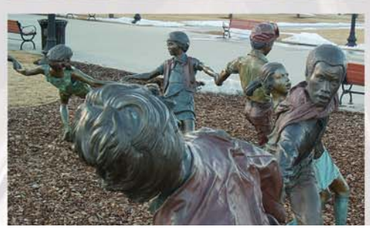
The Sound Localization Guidebook

Activities for developing sound localization skills



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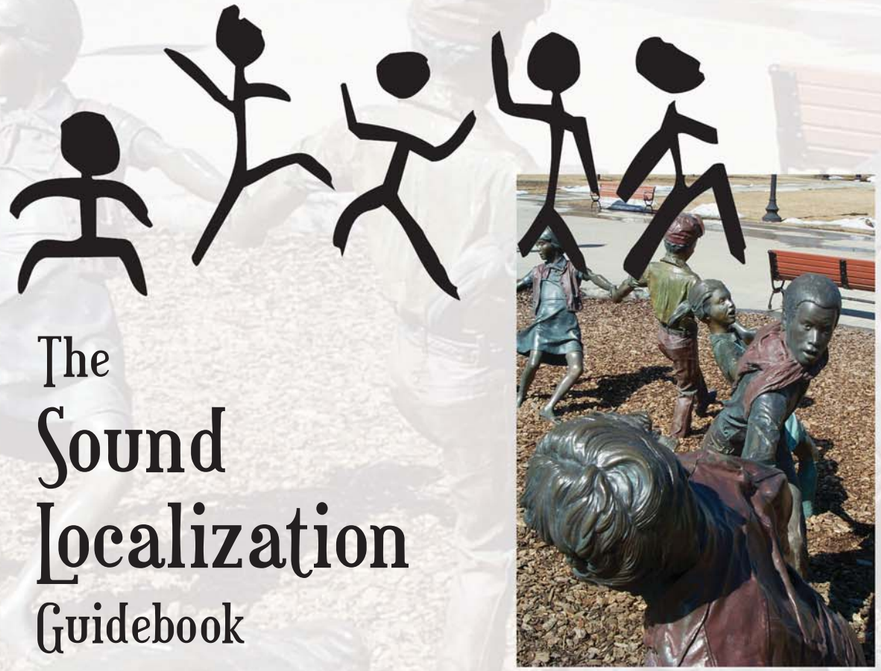

The Sound Localization Guidebook

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Fourth Edition

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In keeping with our philosophy to provide access to information for people who are blind or visually impaired, the American Printing House for the Blind provides this book in large print and braille.

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Preface

As with the original edition, the specific objective of this revised book is to meet the sound localization needs of young learners who are blind. The activities presented are suited to a variety of situations and learners. Every effort has been made to provide the classroom teacher, aide, physical education instructor, and orientation and mobility specialist with a basic inventory of activities to use in the development of sound localization skills. The activities outlined also include ones permitting participation of individuals or small groups of learners who are blind with their sighted peers.

In addition, this new edition includes a list of sport activities that can be taught to children and enjoyed by individuals of any age.

The first edition of this book was a product of the Sound Localization Institute held in April, 1972 at the American Printing House for the Blind (APH), Louisville, Kentucky. Drawn from the extensive experience of the participants, the activities and learning situations represent a variety of successful approaches to teaching sound localization. Undoubtedly other activities and approaches are also effective. The reader is invited and encouraged to send APH additional activities or simple procedures that foster sound localization skills. Suggestions for revising or editing activities that have been presented as well as new activities or approaches will be considered for inclusion in the next edition.

APH wishes to acknowledge the members of the 1972 Sound Localization Institute:
M. Bernadette Alber
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Forty-two O&M instructors and/or P.E. teachers participated in a product specific survey (2002) and recommended that APH include some new games, along with instructions and/or adaptations on how to play the games. Robert Wall, Ph.D., Western Michigan University, and Rebecca Price, COMS, Western Pennsylvania School for Blind Children reviewed the updated manuscript and provided guidance on the reorganization of the 2005 edition. Dr. Wall authored Appendix A.

[Number to come] young learners participated in the field test evaluation of the revised manual and the Portable Sound Source, Sport Edition, accompanying it. The results of the field test study showed... [will complete after field testing].

APH gratefully acknowledges and thanks the following professionals who participated in the field evaluation.

[List field test sites and evaluators]

Chapter One

Introduction

Introduction

In most instances the success of the educational process depends on effective communication. For the learner who has a visual impairment, the auditory channel is especially important. A young learner with a visual impairment, striving to function in a sighted environment, places great reliance upon the auditory modality for gaining information. As a result, educators of learners with visual impairments began to construct procedures to encourage effective listening behavior. In preparing this manual, the authors have proceeded on the principle that any skill can be enhanced through a program of sequential developmental activities.

Basically there are five levels of learning that characterize the effective use of sounds in the environment.

1. Awareness
2. Discrimination
3. Interpretation
4. Localization
5. Conversion

Awareness is the recognition of sound in the environment. The learner should realize that sounds are all around him. *Discrimination* is the ability to recognize a particular sound within a background of noise or as distinct from other sounds. The use of sounds around him requires an *interpretation*, which is the association of a sound with the object producing it. Ideally the learner will want to know

more about the source of a sound and will display inquisitive behavior. *Localization* is the identification of the exact source of the sound. The sound may be located in reference to the learner's position or some other referent being used. Depending on the learner and the environment, localization may precede interpretation. *Conversion* is the utilization of the sound as an aid to the learner's interaction with the environment. The conversion of a sound requires awareness, as well as interpretation and localization. While all of the above levels should be included in a comprehensive listening program, the activities in this manual are primarily concerned with the enhancement of localization skills. Remember that to efficiently localize a sound, a student must first be aware of a sound, and must be able to discriminate that sound from other sounds in the environment.

The original study used in 1972 to develop this manual surveyed orientation and mobility specialists and classroom teachers relative to the development of sound localization skills. The survey revealed a paucity of applicable information, thus placing upon the Institute the responsibility for developing virtually a whole new curricular approach to teaching sound localization skills. The survey revealed that the visually impaired learners were generally instructed to rely extensively upon environmental sounds. Instructors often used sounds in the natural environment, but ones that could be partially controlled by the instructor. However, the assumption that the student's use of a familiar voice, the sound of a distinctive motor, or wind chimes enhances localization skills may be questioned. Such use of

environmental sounds may in fact be a discrimination task or an association with a particular location and not a situation that emphasizes or requires a specific localization.

Recent sound localization studies have shown that blind and sighted individuals did not differ when asked to attend to a sound placed centrally in front of them (Lessard, Paré, & Lassonde, 1998; Röder, Teder-Sälejärvi, Sterr, Rösler, Hillyard, & Neville, 1999). However, blind subjects did map the environment better than sighted subjects when attending to sounds in peripheral auditory space (Röder et al., 1999). Surprising to researchers, blind subjects with peripheral residual vision did not localize sounds as well as blind or sighted individuals (Lessard et al., 1998; Röder et al., 1999). In general, however, young learners who are blind have thresholds of sound localization equivalent to those of sighted children (Ashmead, Wall, Ebinger, Hill, Yang, & Eaton, 1998). Observed differences, often in favor of children who are blind, appear to be due to practice. Improved sound localization skills demonstrated by blind individuals can be achieved by sighted individuals who are given sound localization training (Lewald, 2002). The reader should recognize that localization skills are developmental in nature and accuracy requires practice. *"Neither mother's own voice nor sound-making toys can successfully be used to encourage movement until both permanence of sound producers and localizing skills have been acquired"* (Sonksen, 1984, p. 284).

In the interest of efficient instruction of young learners, APH developed a highly controllable artificial sound source, called the Portable Sound Source (PSS). Several times over the

years, the Technical Research Department has refined the design and made it more portable and user friendly.

Characteristics of the PSS lend themselves readily to the development of sound localization skills. Its size and weight permit easy manipulation and direction of the sound. It may be moved in a horizontal plane to any point around the learners, and within a vertical plane raised to head level and above or placed on the ground. Tone, volume, and signal rate can all be varied to make the sound more discriminable by learners. The use of a highly discriminable sound source helps to alleviate problems associated with awareness and identification, and allows learners to devote full attention to the development of sound localization skills.

Purpose

The purpose of this manual is to provide teachers of visually impaired young learners with a few selected activities that may be used to develop sound localization skills.

Program

Chapters 2-5 focus on individualized skills that are preliminary to the group skills presented in chapter 6. The individualized activities are instructionally sequenced how a teacher and young learner may best use the sound source.

- **Chapter 2** presents activities where both the learner and the sound source are stationary. Although the activities in this chapter are described for individualized instruction, they can be used in small group settings as well, with participants replying in unison, raising their hands, or being called on, when verbal responses are required.

- **Chapter 3** presents activities where the learner is stationary and the sound source is moving.

- **Chapter 4** presents activities where the learner is moving and the sound source is stationary.

- **Chapter 5** presents activities where both the learner and the sound source are moving.

- **Chapter 6** introduces group play/activities that help the learner(s) practice localization skills learned in the previous chapters.

Implicit in the chapter sequence are situations that increase in complexity. Each chapter represents a different set of factors based on the relationship of the learner to the sound source. Activities within a chapter also represent the sequential development of skills. This provision for chapter and activity sequence offers flexibility for the instructor in the arrangement of experiences that are provided. Likewise, if a learner has sufficient skill, he can move quickly through the first few sections as a test phase, before going on to

higher level tasks. Always keep in mind that is not necessary to attain skill or even attempt all activities in one chapter before moving to the next.

When using chapter 6, it is possible for the teacher to make continuous observations of the learner's skill level while participating in the group activities, and if necessary return to specific individualized activities presented in the previous chapters for practice and reinforcement of skills.

The activities are intended as a guide for the teacher. The reader should become thoroughly familiar with the types of activities presented, try them out with learners, and then make some preliminary decisions regarding the sequence, level of difficulty, and their appropriateness for each learner's situation.

While the development of sound localization skills is the continuing and dominant objective, the games and activities presented may be useful in the accomplishment of several objectives. Many of the games and activities introduce an element of competition either with members of the group or with oneself. Since the ability to localize is related to successful performance, the activity approach is highly motivating. Of course, in a class of sighted and blind learners, all derive educational benefits from participation.

Once the focus of the activity is clearly on the development of sound localization skills, teachers can effectively apply their own distinctive styles of teaching with no fear of obscuring the basic objectives.

Familiarization

Before the introduction of formalized activities, the learner must be familiarized with the sound device. Since variation in the device's rate, volume, and tone are possible, the learner should first become familiar with these characteristics. Complete familiarization includes the operation of all controls and recognition of the resulting effect. The familiarization should be used to decrease fear or negative feelings. It should also act to reinforce the learner's level of awareness and identification. The familiarization underlies many of the preliminary activities that have been suggested, but there are also specific topics and situations that will aid in the overall process.

Planned learning situations familiarize the learner with the device's capabilities.

1. Introduce the sounds of the device when conducting sound discrimination activities such as listening to recorded environmental sounds. These are quite different from ordinary sounds learners might hear.
2. Introduce the sounds of the device when discussing loudness and softness (volume). Demonstrate a loud signal and a soft signal.
3. Introduce the sounds of the device in the course of discussing high and low sounds (pitch or tone). Ask the learner to discriminate between a high sounding signal and a lower sounding signal.

4. Introduce the sounds of the device during or following a discussion of rhythm. Use the device to demonstrate three different speeds (rate) of signal frequency.

Physical activities readily lend themselves to demonstrating and emphasizing the foregoing suggestions.

1. Ask the learner(s) to spread her arms wide apart when the sound is loudest and bring her hands together when it is softest.
2. Ask the learner(s) to stand as tall as he can when the sound is high and to squat down as the sound becomes lower in tone. By varying the tone and volume the result can be a series of deep knee bends or arm and shoulder extensions.
3. Ask the learner(s) to hop on one foot in the same rhythm as the signal — the activity may be varied by jumping or raising up to tiptoe in time with the signal. The learner(s) may be asked to clap in rhythm.
4. Require the learners to respond to the absence of sound. A variation of *Musical Chairs* may be used in which the learners squat down when the signal is discontinued. The last learner responding is eliminated.

The teacher may wish to use some discretion in allowing young learners to manipulate the controls. For those who are given the opportunity, the following suggestions are made.

Model: Portable Sound Source, Sport Edition

The push button model has 30 stepped levels of rate, tone, and volume. It can be operated by pushing the tactile buttons on the device, or by using the tactile remote control.

1. Encourage the learners to examine the shape of the device. Point out the speaker, the carrying strap, the off/on two-position power switch, and the eight control buttons.
2. The off/on two-position power switch is centrally located at the top of the device. This switch must be pushed to the right before the Play button will activate. This switch also allows for the operation of the remote. When not in use for extended periods of time, the switch should be pushed to the left to conserve battery life.
3. The first two buttons (black north and south pointing raised carets) are the Rate buttons. The upper button increases the rate or makes the repetitive sound go faster. The bottom button decreases the rate or makes it go slower.

4. The second set of buttons (blue north and south pointing raised carets) regulates the Tone. The upper button makes the tone (or pitch) higher, and the lower button makes the tone lower.
5. The third set of buttons (white north and south pointing raised carets) controls the Volume. The upper button increases the volume, and the lower button decreases the volume.
6. The last set of buttons controls the Play/Stop action. The upper button (a green raised circle) starts the device. The lower button (a red raised X) stops the device.

Model: Portable Sound Source 2003

The turn knob model produces continuous sounds, allowing for the option to create slurring effects by slowly or quickly turning the knobs.

1. The control panel consists of three knobs and a two-position switch.
2. The device is activated by pushing up the switch located on the left of the control panel.

3. The first knob on the left controls the rate at which the beeping signal is emitted. The rate increases as the knob is turned clockwise.
4. The second knob controls volume, which increases as the knob is turned clockwise.
5. The third knob from the left controls the tone (or pitch) of the signal. Turning the knob in a clockwise direction increases frequency.

Suggest activities to help learners refine their abilities to follow directions. One, two, or a series of directions may be used. Games such as *Simon Says* and *Mother May I* may provide structure for the learners' responses and insure that they are attending to the task.

Directions such as the following would be appropriate in the familiarization process.

a. ("Simon says") Locate the handle/carrying strap.
b. Carry the device by the handle. ("Mother may I?")
c. Carry it by placing your hands under it on the base.
d. Touch the speaker.
e. Place the speaker toward you.
f. Turn the speaker away from you.
g. Locate the off/on switch (and play button if applicable), turn the device on.

h. Locate the tone control, increase and decrease the frequency.

i. Locate the volume control, increase and decrease the volume.

j. Locate the rate control, increase and decrease the rate.

Chapter Two

Learner Stationary and Sound Source Stationary

Learner Stationary and Sound Source Stationary

The general purpose of activities in chapter 2 is to provide further familiarization with the device and to introduce beginning localization skills.

Stationary refers to the spatial position assumed by the learner and the sound source. The activities and localization tasks are specifically designed for the blind learner who has observable needs in the area of sound localization, and provide a series of skill-related activities that are fundamental to localization situations. It is a relatively simple task to make direct applications of the activities listed to situations commonly encountered in orientation and mobility instruction. However, in an effort to achieve wider acceptance and usage of the fundamentals in the classroom, the opportunity to make specific applications to formal O&M instruction has been deferred in this chapter. The approach used is essentially individualized instruction for development of sound localization skills.

Several conditions are noted for each activity listed in chapter 2. The conditions may vary as to the placement of the sound source spatially and the characteristics of the sound (volume, rate, and tone). In the initial phases of instruction an effort should be made to select a sound characteristic and instructional area which will facilitate a positive attitude on the part of the learner.

Again, it should be remembered that activities are intended as a guide for the teacher. The situations are instructional in nature, and dialogue between teacher and learner is given only to facilitate an accurate description of the situation and potential interaction between the learner and the teacher. Diagrams are provided for several conditions to illustrate the logistics involved in performing a demonstration.

Each activity is performed with the learner and the sound source in a stationary position at *the time* the sound is being emitted. After each condition is performed, the sound source is *turned off* and then moved to another position when necessary. The next condition is explained to the learner, and then the sound source is *turned on*. The purpose is to increase the student's ability to recognize and describe accurately the location of sound.

Activity One: Introducing the sound characteristics of the sound source

1. Assume initial position: The sound source is placed directly in front of the learner at head height and at the distance of 4 to 10 feet.

Describe each sound characteristic prior to the demonstration.

Demonstrate:

a. loud volume
b. soft volume
c. high tone
d. medium tone
e. low tone
f. slow rate
g. fast rate

2. Repeat all conditions and allow the learner to identify the sound characteristics *after* hearing each sound.

Instructor: "Describe the sound you are hearing."

3. Have the learner give other examples of auditory sounds that he has heard in the school or home environment and describe their characteristics.

Activity Two: Locating height of sound source

1. Assume initial position: Sound source is placed directly in front of the learner at a distance of 4 to 10 feet.

Describe the sound in terms of its height. The sound characteristics should remain the same for the complete range of height position (e.g., soft sound, medium tone, slow rate).

Demonstrate:

a. sound source at floor level
b. sound source at learner's waist level
c. sound source at learner's head level
d. sound source above learner's head level

2. Repeat condition one and allow the learner to identify the height location of the sound after hearing each sound.

Instructor: "How high is the sound?"

3. Repeat previous conditions by varying volume, tone, and rate.

Activity Three: Locating the sound source in relation to the body

1. Assume initial position: Sound source is placed at head height at a distance of 4 to 10 feet from the learner. Place the sound source as follows:

a. in front of learner
b. behind learner
c. left of learner
d. right of learner

Body relationships should be understood by the learner prior to the demonstration.

Instructor: "The sound you hear will be in front of you."

2. Repeat all conditions and allow the learner to identify the body relationship after hearing the sound.

Instructor: "Where is the sound?"

3. Repeat the conditions, varying the volume, tone, rate, and height position in relation to the body.

Activity Four: Determining relative distance of sound source

1. Assume initial position: Sound source is placed directly in front of the learner at head height in a near position. Near is defined as the space around the learner within reaching/touching distance; approximately one to three feet.

Instructor: "Is the sound near you?" Provide feedback to the learner by allowing him to touch the sound source.

2. Take subsequent position: Sound source is placed directly in front of the learner at head height in a far position. Far is defined as space around the learner beyond touching distance; approximately four feet and beyond.

The sound characteristic used in condition one should be the same for this condition.

Instructor: "Is the sound near you or far from you?" (Let the learner know if he responds accurately.)

3. Introduce remaining body relationships.

After an understanding has been established of near and far with reference to the frontal position, the remaining body relationships (behind, left, right) should be introduced. Volume, tone, and rate may be varied when presenting the remaining relationships. Help the learner understand that "softness" does not always directly relate to distance. Sound may be near and soft or far and loud.

Activity Five: Familiarization tasks

The conditions may be conducted individually with a learner, or in the classroom, incorporating the use of the sound source into regular class work. For example, in the area of arithmetic *say to the learner(s)*:

1. "Count the number of signals you hear." Obtain a response.
2. "Count the signals, and add _____." Provide additional number and obtain learner response.
3. "Count the signals and subtract _____." Provide additional number and obtain learner response.

Several variations are possible, but the general process is a good way to reinforce basic number combinations with different and novel media.

Activity Six: Requiring a physical response

The conditions are not dependent on a large area for instruction. The purpose is to develop pointing and body directional skills. For example, the learner might be asked to:

1. Point to the sound source using the hand or index finger.
2. Turn to face the sound (i.e., toes and nose directed toward the sound).
3. Turn in place to position the sound behind one's self.
4. Turn in place to position the sound to one's right or left (i.e., three o'clock or nine o'clock positions).
5. When the sound source is being held by the teacher, squat down until it is above head level.
6. Clap in rhythm to the sound.

Activity Seven: Requiring a verbal response

The conditions may be conducted in the classroom. The purpose is to discriminate when changes in direction of sound occur and respond verbally. For example, a procedure should provide opportunities for the learner to react to changes in directional sounds and receive feedback concerning his accuracy. Situational questions follow:

1. Is the speaker directed toward you?
2. Is the speaker directed away from you?

Place the sound source on a desk or hold it above the head of the learner and ask:

3. Is it above your head?-below your ear level?

Vary the volume of the sound source and ask:

4. Does it sound like the sound source is moving toward you (increasing volume)?
5. Does it sound like the sound source is moving away from you (decreasing volume)?

The sound source is not moved, only the volume is changed.

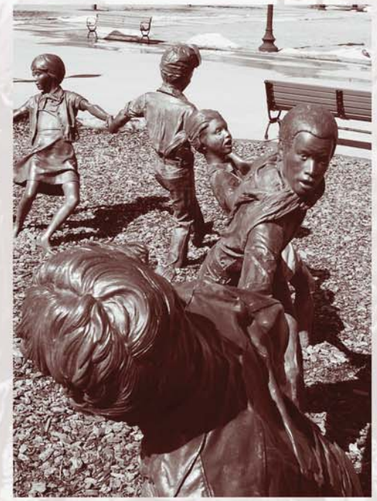
Activity Eight: Requiring complex responses

A larger area is required for the suggested conditions.

1. Place the sound source in the bottom of a large box and toss bean bags or small playground balls toward and into the box. In the beginning, toss from a position relatively close to the box. When retrieving the bean bag or ball, indicate the distance from the sound source to the throwing line.
2. Place the sound source directionally behind an object (e.g., bowling pin, Indian club) and practice tossing, rolling, or throwing a ball in a specific direction.

Chapter Three

Learner Stationary and Sound Source Moving



Learner Stationary and Sound Source Moving

Each of the following activities should be demonstrated at distances near and far from the learner (Approximately: near-1 to 3 feet; far-4 to 15 feet). Aim sound source directly toward learner at all times.

Activity One: Localizing sound in relation to each side of the body

1. Assume initial position: Instructor stands a specific distance in front of learner with sound source aimed at learner's head level.

Instructor: "Where is the sound?"

Learner: "In front of me."

Continue moving around the learner stopping on the right side, behind, and left side of the learner.

Instructor: "Where is the sound in relation to your body?"

If the learner is familiar with telling time and understands the relationship of the situation, describe the localization in terms of clock positions (i.e., three, six, nine o'clock). If the learner has difficulty with this task, have him point to the sound source continually as it moves.

2. Repeat condition one but vary the height of the sound source.

Instructor: "How high is the sound, and where is the sound in relation to your body?"

Activity Two: Localizing a moving sound in relation to each side of the body

This activity provides practice in localizing sound that is moving away from the learner.

1. Assume initial position: Instructor stands directly in front of the learner with sound source aimed at head level. Instructor backs up specified distances from the learner. A continuing sound should be emitted while it is being moved.

Instructor: "Listen to the sound as it moves away from you."

2. Repeat the previous condition by placing the sound source on the right, behind, and left side of the learner.

3. Demonstrate each condition with the sound source aimed at head level. After each demonstration, vary the height of the sound and ask if it is above, below, or at head level.

Supply information regarding distances of learner from sound source as this will provide additional informational input to the student. For example, tell the learner when the sound is 3, 4, 8, or 10 feet from him.

4. Experiment with the learner's ability to estimate his distance from the sound source in feet and/or yards.

Activity Three: Localizing a sound moving parallel to the learner

This activity introduces sound moving in a straight line of direction, parallel to each side of the learner's body.

1. Assume initial position: Instructor stands in front and to the left of learner with sound source aimed at head level. Instructor walks from the learner's left to right side parallel to the learner's front side.

Instructor: "Listen to the sound as it moves from your left to your right." (See Figure 1.)

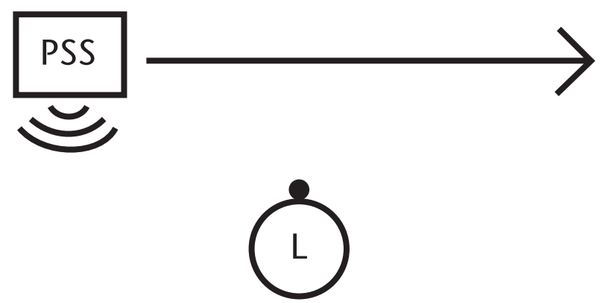


Figure 1

2. Repeat condition one by moving the sound from the right to the left.
3. Repeat condition one and two behind the learner.
4. Take second position: Instructor stands in front and to the right of learner with sound source aimed at head level.

Instructor walks past learner, parallel to the learner's right side.

Instructor: "Listen to the sound as it moves from in front of you to behind you." (See Figure 2.)

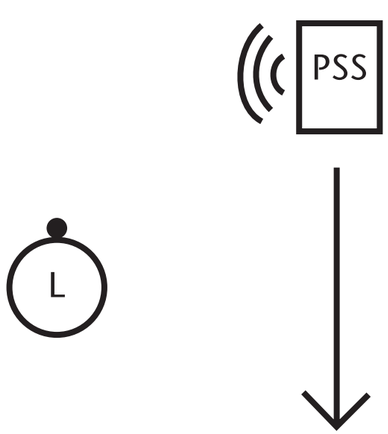


Figure 2

5. Repeat condition four on the left side of the learner.
6. Repeat condition four and five by walking from behind to in front of the learner.

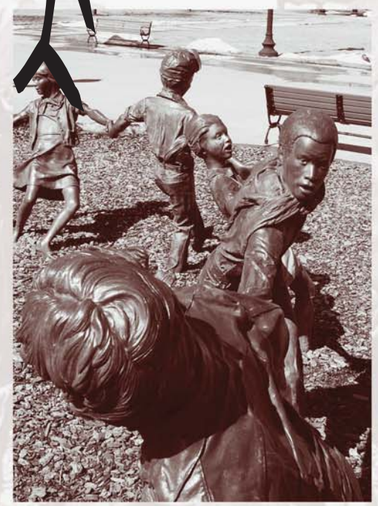
Activity Four: Responding to a moving sound

Repeat the previous activity but have the learner tell the instructor to stop when the moving sound is directly opposite each side of his body.

Instructor: "Tell me to stop when the sound is directly in front of you .... in back of you .... directly on your right .... directly on your left."

Chapter Four

Learner Moving and Sound Source Stationary



Learner Moving and Sound Source Stationary

Each activity within this category is performed with the learner moving his head or entire body at the time the sound is being emitted. The sound source remains in a stationary position. After each condition is performed, the sound source is turned off. When necessary the instructor will specifically position the learner to perform a task before turning on the sound source. The first three activities should be demonstrated at near range initially. All conditions should be explained to the learner before the demonstration.

Activity One: Introducing facing movement by only moving the head

Explain to the student that the tasks to be performed involve positioning the head so that the nose is pointed directly at the sound source. The sound source should be placed at head level for the initial demonstration of the first three conditions. After each condition, the instructor should position the learner to facilitate the next facing movement (conditions two and three).

1. Assume initial position: Learner stands directly in front of sound source.

Instructor: “Where is the sound?”

Learner: “In front of me.”

2. Place sound source on learner's left side.

Instructor: "Where is the sound?"

Learner: "On my left."

Instructor: "Turn only your head and face the sound."

3. Place sound source on learner's right side.

Instructor: "Where is the sound?"

Learner: "On my right."

Instructor: "Turn only your head and face the sound."

Activity Two: Moving the entire body to face the sound source

This activity repeats conditions presented in the previous activity; however, the learner must move his entire body when facing the sound source. Each condition should be explained to the student prior to the demonstration. Show the learner how to correctly align his head with his body when facing the sound source. Place the sound source at head height for the initial demonstration of the first four conditions. When necessary the instructor should position the learner to perform facing movements (conditions two, three, and four).

1. Assume initial position: Learner stands directly in front of sound source.

Instructor: "Where is the sound?"

Learner: "In front of me."

Instructor: "Are you facing the sound?"

Learner: "Yes."

2. Have learner stand with sound source on left side.

Instructor: "Where is the sound?"

Learner: "On my left."

Instructor: "Turn and face the sound."

3. Have learner stand with sound source on right side.

Instructor: "Where is the sound?"

Learner: "On my right."

Instructor "Turn and face the sound."

4. Have learner stand with sound source behind him.

Instructor: "Where is the sound?"

Learner: "Behind me."

Instructor: "Turn and face the sound."

5. Repeat the previous conditions; vary height of sound source.

Instructor: “How high is the sound? Turn and face the sound.”

Activity Three: Pointing and facing

This activity introduces pointing with facing movements. Pointing behavior is intended to further assist the learner in localizing sound. As with previous activities, the instructor should position the learner to perform the conditions that follow.

1. Assume initial position: Learner stands directly in front of sound source.

Instructor: “Where is the sound?”

Learner: “In front of me.”

Instructor: “Are you facing the sound?”

Learner: “Yes.”

Instructor: “Use either hand and point at the sound.”

2. Have learner stand with sound source on his left side.

Instructor: “Where is the sound?”

Learner: “On my left.”

Instructor: “Turn only your head and face the sound. Use your left hand and point toward the sound.”

3. Have learner stand with sound source on right side.

Instructor: “Where is the sound?”

Learner: “On my right.”

Instructor: “Turn only your head and face the sound. Use your right hand to point to the sound.”

4. Have learner stand with sound source on left side.

Instructor: “Where is the sound?”

Learner: “On my left.”

Instructor: “Turn your body to face the sound source. Point at the sound source using either hand.”

5. Have learner stand with sound source on right side.

Instructor: “Where is the sound?”

Learner: “On my right.”

Instructor: “Turn your body to face the sound. Point at the sound using either hand.”

Activity Four: Walking toward a sound source

The following conditions involve localizing a sound by walking an arbitrary distance to locate the position of the sound source. The distance a learner must walk to locate the sound source is left up to the instructor's judgment. If a learner has had little experience with this activity, starting at a distance of 5 feet and working up to distances of 30 feet may be a successful approach. Skill in localizing sound will increase with practice; therefore, the following conditions may be performed as many times as needed. However, do not be discouraged if a learner is less precise at farther distances. This is a natural outgrowth of the human perceptual system and takes much practice to counter.

1. Assume initial position: Learner stands facing sound source, a specific distance from sound source.

Instructor: "Walk to the sound."

2. Have learner stand with sound source behind him, a specific distance from sound source.

Instructor: "Make a half-turn to the left/right; walk to the sound."

3. Have learner stand in front and equidistant from two sound sources (i.e., Place one sound source on the right and one sound source on the left).

Instructor: "Walk straight ahead until you are directly between the two sounds, then stop. Turn right and face that sound. Point at the sound, then walk to the sound."

4. Repeat condition three by having learner turn left when he reaches the midpoint between the two sound sources.
5. Repeat condition three and four but eliminate the sound source opposite the direction in which the learner is turning.

Activity Five: Walking away from a sound source

Repeat each of the conditions in the previous activity by reversing each walking pattern.

1. Assume initial position: Learner stands with sound source behind him, a specific distance away from sound source.

Instructor: (Standing behind the learner and the sound source) "Walk straight away from the sound. Stop walking when I turn off the sound."

2. Have learner stand facing sound source, a specific distance away from the sound source.

Instructor: "Turn around so that your back is facing the sound. Walk away from the sound. Stop walking when I turn off the sound."

3. Have learner stand with his back next to one sound source. Place another sound source directly in front of him, a specific distance away.

Instructor: "Walk toward the sound in front of you. When you are directly between (middle) the two sounds, stop. Turn right and walk until I turn off the sound."

4. Repeat condition three by having learner turn to the left.
5. Repeat condition three and four but eliminate the sound source in front of the learner.

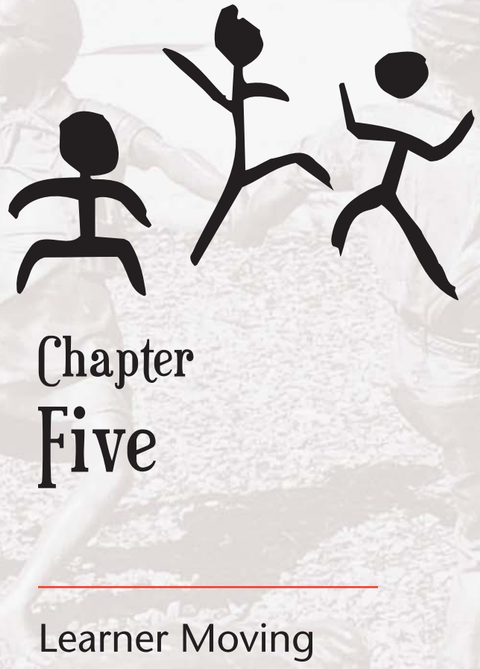
Activity Six: Walking around a sound source

This activity provides practice in localizing sound while walking in a circle. Providing the learner contact with a pole or rope connected to the center of the circle will assure that an accurate circular pattern is walked.

1. Assume initial position: Learner stands with his right side facing and a specific distance away from sound source. Instructor will stand behind sound source with rope/pole in his hand. Learner will grasp the other end of the rope/pole with his right hand.

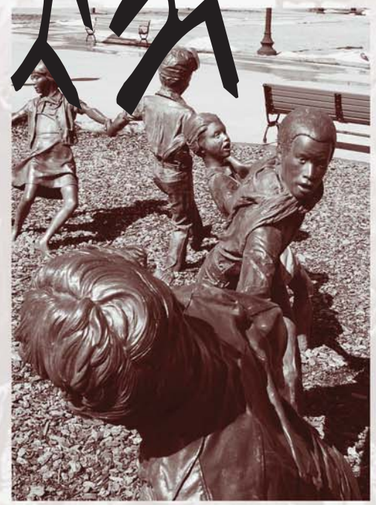
Instructor: "Hold on to the rope/pole and walk around the sound. Stop when your right ear is again in line with the sound."

2. Repeat condition one by having learner stand with his left side facing sound source.
3. Repeat previous conditions by varying the distance the learner stands away from sound source. Experiment with eliminating the rope/pole after several practice trials.



Chapter Five

Learner Moving and Sound Source Moving



Learner Moving and Sound Source Moving

Each activity within the category is performed with the learner moving his head or entire body at the same time the sound source is being moved by the instructor. All conditions of an activity should be explained to the learner before turning on the sound source. Provide feedback relative to movement performance and distance judgements.

Activity One: Tracking a sound source by moving only the head

1. Initial position: Instructor, facing learner's right side, aims sound source at learner's head. Instructor walks in half circle (180° sweep) from the learner's right side to the learner's left side. Sound is constantly aimed at learner's head. (See Figure 3.)

Instructor: "Move only your head and follow the sound as it moves from your right to your left."

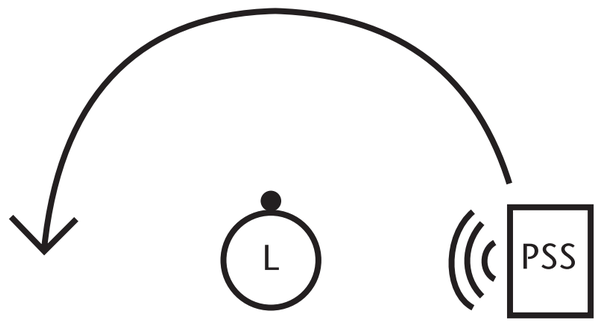


Figure 3

2. Repeat condition one by moving the sound from left to right. (See Figure 4.)

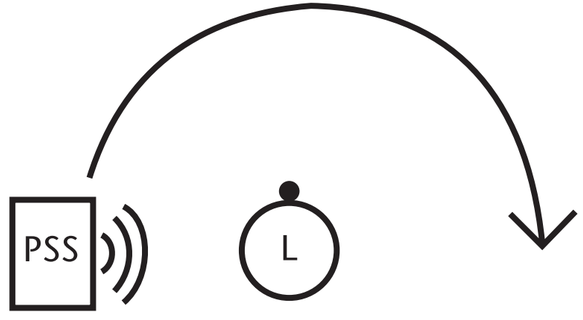


Figure 4

Activity Two: Tracking a sound source moving the entire body

1. Repeat conditions one and two in the previous activity by having the learner move his entire body when tracking the sound in a half circle (180° sweep).

Instructor: "Move your whole body and follow the sound as it moves from your right to your left; from your left to your right."

2. Repeat the previous conditions by having the learner point at the moving sound.
3. Repeat condition one and two moving in a 360° circle.

Instructor: "Move your whole body and follow the sound as it moves in a circle around you."

4. Repeat condition three by having the learner point at the moving sound.

Activity Three: Following a moving sound source

1. Initial position: Instructor and learner face each other. Instructor aims sound source at learner's head. Instructor will back up in straight line, then a random pattern. Learner follows instructor. Sound remains constant.

Instructor: "Follow the sound as it moves away from you."

2. Repeat condition one and have learner stop and start as sound is turned off and on.
3. Repeat condition one by having learner stop and start when instructor stops and starts. Sound remains constant.

Activity Four: Walking parallel to a moving sound

1. Initial position: Learner stands next to a wall or a guideline/wire that he trails. Instructor stands next to learner aiming sound source at learner's head. Instructor and learner walk side by side in a parallel line. (See Figure 5.)

Instructor: "Trail the wall and follow the sound."

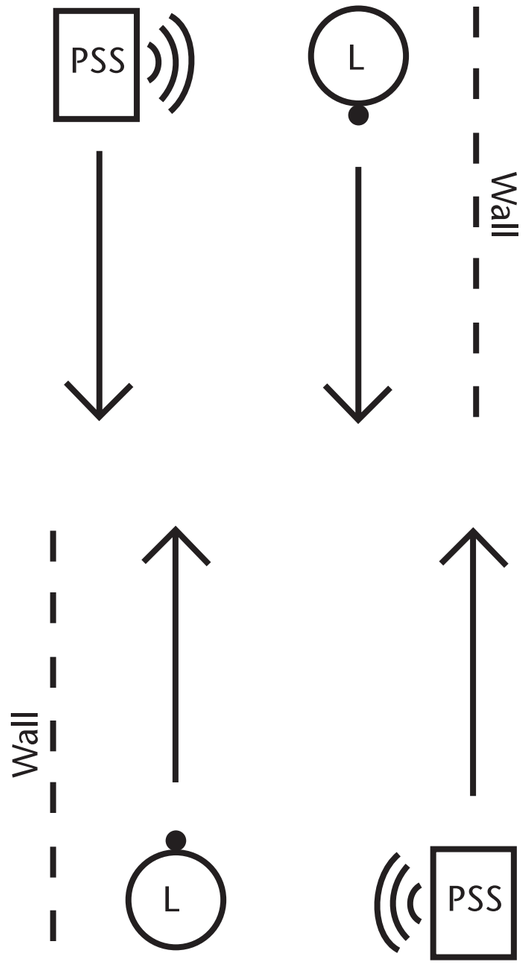


Figure 5

2. Repeat condition one by having the learner walk in tandem with the instructor. Eliminate trailing the wall. Experiment with increasing distance between instructor and learner using sighted guide technique, extended arms, and pole or rope of various lengths.
3. Repeat condition two with no physical contact between the learner and the instructor.
4. Repeat condition three by having learner stop when sound source is turned off and start when sound is turned on.

Activity Five: Walking parallel to a sound while walking a 90° angle

1. Assume initial position: Instructor and learner stand side by side a specific distance apart. Sound source is aimed at learner's head. Instructor and learner walk in a parallel direction side by side. (See Figure 6.)

Instructor: "Walk beside the sound. After we have walked several steps, we will turn right; then we will continue walking."

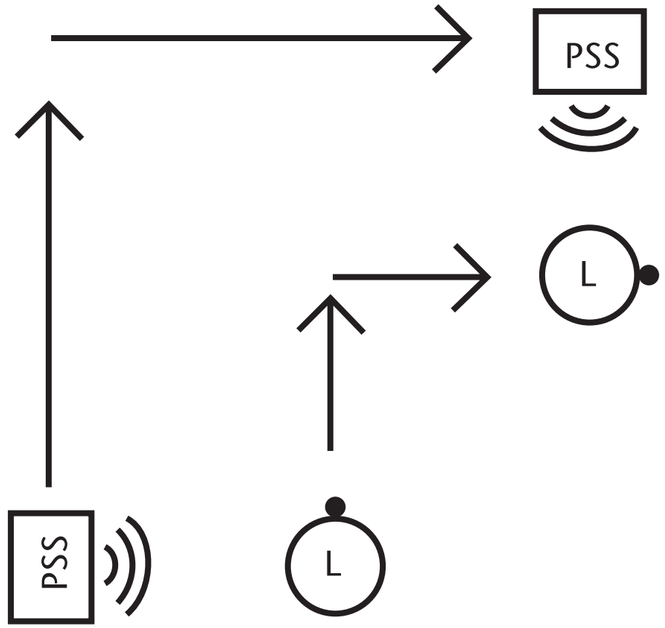


Figure 6

2. Repeat condition one by turning left. (See Figure 7.)

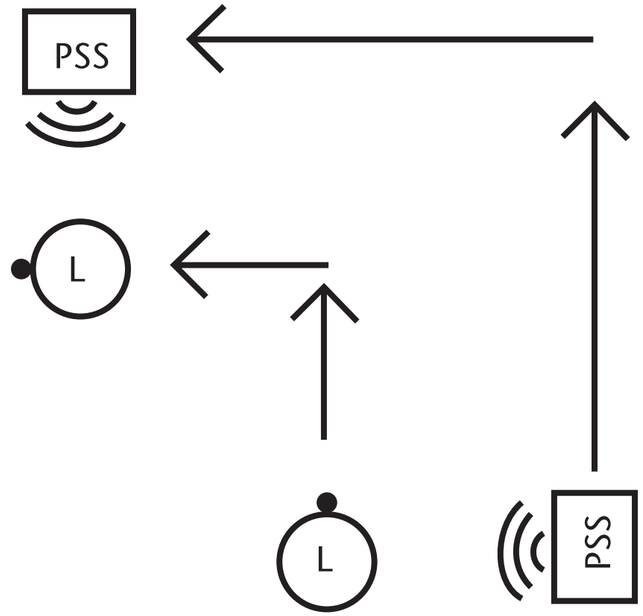


Figure 7

3. Repeat condition one and two by placing sound on opposite side of learner.

Activity Six: Localizing sound when moving in opposition to the sound source

1. Assume initial position: Instructor stands in front and to the learner's right at a specific distance away. When sound source is turned on, instructor and learner start walking toward each other in a parallel line of direction. Instructor stops before he reaches learner. Learner continues walking in a parallel line and stops beside the sound source. The difficulty in performing this condition is in maintaining the parallel position; tendency of learner will be to veer toward or away from the sound.

Instructor: "Walk straight ahead until you hear the sound directly on your right side; then stop." (See Figure 8.)

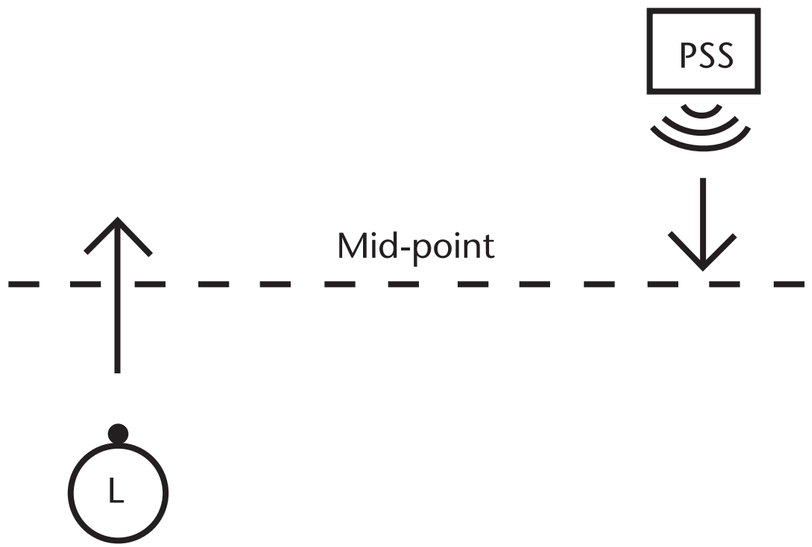
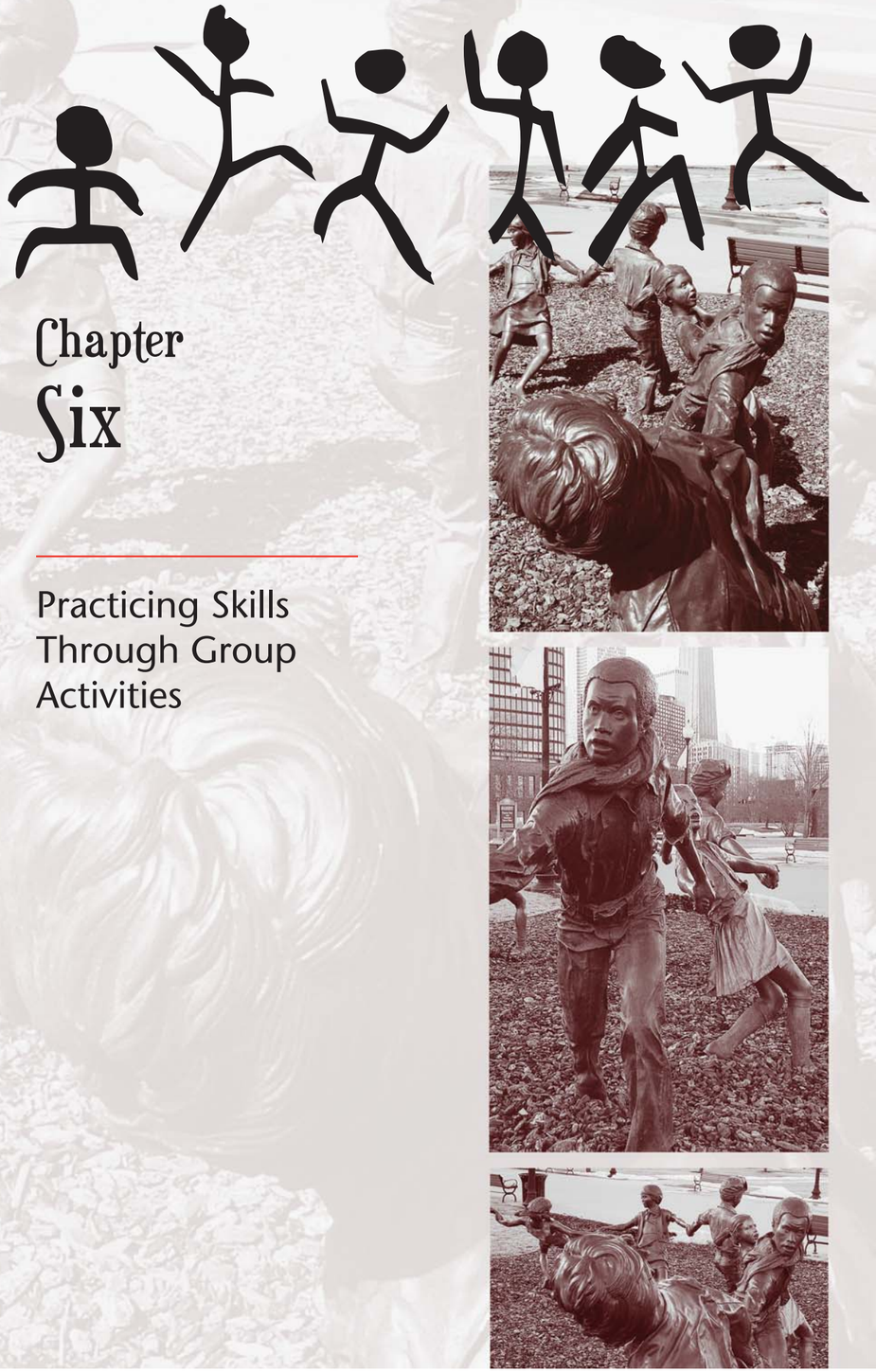


Figure 8

2. Repeat condition one by reducing the distance the instructor walks and increasing the distance the learner walks. Alternate sides.
3. Repeat condition one by having the learner stop and start several times as he approaches the sound. When the sound is turned off, the learner will stop; when sound is turned on, the learner will start.

The activities outlined in chapters 2-5 are used to expose and train children to basic ways of interacting with direct sounds. These experiences and the skills developed through these exercises can be extrapolated to more sophisticated uses of sound in daily orientation and mobility tasks. A brief discussion of other ways sound can be used for orientation and mobility tasks and some examples of every day tasks using the skills developed through these exercises is covered in Appendix A.



Chapter Six

Practicing Skills Through Group Activities

Practicing Skills Through Group Activities

Learner Stationary and Sound Source Moving

The activities in chapter 6 focus on levels of learner functioning and the development of basic localization skills. It is recognized that the games and activities may be played without the introduction of a sound source; however, the additional emphasis on sound localization skills provides many additional opportunities to develop this highly desirable skill. This chapter lends itself to many adaptations within a learner's physical education curriculum. Attaching the sound source to another person who is of interest in a game and who is moving would fit into this category.

Activities requiring a tracking response

Auditory tracking occurs when the learner follows a sound through head or body movement while maintaining a spatially stationary position. The area needed may be relatively small for circle games, or in some instances, the movements may require a large open area. The purposes of the suggested activities are to track a moving sound and to make game decisions based on information obtained auditorily and requiring sound localization. For example, procedures might be:

1. Incorporate the use of the sound source in primary level circle games.

METHOD: In games such as *Ring around the Rosy* or *Farmer in the Dell*, learners in the circle may carry the sound source, and the learner who has visual impairment can track the sound, turning in place. When choosing is involved, the learner should also be informed as to who is carrying the device and who the classmates are to her right and left.

2. Use a sound source in tag or "it" games. Learners should be made aware of the location of person or persons who are "it."

METHOD: In games such as *Ocean Is Stormy* or *Pussy Wants a Corner*, the learner who has a visual impairment can track those who are "it" within the play area and make independent decisions about when to move.

Activities requiring a verbal response

The activities should be conducted in the classroom. The purpose of the activities is to localize a sound and associate it with a specific point in the known environment.

For example, procedures might be:

1. Play an adapted version of *Heads-Up Seven-Up* in which all learners have their heads on their desks. "It" places the sound source on a classmate's desk and then from the front of the room asks, "Who has the Sound Source?" Learners localize the sound before raising their hands to reply.

2. Give the sound source a name and place at any point within the room. The question then becomes "Where Am I?" It may be by the locker, drinking fountain, sink, pencil sharpener, or any other landmark within the room.

Activities requiring classroom applications

The activities should be conducted in conjunction with science instruction. The purpose is to demonstrate the concept of planetary movements. For example, procedures might be:

1. Demonstrate the movement of the moon (sound source) around the earth (learner).
2. Demonstrate the movement of the earth (sound source) around the sun (learner).

Learner Moving and Sound Source Stationary

These activities emphasize skills that require accurate localizations over greater distances. In general, a more open and unrestrictive space is required.

Since expectations regarding learner movement have been made, close attention must be paid to an underlying principle in all physical activities for learners with visual impairments. The work space must be so structured as to insure that the learner moves safely and still experiences freedom of movement. Quite often the student must be

taught protective techniques and be given sufficient time to explore the area. It is also important that supervision be maintained over the space and/or the activity.

Activities requiring localization of a stationary sound

The purpose of the activities is to use a sound cue as a goal or directional aid that assists movement. For example, procedures might be:

1. Use game approach.

    a. Incorporate the sound into primary level games.

METHOD: In games such as *Lame Fox and Chickens, Squirrels and Trees, Animal Chase, Midnight,* or *Minnows in the Net*, the sound source represents a base, rest, safety area, or "it." The learner runs toward the sound. Rapid movement is necessary, and the learner is encouraged to avoid being caught. The sound source may be placed at ground level, but in order to avoid the possibility of tripping over it, it may be held or suspended from the wall.

    b. Use games that focus on listening acuity as well as localization skills.

METHOD: In games such as *Sardines* and *Easter Egg Hunt*, the learners search quietly and independently for a hidden sound source. The difficulty of the task can be increased substantially by controlling the volume of the device.

    c. Use circle games. When the visually impaired learner is in the outer circle, the sound source should be centered. The procedure should encourage the student to maintain an equal distance from the sound source.

2. Use self-testing stunts. In activities classified as self-testing stunts, the level of learner performance can be influenced by his ability to localize sounds and the availability of useful sound cues.

METHOD: In relays, direction of movement is especially important where time is a factor and veering tendencies must be overcome. In tug of war, a sound source may be used in at least two ways to structure the environment: either place the sound source at the dividing line to indicate the successfulness of the team effort, or place the device directly behind the team with the instruction that they pull toward the sound. Placement at the end of a trampoline, facing the performer, may assist in maintaining a proper and safe position on the bed of the trampoline. A sound source is definitely an aid to developing freedom of movement and locomotor skills in an open space. It may also be used to provide additional cues to the various couple locations in square dancing.

3. Use track and field activities. In running dashes, jumping, or throwing, the sound source is the best method of maintaining a direction and orientation to the task.

Activities requiring classroom learning applications

The activities may be conducted in conjunction with social studies, geography, or subjects related to cardinal directions. The purpose is to structure the environment in order to recognize the spatial relationship of the four cardinal directions. Suggested situations:

1. Place the sound source at a point designated as North. Relative positions of students or objects within the area may be described using cardinal directions in relation to a stationary northern position. Discuss the many spatial relationships possible within this framework.
2. Incorporate the use of a sound source in any appropriate work experience. The sound source may be used as a directional guide when mowing grass or other work oriented situations in which the student must cope with large open areas.

Learner Moving and Sound Source Moving

The task of localization is highly complex when both the listener and the sound source are moving. However, in many of the activities already discussed the situation does arise, but may not have been emphasized. The reader should carefully consider activities already suggested as possible vehicles for developing these higher level skills.

Activities requiring a tracking response

1. Games such as *Chain Tag, Animal Chase*, or *Ocean Is Stormy*, may be structured so the sound source is carried by "it" or the instructor who is close by. The student with a visual impairment who is able to localize is in a better position to avoid being caught. Similarly, he may avoid being hit in *Prison Ball*, or other throwing games. As an alternative to *Dodge Ball* try games such as *Prison Ball* or *Bounce and Catch*. The ball should be thrown from the sound source location. In this manner the visually handicapped learner has an opportunity to move to a point farthest away from the sound source and thrower.

2. A different type of tracking is required in games such as Follow the Leader and Blue Bird through the Window which require the student to follow the sound. Types of self-testing activity that require following a sound are riding a bicycle, following an outdoor trail, or completing an obstacle course.

Activities requiring classroom learning application

The activities should be conducted in conjunction with science instruction. The purpose is to develop the concept of planetary movement. The activity has already been discussed, but, with both elements allowed to move, a higher conceptual level may be obtained.

Individualized localization tasks

1. The learner should develop the ability to maintain a constant distance from the sound source. The skill becomes one of moving in a congruent pattern with the sound source.
2. The learner should also be able to intersect the sound source at a point directly in front of him by estimating distance and the speed at which he approaches the intersection.

Appendices

A. Using Sound In Performing O&M Tasks

B. Playing Games With a Sound Source

C. Sound Source Adaptations For Recreational /Sport Activities

Appendix A: Using sound in performing O&M tasks

A person moving without vision relies on hearing to structure interaction with the environment. Depending on the situation, sound can be used in very different ways to obtain information about the environment. This manual deals with the first level of practical use of sound for navigation: interactions with single, discrete sound sources. Interaction with single, discrete sound sources is basic to many auditory skills and practicing these interactions can aid development of other, more complex or subtle acoustic skills. Other practical uses of sound in navigation include paying attention to more than one source at a time, using the sudden absence of sound to recognize a doorway or opening, and paying attention to reverberation delay to estimate the size of a room or the presence of a large object.

Recall that there are five levels of learning that characterize the effective use of discrete sounds in the environment.

1. Awareness
2. Discrimination
3. Interpretation
4. Localization
5. Conversion

A child must first be *aware* of a sound. The child then learns to *discriminate* one sound from another or one sound within a background of other noise. A child must also be able to

associate a sound with an object, or *interpret* the meaning of a sound. For O&M purposes, it is often a prerequisite that the child be able to *localize* or determine the location of a sound. When these first four basic conditions are met, a child can use *conversion* to make practical use of a sound as an aid to the learner's interaction with the environment. Awareness, discrimination, and interpretation are basic listening skills that children should be taught and should practice but that are often well developed before a child enters school. While localization and conversion are also often well developed, since they form the underpinnings of more sophisticated uses of sound, they need to be particularly practiced. The importance of developing a conscious and practiced sense of using sound when moving through the environment can be illustrated by discussing some common daily activities. In this appendix we will discuss some of the factors influencing localization of sounds and illustrate how they play a role in common O&M tasks.

The human perceptual system can determine the horizontal position of a sound to within about 1 degree and can determine the position of sounds in the vertical plane to about 3 degrees (Perrott & Saberi, 1990), depending on what kind of sound it is and the listening conditions. Our auditory perceptual system is also not designed well for determining distances to sounds (Zahorik, 2001; 2002a). We are best at localizing sounds directly in front of us and get better if we can listen to a sound for a longer time and if we can move our heads as we listen. Our perception of the distance to or location of sounds is easily confused by distracting sounds (Langendijk, Kistler, & Wightman, 2001)

or by differences in the loudness and frequency of sounds (Schenkman, 1983).

Just like visually locating a stationary object, being able to localize a stationary sound source is made easier through the use of binaurality. Being able to move our heads while listening maximizes the benefit of having two ears. Because our head separates our ears from each other, sounds coming to our two ears are slightly different. Our brains are designed to make use of that difference between the sounds at the two ears to figure out from where the sound came.

When we are listening to sounds around us, we usually are not listening to only that sound. We either have other sounds we are trying to ignore or the walls and objects around us change the sound. This can be good or bad, depending on what it is we want to do. If your objective is to figure out from where a sound is coming, it is most easily done if nothing is between you and the sound. If there are lots of things around you or if you are in an enclosed room, you might have trouble localizing a sound because of the way the sound bounces off the objects and walls. However, if your intent is to find a particular object or to figure out the dimensions of a space, then having sound bouncing around is more helpful.

Chapter 4 dealt with the situation in which a sound in the environment is stationary. In daily tasks, a person needs to be able to localize stationary sounds to know where important sound producing objects are. Being able to localize sound producing objects such as vending machines,

dogs, church bells, a person talking, or subway turnstiles (to name a few) is essential to efficient travel. Underlying use of this localization ability is a list of spatial concepts (i.e., right, left, up, down, forward, etc.) that a person must have internalized and be able to use to connect his or her own position to the sound. Being able to connect your own position to another object in spatial terms is the first step to purposeful movement. One of the early milestones of purposeful movement for an infant is reaching toward a sound producing toy. Recognizing that the toy is in a particular place and that the infant can move to reach that toy begins the process of movement through the environment and a lifetime of interaction with sounds in the environment. As an infant toddles, a parent's voice becomes a common stationary sound the infant moves toward. It is partially because we spend so much of our early development moving toward meaningful sounds that we are better able to localize sounds directly in front of us.

Moving from activities in which discrete sounds are stationary and a child begins to move in relation to them assists in the development of self-to-object concepts. Learning how a sound's position changes in relation to a child's body as he or she moves about is one way to approach the instruction of this concept. As more sounds become important to the child, object-to-object relationships begin to be developed. However, these spatial relations are better developed if a child has ongoing, active exploration of the sound producing objects and their relative positions.

Chapter 5 dealt with situations in which both the learner and the sound could be in motion. A number of important daily O&M tasks correspond to this category. As a toddler begins walking or crawling through the home environment, sounds such as the family dog or siblings move around the environment. These are the first consistent exposures to sounds that move around the infant at a time when the infant is also able to make large body movements in reaction. Play with a parent or sibling that involves running to or away helps calibrate the auditory system. A parent rolling a toy car or truck toward a child who then reaches for it, a child running away from a family member playfully chasing them, or a child following a dog to pet it are all early examples of localizing and moving in reaction to moving sound sources. The activities in this manual take this kind of exposure and systemize it so that a child is made aware of the kind of information they have been reacting to and how to become more adept at doing so. This practice can be applied to future O&M tasks.

The following are examples of daily tasks applicable for some of the activities outlined in chapter 5:

Activity One: Tracking a sound source by moving only the head

1. Tracking a person as they walk. A common example of this task indoors is paying attention to a teacher walking in a classroom. If a teacher (or anybody) is talking to the child while simultaneously walking, it

is important that the child be able to track that person to indicate a continued interest in what the person is saying.

2. Following a ball in a sporting event. When developing basic skills for later playing goalball, a child must be able to auditorily track a ball rolling on the floor and predict where that path will take the ball in relation to the child's position.
3. Tracking vehicles. When standing on a street corner, waiting to cross, a person often does not want to move their body unnecessarily in order to keep their alignment relative to the crossing. However, they might want to be aware of and track cars passing by them to determine whether they are turning or not. Depending on the particulars of the intersection, the person might need to make a decision to cross based on the path of these cars.

Activity Two: Tracking a sound source moving the entire body

1. Aligning one's self to passing traffic. When waiting at a street corner, perhaps after locating and pushing a pedestrian pushbutton, a person often has to align themselves to passing traffic. Whether this is done in relation to perpendicular or parallel traffic, the task requires that a person auditorily follow the path of a moving vehicle and then move their entire body in reaction to the path of that vehicle.

Activities Three to Five: Following a moving sound source, walking parallel to a moving sound, and walking parallel to a sound while walking a 90° angle

1. Matching paths with a passing person or object in order to follow it. When walking with a group of people or following one particular person, it is often useful to simply follow the sound of their voice or footsteps. Being able to discriminate that person from any background noise and notice if they turn and change your own path accordingly can be a sophisticated use of sound.

Activity Six: Localizing sound when moving in opposition to the sound source

1. Walking up to a curb based on the sounds of idling traffic. In some situations a person approaches an intersection and must use the approaching traffic to gauge where the intersection is. When walking up to an intersection with the parallel street on the right, if no traffic is currently traveling in the same direction as the pedestrian, the sound of perpendicular or oncoming traffic must be used to gauge the pedestrian's position relative to the street. When the pedestrian is crossing the street, perpendicular traffic is stopped and only the sound of oncoming

traffic on the parallel street remains as an indication of relative position.

These are just some examples of situations in which the exercises in this manual can be applied to everyday tasks. However, the skills developed in this manual can be elaborated upon to develop more sophisticated uses of sound for O&M tasks. There are many subtle acoustic phenomena that people learn through trial and error (Worchel & Mauney, 1950) and use unconsciously (Juurmaa, 1970a). Being able to localize discrete sounds in the environment and paying more attention to sounds around a person can lead that person to be aware of different kinds of sounds around them. For example, when a discrete sound source is blocked by an object, that sound lowers in intensity. The resulting "sound shadow" can be used to detect objects. With practice, very slender objects such as poles and small trees can be detected in this way. Moving past such a sound shadow makes it more apparent than just standing in front of it.

As a person practices being able to localize different kinds of sounds in different environments, perhaps beginning with more obvious phenomena such as sound shadows, it will become apparent that there are other ways to use sound. The physics behind sound phenomena do not have to be understood for a person to be able to make practical use of the effects. While the human perceptual system is not sensitive enough to use echoes the same way bats or dolphins can, in limited situations we can use echoes to determine distances. This is generally when the distances are

very large and there is a lot of space between several large objects (like on a grassy area among several buildings on a college campus).

Reflective environments (those with walls or borders of some sort) or the presence of large objects create a field of reflected sound that the human auditory system can use, beyond the localization of direct sounds. The acoustic field, comprised of direct sounds and all of the reflections off walls, ceilings, and objects, is somewhat analogous to the visual field (Schwartz, 1984). Movement through this acoustic field allows a person to gain information about the surroundings. The ratio of direct sound to reflected sound in this acoustic field can be used to determine distances to sounds (Zahorik, 2002b), and the pattern of reflected sound can provide information about the size and structure of a room (Clifton, Freyman, & Meo, 2002). How quickly the reverberations fade away or whether they are reflected more strongly from one area than another (because of room geometry or building materials, for example) make different rooms or objects sound different from each other. Rooms of different sizes will sound different whether the person is actively making noise (footsteps, cane taps) or just standing still but moving through the sound field helps the perception. The size and shape of the room and, to some degree, the material the walls are made of and how many windows there are, affects how sound bounces around in the room. There is always sound around you, even if you are trying to be very quiet. So just standing in the middle of a large room will sound different from standing in the middle of a small room. With practice and consistent exposure to a

particular room, a person might be able to tell whether large pieces of furniture have been moved in the room, based on how the room sounds.

In addition to paying attention to how self-motion relative to the field of ambient sound indicates features of the environment, the acoustic characteristics of directionality, pitch, timbre, intensity, and envelope both for direct and reflected sound are used to distinguish between acoustic environments (Kish, n.d.). These characteristics of sound are also affected by the material off of which sound is reflected. With practice, a person can perceive increasingly subtle variations in position, size, texture, shape, distance, and even composition (Kish, n.d.). With practice, people have been able to sense the presence of small objects from 2 to 3 meters away (Jones & Myers, 1954; Myers & Jones, 1958; Rice, Feinstein, & Schusterman, 1965), ascertain the lateral location of a single object to within a few degrees (Rice, 1969), determine the shape of objects (Hausfeld, Power, Gorta, & Harris, 1982; Rice, 1967a, 1967b, 1967c), and identify textures of surfaces (Hausfeld, Power, Gorta, & Harris, 1982; Juurmaa, 1970b; Kellogg, 1962).

By developing awareness of and sensitivity to these often subtle acoustic cues, a person who is blind can make use of sound to learn a great deal of information about her environment.

Appendix B: Playing games with a sound source

Animal Chase

This game is best played on an asphalt court or in a gym approximately 50 feet wide. All players line up along one side, and "it" takes his place in the middle of the playing area. He calls the name of some animal, such as dog, cow, or cat, whereupon all the players must run across the playing area, imitating the animal designated. Anyone caught before reaching the opposite side must join hands with "it" and help her catch other players. The original "it" remains the caller throughout the game. The last one caught is "it" for the next game.

Variations: 1) The game can be played by assigning a specific animal to two or three players. When that animal is called, only those who represent it run across the court. 2) As each player is caught and join "it," he gets to call out the next animal. 3) Place a portable sound source on each side of the gym. 4) "It" wears a sound source.

Blue Bird (circle game)

Players stand in a circle, holding hands, arms up, which signifies that the windows are open. One or two blue birds are in center. As you sing the song, the birds weave in and out the open "windows." The bluebird with blindness

follows a sighted bluebird who carries a sound source. Sing as follows, “Blue bird, blue bird through my window, blue bird, blue bird through my window, blue bird, blue bird through my window (players bring down arms to close window)....oh blue bird aren’t you tired?” Birds want to stay inside circle as windows are being closed. You can change the name of the birds to fit with your theme, (e.g. blue jay, cardinal, sparrow, etc.). Then the blue bird gets to choose someone else to be a blue bird, and the game continues.

Bounce and Catch

Create two even numbered teams, one for each side of the gym. Use two different colored balls approximately 8 inches in size. Each team gets a ball. When throwing the ball to an opponent, the ball must bounce at least once, and the person on the receiving end MUST make an attempt to catch the ball. The object is to throw the ball “TO” an opponent, not “AT” an opponent and force them to make an attempt to catch the ball. If the ball makes contact with an opponent before it bounces, the thrower is out! If a player makes no attempt to catch the ball or dodges it, then he is out. An unsuccessful attempt to catch the ball means the player is out. A player can “SAVE” a teammate who is out by catching a dropped ball, before it touches the ground. If the save attempt fails, the “SAVER” is not out but teammate still is. One ball can not be used to block the other one. If a player has a ball when the other comes his way, there are three options: hold the ball and catch the incoming one, throw the ball and catch the incoming one, or pass to a teammate and catch the incoming ball. At no time is NOT trying to catch the ball an option. Players must catch an incoming ball. As players go out, they sit on the side, in order of how they got out, on their half of the gym. If someone on the opposing team goes out, the first player in line rejoins the game one for one. Electronic sound balls can be used, or place a sound source next to the player throwing the ball.

Chain Tag

When a player who is blind participates in chain tag, the playing area should have definite boundaries, such as fences, walls, sides of buildings, edges of lawns, or concrete surfaces. The players scatter over the playing area. At the signal, one player who is “it” chases the others. When he tags a runner, the later joins hands with him, and the two together chase the other players. A catch or tag made while the line is broken is invalid. The game continues until all but one have joined the chain. She is the winner and “it” for the next game. So that a sightless player may have a fair opportunity to win, he may be paired up with a classmate who has normal vision, and the two of them attempt to avoid being caught. More mobile sightless players should be encouraged to run alone. In this case the chain should be required to hold him for 10 counts before he is considered caught. The sound source is used to define a boundary of the playing area.

Easter Egg Hunt (Miniature Pumpkin Hunt, Candy Cane Hunt)

This game can be changed to coincide with holidays. Hide (real or plastic) eggs along with portable sound devices. Players independently and quietly hunt for eggs, collecting them in their bags or baskets. Older players can turn off each device as they locate each egg.

The Farmer in the Dell (circle game)

Choose one player as the farmer. Have the players join hands and dance around while the song is sung. At the end of the first verse, the farmer chooses his wife, who joins him in the circle. At the end of the second, the wife chooses a learner and so on until everyone is in the circle except the cheese (who becomes the farmer the next round). If you have less than 10 players, skip one of the verses... if you have more than 10 players, pick one of the learners who are left at the end to be the farmer. The player with blindness can locate and select the player carrying the sound source as the next one to move into the circle, or the sound source can be placed inside the circle as an orientation device.

The farmer in the dell
The farmer in the dell
Hi-ho, the derry-o
The farmer in the dell
The farmer takes a wife

The farmer takes a wife
Hi-ho, the derry-o
The farmer takes a wife

The wife takes a child
The wife takes a child
Hi-ho, the derry-o
The wife takes a child

The child takes a nurse
The child takes a nurse
Hi-ho, the derry-o
The child takes a nurse

The nurse takes a cow
The nurse takes a cow
Hi-ho, the derry-o
The nurse takes a cow

The cow takes a dog
The cow takes a dog
Hi-ho, the derry-o
The cow takes a dog

The dog takes a cat
The dog takes a cat
Hi-ho, the derry-o
The dog takes a cat

The cat takes a rat
The cat takes a rat
Hi-ho, the derry-o
The cat takes a rat

The rat takes the cheese
The rat takes the cheese
Hi-ho, the derry-o
The rat takes the cheese

The cheese stands alone
The cheese stands alone
Hi-ho, the derry-o
The cheese stands alone

Follow the Leader

The players form a column, and one player is appointed leader. The leader performs various stunts, such as climbing over obstacles, jumping certain distances, or walking 10 feet with a book on her head. Players who fail to do any stunt set by the leader go to the back of the line. The instructor should change leaders after every four or five stunts. The player directly in front of the player with a visual impairment can carry or wear the sound source and describe the next action to perfom.

Heads-Up Seven-Up

The game is best if played with 20 or more players, and is ideal for rainy days, when large groups need to be occupied. Select seven players and tell them to move to the front of the class. Someone, usually the teacher, says, “Heads down, thumbs up,” and the rest of the group does just that.

The seven who were selected move quietly through the room and each select one person by touching his or her thumb. Once touched, the thumb goes down to avoid being touched twice. When all seven players have touched the thumbs of seven others, the teacher says, “Heads up, seven up.” The heads go up, and the seven who were chosen stand. Those standing get one chance to guess who picked them. If they guess right, the two players switch places. If they don’t, the “toucher” gets to stay up for another round. Another adaptation is described in chapter 6.

To adapt for sound, all players wear blindfolds except the seven (can be fewer than seven). The seven each carry a different sound source. The chosen seven must identify their “touchers” by sound.

Lame Fox and Chickens

Equipment needed:

- Panel mats (all) laid out to create pathways (mats on both sides of the pathways)
- Pinnies (6)

Select six players to be foxes (they wear pinnies). All other players are chickens trying to get away. Utilizing one of the locomotor movements listed below, players must stay in the pathways made by the mats. If a player touches a mat (either a fox, or a chicken), player must sit on the nearest mat until he says the alphabet without the vowels (or anything else you think of that is not an exercise). Place sound sources along the mats to mark the pathway.

Animal locomotor walks:

- Alligator – Slither like a snake while adding arms (point elbows up in the air).
- Bear – Walk on all fours so the right hand and right foot move forward at the same time, same with left hand and left foot.
- Crab – Walk on all fours with bottom toward the mat (feet/head first).
- Dog – Walk on all fours on the mat.
- Frog – Squat down and jump off all fours at the same time and land on all fours together.
- Inchworm – Lie on belly and bring hips forward (up in the air) without moving hands forward. When hips are up in air, slide upper body forward without moving feet.
- Lame bear – Walk like a bear, except with only one back leg.
- Lame dog – Walk on hands and one foot.
- Rabbit – Start in squatting position. Reach forward with hands only. When hands are back on the mat, bring feet forward without moving hands.
- Snake – Slither on belly down and back.
- Seal – Hold self up in a pushup position. Keep arms straight, and drag feet behind you.

Midnight

An enclosed area such as a gymnasium or tennis court is a good place to play Midnight. All the players stand in a semicircle with the fox in the center. The players ask, “What time is it Mr. Fox?” If he replies that it is any hour except midnight, they remain standing. When the fox shouts “Midnight!” the players run to the far fence or wall, where a sound source is placed. The fox follows the sound of the footsteps and tags a player. This player becomes the next fox, and the game is repeated.

Minnows in the Net

To start, all but two players are minnows (a little fish found in shallow water). Minnows are going to try to swim through the "net." The "net zone" will be an area between two tactile lines in the middle of the gym.

Pick two players to be the "net" inside the net zone. The "net" wears the sound source or places it on the floor at their feet. The minnows will line up against one wall of the gym and try to reach the other side of the gym performing a designated locomotor movement (see animal walks listed previously). A different sound source should be placed at the gym wall. The players that are the net will try to tag the minnows when they are within the net zone of the gym. If a minnow gets tagged by the net, she becomes part of the net too.

To make sure the main focus of the game remains dodging, any player who is part of the net cannot move, pretending that both feet are stuck in the mud. The players who are part of the "net" can only tag the minnows by stretching out their arms. The minnows who are unsuccessful at dodging the net will get caught. Players playing the role of the "net" can wear a portable sound source around their waists or be required to sing a song.

Stress safety rules; minnows can only be tagged from the shoulders to the waist. If a player gets tagged anywhere else, then she automatically makes it through the net safely that round. When everyone becomes part of the net, the teacher can restart the game changing the locomotor movement.

Mother May I (A.K.A. Captain May I)

One person (it could be the teacher or another player) is chosen to be Mother or Captain. She stands facing away from a line of players. She then chooses a player (at random, or in order), and announces a direction. The directions follow a pattern, such as, "Jamie, you may take 'x' giant/regular/baby steps forward/backward." The student responds with "Mother/Captain may I?" Mother then states "Yes" or "No," depending on her whim, and the player complies. If the player forgets to ask, "Mother may I?" he goes back to the starting line. First player to touch Mother wins. If additional sound (other than Mother's voice) is needed, Mother can have a portable sound source at her feet for orientation. All players can wear blindfolds.

Additional steps for Mother May I:

- Scissors step – jump while crossing feet, then jump while uncrossing them
- Banana step – lay down with feet at current spot, mark where the top of player's head is on the floor, new spot for feet is where head was
- Bunny step – a hop

Musical Chairs

Players form a circle. If using chairs or other place markers, start off with one less than the number of participants. Start the music (or any sound device). As the music plays, the players walk around the outside of the circle. When the music stops, the players must sit. The one left standing moves to the inside of the circle, and one more chair is removed for the next round. If in gym class, students can sit on the floor, and the last player to sit down moves to the inside of the circle.

Ocean is Stormy

This game is played best in a gymnasium or on a tennis court. One of the end walls or fences is designated as home base and a sound source is placed there. All players form teams of two, clasp hands, select a name of a fish, and scatter about. One pair, known as sharks, carries a second sound source and walks around the area calling the names of fish. When the name of a fish that has been adopted by a team is called, that pair falls in behind the sharks and marches after them. When the sharks have called all the fish they can think of, they say, "The ocean is stormy." All the players run for home base. Hands must remain clasped throughout the game. The last team to reach home base becomes the sharks for the next game.

Prison Ball

Prison Ball is a milder version of dodge ball that does not eliminate students from the game, instead when they are hit by an opponent, they go to a prison area behind the opposite team. Balls can only be thrown below the shoulders. Players have the opportunity to get out of prison and back on their respective team if they catch a ball that was thrown in the air by one of their own teammates. If someone makes a basket from half court, then everyone in that prison gets to leave to go back to their side. Play with a soft electronic sound ball. A sound source can be attached to the basketball goal and/or in the prison area. This game allows players to run, dodge, catch, throw, strategize together, and cooperate with teammates.

Pussy wants a Corner

Stand in a circle with one player in the middle. Players in the ring change places constantly, and the one in the middle tries to get the place of one of them. When he succeeds, the person displaced becomes the pussy and must stand within the ring until he can displace someone else. A stationary sound source can be placed in the center of the ring as a reference point. For a moving sound source, have a chosen one or two in the circle carry the source while changing places.

Ring Around the Rosy

Players hold hands forming a circle; one wears or carries the sound source. One player (wearing a blindfold is needed) stands in the center of the circle. Skipping clockwise, everyone sings "Ring around the rosy, pocket full of posies, ashes, ashes we all fall down." Everyone falls to the ground. After everyone falls down, the center player locates the player carrying/wearing the sound source; the two players switch places.

Sardines

All players wear blindfolds. One player hides, taking a sound source with him, while the rest count to 100. When the counting is finished, they set out to hunt. Any player discovering the hider crowds into the hiding place. Soon the players are packed in like sardines. If there is not room to hide in the same place, the finder sits down near the hiding place. When the last hunter discovers the spot, the game starts over with the first finder becoming the hider.

Simon Says

The players stand facing the leader (teacher or another student). The leader says, "Simon says, 'Squat!'" whereupon he squats. All players must do likewise. From time to time the leader makes a movement, omitting the words "Simon says," saying, for example, "Reach for the sky." In this case any player imitating the leader is eliminated. The contest is continued until a champion is determined. The winner is the leader next time.

Squirrels and Trees

Two players face each other and hold each other's hands (like for "*London Bridge*"), making a "tree." A third player (a squirrel) goes into the "tree." The teacher (or another designated person) can start music, clapping, or a sound source. When the music or sound stops, the "squirrels" change "trees." You can adapt the game to different levels by using letter sounds or different tones and rates of sound instead of music. It can also be used as a cooperative game or a competitive one like *Musical Chairs*. A sound source can also be placed by a "tree" for the player to locate.

Squirrels and Nuts

Squirrels collect nuts and save them to help get through the winter. This game gives players an idea of how difficult it can be to find nuts.

Use acorns or other items. Have the class close their eyes while you hide a nut in the classroom. When hidden the teacher says "Nut, nut who can find the nut?" The player who finds the nut can take it back to the tree where everyone can locate it (circle area). The first player to find the nut is the next to hide the nut. To make the game harder, use a low volume, low rate, and low tone on the sound source.

Where Am I

All players wear blindfolds. Give the sound source a name and place at any point within the room. It may be by the locker, drinking fountain, sink, pencil sharpener, or any other landmark within the room. The first finder gets to hide the sound source next time.

Zone Ball (a version of Prison Ball)

Players are divided into two teams. Each team throws multiple balls at the other team trying to hit them below the shoulders. Head hits are not allowed. If players are hit, they run down the side wall to the captured zone behind the other team. To get back in the game, they simply have to get a ball that is thrown to them. They don't even have to catch it, as long as they get it without leaving the captured zone. They then run down the side wall to the back of their own zone (touching a cone), and they are back in the game. If they get the bonus ball (a designated color), they may bring a teammate back in the game with them. If players catch a ball thrown at them, they have saved themselves from being hit, nothing more. No one goes out or comes in, but they are saved. Use gator skin balls, bell balls, and electronic sound balls. Sound sources can define playing boundaries.

Appendix C: Sound Source Adaptations for Recreational/Sport Activities

There are many outdoor and indoor athletic activities that persons with visual impairments or blindness can participate in with the assistance of a sound device. Not only are recreational sports good for one's physical health and socialization, participation in sports using sound devices continues to keep sound localization skills at peak performance levels.

Archery

Equipment

- Bow
- Arrows
- Target
- One-inch steel pole or PVC pipe approximately 6-8 feet long
- Adjustable vertical T-pipe mounted into the ground
- Portable Sound Source
- Balloons (on target)

Line up the pipe perpendicular to the target. If possible, it is best to permanently adhere the pole to the ground with cement. Adjust the T-pipe as needed for each shooter. The shooter can line up tactually to the target using the pipes.

Attach balloons to the target. Place the Portable Sound Source under the target, or on top or side if using a bale of hay.

Basketball

Equipment

- Electronic sound emitting ball
- Two Portable Sound Sources with remote control (one if playing half court)

Attach one sound source to each basketball goal, using different rates and tones for each. Activate by using the remote controls. Play regulation basketball or any adapted form suited best for the players.

Beep Baseball

Equipment

- Beep Baseball
- Two Portable Sound Sources with remote control
- Two bases
- Baseball bats

Place one sound source at first base using one rate and tone, and another sound source at third base using a different rate and tone. There is no second base in beep baseball. When the batter hits the ball, randomly choose to which base the batter should run. By using the remote control, activate one base. If the runner reaches the correct base before an outfielder finds the ball and yells "ball," a run is scored. If the outfielder finds the ball first, the runner is out. In beep baseball the pitcher and batter are on the same team. For more information on beep baseball, see the National Beep Baseball Association's web site at http://www.nbba.org/.

Beep Kickball

Equipment

- Electronic sound ball
- Two Portable Sound Sources with remote controls
- Two bases

Follow the same rules and instructions as for beep baseball.

Bocce (also known as Les Boules and Pétanque)

Equipment

- Set of bocce balls (available in sport stores and on the Internet)
- Portable Sound Source

Have the judge/referee hold the sound source next to the pallina (target ball) while the shooter rolls her bocce ball to hit the pallina. For more information see one of the following web sites.

http://www.usapetanque.org/
http://petanque.org/
http://www.bocce.org/history.html

Goalball

Equipment

- One regulation goalball or an electronic sound ball
- Blindfolds
- Knee pads, elbow pads, hip pads
- Face protection

Goalball is played in a gymnasium in a playing area the size of a volleyball court. There are three members of each team on each end of the court protecting the goal line. A team consists of one center and two wings. The game is 20-minutes long, comprised of two 10-minute halves. A regulation goalball is a rubber ball with bells inside for auditory tracking. Each player must wear a blindfold regardless of the degree of visual impairment. The object is to get the ball past the other team's goal line by underhand rolling the ball. The defending players use their entire bodies to block the ball from going over the goal line. For more information visit:

http://www.usaba.org
http://www.ibsa.es/eng/deportes/goalball/presentacion.htm

Golf

Equipment

- Golf clubs
- Golf glove(s)
- Golf balls
- Portable Sound Source

Place a portable sound source at the hole, or someone can manually tap the hole with the flag stick. For more information on blind golf see http://www.blindgolf.com.

Hiking

Equipment

- Portable Sound Source
- Appropriate clothing and shoes

The hiking leader can strap the sound source to his waist so that the group can follow the sound.

Horseshoes

Equipment

- Horseshoe set
- Two Portable Sound Sources with remote controls

Place a Portable Sound Source at each pitcher box as close to the stake as possible without interfering with the game. If you do not have a Portable Sound Source, someone can tap the stake with a metal pole to create an orientation sound. For more information on horseshoes, see:

http://www.horseshoepitching.com/rules/nhparul.shtml

Rock Wall Climbing

Equipment

- Multiple Portable Sound Sources with remote controls

Attach sound sources to the wall at the various handholds. Operate with remote controls.

Additional Activities

The Portable Sound Source can be used with the following games, which are listed in *Games for People with Sensory Impairments*, by Lauren J. Lieberman, Ph.D. and Jim F. Cowart, Ph.D. (See the reference section.)

Ball in the Box
Box Ball or Bucket Ball
Bright Objects
Throw and Search
10 Shot
Basketball Shoot
Can Game
Archery Balloon Pop
Frisbee Golf

Reference Section

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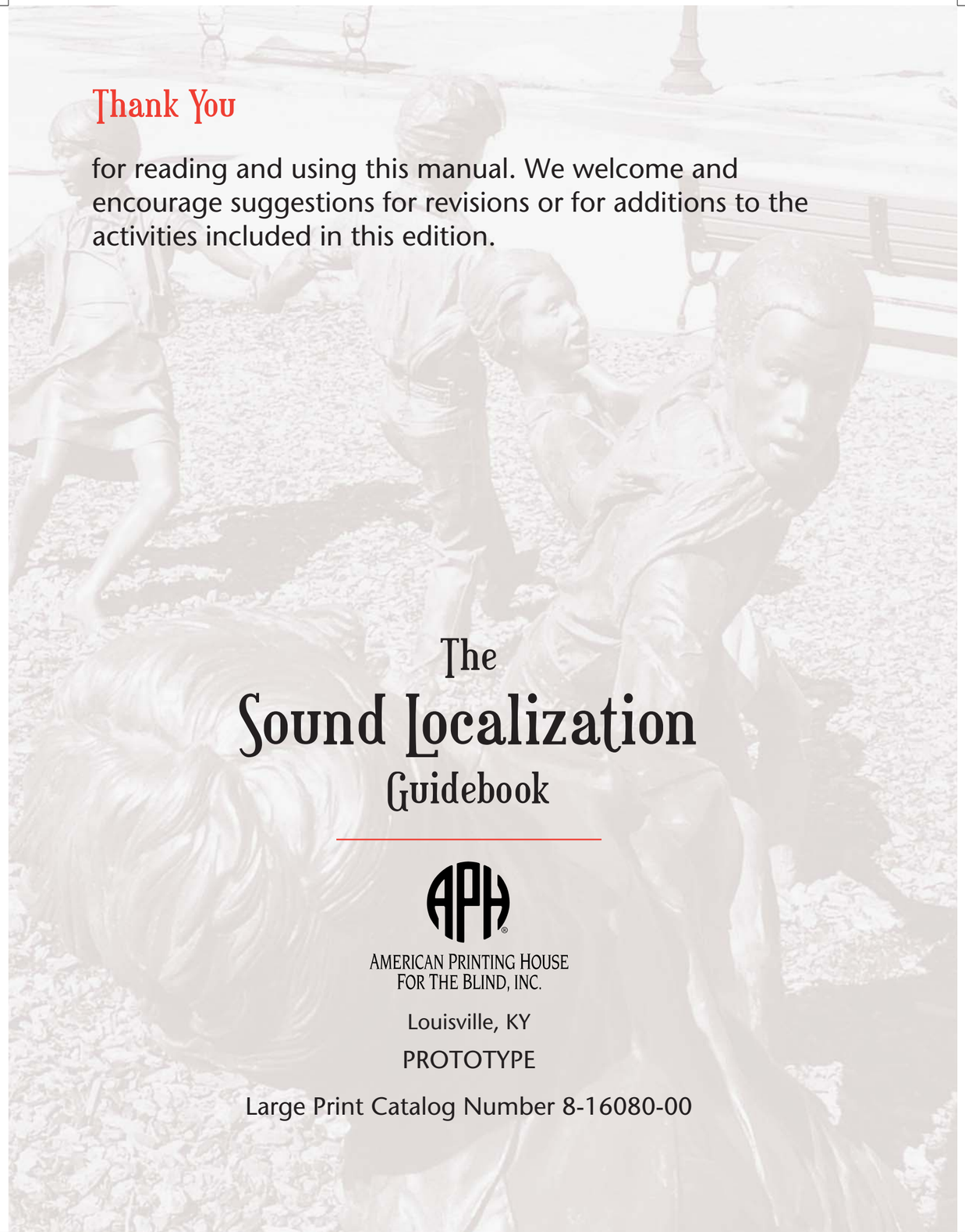
Notice : The changes or modifications not expressly approved by the party responsible
- for compliance could void the user's authority to operate the equipment.



Thank You

for reading and using this manual. We welcome and encourage suggestions for revisions or for additions to the activities included in this edition.

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