

## **Exercise Description – Scrap Cat**

Scrap Cat helps participants develop decoding, vocabulary, and word categorization skills. Scrap Cat also helps the participant learn to automatically access the various dimensions of vocabulary, including semantic, syntactic, phonological, and morphological properties. Scrap Cat helps the participant learn to be flexible when reading, and encourages the development of automatic word recognition and the understanding of conceptual relationships.

### **Reading Curriculum Standards and Scrap Cat**

Scrap Cat reinforces the following nationwide Language and Reading Arts curriculum standards that center on third grade but contain items above and below grade level:

- Understand the basic features of a reading, select and know how to translate letter patterns into spoken language using phonics, syllabication, and word parts, and apply this knowledge for fluent oral and silent reading
- Recognize and use knowledge of spelling patterns (diphthongs, special vowel spellings) when reading
- Know and use complex word families when reading to decode unfamiliar words
- Decode regular multisyllabic words
- Demonstrate knowledge of levels of specificity among grade-appropriate words
- Use the dictionary to learn the meaning and other features of unknown words
- Use knowledge of prefixes and suffixes to determine the meaning of words
- Identify adjectives and compound words
- Identify past, present, and future verb tenses properly
- Recognize the similarities of sounds in words
- Recognize the rhythmical patterns in a selection

### **The Skills Developed in Scrap Cat**

Scrap Cat helps the participant improve decoding, vocabulary, and word recognition skills by working on:

- Conceptual relationships
- Semantics
- Syntax
- Phonological properties
- Morphological properties

### **How Participants Work on Scrap Cat**

When the participant clicks the yellow paw, a bottle or can rolls down the recycling chute and displays a word. The participant must figure out which category the word fits into, and then click that category's bin on the right.

If the participant doesn't understand a word, the participant can look up the definition by clicking the "?" button at the bottom of the recycling chute. Scrap Cat presents the word and the number of syllables, along with a short definition. The participant can click the speaker button if he or she wants to hear the word read aloud.

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If the participant doesn't understand a category, the participant can click the speaker next to each category bin to hear the category name read aloud, as well as hear additional information about the category, such as examples.

## **How Participants Progress through Scrap Cat**

Scrap Cat progresses through four category types as follows:

- **Semantic categories:** The participant sorts words according to definition (such as animals and states).
- **Syntactic categories:** The participant sorts words into grammatical groups (such as nouns and verbs).
- **Phonological categories:** The participant sorts words according to vowel sounds, consonant sounds, and syllables (such as "has one consonant sound" and "has the same vowel sound as ate").
- **Morphological categories:** The participant sorts words by morpheme (such as "has a suffix that means full of " and "is a plural").

## **How Participants Advance in Scrap Cat**

Scrap Cat helps participants advance by working on progressively larger numbers of words in progressively more categories.

- When starting to work on a new category type, such as semantics, Scrap Cat presents two different categories (such as animals and things to wear) from the first category group. The participant then sorts six different words (such as salamander and mitten) into these categories.
- After all six words have been sorted, Scrap Cat evaluates that group of trials. If the participant has sorted at least 90 percent of the words correctly, Scrap Cat presents more categories and more words to sort until the participant is sorting 20 words into 4 different categories.
- After the participant has completed 90 percent of each group of trials correctly for the current category group, Scrap Cat advances to the next category group.
- If a group of trials includes fewer than 10 trials, the participant may complete 1 trial incorrectly and still be considered for advancement.

## **Plateau-Based Transitions**

If a participant repeats a group of trials 3 times but does not achieve 90 percent correct, Scrap Cat presents a new category group from the same category type.

Before the participant completes the exercise, and after the participant completes as much of the material in Scrap Cat as possible, Scrap Cat returns the participant to the group (or groups) of trials that the participant did not complete with 90 percent accuracy. Scrap Cat requires the participant to work on this group (or groups) of trials until he or she achieves 90 percent accuracy.

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## **Points Rewarded in Scrap Cat**

Scrap Cat awards points to the participant based on the following conditions:

- **Correct answers:** The participant earns 4 points for each trial that is correctly completed without the use of the dictionary.
- **Dictionary-aided correct answers:** If the participant uses the dictionary, Scrap Cat awards only 1 point for a correct answer. In addition, that answer does not count toward the total correct for the group of trials and is therefore not evaluated for advancement. A correct answer after dictionary use also does not count toward bonus points.
- **Bonus points:** After the participant completes 10 trials correctly without the use of the dictionary, Scrap Cat rewards the participant's performance with 10 bonus points.

## **Exercise Description – Canine Crew**

Canine Crew helps participants develop decoding, vocabulary, and automatic word recognition skills. Canine Crew improves participants' semantic and phonological skills by working on rhymes, synonyms, antonyms, and homophones. Canine Crew helps the participant learn to be flexible when reading, and encourages the development of automatic word recognition and the understanding of conceptual relationships.

### **Reading Curriculum Standards and Canine Crew**

Canine Crew reinforces the following nationwide Language and Reading Arts curriculum standards center on third grade but contain items above and below grade level:

- Understand the basic features of a reading, select and know how to translate letter patterns into spoken language using phonics, syllabication, and word parts, and apply this knowledge for fluent oral and silent reading
- Spell correctly common homophones
- Know and use complex word families when reading to decode unfamiliar words
- Decode regular multisyllabic words
- Use knowledge of antonyms and synonyms to determine meaning of words
- Use knowledge of homophones to determine meaning of words
- Use knowledge of prefixes and suffixes to determine the meaning of words
- Recognize the similarities of sounds in words
- Recognize the rhythmical patterns in a selection

### **The Skills Developed in Canine Crew**

Canine Crew develops decoding and vocabulary skills by helping the participant learn semantic and phonological principles. Canine Crew presents word pairs many times, which allows the participant to not only cement knowledge of those words' meanings and sounds, but also helps the participant develop automatic word recognition and understanding of conceptual relationships.

### **How Participants Work on Canine Crew**

When the participant clicks the yellow paw, the steam shovel drops a brickload of words above a large pothole. The participant must pair words according to the different categories in the exercise. The first category presented is rhymes. When working on this category, the participant clicks a word and then clicks the word that rhymes with the first word.

### **How Participants Progress through Canine Crew**

Canine Crew progresses through the four semantic and phonological categories one by one as follows:

- **Rhymes:** The participant matches all the rhyming pairs on the screen (such as meter/heater).

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- **Synonyms:** The participant matches all the pairs of words that mean the same thing (such as own/possess).
- **Antonyms:** The participant matches all pairs of words that mean opposite things (such as advance/retreat).
- **Homophones:** The participant matches all the pairs that sound alike though they are spelled differently (such as great/grate).

Canine Crew always presents one more word than necessary to complete each screen in order to further challenge the participant.

### **How Participants Advance in Canine Crew**

Canine Crew helps participants advance by working on progressively larger numbers of word pairs and on progressively more advanced vocabulary.

When starting to work on a new category, such as rhymes, Canine Crew presents seven words, six of which belong in rhyming pairs and one of which is a foil to increase the difficulty of the task. After the participant matches the three rhyming pairs, Canine Crew presents another screen of seven words. When the participant has completed the level, Canine Crew evaluates the group of trials in that level. If the participant has matched at least 90 percent of the words correctly, Canine Crew advances to the next level.

If a group of trials includes fewer than 10 trials, the participant may complete 1 trial incorrectly and still be considered for advancement.

At each level, Canine Crew first presents 3 successive screens of 7 words. If the participant matches 90 percent of the words presented (at least 8 out of a total of 9 matches), Canine Crew presents 3 successive screens of 13 words. If the participant matches 90 percent of these words (at least 17 of the 18 matches), Canine Crew presents 3 successive screens of 21 words. If the participant completes 90 percent of these word matches (at least 27 of the 30 matches), Canine Crew advances the participant to the next category.

Rhymes first presents 2 screens of 7 words each, and evaluates the resulting 6 matches for advancement. The next level, 3 screens of 7 words each, is the second level for rhymes but the first level for synonyms, antonyms, and homophones.

The first level of Canine Crew presents words that are, at maximum, at the 2nd grade level. Level 2 incorporates words from the 3rd grade level, and level 3 adds words from the 4th grade level.

### **Plateau-Based Transitions**

If a participant repeats a group of trials 3 times but does not achieve 90 percent correct, Canine Crew presents words from the next level (or, if the participant is at the last level, from the first level of the next category).

Before the participant completes the exercise, and after the participant completes as much of the material in Canine Crew as possible, Canine Crew returns the participant to the group (or groups) of trials that the participant did not complete with 90 percent accuracy. Canine Crew requires the participant to work on this group (or groups) of trials until he or she achieves 90 percent accuracy.

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## **Points Rewarded in Canine Crew**

Canine Crew awards points to the participant based on the following conditions:

- **Correct answers:** The participant earns 5 points for each trial that is correctly completed the first time each word is clicked on.
- **Second attempts at a match:** If the participant makes a match with a word that has already been (erroneously) clicked on, the trial only rewards 1 point to the participant.
- **Bonus points:** If the participant matches all the word pairs with fewer clicks of the mouse than the number of bricks shown in the wheelbarrow, the participant earns the difference in bonus points.

## Exercise Description – Chicken Dog

Chicken Dog helps participants develop spelling skills and sensitivity to letter-sound correspondences. Chicken Dog also helps participants improve decoding skills, which are crucial for flexible, fluent reading.

### Reading Curriculum Standards and Chicken Dog

Chicken Dog reinforces the following nationwide Language and Reading Arts curriculum standards that center on first through fourth grade but contain items above and below grade level:

- Understand the basic features of a reading, select and know how to translate letter patterns into spoken language using phonics, syllabication, and word parts, and apply this knowledge for fluent oral and silent reading
- Spell three- and four-letter short-vowel words and grade-level-appropriate sight words correctly
- Read common and irregular sight words (the, said)
- Use knowledge of vowel digraphs and r-controlled letter-sound associations to read words
- Read compound words
- Read inflectional forms and root words (look, looked)
- Read common word families
- Spell frequently used, irregular words correctly (was, were, says, said)
- Spell basic short-vowel, long-vowel, r-controlled, and consonant-blend patterns correctly
- Recognize and use knowledge of spelling patterns (diphthongs, special vowel spellings) when reading
- Identify and correctly use regular and irregular plurals (dog/dogs, house/houses, fly/flies, wife/wives)
- Correctly spell root words, inflections, suffixes and prefixes, and syllable constructions
- Decode regular multisyllabic words
- Recognize the similarities of sounds in words

### The Skills Developed in Chicken Dog

Chicken Dog helps the participant develop spelling skills and sensitivity to letter-sound correspondences in the following ways:

- **Spelling:** Chicken Dog, which presents words that are missing a letter or letter combination, varies the location of the missing letter(s) by beginning, middle, or end of the word; the linguistic properties of the missing letter(s) by consonant, short vowel, long vowel, or r-controlled vowel; and the orthographic complexity of the missing letter(s) by single letter, letter blend, digraph, diphthong, or special vowel spelling. Chicken Dog presents words from the 1st through 4th grade levels, including 320 of the 500 most commonly used words, as well as the word families mandated by 3rd grade curriculum standards. Words range from single-syllable words that are phonetically transparent to multisyllabic and compound words to words with more than one morphological affix.
- **Sensitivity to letter-sound correspondences and phonemic awareness:** The correct letter or letter combination is chosen from a group of letters and letter combinations that

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- include not only the correct choice but also incorrect choices—foils—that are systematically selected to be either visually or phonetically similar to the correct choice.
- **Decoding skills:** Letter-sound correspondence skills are crucial for successfully decoding written text—which is, in turn, crucial for proficient reading.

## How Participants Work on Chicken Dog

When the participant clicks the yellow paw, a hot dog bearing most of a word appears. The participant hears the word spoken aloud, and then must complete the written word by choosing the missing letters or letter combinations from five presented possibilities.

If the participant needs to hear the word again, the participant can click the yellow paw again to hear it spoken aloud.

## How Participants Progress through Chicken Dog

Chicken Dog first presents words from level 1 of all four categories: beginning consonant, ending consonant, middle consonant, and vowel. Chicken Dog then progresses through the five levels as follows:

### Level 1:

- Single beginning consonants such as *b* in *been*
- Single ending consonants such as *m* in *from*
- Single middle consonants such as *c* in *local*
- Single short vowels such as *e* in *help*

### Level 2:

- Beginning blends such as *bl* in *black*
- Ending consonants such as *ff* in *off*
- Middle two-consonant strings such as *mp* in *company*
- Long vowels such as *a\_e* in *place*

### Level 3:

- Beginning consonants such as *qu* in *queen* and blends such as *scr* in *scramble*
- Ending blends such as *nd* in *and*
- Middle three-consonant strings such as *ncr* in *increase*
- Vowel digraphs such as *ay* in *always*

### Level 4:

- Beginning digraphs such as *ch* in *change* and beginning silent letters such as *w* in *wrist*  
Ending silent letters such as *l* in *folk*
- Middle digraphs such as *ch* in *peaches* and middle silent letters such as *c* in *blackberry*
- Long vowels such as *y* in *sky*, vowel digraphs such as *au* in *autumn*, and diphthongs such as *oy* in *boy*

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## **Level 5:**

- Middle double consonants that represent one phoneme such as *dd* in *address*
- Long vowels such as *y* in *happy*, vowel digraphs such as *oo* in *foot*, and vowels controlled by the letter *r* such as *ar* in *car* and *er* in *her*

## **How Participants Advance in Chicken Dog**

Chicken Dog helps participants progress by presenting a word from each category in random order and then repeating the cycle with a different word from each category.

After the participant has completed all the trials in one level of a category, Chicken Dog evaluates the trials for that level and category. If the participant has completed the spelling of at least 90 percent of the words correctly, Chicken Dog advances to the next level in that category.

If a group of trials includes fewer than 10 trials, the participant may complete 1 trial incorrectly and still be considered for advancement.

As work progresses, the participant progresses through the levels in each category independently.

Chicken Dog presents words up to the 4th grade level throughout the exercise in order to expose the participant to a wide range of vocabulary words.

## **Plateau-Based Transitions**

If a participant repeats a level of a category 3 times but does not achieve 90 percent correct, Chicken Dog presents the next level of the same category. If the participant has reached the final level of that category, Chicken Dog does not transition the participant but continues to present words from that level.

Before the participant completes the exercise, and after the participant completes as much of the material in Chicken Dog as possible, Chicken Dog returns the participant to the group (or groups) of trials that the participant did not complete with 90 percent accuracy. Chicken Dog requires the participant to work on this group (or groups) of trials until he or she achieves 90 percent accuracy.

## **Points Rewarded in Chicken Dog**

Chicken Dog awards points to the participant based on the following conditions:

**Correct answers:** The participant earns 7 points for each trial that is correctly completed.

**Bonus points:** After the participant completes 10 trials correctly, Chicken Dog rewards the participant's performance with 10 bonus points.

## Exercise Description – Twisted Pictures

Twisted Pictures helps participants develop sentence comprehension skills, and helps participants improve syntax and working memory as well as vocabulary skills, all of which are crucial for flexible, fluent reading. Twisted Pictures also helps participants improve their logic skills, another important factor for proficient reading.

### Reading Curriculum Standards and Twisted Pictures

Twisted Pictures reinforces the following nationwide Language and Reading Arts curriculum standards that center on third grade but contain items above and below grade level:

- Use sentence and word context to find meaning of unknown words
- Understand and be able to use complete and correct declarative, interrogative, and imperative sentences
- Identify articles
- Identify adjectives and compound words
- Identify pronouns
- Identify past, present, and future verb tenses properly
- Demonstrate comprehension by pinpointing answers in text
- Extract appropriate and significant information from text, including problems and solutions

### The Skills Developed in Twisted Pictures

Twisted Pictures helps the participant improve sentence comprehension in the following ways:

- **Sentence comprehension:** Twisted Pictures presents four syntactically similar sentences, one of which best describes the picture shown. The participant must comprehend each presented sentence in order to choose the sentence that best describes the picture on the screen.
- **Syntax:** Twisted Pictures presents 17 syntactic structures of varying complexity.
- **Working memory:** The participant must hold each word of the four presented sentences in mind to construct a gist for each sentence, and then must hold those gists in mind while choosing the correct sentence. Developing working memory abilities will help the participant not only keep sentence gist in mind but also read and comprehend more complicated and lengthy texts.
- **Logical reasoning:** Because sentences use reversible nouns, similar vocabulary, and similar syntax, the participant must use logical reasoning rather than relying only on common sense to comprehend each sentence and choose the correct sentence. Using logical reasoning to comprehend sentences allows the participant to become a flexible reader.
- **Vocabulary:** As the participant progresses, Twisted Pictures presents longer sentences that use more advanced vocabulary words. Vocabulary skills contribute to automatic word recognition, which is an important factor in fluent reading. Reading a key set of words several times in different sentences further contributes to automatic word recognition.

## **How Participants Work on Twisted Pictures**

When the participant clicks the yellow paw, a painting and four sentences appear. The participant must choose the sentence that most accurately describes the painting.

## **How Participants Progress through Twisted Pictures**

Twisted Pictures progresses through three levels of difficulty as follows:

- **Level 1:** The participant works on sentences that contain, on average, 6 words. Words are at the 2nd grade level at highest.
- **Level 2:** The participant works on sentences that contain, on average, 8 words. Words are at the 3rd grade level at highest.
- **Level 3:** The participant works on sentences that contain, on average, 12 words. Words are at the 4th grade level at highest.

At each level, Twisted Pictures presents 6 tiers of syntactic complexity. Each tier contains several different syntactic structures (categories) that are all mastered at roughly the same age:

- **1st tier:** Simple clauses, prepositional phrases, negations, conjunctions
- **2nd tier:** Subject relativization—sentences containing a relative clause that describes the subject of the main clause
- **3rd tier:** Transformations and embeddings that challenge Subject-Verb-Object parsing
- **4th tier:** Complex subject relativization—sentences containing a Subject-Verb-Object relative clause that describes the subject of the main clause
- **5th tier:** Object relativization—Subject-Verb-Object sentences containing a relative clause that describes the object of the main clause
- **6th tier:** Cleft sentences and subject infinitival clauses

Twisted Pictures works on syntax through the level expected for 3rd grade.

## **How Participants Advance in Twisted Pictures**

Twisted Pictures presents syntactic structure categories in variable order to give the participant exposure to all syntactic structures. This strategy simulates real-life situations in which the participant is surrounded by people using a variety of syntactic structures in everyday conversation. It also prevents the participant from advancing steadily and then suddenly getting stuck, becoming frustrated, and withdrawing attention from the exercise.

The participant works on 4 different trials for each category, and the participant works on all 4 of these trials before Twisted Pictures moves on to the next category.

Twisted Pictures presents a total of 17 different syntax structure categories at each level.

## **Plateau-Based Transitions**

Twisted Pictures does not use plateau-based transitions for the following reasons:

- Twisted Pictures presents all categories of syntactic complexity at each level.

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- Each level increases the difficulty of sentence length and vocabulary level but not the complexity of the syntax.

Therefore, Twisted Pictures requires the participant to work on the trials at each level until he or she achieves 90 percent accuracy. At that point, the participant is better prepared to work on the same syntactic structures in longer sentences with more difficult vocabulary words.

### **Points Rewarded in Twisted Pictures**

Twisted Pictures awards points to the participant based on the following conditions:

- **Correct answers:** The participant earns 7 points for each trial that is correctly completed.
- **Bonus points:** After the participant completes 10 trials correctly, Twisted Pictures rewards the participant's performance with 20 bonus points.

## Exercise Description – Book Monkeys

Book Monkeys helps participants develop paragraph comprehension skills. Specifically, Book Monkeys helps participants learn to read for literal meaning, cause-and-effect relationships, and inferential comprehension; these different aspects of text contribute to participant's overall comprehension of long passages. Book Monkeys helps participants improve working memory as well as vocabulary skills, which are crucial for flexible, fluent reading.

### Reading Curriculum Standards and Book Monkeys

Book Monkeys reinforces the following nationwide Language and Reading Arts curriculum standards that center on third grade but contain items above and below grade level:

- Use sentence and word context to find meaning of unknown words
- Understand and be able to use complete and correct declarative, interrogative, and imperative sentences
- Identify pronouns
- Demonstrate comprehension by pinpointing answers in text
- Recall and summarize major points in text
- Make predictions about coming information
- Distinguish main idea and supporting details in expository text
- Distinguish cause and effect
- Extract appropriate and significant information from text, including problems and solutions
- Determine the underlying theme or author's message in fiction and nonfiction

### The Skills Developed in Book Monkeys

Book Monkeys helps the participant improve paragraph comprehension in the following ways:

- **Literal comprehension:** Book Monkeys presents questions that ask the participant to recall facts from the paragraph, such as the main point. The ability to extract the main point from a paragraph—the gist—contributes to comprehension of longer passages, and is a skill targeted by 3rd grade curriculum standards.
- **Causative comprehension:** Book Monkeys presents questions about the cause of the events within the paragraph. Understanding cause and effect is important for comprehending and remembering text. Participants work on recognizing cause-and-effect relationships as part of the 2nd grade curriculum.
- **Inferential comprehension:** Book Monkeys presents questions that ask the participant about various hypotheses he or she needed to form in order to understand the text, such as to whom a pronoun refers and what the best title for the paragraph might be. Inferential comprehension is crucial for understanding the links between concepts and building a coherent gist for the entire passage.
- **Working memory:** The participant must hold in working memory the gist of the paragraph, as well as important details, to answer the questions correctly. Developing working memory abilities helps the participant not only keep the gist of the paragraph in mind but also read and comprehend longer, more complicated texts.
- **Vocabulary:** As the participant progresses, Book Monkeys presents longer paragraphs that use more advanced vocabulary words. In addition, Book Monkeys regularly asks

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participants to identify the meaning of a word that is from 1 to 3 grade levels above the vocabulary level of the paragraph. Vocabulary skills contribute to automatic word recognition, an important factor in fluent reading.

### How Participants Work on Book Monkeys

When the participant clicks the yellow paw, a monkey dangles an open book on the screen. The participant must first read the displayed paragraph, click the **Done Reading** button, and then read the librarian's question. Several scholarly monkeys display possible answers to the question, and the participant must choose the correct answer.

After the participant has answered two questions about the paragraph, Book Monkeys displays the paragraph again to help the participant refresh his or her memory. The librarian asks six questions about each paragraph; the paragraph reappears after the participant has answered the second and fourth questions.

### How Participants Progress through Book Monkeys

Book Monkeys progresses through three levels of difficulty as follows:

- **Level 1:** The participant works on paragraphs of around 6 sentences; each sentence contains, on average, 10 to 11 words. Questions are easier than level 2. Words are at the 2nd grade level at highest.
- **Level 2:** The participant works on paragraphs of around 5 to 6 sentences; each sentence contains, on average, 9 to 10 words. Words are at the 2nd grade level at highest.
- **Level 3:** The participant works on paragraphs of around 7 sentences; each sentence contains, on average, 9 to 12 words. Words are at the 3rd grade level at highest.

At each level, Book Monkeys presents four nonfiction paragraphs and six fiction paragraphs. After the participant has read a paragraph, Book Monkeys asks the participant:

- Two **literal** questions of a true-false nature (*This story does not tell you...*)
- Two **causative** questions regarding causes of events within the paragraph (*The animals dig the holes first because...*)
- Two **inferential** questions that require the participant to formulate a hypothesis about certain components of the paragraph. The two inferential questions are chosen from four possible types:
  - The most appropriate title for the paragraph (*The best title for this story is...*)
  - What is most likely to happen next (*Which sentence would most likely come next?*)
  - The meaning of a particular word (*The word "mayor" means...*)
  - Whom or what a particular pronoun refers to (*The word "she" is talking about...*)

At each level, the monkeys ask all types of inferential questions.

### How Participants Advance in Book Monkeys

After Book Monkeys presents a paragraph and six questions about that paragraph, Book Monkeys evaluates the participant's responses. If the participant answered all six questions correctly, Book Monkeys activates the yellow paw and allows the participant to go on to the next paragraph. If the participant has not answered a question correctly, Book Monkeys gives the participant two more tries at it.

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Book Monkeys allows the participant to revisit incorrectly answered questions for two reasons. One is to accommodate the working memory capacity of young participants; a participant may have answered the question incorrectly simply because he or she could not remember the paragraph well enough. If so, the participant will do better after reading the paragraph again. The second reason is that the participant may not have developed the skills necessary to comprehend and extract the main point of a passage. By giving the participant the chance to rethink his or her reading strategy, Book Monkeys guides the participant toward reading for comprehension and retention of the salient points of a text.

During the participant's second attempt to answer a question correctly, Book Monkeys displays the paragraph again and the librarian repeats the question. The monkeys give the participant the same four choices, but Book Monkeys grays out and deactivates the incorrect answer the participant chose the first time.

After the participant responds, Book Monkeys displays another question that wasn't correctly answered (if there are any). After Book Monkeys cycles through all the questions that the participant didn't answer correctly the first time around, Book Monkeys evaluates the participant's responses.

If the participant still has not answered a question correctly, Book Monkeys gives the participant one last attempt. During the participant's third attempt to answer a question correctly, Book Monkeys displays the paragraph again and the librarian repeats the question. The monkeys give the participant the same four choices, and Book Monkeys grays out and deactivates both incorrect answers that the participant chose the first two times. If the participant answers correctly, Book Monkeys displays the next question that has not yet been correctly answered (if any). If the participant doesn't choose the correct answer on the third try, Book Monkeys highlights the correct answer.

Book Monkeys does not give the participant a fourth try at questions that the participant has not answered correctly; after the third round of attempts, Book Monkeys activates the yellow paw and allows the participant to progress to the next paragraph.

After the participant has completed all the trials in one level, Book Monkeys evaluates all the trials for that level. In evaluating trials for advancement, Book Monkeys only considers the participant's first response to each question. If the participant has chosen 90 percent of the answers correctly on the first try, Book Monkeys advances to the next level.

### **Plateau-Based Transitions**

Book Monkeys does not use plateau-based transitions to advance the participant to the next level for the following reasons:

- Book Monkeys presents all categories of questions at all three levels.
- Level 2 increases the difficulty of the exercise by increasing the similarities between the target answer and the foils, but it does not increase the difficulty of the type of question asked.
- Level 3 increases the difficulty of the paragraph by increasing the number of sentences per paragraph, the sentence length, and the vocabulary level, but it does not increase the difficulty of the type of question asked.

Therefore, Book Monkeys requires the participant to work on the trials at Level 1 until he or she achieves 90 percent accuracy. At that point, the participant is better prepared to work on the same types of questions at a higher level of difficulty.

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However, if a participant is unable to answer a question about a paragraph after three tries, Book Monkeys transitions the participant to another paragraph. Because the librarian asks slightly different questions about each paragraph, the participant has the chance to not only read different material but also respond to questions that might be more comprehensible to him or her.

### **Points Rewarded in Book Monkeys**

Book Monkeys awards points to the participant based on the following conditions:

- **Correct answers:** The participant earns 12 points for each trial that is correctly completed on the first attempt. The participant earns 6 points for a trial that is correctly completed on the second attempt and 3 points for a trial that is correctly completed on the third attempt.
- **Bonus points:** After the participant completes 10 trials correctly, Book Monkeys rewards the participant's performance with 40 bonus points.

## Exercise Description – Hog Hat Zone

Hog Hat Zone helps participants develop morphological skills, the ability to understand and correctly use small words, letters, and letter combinations that change the meaning of a word. Because morphologically important words affect the relationships between words, the meaning of a sentence, and the relationships between sentences, the morphological skills developed in Hog Hat Zone help participants read longer passages, an important aspect of fluent reading. Hog Hat Zone also helps participants use morphological affixes-prefixes and suffixes-to increase their vocabulary, which in turn aids in automatic word recognition, another important factor for proficient reading.

### Reading Curriculum Standards and Hog Hat Zone

Hog Hat Zone reinforces the following nationwide Language and Reading Arts curriculum standards that center on third grade but contain items above and below grade level:

- Identify and correctly use regular and irregular plurals (*dog/dogs, house/houses, fly/flies, wife/wives*)
- Spell correctly one-syllable words that have blends, compounds, and complex orthographic patterns (*qu*, consonant doubling, changing *y* to *ies* to form plurals)
- Spell correctly common homophones
- Spell correctly root words, inflections, suffixes and prefixes, and syllable constructions
- Use knowledge of homophones to determine meaning of words
- Use sentence and word context to find meaning of unknown words
- Use knowledge of prefixes and suffixes to determine the meaning of words
- Understand and be able to use complete and correct declarative, interrogative, and imperative sentences
- Identify subjects and verbs that are in agreement
- Identify articles
- Identify adjectives and compound words
- Identify pronouns
- Identify past, present, and future verb tenses properly
- Read and respond to a wide variety of significant works of children's literature
- Recognize the similarities of sounds in words

### The Skills Developed in Hog Hat Zone

Hog Hat Zone helps the participant improve paragraph comprehension skills and develop a better understanding of morphological complexity in the following ways:

- **Paragraph comprehension:** Hog Hat Zone presents paragraphs excerpted from classic children's literature that are missing morphologically important words. The missing words follow the progression of participants' acquisition of pronouns, plural and possessive nouns, auxiliary verbs, third person singular and past tense verbs, derivational affixes (prefixes and suffixes that change a word's meaning or part of speech), and contractions. Understanding these morphologically important words and how they are spelled in English is crucial for understanding the links between words, the meaning of a sentence, and the relationships between sentences.

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- **Morphological complexity:** Hog Hat Zone displays four choices for each missing word: one choice is the correct word, and the other three choices are foils—incorrect choices closely related to the correct choice. The foils are systematically chosen to include words that are commonly confused with the correct word, and they are similar to the correct word either morphologically (through similar root words, affixes, or parts of speech) or orthographically (through similar spellings or spelling-sound correspondences).
- **Vocabulary:** Hog Hat Zone helps participants learn to recognize and correctly use morphological affixes—prefixes and suffixes. Because comprehension of morphological changes leads to vocabulary growth in 3rd grade and beyond, Hog Hat Zone helps participants increase their vocabulary skills. These vocabulary skills, in turn, contribute to automatic word recognition, an important factor in fluent reading. Hog Hat Zone presents paragraphs that contain a range of vocabulary words appropriate for the 2nd through 4th grade levels.

### How Participants Work on Hog Hat Zone

When the participant clicks the yellow paw, a paragraph appears, minus some key words. Four choices for the first missing word appear, and the participant must click the word that correctly fills the gap. After the participant selects a choice, a group of four choices for the next missing word appear; this sequence repeats until the paragraph is complete.

### How Participants Progress through Hog Hat Zone

Hog Hat Zone progresses through four tiers of morphological complexity as follows:

- **Tier 1:** Pronouns (such as *she*) and auxiliary verbs (such as *will*)
- **Tier 2:** inflectional suffixes, which are suffixes that add information about number, case, tense, or person, or but do not change a word's part of speech. inflectional suffixes can be added to nouns (such as the *-s* in *cats*) and verbs (such as *worked* and *working*).
- **Tier 3:** Prefixes (such as the *re-* in *reheat*) and derivational suffixes, which are suffixes that change a word's meaning (such as the *-less* in *useless*) and often its part of speech (such as the *th* that changes *heal* to *health*)
- **Tier 4:** Deictic pronouns, which are pronouns that point to something (such as *here*); possessives (such as *Mike's*); and contractions (such as *they're*). Many of these pronouns are challenging because they have highly confusable homophones (for instance, *they're* has two homophones: *there* and *their*).

At each tier, Hog Hat Zone presents several categories of morphological complexity that are mastered at roughly the same age in participants' spoken language development.

#### Tier 1 (Pronouns and auxiliary verbs):

1. Nominative case pronouns, which are the subject of a clause
2. Accusative case pronouns, which are the object of a verb
3. Third person gender
4. Possessive pronouns
5. Deictic pronouns, (this, that, these, those)
6. Auxiliary verbs

#### Tier 2 (Inflectional suffixes and verb tenses):

1. Comparatives and superlatives

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2. Plural nouns
3. Third person singular verbs
4. Gerunds, which are verbs that function as nouns, end in *-ing*, and describe an action or state of being
5. Progressive tense, which uses a form of *to be* plus a verb ending in *-ing* and describes a continuous action
6. Past participles, which are verbs that function as adjectives and end in *-ed* or *-en*
7. Perfect tense, which uses *have* or *had* plus the perfect tense of a verb to refer to a completed action that occurred at a different time
8. Present participles, which are verbs that function as adjectives and end in *-ing*

**Tier 3** (Prefixes and frequent derivational suffixes, which change a word's meaning and often its part of speech):

1. Prefixes
2. [Combined with Category 1]
3. Derivational suffixes that create adverbs
4. Derivational suffixes that create adjectives
5. Derivational suffixes that create negative adjectives
6. Derivational suffixes that create nouns

**Tier 4** (Deictic pronouns, possessives, and contractions):

1. Deictic pronouns, (here, there)
2. Possessive nouns
3. Contractions of *will*
4. Contractions of *would*
5. Contractions of *is* and *am*
6. Contractions of *are*
7. Contractions of *have*, *has*, and *had*

Within each tier, Hog Hat Zone presents two units. The first unit presents paragraphs of 2 to 3 lines displayed on pipes, and the second unit presents paragraphs of 4 to 5 lines displayed on girders. After the participant has completed the first unit (shorter paragraphs on pipes), Hog Hat Zone presents the second unit (longer paragraphs on girders).

The paragraphs can have as few as one missing word and as many as five, but each line as presented on the exercise screen contains at most one gap.

### How Participants Advance in Hog Hat Zone

Hog Hat Zone presents the categories within a tier in random order. The participant works on 10 different trials per category.

After the participant works on all trials in a tier, Hog Hat Zone evaluates all the trials in that tier for advancement. If the participant correctly completed 90 percent of the trials in the first unit (pipes and shorter paragraphs) and 90 percent of the trials in the second unit (girders and longer paragraphs), Hog Hat Zone advances to the next tier.

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## **Plateau-Based Transitions**

If the participant did not correctly complete 90 percent of the trials in either unit Hog Hat Zone presents that unit again. If the participant repeats a unit 3 times but does not achieve 90 percent correct, Hog Hat Zone presents the next tier.

Before the participant completes the exercise—and after the participant completes as much of the material in Hog Hat Zone as possible—Hog Hat Zone returns the participant to the units that the participant did not complete with 90 percent accuracy. Hog Hat Zone requires the participant to work on these units until he or she achieves 90 percent accuracy.

## **Points Rewarded in Hog Hat Zone**

Hog Hat Zone awards points to the participant based on the following conditions:

- **Correct answers:** The participant earns 8 points for each trial that is correctly completed.
- **Bonus points:** After the participant completes 10 trials correctly, Hog Hat Zone rewards the participant's performance with 20 bonus points.