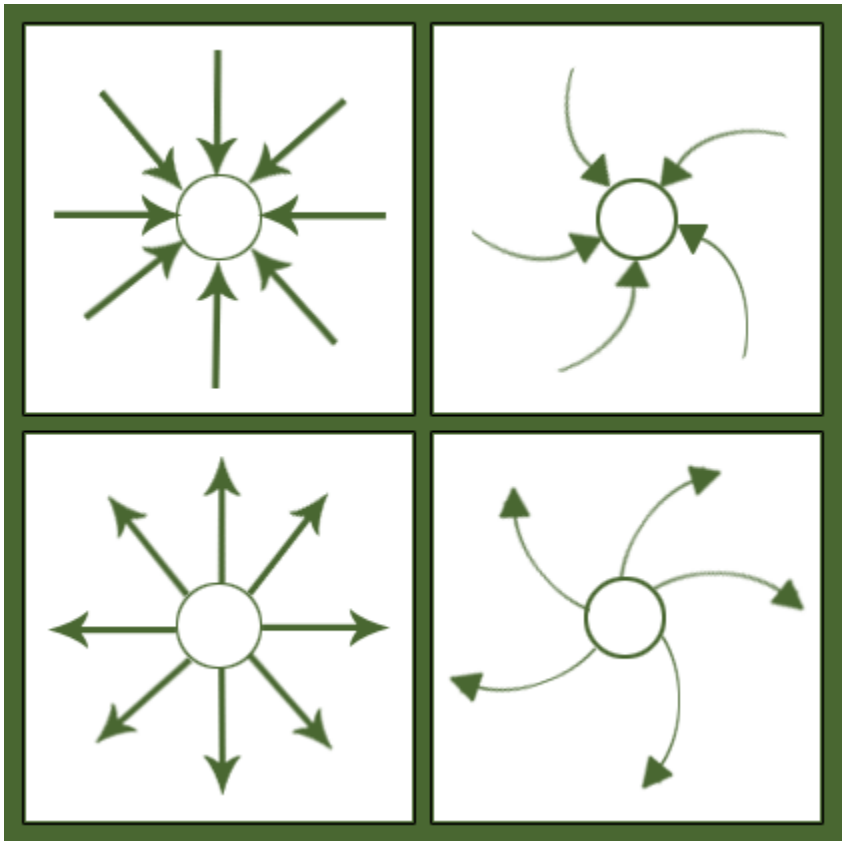
Kinesthetic Activity: Movement of Air in High and Low-Pressure Systems

Overview
This activity helps students **feel** how high and low-pressure systems spin. The motion is due to deflection resulting from the Coriolis Force. In the Northern Hemisphere, it causes high-pressure systems to rotate clockwise and low-pressure systems to rotate counter clockwise. The direction for rotation is opposite in the Southern Hemisphere.

The reason for this deflection is relatively simple. Air rises in the center of low-pressure systems and is replaced by air rushing in from surrounding higher-pressure areas. (Remember that nature abhors a vacuum.) As the air moves in to the center, it deflects to the right.



Upper left: What would happen without the Coriolis Force
Upper right: The effect of the Coriolis Force on motion

The same thing is true for high-pressure systems in the Northern Hemisphere.

Lower left: What would happen without any Coriolis Force.
Lower right: Overall motion with Coriolis Force.

ACTIVITY FOR LOW-PRESSURE SYSTEMS
Teacher: Practice the activity several times in advance. Then demonstrate it and have your students go through the following procedure.

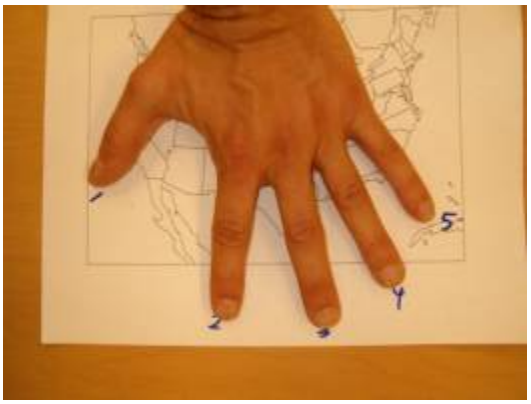
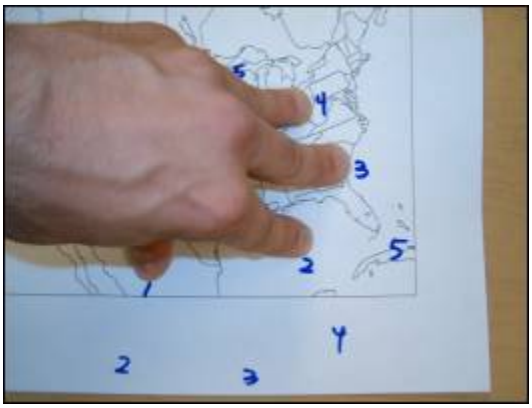
Stand over your desk with the map flat in front of you. Put your left hand on the map with your fingers facing at you (your thumb points to the left). Twist your hand counter clockwise (to the left), bringing your fingers closer and closer together until all your fingers touch.

Do it again but this time, when you're at the starting position, write a number on the map at the end of each finger (1, 2, 3, 4, 5).

Then move your fingers 1 – 2 cm, stop and write a new number again for each finger (1, 2, 3, 4, 5). Repeat this until your fingers are together in the center of the low. Note that your hand has risen as you've pulled towards the center. This is how low-pressure centers behave.

Now connect all of the 1s and 2s, etc. and put arrows on the lines toward the center. Note that the winds are moving counterclockwise towards the center of a low (in the Northern Hemisphere).

More detailed instructions
Left: Start with your hand flat over the circle with the L (low) on it. Your hand will be in an awkward position (your fingers are pointing at your body).
Right: As you move your hand counterclockwise, your hand will begin to arch up from your wrist.

Left: As you continue up, rotating counterclockwise, your fingers will end up in a circle with the L (low).
Right: This is what you should see when you connect the numbers (the pink arrow adds emphasis and clearly completes the rotation of the wind).


ACTIVITY FOR HIGH-PRESSURE SYSTEMS

Start with your hand in the end position of the low-pressure system (fingers drawn together in a circle around the high, with your palm facing away from you to start). You'll see that the air sinks at the center of the high-pressure area and that it moves out in a clockwise fashion.

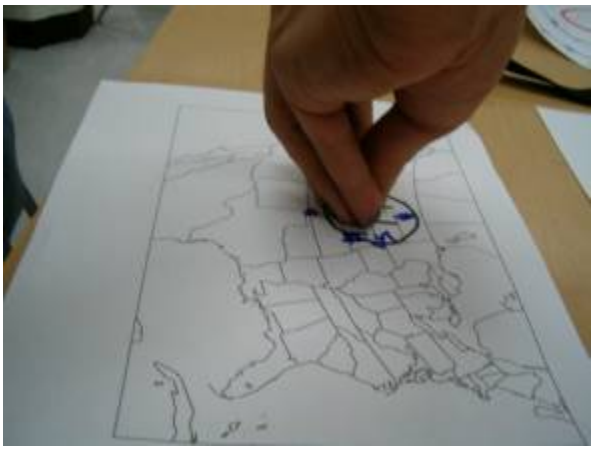
Do it again but this time, when you're at the starting position, write a number on the map at the end of each finger (1, 2, 3, 4, 5).

Then move your fingers 1 – 2 cm, stop and write a new number again for each finger (1, 2, 3, 4, 5). Repeat this until your fingers are flat on the paper.

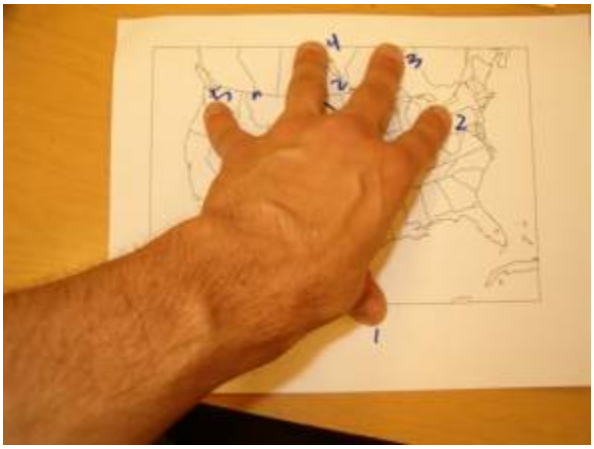
Now connect all of the 1s and 2s, etc. and put arrows on the lines toward the center. Note that the winds are moving clockwise away from the center of a high (in the Northern Hemisphere).

More detailed instructions

Left: Your hand is turned away from you at the start. Write a number (1-5) for each finger
Right: Turn your hand clockwise and down. As you move incrementally, write the numbers for each finger.




Left: As you rotate clockwise, your fingers spread apart.
Right: A view from the side.




Left: Do this until your hand is flat. Keep adding the numbers (1-5 for each finger).
Right: Connect the numbers and add the arrows.