



# AIR OF THE WOLF



## RATIONALE FOR ADVENTURE

This STEM-based adventure helps Wolves explore basic aspects of air—an often overlooked substance. Then they discover some of the many things that air can do for us.

## TAKEAWAYS FOR CUB SCOUTS

- Scientific discovery
- Easy yet fun activities
- Creativity
- A Scout is obedient.



## ADVENTURE REQUIREMENTS

*Wolf Handbook, page 124*

Complete the following requirements.

1. Conduct two of the following investigations to see how air affects different objects:
  - A. Make a paper airplane and fly it five times. Try to make it fly farther by altering its shape. Fly it at least five more times to see if your changes were effective.
  - B. Make a balloon-powered sled or a balloon-powered boat. Test your sled or boat with larger and smaller balloons.
  - C. Bounce a basketball that doesn't have enough air in it. Then bounce it when it has the right amount of air in it. Do each one 10 times. Describe how the ball bounces differently when the amount of air changes.
  - D. Roll a tire or ball that doesn't have enough air in it, and then roll it again with the right amount of air. Describe differences in how they move.
2. Complete two of the following:
  - A. With other members of your den, go outside and record the sounds you hear. Identify which of these sounds is the result of moving air.
  - B. Create a musical wind instrument, and play it as part of a den band.
  - C. With an adult, conduct an investigation on how speed can affect sound.
  - D. Make a kite using household materials. With your den or family, explain the rules for safely flying kites. Fly your kite.
  - E. With your family, den, or pack, participate in a kite derby, space derby, or raingutter regatta. Explain how air helps the vehicle move.

## NOTES TO DEN LEADER

This adventure has several choices based on which activities you choose to do with your den. These den meeting plans, when followed as written, meet the requirements to earn this adventure. If you choose to make adjustments, be sure you complete at least the minimum requirements.

Requirement 4 is for Wolf Scouts to participate in a kite derby, space derby, or raingutter regatta. The event can occur as part of a den activity or part of a larger event put on by the pack. If the event will be an outing or special event at a location other than the den's regular meeting place, the leader will need to make arrangements with the outing location and confirm plans with families, including the event rules, plans for inclement weather, transportation, and any additional items they need to bring. Make sure activity consent forms are distributed, signed, and collected.

See the appendix for optional den meeting activities, including openings, gatherings, and closings.

# MEETING 1 PLAN

## PREPARATION AND MATERIALS NEEDED

- U.S. and den flags
- Paper for making paper airplanes (Gathering)
- Items for activities:
  - Activity 1: 12-inch balloons (using latex-free balloons if there are any latex allergies in the group); balance beam (see Meeting 1 Resources); several paper clips or pennies
  - Activity 2: balloons; a tape measure; thread; a pan
  - Activity 3 (optional): air pump; a basketball or tire

## GATHERING

- Have each Wolf Scout make a paper airplane and fly it five times, adjusting the shape afterward to make the plane go farther and then flying it again. Use the Scouts' neckerchiefs to mark distances.
- Encourage adult family members to stay and participate to help with making paper airplanes.

## OPENING

- Conduct a flag ceremony of your choosing that includes the Pledge of Allegiance and the Scout Oath and Scout Law.
- Optional opening: Hold a kite up as a prop.

*Say: Kites will fly when four things are arranged properly: lift, drag, thrust, and weight.*

*As Cub Scouts, we have lots of things acting on us: our friends, our families, our values, and our interests. The values in the Scout Law serve to lift us up and encourage us to do more for ourselves and for others. Together, let's recite the 12 points of the Scout Law and remember how those values serve to lift us up in service to other people.*

## TALK TIME

- Introduce the Air of the Wolf adventure to the den. Build interest by describing the goals of the adventure and some of the activities that are planned.
- Ask the Cub Scouts in your den if they have ever noticed the air. Everyone has witnessed really windy days, but most have probably never thought about air as a substance. Describe how air may be used for many things:
  - Baseballs curve when the seams of the spinning ball interact with the air.
  - Air flowing over the dimples of a golf ball may determine the distance the ball travels.



- Windmills generate electricity.
- Mechanics often use air-powered tools.
- Carry out business items for the den.
- Allow time for sharing among Cub Scouts.

## ACTIVITIES

### ◆ Activity 1: The Weight of Air (Optional)

Ask the Cub Scouts in your den if they think air has any weight. After a few guesses, help them conduct this investigation.

- Tie two deflated balloons to a balance beam that you have prepared (see Meeting 1 Resources), with one balloon on either end of the stick.
- Now remove one of the balloons, inflate it, and reattach it in the same spot, which will make that end of the stick heavier. Or you can start with two identically inflated balloons and then let the air out of one or pop it, which will also affect the weight.
- Share this interesting fact: The air in a balloon blown up to 10½ feet in diameter would weigh 50 pounds.
- If the Cub Scouts seem especially interested, you may try to actually weigh the air in the inflated balloon. Put paper clips or pennies in the deflated balloon, and see how many it takes to balance the beam. Use one of these formulas to guess the weight: one standard paper clip = 1 gram; one U.S. penny = 2.5 grams. If you want to convert the total to ounces: 1 ounce = 28.35 grams, or 0.1 ounce = 2.83 grams.

### ◆ Activity 2: Temperature of Air (Optional)

Testing the effect of warming or cooling on air is easy.

- First, give one of the Scouts a deflated balloon (again, be aware of any latex allergies in the den). Have the Scouts each tie their balloon shut and set it in a pan of very warm water. While the balloon won't inflate, it will puff up enough for everyone to see that warm air takes more space (volume) than cooler air.
- Take another balloon, inflate it halfway, and have the Scouts measure its circumference. Then tie a thread loosely around the balloon and set it in the same water for three to five minutes. As the balloon gets warmer, note that the thread is visibly holding to its surface. Now, measure the balloon to see how much it expanded.
- Finally, to test the effects of cooling, have the Scouts set an inflated balloon inside a refrigerator or in ice water.

## CLOSING

If you have enough balloons left, finish the meeting with the thunder of bursting balloons. Tell the Scouts to imagine the sound of one balloon popping as being like a child alone. Then pop all the other balloons at once—that's the sound of Scouting!

## AFTER THE MEETING

- Serve refreshments, if desired.
- Work together to clean up the meeting place.
- Remind each Scout to bring a rinsed-out 20-ounce soft drink bottle for the next meeting's Bottle Band activity.

# MEETING 1 RESOURCES

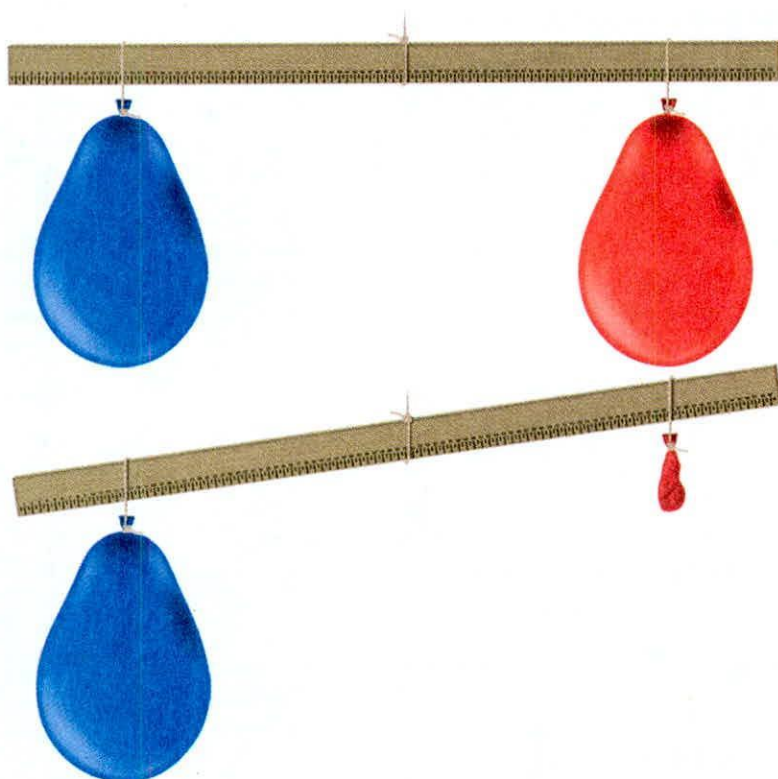
## GATHERING

- Books on paper airplanes may be available at your local library, and you might also look at websites like [www.funpaperairplanes.com](http://www.funpaperairplanes.com) and [www.10paperairplanes.com](http://www.10paperairplanes.com). Print out several patterns of models that vary from the traditional dart-like plane.
- Show the Scouts how cutting flaps into the back edges of the wings and folding the flaps upward—or just bending up the back edges—may keep the planes aloft a bit longer. Either way, the air moving over the back edges will tend to push the nose of the plane up.
- If they require an explanation, have them hold a fairly large piece of cardboard at an angle and move their arms forward quickly. They should be able to feel the lift.

## ACTIVITIES

### Activity 1: The Weight of Air

- You can make a balance beam with a dowel or other narrow piece of wood. Use a screw to attach a cross member so that it can swing easily.
- The cross member should be balanced, but if not, use small weights to make it balance (tape, small coins, or paper clips should work). Or, it may be easier to start with a balloon attached to each end and then balance the beam.





# MEETING 2 PLAN

## PREPARATION AND MATERIALS NEEDED

- U.S. and den flags
- Items for activities:
  - Activity 1: a voice recorder or other device that Scouts can use to record sounds outdoors
  - Activity 2: cardboard tube; string
  - Activity 3: water; eight 20-ounce soft drink bottles; straws; measuring cup
  - Activity 4: sections of corrugated cardboard (1½ x 8 inches); straws
- Materials for craft stick harmonicas (see Meeting 2 Resources)
- If you have access to the internet during the meeting, find some videos of aeolian harps—instruments played solely by the motion of wind. The Scouts will likely be fascinated by these instruments. (Talk Time)

## GATHERING

As Scouts arrive, have them create harmonicas.

## OPENING

- Have Scouts hum “God Bless America” on the craft stick harmonicas they made during the Gathering.
- Conduct a flag ceremony of your choosing that includes the Pledge of Allegiance and the Scout Oath and Scout Law.

## TALK TIME

- Carry out business items for the den.
- Allow time for sharing among Cub Scouts.
- Discuss how the previous week’s meeting on air serves as the basis for this week’s meeting in which Cub Scouts will explore how wind can make music.

## ACTIVITIES

### ◆ Activity 1: Wind Sounds (Requirement 2A)

- Have the den go outside, and encourage everyone to listen closely for sounds that are associated with the wind. There may be many such noises (e.g., cans rolling on the pavement, wind whistling through the trees), but even gentle breezes will cause leaves to rustle or move wind chimes. If there is no wind, ask Scouts to describe things they may have heard in the past that are associated with the wind.
- While the Scouts are listening, record as many different sounds as you can, including some that aren’t related to wind. Then play the recording and have everyone identify a sound that resulted from wind.

### ◆ Activity 2: Speed and Sound Investigation (Requirement 2C)

Tell Scouts that in some countries, there is an instrument called a “bullroarer” that uses speed to create sound. This activity will use a similar concept to investigate how sound can be affected by speed.

Tie a string to a cardboard tube, ensuring that the knot is secure.

Have Scouts create a large circle with a single Scout in the center, and test the safety distance to ensure the circle is wide enough to keep the tube from hitting anyone.

When ready, have the Scout hold the string and swing the tube above their head in a circle. Have each Scout take a turn, and encourage Scouts to try speeding up or slowing down the tube to see how the change in speed affects the sound.

After each Scout has had a turn, have them share what they noticed.



### ◆ Activity 3: Bottle Band (Requirement 2B)

- Have each Scout remove the cap from a 20-ounce bottle and blow gently across the top to hear the tone the bottle makes. Then line up the bottles on a flat surface.
- Leave one bottle empty, but pour the following amounts of water into the other seven bottles:  $1\frac{1}{2}$  cups, 2 cups,  $2\frac{3}{4}$  cups, 3 cups,  $3\frac{3}{4}$  cups, 4 cups, and  $4\frac{3}{4}$  cups. Now have the Scouts experiment, blowing gently across the open tops and listening for variations in tone. The water amounts given should produce a fairly accurate musical scale, and with some practice, the “bottle band” might play a tune!
- You will find that the more water a bottle contains, the higher its tone will be. The tone can be altered by inserting a straw in the bottle, placing a finger over the end of the straw, or pouring out some water.

### ◆ Activity 4: Soda Straw Pipe Organ (Optional)

Here’s another way to create a musical wind instrument, if the den has time:

- Cut the eight straws down to the following lengths in inches:  $4\frac{1}{4}$ ,  $4\frac{1}{2}$ ,  $5\frac{1}{4}$ , 6,  $6\frac{3}{4}$ , 7,  $7\frac{3}{4}$ , and  $8\frac{1}{2}$ .
- Starting about  $1\frac{1}{2}$  inches from one end of the cardboard, push the straws between the corrugations and leave four empty corrugations between each straw.
- Flatten the top ends of the straws and cut off the corners. Blow into the instrument with your lips lightly around the straws—like a harmonica. Listen to the unique sounds that come out as you continue blowing and sliding the instrument across your lips.

## CLOSING

- Tie the musical activities at this meeting to relevant points of the Scout Law. For example, the Wolf Scouts helped each other make the Bottle Band, and creating music probably made them feel cheerful.
- Review details for the upcoming outing in Meeting 3 if the kite derby will be held at a location and/or time different from the den meeting. Make sure all Scouts and their families know the plans.

## AFTER THE MEETING

- Serve refreshments, if desired.
- Record completion of requirements 2A, 2B, and 2C.
- Work together to clean up the meeting place.
- Remind each Scout to bring materials for making a kite at the next meeting.

# MEETING 2 RESOURCES

## GATHERING

### Wooden Harmonicas

Use the instructions for requirement 2B in the *Wolf Handbook* to create harmonicas using craft sticks.

#### Materials:

- Two tongue depressors or wide craft sticks
- Scissors
- Paper
- Clear tape
- Three rubber bands (one wide, two skinny)

1. Cut two strips of paper the same size as a tongue depressor.
2. Place one tongue depressor on top of the other. Wrap one paper strip around each end of the tongue depressors. Wrap tape around each loop without touching the tongue depressors.
3. Slide off one tongue depressor. Stretch the wide rubber band around the length of the tongue depressor and paper loops.
4. Place the second tongue depressor back on top. Wrap one skinny rubber band around each end outside of each paper loop.





# MEETING 3 PLAN

## PREPARATION AND MATERIALS NEEDED

- U.S. and den flags
- Materials for making kites (paper, sticks, string, glue, scissors, markers) and kite reels (wood blocks, dowels, glue, and a drill if the wood is not predrilled). Have a parent or other adult present to help each Scout.
- If the den will hold a kite derby as part of this meeting, be sure that the meeting location allows a safe outdoor space for flying the kites.
- Confirm that transportation to and from the event is in place. Secure signed activity consent forms.
- The unit den leader should bring a copy of the *Guide to Safe Scouting*.
- Prepare simple enough ribbons or awards for each Scout to be presented with a special award at the end of the kite derby. Awards could include: Most Colorful, Highest Flying, Fastest, etc.

## GATHERING

As Scouts arrive, have them decorate the paper they will use to create their kites.

## OPENING

- Conduct a flag ceremony of your choosing that includes the Pledge of Allegiance and the Scout Oath and Scout Law.
- During the ceremony, you could tie the waving of the flag into the previous week's discoveries about wind.

## TALK TIME

- Carry out business items for the den.
- Allow time for sharing among Cub Scouts.
- Review the information on kite safety (requirement 2D) and the science of air (requirement 2E) in the *Wolf Handbook*.

## ACTIVITIES

### ◆ Activity 1: Making a Kite (Requirement 2D)

- Have each Cub Scout in your den build a kite and assemble a kite reel. Use the directions in the *Wolf Handbook* for a newspaper kite (see the Meeting 3 Resources), or choose other design options for the den.
- If limited space is an issue, try making finger kites, which are not more than 8 to 10 inches long and can be flown by simply running.

### ◆ Activity 2: Kite Derby (Requirement 2E)

- Have the Wolf Scouts take their new kites outdoors to hold a small-scale kite derby. As an alternative, this can be planned as a separate activity with the pack or as part of a community event.
- Allow time for Wolves and adults who are able to help to try launching and flying their kites.

## CLOSING

Close the meeting with appropriate remarks about kites flying high and a comparison to Scouts "flying high" by doing their best and "soaring" to their rank advancement.

## AFTER THE MEETING

- Serve refreshments, if desired.
- Record completion of requirements 3A, 3B, and 4.
- Work together to clean up the meeting place.

## MEETING 3 RESOURCES

### Activity 1: Making a Kite

Use the instructions for requirement 2D in the *Wolf Handbook* if your den will create newspaper kites.

#### Materials:

- Two-page spread of newspaper
- Scissors
- Cellophane tape
- String
- Long sticks, bamboo plant rods, or ¼-inch wooden dowels
- Marker



Upon completion of the Air of the Wolf adventure, your Wolves will have earned the adventure loop shown here. Make sure they are recognized for their completion by presenting the adventure loops, to be worn on their belts, as soon as possible according to your pack's tradition.

