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Tune in™ to Reading, an interactive singing computer program, and children who are deaf or hard of hearing using cochlear implants: Could this program be effective in improving reading fluency?

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TUNE IN™ TO READING, AN INTERACTIVE SINGING COMPUTER PROGRAM, AND CHILDREN WHO ARE DEAF OR HARD OF HEARING USING COCHLEAR IMPLANTS: COULD THIS PROGRAM BE EFFECTIVE IN IMPROVING READING FLUENCY?

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Abstract: A literature review of reading fluency and music production with an analysis of Tune in™ to Reading and its potential to improve reading fluency in children who are deaf or hard of hearing using cochlear implants.

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Introduction

In 2012, I attended a reading seminar by Timothy Rasinski entitled, "Effective teaching of reading: From phonics to fluency to proficient reading." Rasinski began his seminar by talking about the relationship between singing and reading and how song naturally capitalizes on elements of reading fluency. Rasinski alluded to research on a singing intervention to improving reading fluency and how children make over a year's progress in their reading fluency in a nine-week period (Rasinski, 2012). Although the findings seemed unorthodox, I immediately thought of the potential implications of this research on children who are deaf and hard of hearing using cochlear implants.

Children with hearing loss often have very delayed language and reading skills. Singing is one way that has been shown to provide language-learning opportunities. In their 2011 article, "Music therapy for preschool cochlear implant recipients," Gfeller, Driscoll, Kenworthy, and Van Voorst mentioned that singing provides children with cochlear implants the opportunity to practice syntax, vocabulary, and elements of speech production including duration, stress, articulation, and inflection (Gfeller, Driscoll, Kenworthy, & Van Voorst, 2011). Can singing help improve reading fluency as well? If a singing intervention could improve reading fluency in this population, the implications would be monumental.

From further investigations, I learned that the interactive singing software program Rasinski alluded to is called *Tune in™ to Reading*, and its effectiveness has not been examined for children with hearing loss. This led me to wonder: could *Tune in™ to Reading* be effective in improving reading fluency for children who are deaf and hard of hearing using cochlear implants?

This independent study attempts to answer this question in three parts, namely: 1) a literature review of reading fluency including a review of music production by children with cochlear implants, 2) a description of the *Tune in™ to Reading* software and a review of its effectiveness for children with typical hearing, and 3) an analysis of this software's potential to improve reading fluency in reading in children who are deaf or hard of hearing using cochlear implants.

Part 1: Literature Review of Reading Fluency and Review of Music Production

Reading Fluency

This literature review will examine the available research on reading fluency including the components of reading fluency, how reading fluency is assessed, and what is known about reading fluency problems among children who are deaf or hard of hearing. Current strategies and/or curricula designed to improve reading fluency in students who are deaf or hard of hearing will also be examined.

Reading fluency must be examined in its entirety before any conclusions can be made. Rasinski provided an excellent mental exercise for understanding the concept of reading fluency. Reflect on the qualities that make a person a good public speaker. This person likely talks with intonation, expression, varied tones, phrases, an appropriate speed, and uses accurate speech. If the speaker asks a question, his or her voice likely rises at the end of the question. These things consequently allow listeners to better understand the message of the speaker. All of these elements are also components of reading fluency, which allow for improved comprehension of a text (Rasinski, 2004).

Rasinski describes reading fluency as being multidimensional, and defines reading fluency as the combination of decoding written word with automaticity, decoding written word with accuracy, and using external or internal expression to interpret written word. The combination of these elements of fluency helps readers achieve reading comprehension (Rasinski, 2004).

The first two essential components of reading fluency are related to 'decoding words,' namely accuracy and automaticity. Comprehension of a passage heavily relies on decoding words accurately. Understanding the meaning of a sentence relies on one's vocabulary, as one can only decode known words. Also essential for reading fluency is automaticity, which is the ability to decode words with minimal to no effort. All readers have a limited amount of cognitive resources and attention available to expend. When these resources are used to decode words, then there are fewer resources available for reading comprehension. Accuracy and automaticity in decoding words are necessary for reading fluently (Rasinski, 2004).

The other necessary components of reading fluency involve the use of external and internal expression to interpret the written text, or simply prosody and comprehension. Prosody encompasses appropriately altering the expression of a text through tone, volume, phrasing, rate, pausing, pitch variations, stress or emphasis, and intonation (Rasinski, 2004). To read with appropriate prosody, the reader must comprehend the text to know the appropriate phrasing and expression to use. Reading without comprehension is not truly reading. Reading the words on the page without understanding them is not actually reading, but is simply decoding. In their 2003 article, "Fluency: A review of developmental and remedial practices," Kuhn and Stahl stated the importance of reading fluency for reading comprehension. To comprehend what is being read, the main purpose of reading, readers must have fluency (Kuhn & Stahl, 2003). In their 2005

article, “Fluency: Bridge between decoding and reading comprehension,” Pikulski and Chard stated that fluency and comprehension have a reciprocal relationship, each fostering the other, regardless of if fluency contributes to comprehension or vice versa (Pikulski & Chard, 2005).

Reading fluency can be assessed in a number of different ways. Reading fluency is often measured as the rate of reading, or the number of words read correctly every minute (Rasinski, 2003). However, reading rate alone is an incomplete assessment of fluency, as it measures automaticity and accuracy, but does not capture other aspects of fluency. If one has automaticity and accuracy in reading but reads words individually, there is no comprehension and ultimately no reading. Rasinski argues that fluency encompasses reading at an appropriately fast pace with phrasing and expression. The combination of these reflects comprehension of the passage (Rasinski, 2004). Pikulski and Chard mentioned two instruments to assess reading fluency: informal reading inventories such as the Qualitative Reading Inventory (QRI) and leveled texts such as *Leveled Reading Passages*. Instruments like these assess four dimensions of fluency: oral reading rate, oral reading accuracy, oral reading quality, and reading comprehension (Pikulski & Chard, 2005).

Another more holistic way of assessing reading fluency is to use fluency rubrics or rating scales such as the National Assessment of Educational Progress (NAEP) Fluency Scale and the Multidimensional Fluency Scale (MFS). The NAEP’s Oral Reading Fluency Scale is a single four-point fluency rubric that reflects the phrasing, expression, and intonation of the reader. The MFS separates judgments of reading fluency into four sections: phrasing, smoothness, accuracy, and pace. Each of these sections is rated with a four-point fluency rubric (Rasinski, 2003).

Children who are deaf and hard of hearing struggle with reading fluency. Easterbrooks and Estes examined the reading process in “Developing literacy skills in children with hearing

loss" (2007). They described the relationship among literacy processes as a pyramid, with each subsequent layer built upon the one before. At the top is reading comprehension, the ultimate goal. At the bottom, the base of the pyramid, is conceptual knowledge about the world. Children who are deaf and hard of hearing have limited world knowledge compared to children with typical hearing. Thus, the base of their pyramid is smaller, making it harder to acquire all of the subsequent skills associated with reading, including fluency. The next layer involves the components of language. Children with hearing loss have significantly poorer syntax abilities and vocabularies than their peers with typical hearing. Because vocabulary level is the highest predictor of reading achievement, children with hearing loss have another disadvantage for literacy learning. The subsequent pyramid layer is decoding, or transforming the written code from letters to sounds. Decoding is difficult for children with hearing loss, as they have impaired access to sound and a more limited vocabulary for decoding words. Decoding skills are only useful for words that are already in the child's oral vocabulary. The next layer is fluency, which integrates all of the previous layers of the pyramid (Easterbrooks & Estes, 2007). It is not surprising that reading fluency is difficult for children who are deaf and hard of hearing when examining reading as a pyramid of these skills and knowledge.

Looking at programs designed to improve reading fluency, Pikulski and Chard suggest a developmental nine-step program. Steps one through five reflect instruction in underlying skills needed for reading fluency including graphophonic foundations, oral language skills and vocabulary, high frequency vocabulary words, spelling patterns and common word parts, and decoding skills. The last four steps examine instruction necessary for improving reading fluency. Step six covers choosing appropriate texts for the reader to increase reading speed and coach strategic reading behaviors. Step seven involves using repeated reading interventions for

struggling readers. The final steps encompass extending reading fluency to independent reading and monitoring the development of reading fluency with appropriate assessments (Pikulski & Chard, 2005).

In 2002, Chard, Vaughn, and Tyler synthesized research from the past twenty-five years on interventions to improve reading fluency for children in elementary school with learning disabilities. The findings from the synthesis suggested children with learning disabilities benefit from repeated reading interventions. More specifically, repeated reading interventions correlate with improvements in comprehension, reading rate, and accuracy (Chard, Vaughn, & Tyler, 2002). In his book, *The Fluent Reader*, Rasinski mentions that repeated readings are a way of providing more practice to improve reading fluency (Rasinski, 2003).

Another strategy to improve reading fluency noted in the research collected by Chard et al. is for teachers to model fluent reading to children through oral reading. Especially for children with low fluency, repeated readings with a model appear to be more effective in improving reading fluency than without a model (Chard et al., 2002). Rasinski agreed that modeling fluency through oral reading allows children to hear the meaning of reading in both the expression of the reader as well as the words chosen by the author. This ultimately helps children foster an understanding of the meaning of reading (Rasinski, 2003).

A strategy Rasinski mentioned to improve reading fluency is to provide oral support for struggling readers. This support could be in the form of choral reading, using recorded materials, paired reading, etc. Chard et al. specified that while computer- or tape-modeled readings appear more effective than no reading model, they may not be as beneficial as a teacher model (Chard et al., 2002).

Another strategy Rasinski noted is encouraging reading fluency through phrasing. Phrasing text allows readers to look at the meaning of a phrase instead of examining each word separately; this fosters comprehension (Rasinski, 2003). Chard et al. agreed that struggling readers can be given text that is broken up into phrases to help improve reading comprehension and fluency (Chard et al., 2002).

In their 2005 article, "Teaching reading to children who are deaf: Do the conclusions of the National Reading Panel apply?", Schirmer and McGough noted that there are very few research studies on fluency instruction for children who are deaf and hard of hearing. Schirmer and McGough did not find any studies on guided oral reading instruction with readers who were deaf and hard of hearing. Only two research studies were found on fluency instruction in independent silent reading. A study by Limbrick, McNaughton, and Clay examined the effectiveness of independent oral reading for improving reading fluency (Limbrick, McNaughton, & Clay, 1992). The other study by Kelly examined the differences in reading fluency ability between average and skilled readers who are deaf (Kelly, 1995). From these studies, the only conclusion Schirmer and McGough could make was that independent oral reading seems promising for improving reading fluency in children who are deaf and hard of hearing (Schirmer & McGough, 2005).

Music and Pitch Production in Children who have Cochlear Implants

Since the *Tune in™ to Reading* software uses singing implicitly as a vehicle to improve reading fluency, it would seem necessary to also examine music and pitch production abilities of children who are deaf and hard of hearing using cochlear implants. According to Xu et al., prelingually-deafened children have a different musical appraisal compared to postlingually-

deafened adults. Postlingually-deafened adults have a recollection of what music sounded like prior to becoming deaf, while prelingually-deafened children have minimal to no former musical experiences prior to receiving a cochlear implant (Xu et al., 2009). Therefore, music perception and production results with postlingually-deafened adults cannot be assumed to generalize to prelingually-deafened children, and as such will not be summarized in this literature review.

In their 2006 article, "Pitch and timing in the songs of deaf children with cochlear implants," Nakata, Trehub, Mitani, and Kanda investigated the timing and pitch singing characteristics of children who were congenitally deaf using cochlear implants. Twelve Japanese children who were congenitally deaf, using a unilateral cochlear implant, and ranging from five to ten years old participated in the experimental group. Three-quarters of the participants used a hearing aid in their non-implanted ear. Six Japanese children with typical hearing ranging from five to nine years old participated in the control group. All children were asked to sing familiar songs (Nakata, Trehub, Mitani, & Kanda, 2006). In their 2009 article, "Vocal singing by prelingually-deafened children with cochlear implants," Xu et al. investigated the singing proficiencies of children who were prelingually deafened and used cochlear implants. Seven children ranging from 5.4 to 12.3 years old participated in the study; these children had received cochlear implants from the Beijing Tongren Hospital in Beijing, China. Fourteen children with typical hearing ranging from 4.1 to 8.0 years old participated in the control group. All children were asked to sing a familiar song. Pitch, frequency, and durational aspects were analyzed in the recorded songs (Xu et al., 2009).

The results from both studies are consistent. For rhythm, Nakata et al. found no significant difference between the variations of durational patterns produced by participants with cochlear implants and those produced by participants with typical hearing (Nakata et al., 2006).

Similarly, Xu et al. found no significant difference in rhythmic variation between participants with cochlear implants and participants with typical hearing (Xu et al., 2009). Therefore, rhythmic timing in music sung by children with cochlear implants is similar to that of their typically-hearing counterparts (Nakata et al., 2006). For pitch, again the two studies' results are consistent with each other, but in this case, the pitch patterning of children with cochlear implants was exceedingly different than the pitch patterning of children with typical hearing. While the sung pitch range of the control group fit in the expected pitch range, the pitch range of the children with cochlear implants was less than a third of the expected range (Nakata et al., 2006). The researchers also examined both groups' ability to match the inflectional direction of the songs. Correct inflectional direction indicates singing pitch increased when the pitch of the notes ascended, and decreased when the pitch of the notes descended. The children with cochlear implants matched the direction at chance level (48% correct), while the children with typical hearing matched the inflectional direction almost flawlessly (96% correct) (Nakata et al., 2006). Similarly, Xu et al. found that sung pitch produced by children with cochlear implants was significantly worse than the sung pitch produced by children with typical hearing. Children with cochlear implants sang with a reduced pitch range, less than half of what was expected. And again, the children with cochlear implants had poor accuracy in pitch contour direction, synonymous with 'inflectional direction' described above. Xu et al. report the contour directions to be near chance (52.3% correct) for the children with cochlear implants, while the children with typical hearing showed very good contour direction accuracy (94.4% correct) (Xu et al., 2009).

Music and Pitch Training in Children who have Cochlear Implants

In addition to understanding the research on music and pitch production of children who are deaf and hard of hearing using cochlear implants, it is also important to examine music and pitch training of children who are deaf and hard of hearing using cochlear implants. In their 2010 article, "Music training improves pitch perception in prelingually deafened children with cochlear implants," Chen et al. investigated the effects of such training for children who were prelingually deafened with cochlear implants. Twenty-seven children with monaural cochlear implants, ranging from 5 to 14 years old, participated in the study. Test stimuli consisted of two successive piano notes from middle C (256 Hz) to B (495 Hz). Children identified the broad relationship of the two successive tones (higher, lower, or the same) (Chen et al., 2010). The results showed a positive correlation between the duration of musical training and correct identification of the broad pitch relation of the two notes for children who were prelingually deafened with cochlear implants. In particular, the perception of ascending pitch intervals improved significantly after musical training, although not to the level of pitch perception ability exhibited by students with typical hearing. Additionally, no correlation was found between pitch perception and the implant type or age of implantation (Chen et al., 2010).

Part 2: *Tune in™ to Reading* Overview and Review of its Effectiveness

Tune in™ to Reading is an interactive software program based on a design originally intended to improve users' singing on pitch. At the same time, participants unknowingly improved their reading prosody and fluency (Calderone, Bennett, Homan, Dedrick, & Chatfield, 2009). This awareness caused numerous research studies to be conducted on the effectiveness of using *Tune in™ to Reading* to improve reading fluency.

The interactive software *Tune in™ to Reading* had been updated over the years and has had numerous names. Calderone, Bennett, Homan, Dedrick, and Chatfield (2009) noted that the software was originally known as *Carry-A-Tune,* which was later updated into *SingingCoach* and then into *Tune in™ to Reading* as the program became more teacher- and student-friendly. *Tune in™ to Reading* allows for feedback and pitch recognition, with the program showing real-time tracking of pitch and tone for each user. The program is individualized to each participant's vocal range (Calderone et al., 2009). A microphone headset is used for singing, recording, and listening to the program (Biggs, Homan, Dedrick, Minick, & Rasinski, 2008). Over six hundred songs are included in *Tune in™ to Reading,* with reading levels of the songs varying from second grade to twelfth grade. The program incorporates repeated reading by having participants read lyrics multiple times while working on their singing (Calderone et al., 2009).

Tune in™ to Reading Software Components

The *Tune in™ to Reading* software is available for both Mac and Windows operating systems, but the latest version of *Tune in™ to Reading* can only be used on Windows. *Tune in™ to Reading* requires an active Internet connection and Java plug-in. Before a student begins using *Tune in™ to Reading,* the teacher must create a student account and assign a reading grade level. *Tune in™ to Reading* is designed to improve reading achievement and fluency levels from a first grade reading level up to an eighth grade reading level. This reading grade level can be manually adjusted by the teacher and/or automatically adjusted from the student's progress or lack of progress throughout using the software. The student must also set a custom vocal range. This can be altered as many times as needed throughout the use of *Tune in™ to Reading* (*Tune in™ to Reading,* 2013).

After an account is created, the student signs in and selects a song from the *TUNEin Library*. Each song is worth a certain number of points, with easier and shorter songs being worth fewer points than more challenging ones. Points are awarded by the student's performance on the quiz at the end of the song. Each reading grade level has a different list of songs available in the *TUNEin Library*. After selecting a song, the student listens to it three times. The speed of the song can be adjusted with the temporal slider control as can the sound mixture between the melody and band components. In order to move on to the singing portion, the student needs to click on each vocabulary word. These vocabulary words are displayed in a list at the top of the page and throughout the story. Upon clicking a vocabulary word, a new window pops up that displays an auditory-only definition supplemented with an unanimated or animated picture (*Tune in*^{TM} *to Reading*, 2013).

The student is finally ready to sing the song. As the song begins to play, a red cursor keeps track of the tempo of the song and helps the student keep his or her place while singing. The blue in-time pitch feedback allows the student to see if his or her pitch is below, matching, or above the target pitch of the song. This feedback gives the student an opportunity to improve his or her pitch. After completion of the song, the student may be awarded a bronze, silver, or gold star depending on his or her performance. The criterion for receiving each star was unclear and must be further investigated. The student must sing the song five times before taking a quiz. Each quiz assesses comprehension, direct vocabulary, and inferential vocabulary. A student must get 80 percent or better on the quiz to gain full or partial points from that song. After a student completes the quiz, he or she returns to the *TUNEin Library* (*Tune in*^{TM} *to Reading*, 2013).

Effectiveness of Tune in™ to Reading

Several research studies have examined the effectiveness of *Tune in™ to Reading* on reading fluency. Biggs, Homan, Dedrick, Minick, and Rasinski (2008) conducted a research study investigating the impact of song as a reading intervention, through using the singing software *Carry-A-Tune*, for middle school students struggling with reading. The study consisted of forty-eight students who attended a middle school in Florida during the 2004-2005 school year. Participants qualifying to partake in the study were in either seventh or eighth grade; received a below-proficiency score on their FCAT (a Level 1 or 2 score on the reading Florida Comprehensive Assessment Test); and were taking either a musical or chorus elective course. Of the forty-eight participants, half were in the treatment group. The students in the control group were matched with similar students in the treatment group. Prior to initiating the *Carry-A-Tune* intervention plan, Biggs et al. gave all participants the Qualitative Reading Inventory (QRI) to collect baseline data. During elective periods, participants in the treatment group used *Carry-A-Tune* three days a week in thirty-minute sessions during the nine-week study. Participants in the control group had a minimum of thirty minutes of mandatory reading time during their elective periods. QRI posttests were administered nine weeks later at the conclusion of the study. The QRI follow-up tests were given to participants four months later (Biggs et al., 2008).

Results from the QRI pretest found, on average, the instructional reading level of participants in both the control and treatment groups to be at a fourth-grade level. At the conclusion of the nine-week study, the QRI posttest showed a distinct difference between the reading levels of the groups. For the treatment group, the instructional reading level improved significantly, with participants making seven months progress during the nine-week period. This gain has strong practical significance. For the control group, there were no additional gains in

their instructional reading level. Four months later, the QRI follow-up tests provided similar results. The treatment group improved their reading level by six months, making their instructional reading level at a solid fifth-grade level. The control group did not have any significant gain in their reading level (Biggs et al., 2008).

A study conducted by Biggs, Homan, and Dedrick (2006) provided similar results. The researchers examined the effect of the software *SingingCoach* on a larger population of participants at three different levels of schooling: elementary school, middle school, and high school. 252 students from three different school districts participated in the study. Each of the six sites had a control and treatment group as well as a pretest and posttest design. All participants were labeled as struggling readers from the interpretation of their Florida Comprehensive Assessment Test scores (Biggs, Homan, & Dedrick, 2006). Prior to starting the software intervention with *SingingCoach*, Biggs et al. gave all participants the QRI pretest to collect baseline data. Participants in the treatment groups at the elementary and middle schools used *SingingCoach* three times a week during the nine-week study. Participants in the treatment groups at the high schools used *SingingCoach* twice a week in forty-five minute sessions during the nine-week study. QRI posttests were administered nine weeks later to all participants (Biggs et al., 2006).

Biggs et al. (2006) stated that reading level results appeared promising for participants at all school levels. For the elementary school level participants, the QRI posttests showed a distinctive difference between the control and treatment groups. For the control groups, the average weighted reading grade level for both elementary schools was 1.53, minimally decreasing but staying roughly the same (1.61 on the QRI pretest). For the treatment groups, the weighted reading level jumped to 2.81, improving roughly a grade level and a half (1.36 on the

QRI pretest). For the middle school level participants, the QRI posttests also showed a distinctive difference between the control and treatment groups at the middle school level. For the control groups, the average weighted reading grade level for both middle schools was 3.46, minimally decreasing but staying roughly the same (3.69 on the QRI pretest). For the treatment groups, the weighted reading level jumped to 4.51, improving almost a complete grade level (3.56 on the QRI pretest). And, for the high school level participants, the QRI posttests also showed a distinctive difference between the control and treatment groups at the high school level. For the control group, the reading grade level for both high schools was 6.65, a slight increase (6.39 on the QRI pretest). For the treatment group, the weighted reading grade level jumped to 7.11, improving over a year grade level (5.74 on the QRI pretest) (Biggs et al., 2006).

Briggs et al. (2006) also assessed reading fluency and examined whether fluency measures improved with the *SingingCoach* software intervention. Fluency was measured on the QRI through words per minute (wpm). For participants in the control groups, fluency measures for elementary, middle, and high school levels went from 70-68 wpm (-2 net wpm gain), 91-94 wpm (+3 net wpm gain), and 116-116 wpm (0 net wpm gain), respectively. For participants in the treatment groups, fluency measures for elementary, middle, and high school levels went from 65-79 wpm (+14 net wmp gain), 88-94 wpm (+6 net wmp gain), and 118-124 wpm (+6 net wpm gain), respectively. Therefore, fluency rates increased more for participants in the treatment groups using the *SingingCoach* software than for those in the control groups (Biggs et al., 2006).

Calderone, Homan, Chatfield, Bennett, and Dedrick (2009) investigated the use of *Tune in™ to Reading* as a reading intervention for adolescents considered struggling readers in the juvenile justice system. The study consisted of 103 male adolescents in the juvenile justice system from six different year-round residential sites. Close to half (44 percent) of these

participants were adolescents with disabilities (i.e.: learning disabilities). The grade levels of the participants spanned a large range: 18 percent were in third to seventh grade, 20 percent were in eighth grade, 40 percent were in ninth grade, and 20 percent were in tenth to twelfth grade. Each of the sites had a treatment and control group. Participants were first ranked by their reading proficiency abilities, according to subjective rankings from teachers at each site. From this ranking, each pair of participants was appointed to either the treatment group or the control group by the flip of a coin (Calderone et al., 2009).

Calderone et al. (2009) used two different reading intervention programs in this research study, one with the treatment group (*Tune in™ to Reading)* and the other with the control group (*FCAT Explorer)*. The *FCAT Explorer* software was created to help students enhance their scores on the Florida Comprehensive Assessment Test (FCAT). The program is web based and offers support and practice for preparing for the FCAT. Participants in the study utilized the reading programs of the *FCAT Explorer* (Calderone et al., 2009).

Instead of using the QRI, Calderone et al. assessed the progress of participants with the *Tune in™ to Reading* Cloze assessment, an informal reading assessment created by the *Tune in™ to Reading* software. The .70 correlation of its scores with those from the QRI supports the validity of the assessment. The assessment was given to all participants at the beginning and the conclusion of the nine-week study. Participants in both the control and treatment groups used the respective software program twice a week in forty-five minute sessions in their reading classes during the nine-week study. At the three sites where the *FCAT Explorer* software was unavailable, the participants received their normal reading instruction for the length of the study (Calderone et al., 2009).

Results from this study by Calderone et al. (2009) were positive, yet mixed. For the control groups, the mean posttest score from the *Tune in™ to Reading* Cloze assessment was 5.90, improving roughly a grade level (from 4.97 on the pretest). For the treatment groups, the mean posttest score was 7.27, improving a grade level and a half (from 5.75 on the pretest). Patterns of results varied across test sites. At two sites, participants in the treatment groups (*Tune in™ to Reading* software) showed more reading improvement than those in the control groups (*FCAT Explorer*). At the other four sites, both groups showed similar improvements indicating that both software programs had similar effects. For participants with disabilities, reading scores improved more for those in the treatment groups had larger treatment effects than it did for those in the control groups (Calderone et al., 2009).

Part 3: Analysis of *Tune in™ to Reading* Software & its Potential for CI Children

Thanks to a free one-month trial period of using *Tune in™ to Reading*, it was possible to begin analyzing the components of the software and its potential for a different population of struggling readers, namely children with cochlear implants. The analysis of the software focused on its linguistic and musical components as well as its general ease of use. Overall, *Tune in™ to Reading* is very user friendly and seems feasible for use with children who are deaf and hard of hearing.

An analysis of its linguistic components was conducted through examining the language levels of the lyrics, of the vocabulary definitions, and of the quiz questions. These were analyzed separately according to the Teacher Assessment of Spoken Language (TASL) rating form. Created by Jean Moog and Julia Biedenstein, the TASL is a tool used to assess the spontaneous spoken language and syntactical structures of children with hearing loss. With the TASL, a

child's language is categorized into one of five levels, from the simplest (Level 1) to the most complex (Level 5). TASL Level 1 consists of single words and two-word combinations. TASL Level 2 consists of simple sentences of three or more words. TASL Level 3 includes simple and complex sentences of six or more words, requiring only one verb form. TASL Level 4 consists of complex sentences of eight or more words that have two verb forms. Finally, TASL Level 5 consists of very complex sentences of ten or more words that have three verb forms (Moog & Biedenstein, 2006). The TASL language levels were determined for the sentences associated with lyrics, vocabulary definitions, and quizzes of the first ten songs at the first-grade reading level in *Tune in™ to Reading*.

Table 1 summarizes the results of these language analyses. Also indicated in Table 1 is the range of lower TASL language levels for children with hearing loss (TASL Level ≤ 3). Of the 104 sentences analyzed in the lyrics, approximately 70% were in this lower-language level range (TASL Level ≤ 3). Therefore, almost three quarters (~70 percent) of the lyrics at the first grade reading level are at an appropriate language level for children with hearing loss who are at a lower language level. Of the 62 sentences analyzed in the vocabulary definitions, approximately 56% were in this lower-language level range (TASL Level ≤ 3). Hence, slightly more than half (~56 percent) of the vocabulary definitions were at an appropriate language level for children with hearing loss who are at a lower language level. Of the 60 sentences analyzed in the quizzes, approximately 47% were in this lower-language level range (TASL Level ≤ 3). This large percentage (53%) of quiz sentences at high language levels could pose a potential problem for children with hearing loss when using *Tune in™ to Reading*. The only way for users to acquire points is from scoring well on the quizzes. Further investigation is needed to determine whether a low language level would limit a user's performance on the quizzes.

An analysis of the musical components of *Tune in™ to Reading* was less objective or quantitative. This analysis included subjective observations and impressions on whether accurate pitch production is required for program success, ease of use of various options (customized pitch range, temporal slider, instrument/melody mixer), the in-time feedback functionality, and the use of phrasing in the songs. Although research has shown that accurate musical pitch production is poor in children using cochlear implants, producing inaccurate pitch did not appear to negatively affect the score or progress a student would make using *Tune in™ to Reading*, as found through personal investigation of the software. To see how the software would react to monotone singing, my secondary reader and I sang in monotone, keeping the blue in-time pitch feedback line at a consistent height. The program still rewarded us with a star, indicating that singing in monotone did not appear to negatively affect our progress, yet this is inconclusive. The effects of singing in monotone as well as singing with a smaller than expected pitch range on the user's progress in *Tune in™ to Reading* must be further investigated.

Many of the program's options were examined and found easy to use. For example, the custom pitch range is simple to set up and alter, if needed. The temporal slider control, which adjusts the speed of the song without distorting the music or singing, was also simple to understand and use. This option of slowing down a song's tempo gives additional processing time for the user and could be especially beneficial to children who are deaf and hard of hearing using cochlear implants. The mixing control allows the user to adjust the balance between the levels of the melody and musical accompaniment, and is capable of presenting the melody very clearly without instrumental interference or distraction. This, too, might be helpful for children using cochlear implants. The in-time pitch feedback feature provides visual feedback intended to help the user keep the proper rhythm of the song and correct his/her pitch.

One potential area of concern is the phrasing of some of the songs. The *Tune in™ to Reading* songs occasionally disregard pauses even though the musical phrasing and punctuation of the song indicated a pause should be present. This unexpected phrasing makes some sentences difficult to comprehend through audition alone. It also could inadvertently confuse a student about the proper use and interpretation of punctuation, especially students who struggle with reading. This might confuse struggling readers. In addition, some words are sometimes articulated with incorrect stress, to fit a melody better. For example, the word "terror" is produced as "ter-ROR," with stress on the incorrect syllable. Further investigation should be done to determine the prevalence and rationale for these phrasing and stress inaccuracies.

Technology Connectivity Considerations

An additional important consideration in the potential use of *Tune in™ to Reading* by children who are deaf and hard of hearing using cochlear implants is exactly how such children would have access to the acoustic signals generated by this software and how their voices would be registered by this software. To gain more information about cochlear implants and technology connectivity, audiologist Amy Birath, AuD, CCC-A/SLP, FAAA, LSLS Cert. AVEd was interviewed in April of 2013. Birath explained that cochlear implants manufactured by Cochlear Corporation, Advanced Bionics, and MED-EL are able to connect to a technology devices such as computers, televisions, or music players. (Birath, 2013).

Birath described three connectivity options for children who use cochlear implants to access the auditory components of a computer program that would typically be delivered via headphones. The first option is a direct connection, which always provides the clearest signal to the user of cochlear implants. Each cochlear implant manufacturing company has audio cables

specific to their devices, which are usually provided in the kit that the implant user receives initially with his/her device. (Birath noted that this is at least true with Cochlear, if not other manufacturers.) One end of the audio cable would be connected to the headphone jack of a computer, and the other end connected directly into the cochlear implant. There are even audio cables that can connect bilateral cochlear implants to the computer headphone output, with only one cord (Birath, 2013). Unfortunately, such audio cables are designed to deliver output sound to the user's cochlear implant and are not designed to accommodate a microphone for speech input. To provide auditory input, the child with cochlear implants could use a microphone plugged into the microphone jack or USB port. Another viable option is for the child to use the microphone on the computer. Performance would depend on factors including the room acoustics, strength of the microphone, and microphone sensitivity (which can be adjusted with *Tune in™ to Reading*) (Birath, 2013).

A second option is to deliver sounds to the cochlear implants via Bluetooth and an FM system. Phonak creates a personal FM system called SmartLink+ that allows for Bluetooth connectivity. The programming of the cochlear implants would need to be altered (via remote for Cochlear-manufactured cochlear implants) to attenuate input via the cochlear implant's microphone (i.e.: the environment) and maximize input delivered via Bluetooth. To provide auditory input for *Tune in™ to Reading,* the child with cochlear implants could use either the computer's microphone or a microphone plugged into the microphone jack or USB port when using Bluetooth connectivity for the auditory output (Birath, 2013).

A third option is to use over-the-ear headphones. This is a potential option only if the microphones of the cochlear implants (the parts that receive the sound) are on the processor (that rests behind the ear), or if the device has a T-Mic (an Advanced Bionics feature). This would

allow the over-the-ear headphones to be put over the cochlear implant microphone(s). Birath was not certain if the quality of the auditory signal for a child with cochlear implants using over-the-ear headphones would be affected (Birath, 2013). This connectivity option warrants further investigation.

With all connectivity options, it is important that the source of auditory output is separate from the microphone. If the auditory output is too close to the microphone, the microphone will pick up the auditory output. The in-time pitch feedback blue tracking line will portray this, and the student can be awarded a performance star even if he or she is not even singing.

Implications for Future Research

This independent study raises many implications for further investigation and future research. Further investigation is needed to determine whether a low language level would limit a user's performance on the quizzes in *Tune in™ to Reading*. Further investigation should be done to determine the prevalence and rationale for phrasing and stress inaccuracies found in the *Tune in™ to Reading* software. Further investigation is also needed on the effects of monotonic singing and smaller pitch ranges on the scoring of *Tune in™ to Reading*. An implication for future research is to examine the most effective way to connect a student's cochlear implants to the computer to utilize *Tune in™ to Reading.* The next viable step is creating a pilot study with the *Tune in™ to Reading* software and children who are deaf and hard of hearing using cochlear implants.

Conclusion

Armed with a comprehensive understanding of reading fluency and with current research results on singing by children who are deaf and hard of hearing using cochlear implants, I was able to examine *Tune in™ to Reading* in an innovative way. And my examination explored the extension of this software program to an audience that had probably not been considered previously. A priori, the major concerns about the possible extension of this software to children who are deaf and hard of hearing using cochlear implants concerned language levels of the song and quiz materials, sensitivity of the software scoring rules to monotonic singing, ease of use of various options, and ability to transmit/connect sound stimuli to/from the children with cochlear implants. Overall, my analysis indicates that it is feasible to test whether *Tune in™ to Reading* would improve the reading fluency of children who are deaf and hard of hearing using cochlear implants. The language level of most of the material seems appropriate for such children, user options are easy to understand, software scoring may not be affected by monotonic singing although inconclusive, and there are options for technological connectivity (although it is unclear which is best).

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Table 1

	TASL language analysis of sentences associated with:					
	Lyrics		Vocabulary Definitions		Quizzes	
TASL Level	No.	%	No.	%	No.	%
1	0	-	2	3	0	-
2	19	18	10	16	4	7
3	54	52	23	37	24	40
4	16	15	5	24	26	43
5	5	5	1	2	6	10
Incomplete	10	10	11	18	0	-
Total	104	100	62	100	60	100

Appendix A: TASL Language analysis of the lyrics of the first ten songs at the 1st-grade reading level in *Tune in™ to Reading*

Key for Analysis: *[number of words | sentence type | TASL Level]*
Inc. means incomplete sentence

"Oh Where Has My Little Dog Gone"- 2 pts.

- Oh where, oh where has my little dog gone? *9 | I | T3*
- Oh where, oh where can he be? *7 | I | T2*
- With his ears cut short and his tail cut long. *10 | Inc.*
- Oh where, oh where can he be? *7 | I | T2*

"My Cat"- 3 pts.

- *(to "Rock a Bye Baby" melody)*
- We have one cat and he likes to play. *9 | 2Cl.+C. | T4*
- He loves the yard where he plays all day. *9 | 2Cl.+C. | T4*
- When he gets sleep, he runs back from the backyard to take a long nap. *15 | 2Cl.+2V | T5*
- I go to pet him, he is asleep until dinner when he has to eat. *14 | 3Cl.+2C. | T5*
- Then it's my bedtime, I am just beat. *8 | 2Cl.+C. | T4*
- I'll see him the next day and give him treats. *10 | 2Cl.+C. | T4*

"A Good Day"- 4 pts.

- *(to "London Bridges" melody*)
- I jump rope all the way home, the way home, the way home. *13 | S-V-O | T3*
- Mom walks with me to our home, she walks so fast. *11 | 2Cl.+C | T4*
- We eat lunch as it rains, as it rains, as it rains. *12 | 2Cl.+C. | T4*
- Dad comes home while it rains. *6 | 2Cl.+C. | T3*
- Now we can play. *4 | S-V | T2*
- Dad took me to hike the hill, hike the hill, hike the hill. *13 | 1Cl.+2V | T4*
- Then we rolled down the big hill. *7 | S-V-PP | T3*
- It was so fun. *4 | S-V | T2*
- Mom said, "Be home before dark, before dark, before dark." *10 | DD | T4*
- We got home before dark. *5 | S-V | T2*
- What a good day! *4 | Inc.*

"My Brother and Sister"- 4 pts.

- *(to "On Top of Spaghetti" melody*)
- My mother and father had a baby boy. *8 | S-V-O | T3*
- He made us all happy, filled our house with joy. *10 | 2Cl.+C. | T4*

- The boy is my brother and much like myself, he likes when I read books from up on the shelf. *20 | 3Cl.+2C. | T5*
- Another year later, came our baby girl, who is sweet and so pretty with little brown curls. *17 | 2Cl.+ C. | T4*
- They're three and four years now, and growing like weeds. *10 | 1Cl.+2V. | T4*
- My brother and sister, together we read. *7 | S-V | T3*

"My Red Box"- 4 pts.

- *(to "Twinkle, Twinkle Little Star" melody)*
- My dad gives me my red box. *7 | S-V-O | T3*
- Then I tell him, "I am off!" *7 | ID | T3*
- I go up to my bus stop. *7 | S-V-PP | T3*
- There it's oh, so very hot. *6 | S-V | T3*
- My dad gave me one red box. *7 | S-V-O | T3*
- I went to my hot bus stop. *7 | S-V-PP | T3*
- My dad gives me my red box. *7 | S-V-O | T3*
- Then I tell him, "I am off!" *7 | ID | T3*
- I go up to my bus stop. *7 | S-V-PP | T3*
- There it's oh, so very hot. *6 | S-V | T3*
- My dad gave me one red box. *7 | S-V-O | T3*
- I went to my hot bus stop. *7 | S-V-PP | T3*

"The Park Just Up the Hill"- 4 pts.

- *(to "Blow the Man Down" melody)*
- Walk up the small road with your ball and your bat. *11 | S-V-PP | T3*
- The park is just up the hill. *7 | S-V-PP | T3*
- My mom has made lunch, food as good as all that. *11 | S-V-O | T3*
- Just take your time and walk up the hill. *9 | 2Cl.+C. | T4*
- Then we will play ball some before it gets dark. *10 | 2Cl.+C. | T4*
- In our new park just up the hill. *8 | Inc.*
- My father will take you all home in his car. *10 | S-V-O-PP | T4*
- Back to your homes just down the hill. *8 | Inc.*
- Back to your homes just down the hill. *8 | Inc.*

"This Old Man"- 4 pts.

- This old man, he played one. *6 | S-V-O | T3*
- He played knickknack on my drum. *6 | S-V-O-PP | T3*
- With a knickknack paddywhack give a dog a bone. *9 | S-V-O-PP | T3*
- This old man came rolling home. *6 | S-V-O | T3*
- This old man, he played two. *6 | S-V-O | T3*
- He played knickknack on my shoe. *6 | S-V-O-PP | T3*

- With a knickknack paddywhack give a dog a bone. *9* | *S-V-O-PP* | *T3*
- This old man came rolling home. *6* | *S-V-O* | *T3*
- This old man, he played three. *6* | *S-V-O* | *T3*
- He played knickknack on my knee. *6* | *S-V-O-PP* | *T3*
- With a knickknack paddywhack give a dog a bone. *9* | *S-V-O-PP* | *T3*
- This old man came rolling home. *6* | *S-V-O* | *T3*

"Wake Up Call"- 4 pts.

- *(to "The First Noel" melody)*
- My loud pet bird wakes me up each morning. *9* | *S-V* | *T3*
- At seven o'clock there is your warning. *7* | *S-V-O-PP* | *T3*
- The first time she sang her rare wake up call, her first round of chirping just awed us all. *19* | *2Cl.+2V* | *T5*
- My loud pet bird has such pretty wings. *8* | *S-V-O* | *T3*
- White and blue colored with polkadot things. *7* | *Inc.*
- She flies high in the sky, but she always returns home to her nest and her tiny babies. *18* | *2Cl.+C.* | *T4*
- The babies wait for her to return home with a meal for all nine and a song of her roam. *20* | *1Cl.+2V* | *T4*

"My New Pal"- 4 pts.

- *(to "Frere Jacques" melody)*
- What is your name? *4* | *I* | *T2*
- What is your name? *4* | *I* | *T2*
- I am Sam. *3* | *S-V* | *T2*
- I am Sam. *3* | *S-V* | *T2*
- Very nice to meet you. *5* | *Inc.*
- Very nice to meet you. *5* | *Inc.*
- I like ham. *3* | *S-V-O* | *T2*
- I like ham. *3* | *S-V-O* | *T2*
- What is your name? *4* | *I* | *T2*
- What is your name? *4* | *I* | *T2*
- I am Sal. *3* | *S-V* | *T2*
- I am Sal. *3* | *S-V* | *T2*
- Nice to meet you, also. *5* | *Inc.*
- Nice to meet you, also. *5* | *Inc.*
- Will you be my new pal? *6* | *I* | *T3*
- I'll be your pal. *4* | *S-V-O* | *T2*
- I'll be your pal. *4* | *S-V-O* | *T2*
- Want to play? *3* | *I* | *T2*
- Want to play? *3* | *I* | *T2*
- I will call some more kids. *6* | *S-V-O* | *T3*

- I will call some more kids. *6* | *S-V-O* | *T3*
- Let's play ball, one and all. *6* | *S-V-O* | *T3*
- Let's play ball, one and all. *6* | *S-V-O* | *T3*

"Safe on the Tree Top"- 5 pts.

- *(to "For He's a Jolly Good Fellow" melody)*
- The red hen sat on the treetop. *7* | *S-V-PP* | *T3*
- The red hen sat on the treetop. *7* | *S-V-PP* | *T3*
- The red hen sat on the treetop, to see what she could see. *13* | *2Cl.+2V* | *T5*
- She saw a dog and a fox. *7* | *S-V-O* | *T3*
- She saw a dog and a fox. *7* | *S-V-O* | *T3*
- She saw a dog and a fox run under her big elm tree. *13* | *1Cl.+2V* | *T4*
- The hen said, "What do you want?" *7* | *DD/I* | *T3*
- The hen said, "What do you want?" *7* | *DD/I* | *T3*
- The hen said, "What do you want?" *7* | *DD/I* | *T3*
- What do you want from me?" *6* | *I* | *T3*
- "We just want to have fun. *6* | *1Cl.+2V* | *T3*
- We just want to have fun." *6* | *1Cl.+2V* | *T3*
- Dog says, "We want to have fun." *7* | *DD* | *T3*
- Hen stays up in her tree. *6* | *S-V-PP* | *T3*

Appendix B: TASL Language analysis of the sentences in the vocabulary definitions associated with the first ten songs at the 1st-grade reading level in *Tune in™ to Reading*

Key for Analysis: *[number of words | sentence type | TASL Level]*
Inc. means incomplete sentence

"Oh Where Has My Little Dog Gone"- 2 pts.

- A dog is an animal that can be kept as a pet or trained to work for people. *18 | 2Cl.+2V | T5*
- A tail. *2 | Inc.*
- Ears are the parts of your body that you hear with. *11 | 2Cl.+C. | T4*
- Short means a small distance. *5 | S-V-O | T2* Short is anything that is not long. 7 | 1Cl.+2V | T3
- Long means a great distance. *5 | S-V-O | T2* Long is anything that is not short. 7 | 1Cl.+2V | T3

"My Cat"- 3 pts.

- A cat is a small house pet. *7 | S-V-O | T3*
- Yard is an area next to the house that is usually covered with grass. *14 | 1Cl.+2V | T4*
- A nap is a short period of sleep especially during the day. *12 | S-V-O-PP | T3*
- To pet means to touch with your hand in a loving or friendly way. *14 | 1Cl.+2V | T4*
- Bedtime is the usual time when someone goes to bed. *10 | 2Cl.+C. | T4*

"A Good Day"- 4 pts.

- Before means at an earlier time. *6 | S-V-PP | T3*
- Hike means to walk a long distance especially for fun or exercise. *12 | 1Cl.+2V | T4*
- I jump. *2 | S-V | T1*
- It rains. *2 | S-V | T1*
- She walks slowly. *3 | S-V | T2*

"My Brother and Sister"- 4 pts.

- Father means a man parent. *5 | S-V-O | T2* Father is dad. *3 | S-V-O | T2*
- Four. *1 | Inc.*
- A building in which a person or some people live. *10 | Inc.*
- Mother is a woman parent. *5 | S-V-O | T2* Mother is mom. *3 | S-V-O | T2*
- Three. *1 | Inc.*
- A year equals twelve months. *5 | S-V | T2* A calendar year is from January 1st to December 31st. *10 | S-V-PP | T3*

“My Red Box”- 4 pts.

- A usually square container. *4* | *Inc.*
- Gives means allows someone to have something as a present. *10* | *1Cl.+2V* | *T4*
- Go means to travel to a place. *7* | *1Cl.+2V* | *T3*
- Tell means to say something to someone. *7* | *1Cl.+2V* | *T3*
- Went means to have already traveled to a place. *9* | *1Cl.+2V* | *T4*

“The Park Just Up the Hill”- 4 pts.

- This is a hill. *4* | *S-V* | *T2* A hill is not as high as a mountain. *9* | *S-V-PP* | *T3*
- Walk. *1* | *Inc.*
- A road is a hard flat surface for cars, people, and animals to travel on. *15* | *1Cl.+2V* | *T4*
- Ball. *1* | *Inc.*
- Lunch is food eaten in the middle of the day. *10* | *1Cl.+2V* | *T4*
- Dark means having very little or no light. *8* | *1Cl.+2V* | *T4*

“This Old Man”- 4 pts.

- Bone is one of the hard pieces that form the skeleton inside a person or animal. *16* | *1Cl.+2V* | *T4*
- A drum is a musical instrument. *6* | *S-V* | *T3*
- A home is a place where a person or a family lives. *12* | *1Cl.+2V* | *T4*
- The knee is the joint between the upper leg and the lower leg. *13* | *S-V-PP* | *T3*
- A man is an adult male. *6* | *S-V* | *T3*
- Shoe. *1* | *Inc.*

“Wake Up Call”- 4 pts.

- A bird is an animal with wings, two legs, and a beak. *12* | *S-V-PP* | *T3*
- Chirping is a short high sound. *6* | *1Cl.+2V* | *T3*
- Nine. *1* | *Inc.*
- Seven. *1* | *Inc.*
- In this song, time means moment. *6* | *S-V-PP* | *T3* At this time means at this moment. *7* | *S-V-PP* | *T3*
- White is the color of milk or fresh snow. *9* | *S-V-PP* | *T3*

“My New Pal”- 4 pts.

- Call means to tell or ask someone to come. *9* | *1Cl.+2V* | *T4*
- Ham is a type of meat. *6* | *S-V-PP* | *T3*
- Like means to enjoy. *4* | *1Cl.+2V* | *T2*
- Name is what you call yourself or someone else. *9* | *1Cl.+2V* | *T4*
- Play means to do things for fun. *7* | *1Cl.+2V* | *T3*
- Want means to desire or to wish for. *8* | *1Cl.+2V* | *T4*

“Safe on the Tree Top”- 5 pts.

- A hen is a female chicken. *6 | S-V-O | T3*
- Run means to move faster than walking. *7 | 1Cl.+2V | T3*
- Saw means what you have already seen. *7 | 1Cl.+2V | T3*
- Top is the highest part of something. *7 | S-V-O-PP | T3*
- You. *1 | Inc.*

Appendix C: TASL Language analysis of the quiz questions associated with the first ten songs at the 1st-grade reading level in *Tune in™ to Reading*

Key for Analysis: *[number of words | sentence type | TASL Level]*
Inc. means incomplete sentence

"Oh Where Has My Little Dog Gone"- 2 pts.

- 1. My uncle's ___ barks all night long. *7 | S-V | T3*
  - A. dog
  - B. cat
  - C. fish
  - D. bird
- 2. Who is lost? *3 | I | T2*
  - A. a boy
  - B. a girl
  - C. a little dog
  - D. a cat
- 3. The parts of your body that you hear with are called ___. *12 | 1Cl.+2V | T4*
  - A. nose
  - B. ears
  - C. mouth
  - D. hand
- 4. Sally's hair was very ___ before she got a haircut. *10 | 2Cl.+C. | T4*
  - A. lost
  - B. cold
  - C. hot
  - D. long
- 5. What did the little dog have that was cut short? *10 | I | T4*
  - A. his ears
  - B. his nails
  - C. his nose
  - D. his legs
- 6. Something ___ is something that is not long. *8 | 1Cl.+2V | T4*
  - A. wet
  - B. short
  - C. mad
  - D. tired

"My Cat"- 3 pts.

- 1. The time when someone goes to sleep at night is called ___. *12-13 | 1Cl.+2V | T4*
  - A. dinner time
  - B. bedtime
  - C. lunch time

    - D. snack time
- 2. The pet bird is scared of the ___ that also lives in the house. *14 | 1Cl.+2V | T4*
    - A. cat
    - B. cow
    - C. tiger
    - D. whale
- 3. When does the cat wake up? *6 | I | T3*
    - A. when it is dark
    - B. when he has to eat
    - C. when the dog barks
    - D. when it is time to go
- 4. A __ is an area near the house that has grass. *11 | 1Cl.+2V | T4*
    - A. pool
    - B. garage
    - C. beach
    - D. yard
- 5. My baby sister has to take a ___ in the afternoon when she gets sleepy. *15 | 2Cl.+2V | T5*
    - A. meal
    - B. roll
    - C. nap
    - D. pet
- 6. The next day the cat will get ___. *8 | S-V | T3*
    - A. treats
    - B. naps
    - C. toys
    - D. scared

"A Good Day"- 4 pts.

- 1. The frogs ___ into the pond. *6 | S-V-PP | T3*
    - A. jump
    - B. eat
    - C. sleep
    - D. drive
- 2. Who comes home while it rains? *6 | I | T3*
    - A. Grandpa
    - B. Dad
    - C. Brother
    - D. Sister
- 3. I use an umbrella to stay dry when it ___. *10-11 | 2Cl.+2V | T5*
    - A. snows
    - B. is cold
    - C. is hot
    - D. rains
- 4. To ___ means to walk a long way for fun or exercise. *12 | 1Cl.+ 2V | T4*

    - A. roll
    - B. swim
    - C. hike
    - D. sit
- 5. What did they do at the hill? *7 | I | T3*
    - A. They flew a kite.
    - B. They ate cookies.
    - C. They went fishing.
    - D. They rolled down the hill.
- 6. Something that happened earlier means it happened ___. *8 | 1Cl.+2V | T4*
    - A. before
    - B. under
    - C. over
    - D. later

"My Brother and Sister"- 4 pts.

- 1. A ___ has 12 months. *5 | S-V | T2*
    - A. day
    - B. week
    - C. year
    - D. fall
- 2. One plus two equals ___. *5 | S-V | T2*
    - A. three
    - B. seven
    - C. ten
    - D. six
- 3. The ___ had little brown curls. *6-7 | S-V | T3*
    - A. mom
    - B. baby girl
    - C. dad
    - D. brother
- 4. A ___ is a building where a family lives. *9-10 | 2Cl.+C. | T4*
    - A. store
    - B. library
    - C. gas station
    - D. house
- 5. I call my ___ "Mom" but sometimes I call her "Mommy." *11 | DD or 2Cl.+C. | T4*
    - A. brother
    - B. dog
    - C. mother
    - D. teacher
- 6. What do the kids like to do together? *8 | I | T4*
    - A. read
    - B. watch TV
    - C. eat popcorn

- D. swim

“My Red Box”- 4 pts.

- 1. Mom ___ me my lunchbox every morning before I get on the bus. *13 | 2Cl.+C. | T4*
  - A. gives
  - B. holds
  - C. waits.
  - D. sees
- 2. What color is the box? *5 | I | T2*
  - A. blue
  - B. green
  - C. red
  - D. white
- 3. To travel to a place means you ___ to that place. *11 | 1Cl.+2V | T4*
  - A. left
  - B. eat
  - C. go.
  - D. sleep
- 4. Today I ___ to the doctor before going to school. *10 | 2Cl.+C. | T4*
  - A. will
  - B. went
  - C. wake
  - D. want
- 5. Where did this boy go with his red box? *9 | I | T3*
  - A. the park
  - B. the library
  - C. the bus stop
  - D. the store
- 6. Tell means to ___ something to someone. *7 | 1Cl.+2V | T3*
  - A. say
  - B. take
  - C. sell
  - D. lend

“The Park Just Up the Hill”- 4 pts.

- 1. Dark means having little or no ___. *7 | 1Cl.+2V | T3*
  - A. food
  - B. light
  - C. smell
  - D. taste
- 2. The baby boy has to learn how to ___ before he learns to run. *14 | 2Cl.+2V |T5*
  - A. swim
  - B. fly
  - C. drive
  - D. walk
- 3. What are the kids going to play at the park? *10 | I | T3*

    - A. jump rope
    - B. hide and seek
    - C. ball
    - D. tag
- 4. Lunch is the ___ you eat in the middle of the day. *12 | 1Cl.+2V | T4*
    - A. food
    - B. field
    - C. foam
    - D. feet
- 5. Dad drove his car slowly down the bumpy ___. *9 | S-V-O-PP | T3*
    - A. house
    - B. road
    - C. pool
    - D. train
- 6. How will the kids get back home? *7 | I | T3*
    - A. They will walk back.
    - B. They will ride a bike.
    - C. Dad will take them in his car.
    - D. They are not going home.

"This Old Man"- 4 pts.

- 1. A home is a place where people ___. *8 | 1Cl.+2V | T4*
    - A. fly
    - B. live
    - C. bark
    - D. lose
- 2. The little ___ will grow up to be a man. *10 | 1Cl.+2V | T4*
    - A. fish
    - B. bird
    - C. girl
    - D. boy
- 3. Who does the old man give a bone to? *9 | I | T4*
    - A. a boy
    - B. a girl
    - C. a dog
    - D. a deer
- 4. The ___ is between the top of your leg and the bottom of your leg. *15 | S-V-PP | T3*
    - A. knee
    - B. nose
    - C. toe
    - D. head
- 5. A shoe came off Tom's ___ when he was running at the park. 13 | 2Cl.+C. | T4
    - A. hand
    - B. head
    - C. foot

    - D. back
- 6. In the song, the old man comes rolling ___. *9* | *S-V-O-PP* | *T3*
    - A. back
    - B. home
    - C. slow
    - D. fast

"Wake Up Call"- 4 pts.

- 1. A bird is an animal that has ___, two legs and a beak. *13-14* | *1Cl.+2V* | *T4*
    - A. horns
    - B. wings
    - C. big teeth
    - D. big ears
- 2. The baby birds are singing and ___ because they are happy. *11* | *2Cl.+2V* | *T5*
    - A. barking
    - B. mooing
    - C. chirping
    - D. meowing
- 3. What does the pet bird do every morning? *8* | *I* | *T4*
    - A. She takes a bath.
    - B. She sings a wake up all.
    - C. She hides.
    - D. She lays eggs.
- 4. White is the color of ___ or fresh snow. *9* | *S-V-PP* | *T3*
    - A. milk
    - B. bananas
    - C. chocolate
    - D. dirt
- 5. Timmy wakes up at ___ o'clock to go to school. *10* | *1Cl.+2V* | *T4*
    - A. forty
    - B. twice
    - C. seven
    - D. blue
- 6. The bird files back to her next because she ___. *11-15* | *2Cl.+C.* | *T4*
    - A. is tired
    - B. is scared
    - C. has to feed her baby birds
    - D. is lost

"My New Pal"- 4 pts.

- 1. To ___ means tell or ask someone to come. *9-10* | *1Cl.+2V* | *T4*
    - A. hang up
    - B. call
    - C. fall

    - D. run
- 2. On my birthday, I make a wish for the new toys I ___. *13-15 | 1Cl.+2V | T4*
    - A. want
    - B. break
    - C. do not like
    - D. lose
- 3. What are the names of the kids? *7 | I | T3*
    - A. Sam and Sal
    - B. Tim and Tom
    - C. John and Jim
    - D. Val and Cal
- 4. Ham is a kind of ___. *6 | S-V-PP | T3*
    - A. rice
    - B. fish
    - C. chicken
    - D. meat
- 5. Many boys have the ___ Bobby. *6 | S-V | T3*
    - A. number
    - B. letter
    - C. name
    - D. phone
- 6. What do the kids want to play? *7 | I | T3*
    - A. nothing
    - B. ball
    - C. cards
    - D. jump rope

"Safe on the Tree Top"- 5 pts.

- 1. A hen is a female ___. *6 | S-V | T3*
    - A. dog
    - B. chicken
    - C. pig
    - D. deer
- 2. The cat ran to the ___ of the tree when the dog started to bark. *15 | 2Cl.+2V | T5*
    - A. under
    - B. over
    - C. up
    - D. top
- 3. Where did the red hen sit? *6 | I | T3*
    - A. on the tree top
    - B. on the bus
    - C. in the pen
    - D. on the dog
- 4. When you ___, you move faster than when you walk. *10 | 3Cl.+2C. | T5*
    - A. lay

  - B. crawl
  - C. run
  - D. write
- 5. Yesterday I ___ a red fire truck at the park. *10* | *S-V-O-PP* | *T3*
  - A. sit
  - B. saw
  - C. step
  - D. so
- 6. What did the red hen see? *6* | *I* | *T3*
  - A. a dog and a fox
  - B. baby chicks
  - C. a cat and a bird
  - D. a rat and a turtle