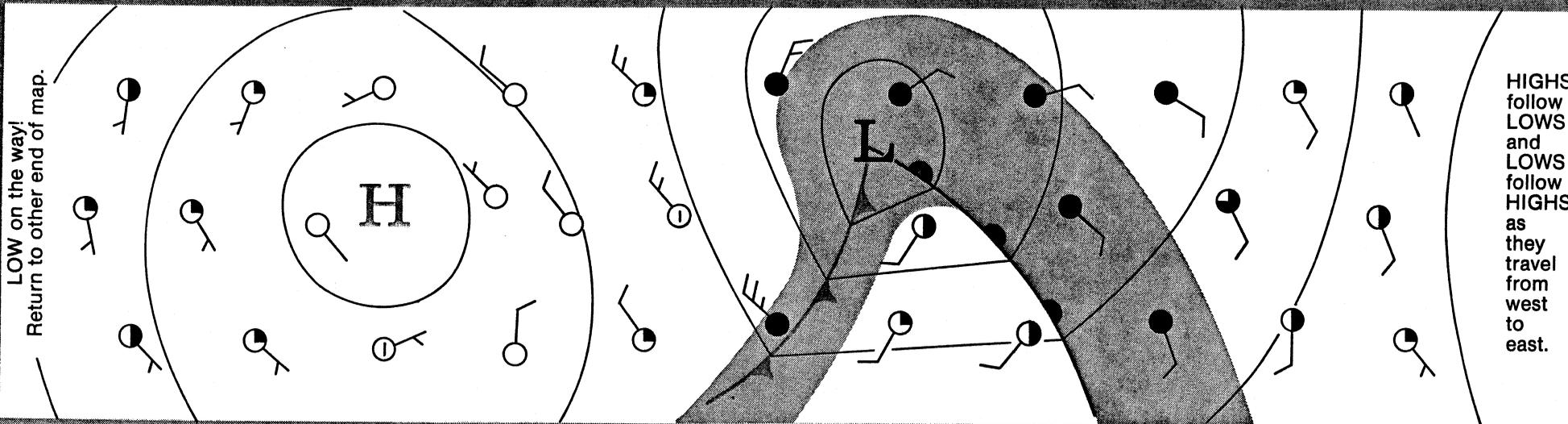
clouds

↓ air pressure

temp ↓

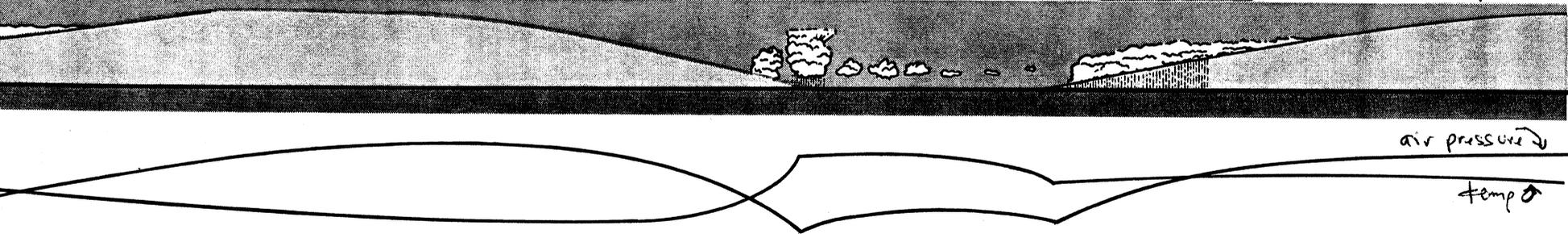
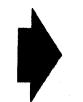


side view of atmosphere



LOW on the way!
Return to other end of map.

HIGHS follow LOWS and LOWS follow HIGHS as they travel from west to east.



side view of atmosphere

air pressure ↓

temp ↑



clouds

The WeatherCycler

Name _____

Study Activity I WEATHER MAPS

Introduction

Weather maps are keys to understanding the weather. They tell about the atmospheric systems, called Highs and Lows, that control weather. *The WeatherCycler* shows how weather maps can be read.

Learning Objectives

As a result of this learning activity, you will be able to:

1. Read a weather map and explain it to others.
2. Use a weather map to describe the weather at different places.

Directions

Refer to *The WeatherCycler* to select the responses at the right which correctly complete the statements in this Study Activity. Circle your responses.

Section A

Carefully look at the face of *The WeatherCycler* with the slide pushed all the way in. What you see in the large chart window is a map view of a weather "Low". You can find explanations of common weather map symbols to the lower left of the chart face.

1. The "L" marks the middle of a Low. It is called a Low because its center is where the air pressure is lowest. Lows are large storm systems that stretch over hundreds of miles or more. It is raining or snowing in the Low wherever the map _____ shaded.
2. Weather stations are shown on the map as small circles with attached lines suggesting musical notes, or arrows. Look at the station on the map pointed to by "A". It looks like this: . The wind direction there is given by the arrow shaft. The wind is from the southeast. Since winds are named by the direction from which the wind is blowing, this station has a _____ wind.
3. Look at all the wind directions displayed at stations surrounding the map "L". The general pattern of wind directions in the Low shows winds blow _____ around the center of lowest pressure.
4. Cloud cover is reported by the way the station circles are filled in. Stations in the shaded areas on the map have reported amounts of cloud cover described as _____.
5. Fronts extend outward from the center of the Low. The blue line with attached "spikes" represents a _____ front.
6. *The WeatherCycler* shows that rain or snow usually occurs in a relatively broad band ahead of the (a) _____ front and in a narrow band along the (b) _____ front.

1. is
is not
2. southeast
northwest
3. clockwise 
counterclockwise 
4. no clouds
completely overcast
5. warm
cold
- 6a. warm
cold
b. warm
cold

Section B

Pull *The WeatherCycler* slide out until the "H" is in the center of the "Surface Weather Map" window. This view represents a major weather system called a "High".

1. The nearly circular black lines surrounding the "H" connect places that have the same air pressure. They show how air pressure changes in a High with the highest pressure in the center. These lines are called _____.
2. Wind directions are generally _____ around the center of the High marked by the "H".
3. Skies are generally _____ in a High.

1. isotherms
isobars
2. clockwise 
counterclockwise 
3. clear or
partly cloudy
overcast

Section C

Use *The WeatherCycler* and the weather map at the right to answer the following:



1. Weather at Location X: The weather at X is controlled by a (a) _____. The wind at X is probably from the (b) _____ and the sky is clear or partly cloudy.
2. Weather at Location Y: The weather at Y is controlled by a Low. The wind is probably from the (a) _____, the sky is (b) _____, and rain or snow (c) _____ likely to be falling.

- 1a. High
Low
b. southwest
northwest
- 2a. southeast
northwest
b. clear
overcast
c. is
is not

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The WeatherCycler

Name _____

Study Activity II WEATHER IN HIGHS

Introduction

The "H's" or "Highs" of weather maps mark the centers of fair-weather systems. *The WeatherCycler* helps you understand what kind of weather you can expect in a High.

Learning Objectives

As a result of this learning activity, you will be able to:

1. Describe the kinds of weather that are likely to be found in a High.
2. Predict the weather changes that can happen as a High passes through your area.

Directions

Refer to *The WeatherCycler* to select the responses at the right which correctly complete the statements in this Study Activity. Circle your responses.

Section A

Turn to your *WeatherCycler* and pull the slide out until the "H" is centered in the "Surface Weather Map" window. Answer the following:

1. The wind blows _____ around the high-pressure center marked with an "H".
2. According to the map, skies in a High tend to be _____ with the weather generally fair.

1. clockwise 
counterclockwise 
2. clear
cloudy

Section B

With the "H" in the middle of the map window, imagine yourself being on the map at Point B. Now pull the slide out slowly to imitate the typical motion of Highs towards the east. Look at map data and the windows below the map to see how your weather changes at Point B.

1. Which sequence at the right better describes the shift in wind direction as the High's center passes by to the north of your Point B location?
2. According to the window showing air-pressure changes at Point B, which choice at the right describes how the pressure changes as the High passes by?
3. The same chart window shows gradual _____ at Point B when the air pressure is falling.

1. north, east, southeast
south, west, north
2. rising and then falling
falling and then rising
3. cooling
warming

Section C

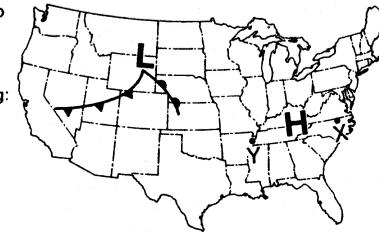
Adjust the slide so the "H" is again in the middle of the map window. Now pull the slide out slowly. Imagine yourself on the map at Point A while the High moves towards the east.

1. Which sequence at the right better describes the shift in wind direction as the High's center passes by to the south of your Point A location?
2. According to the window showing air-pressure changes, which choice at the right describes how the pressure would change at Point A as the High passes by?
3. The same chart window shows gradual _____ at Point A when the air pressure is falling.

1. northwest, west, south
south, east, northwest
2. rising and then falling
falling and then rising
3. warming
cooling

Section D

The High shown on the map at the right is dominating the weather at X and Y. Use *The WeatherCycler* and the map to answer the following:



1. Weather at X: The wind is probably from the (a) _____, the sky is (b) _____, and the temperatures are relatively cool.
2. Weather at Y: The wind is probably from the (a) _____, the sky is (b) _____, and temperatures are relatively warm.
3. The center of the High is predicted to be to the east of X tomorrow. Tomorrow, X should be (a) _____ than today with winds from the (b) _____. The weather at X tomorrow should be similar to the weather at Y (c) _____.

- 1a. north
south
- b. clear
cloudy
- 2a. north
south
- b. cloudy
mostly clear
- 3a. warmer
cooler
- b. north
south
- 3c. today
tomorrow

The WeatherCycler

Name _____

Study Activity III WEATHER FRONTS

Introduction

Neighboring Highs with different temperatures are separated by boundaries called fronts. Fronts sweeping through your area can bring dramatic weather changes. *The WeatherCycler* describes the kinds of weather cold and warm fronts can deliver.

Learning Objectives

As a result of this learning activity, you will be able to:

1. Explain what cold and warm fronts are and how the weather changes across them.
2. Describe the sequence of weather events that can occur as cold and warm fronts pass your location.

Directions

Refer to *The WeatherCycler* to select the responses at the right which correctly complete the statements in this Study Activity. Circle your responses.

Section A

Pull out the *WeatherCycler* slide so that Point B is aimed at a place on the map's (blue) cold front about 1/4 inch to the right of the station reporting a 25-knot wind from the northwest.

1. The front is a boundary between warm and cold air. It is called a cold front because it is moving and cold air is replacing warm air at the Earth's surface. The cold front is moving in the direction the blue "spikes" are pointing. The windows below Point B show that the cold air is _____ the front.
2. Chart windows below Point B show weather along the cold front is _____.
3. Winds ahead of the cold front are from the south-southwest to southwest while winds behind the front are from the _____.

1. ahead of
behind
2. fair
stormy
3. southeast
northwest

Section B

Adjust *The WeatherCycler* slide until Point B is aimed at the first station to the east (right) of the cold front. Now pull the slide out slowly to put the cold front into motion towards the east. Imagine that you remain at Point B while the front passes by.

1. As the cold front approaches you at Point B, the sky _____.
2. At the time the front passes Point B, the wind shifts direction until it is coming from the (a) _____ and the temperature begins to (b) _____.

1. clears
becomes more cloudy
- 2a. northwest
northeast
b. rise
fall

3. After the cold front passes, the sky (a) _____ and the temperatures are relatively (b) _____.

- 3a. remains cloudy
clears
b. cold
warm

Section C

Move *The WeatherCycler* slide until Point B is aimed at the (red) warm front. It should be pointing at a place on the front about 1/4 inch to the right of the nearest station west of the front.

1. This boundary is called a warm front because warm air is replacing cold air at the Earth's surface. The warm front is moving in the direction the red semi-circles are pointing. The windows below Point B show that the warm air is _____ the front.
2. The windows below Point B show that stormy weather is found _____ the warm front.
3. Winds ahead of the map warm front are from the southeast while winds behind the front are from the _____.

1. ahead of
behind
2. ahead of
behind
3. northeast
southwest

Section D

Push the slide completely into *The WeatherCycler*. Now pull the slide out slowly to put the warm front into motion towards the east. Imagine that you remain at Point B while the front moves.

1. As the warm front approaches you at Point B, the _____.
2. As the warm front passes, your temperature at Point B (a) _____ and the rain or snow (b) _____.
3. After the warm front passes, the temperature is relatively _____ and the weather fair.

1. sky clears
cloudiness increases
- 2a. rises
falls
b. starts
stops
3. warm
cold

The WeatherCycler

Name _____

Study Activity IV WEATHER IN LOWS

Introduction

Lows are the large storm systems that affect our weather. They form between Highs. Traveling Lows deliver a mixture of weather to places in their paths.

Learning Objectives

As a result of this learning activity, you will be able to:

1. Describe Lows and the mixture of weather they contain.
2. Describe the sequence of weather as a Low passes by.

Directions

Refer to *The WeatherCycler* to select the responses at the right which correctly complete the statements in this Study Activity. Circle your responses.

Section A

Push *The WeatherCycler* slide all the way in. The "L" on the map marks the center of a Low. Answer the following:

1. The wind blows _____ around the center marked by an "L".
2. Rain or snow is falling in a broad band ahead of the _____ front and in a narrow band along the other front.
3. The warmest temperatures in the Low are located generally to the _____ of the storm system's center.

1. clockwise  counterclockwise 
2. cold
warm
3. south
north

Section B

With *The WeatherCycler* slide pushed all the way in, imagine yourself being on the map at Point A. Now pull the slide out slowly to imitate the usual motion of Lows towards the east. Look at map data and the windows above the map to see how your weather changes while you remain at Point A. Answer the following:

1. The center of the Low will pass by the (a) _____ of you while you experience (b) _____ period(s) of rain or snow.
2. _____ fronts will cross your location at Point A as the Low passes by.

- 1a. north
south
- b. one
two
2. No
Two

Section C

With *The WeatherCycler* slide pushed all the way in, imagine yourself being on the map at Point B. Now pull the slide out slowly to imitate the motion of Lows towards the east. Look at map data and the windows below the map to see how your weather changes while you remain at Point B. Answer the following:

1. The center of the Low will pass by to the (a) _____ of you while you experience (b) _____ period(s) of precipitation.
2. Your weather at Point B will first feel the effects of a (a) _____ front. When it passes, the wind will shift until it is coming from the (b) _____.
3. When the second front arrives at Point B, your temperatures will begin to (a) _____. At the same time, the wind will shift until it is coming from the (b) _____.

- 1a. north
south
- b. one
two
- 2a. warm
cold
- b. southwest
northwest
- 3a. rise
fall
- b. southeast
northwest

Section D

Use *The WeatherCycler* to interpret the map at the right.



1. Weather at Location X: It is relatively cold and the wind is from the _____.
2. Weather at Location Y: The wind is probably from the _____ and the sky is overcast.
3. Since Lows usually move toward the east, Location _____ is the place likely to have greater changes in weather during the next day or so.

1. northwest
northeast
2. southeast
northwest
3. X
Y

The WeatherCycler

Name _____

Study Activity V FORECASTING WEATHER

Introduction

While modern weather forecasting is complicated, you can often make weather forecasts yourself. It is possible because the weather now to the west of you is likely to be your weather in the future.

Learning Objectives

As a result of this learning activity, you will be able to make and check weather forecasts for the next half day or so.

Directions

Refer to *The WeatherCycler* to select the responses at the right which correctly complete the statements in this Study Activity. Circle your responses.

Section A

The WeatherCycler can give you forecasts. To get the forecast, move the slide until Point A or Point B is aimed at the map station that best fits the current weather. Then flip *The WeatherCycler* to the back side to read the forecast.

1. Push the slide all the way in. Assume that Point B is aimed at the map station that best describes current weather. Flip to the back side to read the forecast in the lower window. According to the forecast, it _____ rain or snow in the next few hours.

1. will
will not

Section B

You can make forecasts because Highs and Lows usually move from west to east. To make a forecast, assume that the weather currently at the next station to the west of your map position will travel and arrive at your location a half-day from now.

1. Push the slide all the way into *The WeatherCycler*. Place yourself at the station aimed at by Point B. Forecast the weather for that station by pulling the slide slowly until the next station arrives at Point B. In the next half-day, skies should (a) _____ and precipitation will probably (b) _____.
2. Pull *The WeatherCycler* slide out until the station due north of the map "H" is at Point A. Your 12-hour forecast for the station at Point A: Temperatures will slowly (a) _____, skies will be (b) _____, and winds will gradually shift until coming from the (c) _____.

- 1a. clear
become cloudy
b. stop
begin
- 2a. rise
fall
b. mostly clear
overcast
c. south
north

3. Adjust *The WeatherCycler* slide until Point B is aimed at the station most nearly due south of the map "L". Your 12-hour forecast: Temperatures (a) _____, showers, and winds shifting to the (b) _____.

- 3a. rising
falling
b. southeast
northwest

Section C

You can quickly check the forecasts you make by comparing them with the forecasts appearing in the windows on the back side of *The WeatherCycler*.

1. Look at the front side of *The WeatherCycler* and move the slide until Point B is aimed at the station due south of the map "H". What is your 12-hour forecast for this location? Forecast: The weather will be (a) _____ with winds gradually shifting until they are coming from the (b) _____.
2. Keep the slide in the same exact position and flip to the back side of *The WeatherCycler*. The Point B forecast window indicates the weather will be fair with winds shifting until coming from the _____. (Check this answer with the forecast you just made in (1) above.)

- 1a. stormy
fair
b. southwest
southeast
2. southwest
southeast

Section D

Forecasts you receive by television and radio include portions covering the next half day or so. They can be interpreted with *The WeatherCycler*. Do this by adjusting the slide until Point A or B is aimed at the station on the map most likely to have the given forecast.

1. Forecast: Increasing cloudiness and turning colder with the chance of thunderstorms. South winds shifting to northwest. This forecast applies to the station (a) _____ of the map "L". A (b) _____ front is expected to pass through the area during the forecast period.
2. Forecast: Continued fair, partly cloudy, and gradual warming. Light east winds shifting gradually to southeast. This forecast best fits a station to the (a) _____ of a passing (b) _____.

- 1a. north
south
b. warm
cold
- 2a. south
north
b. High
Low

The WeatherCycler

Name _____

Study Activity VI INTERPRETING WEATHER ON YOUR OWN

Introduction

You can often tell a great deal about the weather on your own. *The WeatherCycler* is especially useful in helping to understand the weather you directly observe.

Learning Objectives

As a result of this learning activity, you will be able to use direct observations of the sky to detect the High or Low that is controlling your weather and to make general forecasts.

Directions

Refer to *The WeatherCycler* to select the responses at the right which correctly complete the statements in this Study Activity. Circle your responses.

Section A

Turn to your *WeatherCycler* map to find where you would have to be in a High or Low to have the weather described in the following sets of observations.

1. Winds from the northeast, cloudy, steady rain, and low pressure could be observed when you are located to the (a) _____ of the center of a (b) _____.
2. Fair weather, cool, and light winds from the north mean you are probably to the _____ of the center of a High.
3. Clear skies and calm conditions would place you in the center of a _____.

- 1a. north
south
- b. High
Low
2. east
west
3. High
Low

Section B

A series of observations made over several hours at the same place can tell you even more about the prevailing High or Low. Use your *WeatherCycler* to interpret the following:

1. Air pressure is rising while the wind direction is gradually shifting from north to northwest. It is fair and cool. These data best fit weather at a place to the northeast of the center of a _____.
2. Rain has stopped, winds have shifted from southeast to southwest, skies have cleared, and temperatures have risen. These data best fit a station south or southeast of the center of a (a) _____. They indicate a (b) _____ front recently passed the station.

1. Low
High
- 2a. High
Low
b. cold
warm

Section C

General relationships among kinds of weather, air pressure, and wind direction are useful in interpreting your local weather.

1. *The WeatherCycler* shows that _____ air pressure and fair weather usually go together.
2. According to *The WeatherCycler*, if you stand with your back to the wind (imagine yourself at one of the stations on the map), lower air pressure will be in the general direction to your _____ and slightly forward.
3. If the wind is from the south and your back is to the wind, low pressure will be to your (a) _____. This tells you that low pressure is probably to the (b) _____ of your location.

1. low
high
2. left
right
- 3a. left
right
b. east
west

Section D

Make forecasts based on the following sets of observations. Assume that it takes about 12 hours for the weather to move east from one weather station to the next on *The WeatherCycler* map.

1. The weather has been fair, warm, and humid with southwest winds following an extended period of rain. This places you to the south or southeast of the center of a (a) _____. In the next half day or so, you can expect a (b) _____ front.
2. Skies have been clear, air pressure has been gradually rising, and the wind has shifted from north to northeast. You can expect that the weather will (a) _____. Your weather is being controlled by a (b) _____.

- 1a. High
Low
b. warm
cold
- 2a. continue to be fair
become stormy
b. High
Low