

Using Sound Boxes Systematically to Develop Phonemic Awareness

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Considerable evidence affirms the strong relationship between phonological processing skills and the acquisition of reading and spelling in alphabetic languages (Ehri et al., 2001). Additionally, as a child's ability to retrieve phonological information increases, so does the possibility that he or she will use it in decoding (Lonigan, 2006). Part of this phonological information is phonological awareness, or our understanding of different English sound units within the speech flow. Of these sound units, phonemes can be the most difficult for children to learn to detect and manipulate; however, phonemic awareness, along with letter knowledge, is needed for beginners to move on to reading and spelling.

For most children, phonological awareness develops through their literacy experiences at home and in their kindergarten classrooms (Ehri & Roberts, 2006). For some students, though, learning to differentiate sounds in words, especially on the phoneme level, is confusing. For these children, using sound boxes to add a kinesthetic aspect to this auditory process scaffolds their learning so that they may become more adept at manipulating the phonemes in words.

Sound boxes, also known as Elkonin boxes, teach the student how to hear the phonemes in words in sequence by connecting the slow verbal stretching of a word's sounds to the simultaneous pushing of tokens into boxes, one for each sound as it is heard. For example, students push a token into one box for each of the three phonemes in *cat* while they are verbally segmenting the word into its three sounds. Over time, students learn to associate the phonemes they can hear with the number of boxes they can see and tokens they can manipulate in an ordered sequence.

Although sound boxes are often referenced as a method to teach phoneme detection and segmentation (Clay, 2002; Elkonin, 1973), little information is available on how to use them systematically for instruction. To promote consistency of instruction in a

literacy initiative (McCarthy, 1999), I devised a system of organization and delivery, which is shared in this article.

Making Sound Boxes

To create a sound box, also referred to as a sound box card, begin with an 8 ½ × 11 inch piece of construction paper. Divide the paper into three sections with approximately equal areas. In the top third of the paper, glue a recognizable picture that represents the word you are going to use to teach sound segmentation. The purpose of having the picture of the word on the card is to help students remember the word being stretched while they are stretching it. At times, especially if students are likely to overstretch words by inserting extra sounds, they can forget the word they are segmenting. Having the picture there allows them to refocus independently. Printing the word that the picture represents on the back of the card is recommended, especially as the collection of sound box cards grows and the exact word the picture represents may be forgotten.

In the middle third of the paper, draw a horizontal line of square boxes, approximately 2 inches by 2 inches, equaling the total number of phonemes that can be heard in the word. Leave the bottom third blank to provide space for the tokens or markers that get pushed into the boxes as the word is segmented, or stretched.

For example, in a sound box card for the word *feet*, a picture of feet appears in the top third of the page, three connecting boxes are drawn in the middle to represent the three phonemes in the word, and the bottom third of the page is blank to provide space for three markers, which are lined up and waiting to be pushed into the boxes (see Figure 1).

Over time, create a large selection of sound box cards, because different students will need varying amounts of practice before achieving ease in

detecting and segmenting phonemes. Since the goal is to teach the *process* of hearing sounds in words, exposure to a variety of words is more effective than repeated practice with the same words.

Choosing Words for Sound Boxes

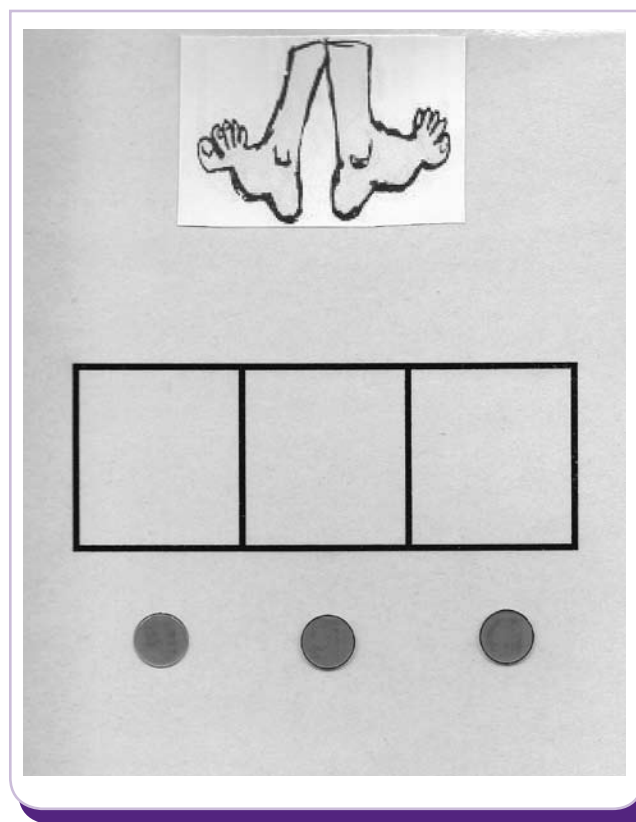
When choosing the words to use in sound boxes, there are some general guidelines: (1) Use only one-syllable words, (2) select words that are conceptually familiar to young children, and (3) choose words that are phonemically regular so that all the stretched sounds can be distinctly heard. For example, words with *r*-controlled vowels, like *car*, should be avoided. Words with silent letters can be used as long as the boxes are drawn to match the number of sounds heard rather than the number of letters needed to spell the words. As seen in Figure 1, the *feet* sound box card has three boxes because you can only hear three sounds.

Levels of Difficulty

After observing the differing challenges that students encountered while stretching out varying phonemes, I developed a system of organization for sound box cards based on a gradient of difficulty:

- Level 1 words have three phonemes and a continuous initial consonant sound, such as /s/, /f/, or /m/, where the flow of breath is not constricted and the sound does not cease as you hold it. These words were found to be the easiest to use when first teaching the process of detection and segmentation because students were able to stretch them out into their component sounds using one continuous breath.
- Level 2 words are more difficult to stretch and have three phonemes with an initial stop consonant, such as /d/, /k/, or /t/. These stop-consonant sounds make the words harder to segment smoothly because of the quick puff of air needed to articulate them. Their initial sound cannot be maintained, resulting in a distinct break from the next phoneme that is being articulated in the word.
- Level 3 words, the most difficult to segment into phonemes, begin or end with blends, such as /bl/ or /mp/. Words with blends can be confusing to segment because the sounds of the blend—for example, the /b/ and /l/ in /bl/—are

Figure 1
Sound Box Card for Feet



so closely connected when we listen to them that it is hard to detect the individual sounds. It is important to draw a box for every detectable phoneme; therefore, if making a card for the word *blue*, there are three boxes, one for the /b/ and one for the /l/ (although they are heard as connected), and one for the /ue/ (which is heard as one sound). To help students understand the close connection of the sounds in a blend, you might suggest that the sounds are like close friends, who may be hard to tell apart sometimes but still have their own sound, just like friends have their own names.

To easily distinguish these levels of difficulty, a color-coding system is useful. For example, for Level 1 words that begin with continuous consonants, cards can be made with green construction paper; for Level 2 words that begin with stop consonants, you can use yellow paper; and for Level 3 words with blends, you can use red paper. (Table 1 includes

Table 1
Useful Words, With Phoneme Segmentation, for Making Sound Boxes

Level of difficulty	Words with phoneme segmentation
Level 1	f-a-n, f-i-sh, f-ee-d, f-ee-t, f-i-le, f-i-ve, j-o-g, l-a-mb, l-ea-f, l-i-d, l-o-ck, m-a-p, m-ea-t, m-e-ss, m-i-ce, m-oo-n, m-o-p, n-ai-l, n-e-t, n-o-se, n-u-t, r-a-t, r-ai-n, r-a-ke, r-ea-d, r-i-de, r-oa-d, r-o-ck, r-o-pe, r-u-g, s-a-ck, s-ea-l, s-ea-t, sh-ee-p, sh-i-p, s-i-ck, s-oa-p, s-u-n, wr-i-te
Level 2	b-a-ke, b-a-g, b-a-t, b-e-d, b-i-ke, b-oo-k, b-u-g, b-u-s, c-a-p, c-a-ke, c-a-ge, c-a-n, c-a-ve, ch-i-ck, c-oa-t, c-o-mb, c-o-t, c-u-p, c-u-t, d-o-g, d-ee-r, d-u-ck, g-a-me, g-a-te, g-oa-t, g-u-m, h-a-m, h-a-t, h-i-t, h-o-se, h-o-t, j-a-ck, j-a-m, j-ee-p, j-e-t, j-ui-ce, k-i-ck, k-i-te, p-i-g, p-a-n, p-a-th, p-ea-k, p-o-t, t-o-p, t-ea-m, t-a-pe, t-i-re, t-u-b, t-u-be, w-a-sh, w-a-ve, w-e-b, w-i-g, w-i-pe
Level 3	
Three phonemes	b-l-ow, c-r-y, f-l-y, g-l-ue, s-k-i, s-t-ew, t-r-ee
Four phonemes	b-l-a-ck, b-l-o-ck, b-r-i-de, b-r-oo-m, b-r-u-sh, b-r-i-ck, c-r-a-ck, d-r-o-p, d-r-e-ss, d-r-i-ve, f-l-a-g, f-r-o-g, f-l-oa-t, f-l-u-te, f-r-uit, g-l-a-ss, g-r-a-ss, g-r-i-ll, g-r-oo-m, h-a-n-d, p-l-u-g, p-l-u-m, p-r-e-ss, p-l-a-ne, p-r-i-ze, s-k-a-te, s-k-i-p, s-l-ee-ve, s-l-i-ce, s-l-e-d, s-l-i-p, s-m-i-le, s-n-i-p, s-p-i-ll, s-p-oo-n, s-p-o-t, s-t-o-p, s-t-ea-m, s-w-ee-p, s-w-i-m, t-r-ai-n, t-r-u-ck

useful words, with phoneme segmentation, for creating sound boxes.)

Teaching How to Hear Sounds in Words

To use a gradual release of responsibility model (Pearson & Gallagher, 1983), you should teach the process of detecting and segmenting phonemes in the following four steps:

1. Model how to stretch the word out into its phonemes. Then have the student repeat the slow, phoneme-by-phoneme articulation. By practicing a smooth pronunciation of the word, the student will learn how to hear each phoneme within a natural speech flow. Make sure that the student can stretch the word back, articulating each phoneme, before moving on to the next step. Occasionally, there will be a student for whom the slow articulation of words is very difficult. One way to help him or her is to use a large mirror showing both the instructor's and the student's mouths so that they can observe each other and match mouth positions as the word is segmented.
2. Demonstrate how the boxes are incorporated into the process. As each sound within the word is articulated, push a marker into one of the drawn boxes. For example, if the word is *mug*, which has three phonemes and a continuous beginning consonant sound, verbalize each phoneme slowly and smoothly (/m.../u.../g/) while simultaneously pushing a marker into the corresponding first, second, and third boxes.
3. Teach students how to use the sound boxes to detect and segment phonemes. At first, divide the responsibility for stretching and pushing with the students. Continuing with the example of *mug*, first stretch the word slowly, articulating each of the three phonemes while directing students to simultaneously push each marker into its appropriate box. Then reverse the tasks. Now push the markers into each box to match students' slow articulation of each sound in the word. If students have difficulty with either part, stretching or pushing, continue to have each student practice the action with additional attempts and sound box cards until the student is successful at it.

4. When students have demonstrated that they can successfully stretch *and* push, help them put the actions together in the final step. Have them independently stretch the word and push the markers into the boxes to demonstrate both detection and segmentation of the word's phonemes.

Doing three cards per instructional session works well to give students practice without it becoming overwhelming or too time-consuming. Other than the introductory session when students are learning the sound box procedure, instruction generally takes less than five minutes per session, making it possible to incorporate this instructional technique into a daily classroom routine. As students become more proficient in the process, the four steps can be collapsed into two (the first and last step), gradually but completely releasing the responsibility for phoneme segmentation to the learner.

When a student can comfortably stretch and push a level of boxes, it is appropriate to introduce a card from the next level. Return to step 1, using full teacher modeling as described previously, to maximize student understanding and success in learning the more difficult task. Typically, at this stage a session could include one sound box card from a more difficult level with two from a level the student could do independently.

Transitioning to Sound–Letter Matching

After students have demonstrated proficiency at detecting and segmenting phonemes on the first two levels of difficulty, it is time to begin transitioning to what are often called letter boxes. The intent of

letter boxes is to help students move from hearing the sounds in words to matching those sounds with their appropriate letters. The same procedure is used as with sound boxes, but now, a second stretch is done. During this second segmentation of phonemes, students write into each box an appropriate letter representing the detected sound, with help from the teacher as needed. As students internalize their understanding of the alphabetic principle and become more sure of sound–letter matches and high-frequency rimes, their need for the support of the boxes will diminish and eventually extinguish.

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