The Effects of a Lesson on Preservice Teachers' Knowledge of Inferencing and Ability to

Prepare Instructional Material

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The ability to make inferences is an important aspect of reading comprehension. In this sample, 18.9% of participants failed to ask any inference questions when creating instructional material. The sample also demonstrated low explicit knowledge of inferencing with a score less than 50%. The purpose of this study was to observe the effects of a lesson of literal and inferential comprehension on preservice teachers' explicit knowledge of inferences and ability to create comprehension questions. A quasi-experimental design was implemented, with preservice teachers ($n = 35$) in the experimental group and Education undergrads in the comparison group ($n = 18$). Results showed that the lesson was not sufficient to deepen preservice teachers' explicit knowledge of inferencing. However, the lesson may have influenced their ability to create instructional material as there was an increase in the total number, the variety and the number of inference questions generated following the lesson. These results are interpreted within the limitations of a quasi-experimental design.

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Introduction

The majority of academic content in upper elementary school is delivered through reading activities. Thus, learning to read represents a fundamental milestone in early education. Given its importance, much research attention has been devoted to investigating literacy instruction (e.g., Moats, 1994; 2009a; 2009b). High quality instruction consists of five essential elements, namely: phonemic awareness, phonics, fluency, vocabulary, and text comprehension (National Reading Panel, NRP, 2000). Therefore, to provide high quality instruction, teachers must be knowledgeable in all of these areas. While research has focused on building teachers' knowledge and improving instructional practice on phonemic and phonics skills in younger children (Moats, 1994), it remains unclear the knowledge base that is required by teachers to promote reading comprehension in older children. This is a pressing issue to investigate, as it is estimated that 65% of American children in fourth grade are reading at, or below 'basic levels' (National Center for Education Statistics, 2013). This finding points to a need to shift research attention towards teachers' understanding of higher-order reading processes. This study investigates preservice teachers' knowledge of inferencing, an important component of reading comprehension, and explores their ability to create instructional material that fosters comprehension. Specifically, I examine whether a lesson on literal and inferential comprehension influenced preservice teachers' knowledge of inferences and ability to create instructional material.

The Importance of Teacher Knowledge

Teacher knowledge is an important factor when it comes to delivering quality literacy instruction. In fact, teacher knowledge is a stronger predictor of classroom instruction than teacher beliefs or philosophies (Bos, Mather, Dickson, Podhajski, & Chard, 2001; Mather, Bos,

& Babur, 2001; McCutchen, Harry et al., 2002). Educators who are knowledgeable about the structure of the English language are also more confident in their abilities to meet the needs of struggling readers (Bos et al., 2001). In line with this finding, evidence indicates that teacher knowledge is positively associated with students' reading abilities (McCutchen, Abbott, et al., 2002; McCutchen, Harry, et al., 2002; Podhajski, Mather, Nathan, & Sammons, 2009; Spear-Swerling, & Brucker, 2004).

However, data from multiple survey studies suggests that teachers may lack the necessary discipline knowledge to teach literacy (Bos et al., 2001; Mathers et al., 2001; McCutchen, Abbott, et al., 2002; McCutchen, Harry, et al., 2002; Moats, 1994; Spear-Swerling & Cheesman, 2012; Washburn et al., 2011a). That is, being a proficient reader does not ensure that teachers have explicit knowledge of the language structure. McCutchen, Harry, et al. (2002) also illustrated that years of experience, measures of general knowledge, and type of training (special needs versus general educator), did not predict teachers' level of reading related knowledge. It seems that the necessary knowledge base to offer high quality literacy instruction requires specialized training.

Reading Related Knowledge

To be a competent professional one needs content knowledge. With regards to literacy instruction specifically, this knowledge base is referred to as reading related knowledge (RRK). RRK consists of knowledge of children's literature and an understanding of the structure of the English language (Cunningham, Perry, Stanovich, & Stanovich, 2004; Ladd, Martin-Chang, & Levesque, 2011; Moats, 2009a, 2009b). The structure of the English language includes phonology, phonics, and morphology. Teacher knowledge of these components helps to foster reading development. *Phonological awareness* consists of knowing the sound structure of a

word (Moats, 2009a). Being able to count, blend, segment and delete sounds in a word indicates a strong awareness in this domain (Moats, 2009a). Knowing that the word "ox" has three speech sounds (o/k/s) involves an example of manipulating the smallest units of sound within a word, which under the umbrella of phonology, is called phonemic awareness. Phonemic awareness is an important predictor of early reading acquisition (Melby-Lervåg, Lyster, & Hulme, 2012).

Phonics knowledge involves letter-sound correspondences, and the ability to recognize spelling patterns (National Reading Panel, 2000). There are 26 letters in the English alphabet and over 200 different ways to represent sounds in the English language (Joshi, Binks, Graham et al., 2009). As such, often there is not a one-to-one correspondence between phonemes and graphemes. For example, the word "match" has five letters but only three speech sounds /m/a/ch/ (Ladd et al., 2011). Knowing letter-sound relations is necessary for successful decoding (Cardoso-Martins, Mesquita, & Ehri, 2011; Levin & Ehri, 2009; Shmidman & Ehri, 2010).

The final component of word structure is *morphology*, which involves identifying units of meaning within a word, such as affixes and root words (Moats, 2009a). For example, 'vision' and 'visible' both have the same derivative, 'vis', which originates from the Latin word 'visio', meaning 'see'. Knowing the derivative, a child may be able to understand a word that is unfamiliar such as 'invisible' (Spear-Swerling, & Cheesman, 2012). Knowledge of morphology is known to facilitate word meaning (Washburn, Joshi, & Binks-Cantrell, 2011).

RRK and its Relation to Teacher Practice

Having knowledge in the area of language structure allows teachers to plan lessons with good examples and to respond to students' errors appropriately (Moats, 1994). Evidence suggest that when teachers do not have a solid understanding of these concepts they are likely to use examples and strategies in class that can confuse children. For example, Mather et al. (2001)

found that 80% of inservice teachers and 93% of preservice teachers believed that 'sounding out a word' was a good technique to use among beginning readers. This is undoubtedly an excellent strategy for words with regular grapheme-phoneme correspondences. However, the English language has many irregularly spelled words whose pronunciation cannot be predicted from its spelling (Moats, 2009a). Difficulties arise when teachers fail to recognize words that are irregularly spelled. Cunningham et al. (2004) revealed that only 11% of teachers were able to correctly identify irregular words that were commonly found in material for their classroom age group.

In a hypothetical scenario, Cunningham, Zibulsky, Stanovich, and Stanovich (2009) asked Grade 1 teachers how they would spend a two-hour literacy block. They found that very little time was allocated to the five areas outlined by the NRP that constitute high-quality literacy instruction. Only phonics made the top five activities, yet it was prioritized as fourth on the list. Interestingly, the authors found that teachers who were more knowledgeable about phonics chose to allocate more class instruction time to this area. During classroom observations McCutchen, Abbott, et al. (2002) found teachers with more content knowledge also had higher amounts of explicit instruction dedicated to phonological awareness.

In sum, teachers' familiarity of RRK seems to influence the information they use, or fail to use, in their classrooms. Having a solid understanding of the English language structure allows teachers to plan lessons and allocate time appropriately, correctly respond to student challenges, and provide effective explicit instruction when necessary.

Teacher Training and its Effects on Students' Reading Outcomes

With training, it appears that teachers can improve their knowledge base, which in turn affects the material presented in class, and has positive outcomes for students (McCutchen,

Abbott, et al., 2002; Podhajski et al., 2009; Spear-Swerling, & Brucker, 2004). McCutchen, Abbott, et al. (2002) provided Kindergarten and Grade 1 teachers with a 2-week training course on the importance of phonological awareness, orthographic awareness and comprehension. A number of implications came from the results of this study. First, McCutchen, Abbott and colleagues demonstrated that teachers' knowledge in areas of literacy instruction could be strengthened, as indicated by the increased performance on posttest scores. In addition, they noted that teachers who are knowledgeable in these areas are likely to use this information in their classroom. For example, the Kindergarten teachers who were more knowledgeable spent more time providing explicit instruction on word sounds and how sounds relate to word patterns, both of which positively influenced students' reading abilities.

Studies assessing preservice teachers' knowledge have similarly indicated poor performance on measures of RRK (Binks-Cantrell, Washburn, Joshi, Hougen, 2012; Bos et al., 2001; Mather et al., 2001; Spear-Swerling & Brucker, 2004; Washburn, Joshi, & Binks-Cantrell, 2011a). However, with merely six hours of training, preservice teachers' scores improved on posttest measures assessing knowledge of phoneme counting, syllable types and detecting irregular words (Spear-Swerling & Brucker, 2004). Furthermore, preservice teachers were able to effectively help children with word decoding problems with only six sessions of tutoring. Interestingly, students reading outcomes were correlated with preservice teachers' posttest scores of knowledge, but not their pre-test scores. Therefore, regardless of how much knowledge the preservice teachers entered the program with, it was what they gained during training that impacted students' reading abilities over brief tutoring sessions.

Long-term effect of teacher training on students' reading outcomes. The extent of teacher knowledge on students' reading abilities seems to have long lasting effects as well.

Evidence suggests that receiving instruction from knowledgeable teachers at the onset of schooling impacts students' reading scores in the upper grades. For example, Carreker et al. (2007) studied the impact of teacher knowledge in Grades 1 and 2 on the reading abilities of students in Grades 3 and 5. The authors tracked a subset of Grade 1 and 2 teachers, who had been given 60 hours of comprehensive preparation in phonemic awareness, letter recognition, sound-symbol pairing, decoding, text comprehension, vocabulary, oral listening comprehension and writing skills, and compared them to a group of teachers who had not received instruction. The authors concluded that the children who received instruction from trained teachers *in both* Grades 1 and 2 had the most growth in the upper grades, compared to students who had less knowledgeable teachers. Likewise, the students who had trained teachers *in either* Grade 1 or 2 demonstrated more growth compared to those students who had untrained teachers for both years.

Together these findings suggest that teachers may lack the necessary knowledge to provide evidence-based literacy instruction. However, with training, teachers can improve their practice, which in turn, benefits students' reading outcomes in short and long terms.

Teacher Knowledge of Language Comprehension

According to the 'simple view of reading', reading comprehension involves both decoding and language comprehension skills (Gough & Tunmer, 1986). Thus, without decoding, one cannot comprehend text. Yet, word reading accuracy alone does not guarantee comprehension. While the studies reviewed above regarding teachers' professional development are encouraging, most investigations have only measured teachers' knowledge related to decoding skills (such as phonemic awareness and phonics). Fewer studies have assessed

teachers' knowledge of language comprehension including, vocabulary, morphology and text comprehension.

Washburn et al. (2011b) provided a survey to teachers, which included morpheme awareness tasks along with questions assessing phonology and phonics. Teachers were asked to identify affixes and root words, and count the number of morphemes in words. Results indicated that from a sample of 185 teachers, performance was low for morpheme awareness (53%). Yet, 70% of the sample rated their perception to teach vocabulary as 'very good'. In addition, compared to other domains of instruction such as phonics and phonemic awareness, teachers rated their abilities highest for vocabulary, pointing to an overestimation of language comprehension knowledge. Moats (1994) who found that only 27% of their sample was able to identify morpheme units, with some teachers mentioning, "they had never been asked to analyze words at this level". Similarly, 40% of Washburn et al.'s sample failed to correctly identify the definition of a morpheme from a multiple-choice list. Therefore, it seems that teachers' knowledge of morphology is comparable to their phonemic and phonics knowledge, which in general seems to be less then adequate.

More recently, researchers included questions to assess all five components (Joshi, Binks, Graham, et al., 2009; Spear-Swerling & Cheesman, 2012) outlined by the NRP report (2000) into their research methodologies. Spear-Swerling and Cheesman (2012) surveyed 142 elementary school educators. The authors collapsed the five components into two categories of questions for their analysis: 1) phonemic awareness and phonics, and 2) reading fluency, vocabulary and comprehension. The findings demonstrate that teachers performed significantly lower in the phonemic awareness/phonics domain compared to that involving fluency/vocabulary/comprehension. However, the scores in both domains were relatively low

61% and 64% respectively. Similar performance scores were illustrated in Joshi, Binks, Graham et al.'s (2009) sample of teacher educators. In this study, questions about teaching vocabulary, comprehension and metacognition were included as well. Performance in this domain was merely 57%, but teacher educators' self-perceptions about teaching the five domains of literacy was highest in comprehension, indicating that they felt positive about teaching this topic.

In sum, this evidence indicates that teachers' performance scores related to fostering comprehension may be slightly better than aspects of literacy relating to decoding skills. However, teachers' understanding of higher order comprehension processes is an area that is underrepresented in the field of teacher content knowledge. Thus, one aim of this study is to explore preservice teachers' understanding of literal information and inferences, an important skill involved in reading comprehension.

Reading Comprehension

There seems to be a developmental time course for the underlying skills that support skilled reading. That is, in the initial stages of reading development, phonological skills play a large role in reading comprehension (Melby-Lervåg et al., 2012; Ouellette, 2006, Ouellette & Beers, 2009; Snowling & Hulme, 2011). However, as readers become more experienced, phonological skills are less of a contributing factor to reading, while linguistic competencies begin to play a more critical role in both decoding and reading comprehension scores (Ouellette, 2006, Ouellette & Beers, 2009). Specifically, while phonological skills have been shown to be a strong predictor of Grade 1 students' decoding and reading comprehension skills, by Grade 4 the contribution of phonological skills drops immensely, while vocabulary knowledge lends more weight to reading comprehension (Ouellette, 2006; Ouellette & Beers, 2009). Other findings suggest that improving word reading accuracy by practicing rapid decoding does not seem to

result in increases of reading comprehension scores for children aged 7-to 8-years-old, compared to interventions that focus on comprehension (McGee & Johnson, 2003; Yuill & Oakhill, 1988).

Together, this evidence suggests that an older child who presents with reading difficulties may not be aided by phonological and phonics instruction alone. In fact, it has been estimated that approximately 10% of school children present with intact word reading skills, but fail to comprehend text (Bowyer-Crane & Snowling, 2005). Yet, "reading interventions for struggling older children frequently focus on decoding skills rather than comprehension" (Kintsch, 1998 as cited in Yeh, McTigue, & Joshi, 2012, p. 126). Of added concern, not only do remedial practices fail to provide comprehension instruction, classroom observations suggest that comprehension skills are being assessed in absence of explicit instruction (Pressley, Wharton-McDonald, Mistretta-Hampston & Echevarria, 1998).

One reason for educators' lack of explicit instruction of reading comprehension could be attributed to teachers' misconceptions of comprehension processes. Anecdotal evidence in an interview with teachers suggested that they believed that students naturally pick up on strategies; therefore they assumed that explicit instruction was not necessary (Pressley et al., 1998). While some students can use strategies without explicit instruction, other students fail to learn these strategies from sheer exposure and require instruction (Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007; Yeh et al., 2012).

In order to provide appropriate instruction, it is important for teachers to understand the process of reading comprehension. Figure 1 illustrates a commonly held view (on left), in which comprehension appears to develop in a sequential fashion following decoding skills (van den Broek et al., 2005). This model suggests that once decoding skills are acquired comprehension soon follows, but this view is inaccurate. The depiction on the right is a more appropriate

illustration of the actual process, because it does not base decoding as the underlying skill

involved in comprehension (van den Broek et al., 2005). Comprehension is not a unitary process.

Rather, it involves a number of components, including working memory, vocabulary knowledge,

activating prior knowledge, comprehension monitoring, knowledge of story structure and the

ability to make inferences (Cain & Oakhill, 2006; Florit, Roch, & Levorato, 2011; Kintsch &

Kintsch, 2005; Potocki, Ecalle, & Magnan; 2013; Oakhill & Cain, 2007; Oakhill & Cain, 2012;

van den Broek et al., 2005; van Kleeck, 2008). Instruction and practice of any these skills in the

classroom should help students' reading comprehension (Yeh et al., 2012).
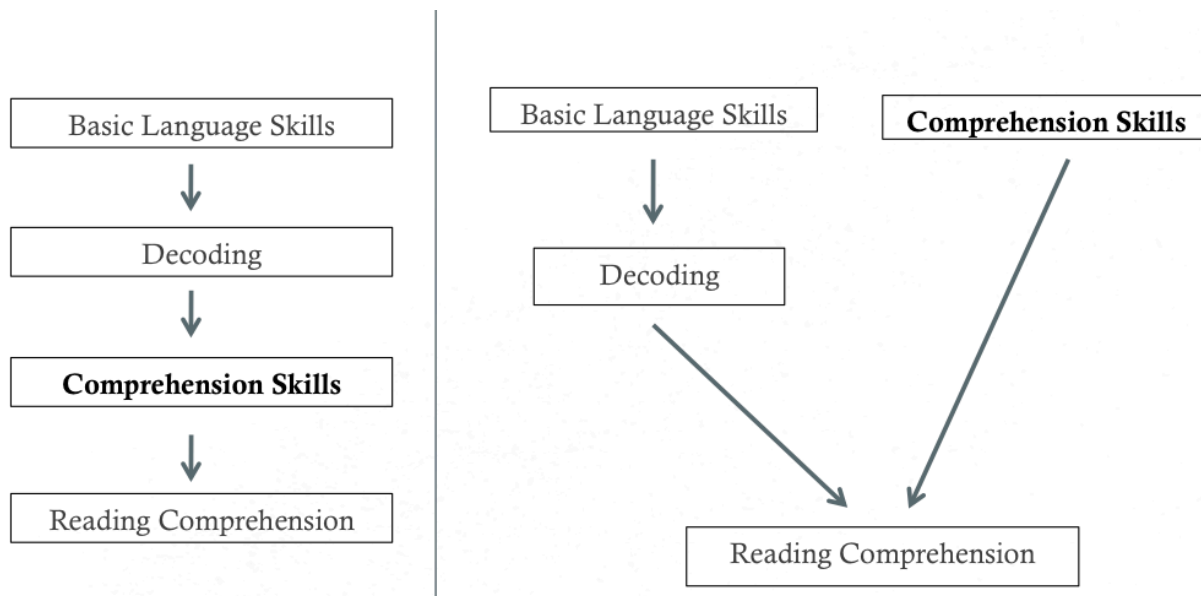
Figure 1. Model of reading comprehension. On the left is a depiction of a commonly held view of

how reading comprehension develops. On the right is a more accurate depiction of how

the process develops (Van den Broek et al., 2005)

Inferencing

The focus of the present study is on inferencing. Inferencing is defined as the ability to 1) extend information explicitly stated in the text, 2) to connect parts of the text with background knowledge, and 3) to create a meaningful and coherent understanding of a passage (Kintsch & Kintsch, 2005; van den Broek et al., 2005; van Kleeck, 2008). Much of what is known about inferencing comes from studies done with poor comprehenders. Poor comprehenders are defined as students who have accurate word reading skills, and low comprehension abilities (Bowyer-Crane & Snowling, 2005; Cain & Oakhill, 2006; Potocki et al., 2013). It has been debated whether poor inferencing is a cause, or consequence, of poor comprehension. A series of studies by Oakhill supports the idea that poor inferencing abilities is a contributing factor to poor comprehension (Oakhill & Cain, 2007). Evidence from longitudinal studies (Oakhill & Cain, 2012), age-matched controls (Cain & Oakhill, 1999) as well as training studies (Yuill & Oakhill, 1988), converge to support this notion.

For example, Oakhill and Cain (2012) illustrated with a longitudinal design that inferencing is a precursor to reading comprehension. In this study, the authors measured various components of reading comprehension. They tracked children from ages 7 to 11 years of age. Three components of comprehension: inferencing, knowledge of story structure and comprehension monitoring, predicted later reading comprehension. Furthermore, these results were apparent when the autoregressor of general reading comprehension skills from earlier years, as well as verbal abilities and working memory, were controlled. The implication of these findings is that comprehension is not a unitary process and hence, each component can be developed to improve reading comprehension.

Studies with poor comprehenders suggests that the core deficit in the ability to understand text stems from poor inferencing (Cain & Oakhill, 1999; Cain, Oakhill, Barnes, & Bryant, 2001; Oakhill, 1982; Oakhill & Cain, 2007; Oakhill, Yuill, & Parkin, 1986;Yuill & Oakhill, 1988). Interestingly, the failure to make inferences in this population does not seem to be attributed to a lack of background knowledge (Cain et al., 2001) or a difference in working memory (Cain & Oakhill, 1999; Oakhill et al., 1986). It seems that the issues leading to comprehension difficulties are attributed to poor comprehenders generating fewer inferences (Cain et al., 2001), having difficulty integrating text (Oakhill 1982; Oakhill et al., 1986) and trouble locating the correct premise in a text necessary for an inference (Cain et al., 2001). This evidence raises the possibility that scaffolding students to generate more inferences, or drawing attention to important information within a text may benefit overall comprehension. Providing teachers with knowledge of this process could help to foster their students' inference-making skills.

Inferential Process

The Network Representation Model (Kendeou, van den Broek, White, & Lynch, 2007; Kendeou, van den Broek, White, & Lynch, 2009; van den Broek, 1989 a;b; van den Broek, 2005) illustrates the end result of inferencing (see Figure 2). The network representation depicts numerous events that occur in a story (indicated by nodes) and the causal relations amongst each event (indicated by the connecting lines). Some of these events have many connections, such as node 4 "Rat liked to copy Cat", while others have fewer, such as node 3 "They lived in houses right next to each other" (Kendeou et al., 2009). The events with many connections contribute to the structure of the story and hence are crucial to overall understanding of a text. Studies with adult readers provide evidence for the network representation model (Kendeou et al., 2007;
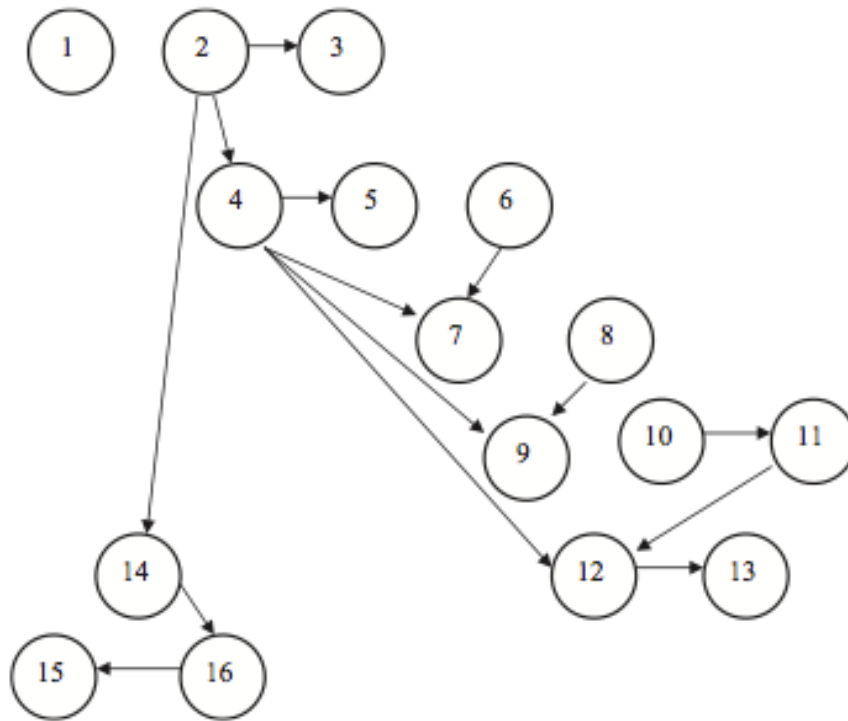
1→ Once upon a time, 2→ Cat and Rat were best friends. 3→ They lived in houses right next to each other. 4→ Rat liked to copy Cat. 5→ Rat built a house that was just like Cat's. 6→ Cat planted a tree by his house. 7→ Rat planted one too. 8→ Cat made a straw mat for his house, 9→ and Rat made one too. 10→ Once, Cat made a flute 11→ and played sweet tunes. 12→ "Let me play a tune, too," said Rat. 13→ So, Cat let Rat play a tune. 14→ Cat and Rat also worked together in their vegetable garden. 15→ They planned to have a big party for their friends 16→ when all of the vegetables were ready.

Figure 2. Depiction of the Network Representation Model (Kendeou et al., 2009). The nodes represent events in a story, and the connecting lines illustrate meaningful relations between events.

van den Broek, 1989a;b; van den Broek et al. 2005). For example, the events with many causal

connections are often judged as more important statements within the story and these events are

often referred to when answering Why-questions more often than events with fewer connections

(van den Broek, 1989a). Thus, comprehension is not the sum total of how many events are

included in an individual's representation; rather, comprehension is achieved when the important

events are differentiated from the minor details (Kintsch & Kintsch, 2005). As van den Broek et

al. describe the process,

> …at the core of successful reading comprehension is the ability to identify
>
> meaningful relations between the various parts of a text and between these
>
> parts and the readers' background knowledge. To do so, readers engage in
>
> inferential processes, which if all goes well, result in a coherent mental
>
> network representation of the text. (2005, p.114)

The inferential process may come naturally and automatically to the experienced adult

reader. However, for beginner and less skilled readers, the process may not be as easy (Kendeou

et al., 2007; van den Broek et al., 2005).

Developmental trends. Evidence suggests children as young as 4-years-old can engage

in the inferential process (Kendeou et al., 2007; Kendeou et al., 2009; van Kleeck, 2008).

Listening comprehension, which involves a number of the same components that underlie

reading comprehension (Florit et al., 2011; Potocki et al., 2013), has been used to assess young

children's inferential skills. Evidence from having children listen to storybooks and watch

television programs indicates that children are able to engage in inference-making. However, the

types of inferences children are able to draw differ from more experienced readers (van den

Broek et al., 2005). For example, difficulties arise when children deal with abstract relations

between events, and with internal states, such as a character's feelings, and relations across events, rather than relations that occur within a single event. Thus, for young children, inferences are easier to make when dealing with concrete and observable events, as well as events that occur within a single episode (Kendeou et al., 2007; van den Broek, 2005).

van den Broek (1989a) investigated the developmental trends of inferencing in children aged 8-,11-,14- and 18-years-old, by asking readers to judge the importance of story statements and answer story questions. The author found that all age groups were able to judge the important events that occurred within a single episode of a story. This indicates that children are sensitive to the number of connections an event had within a single episode, and rate those with more links as more important compared to those with fewer links. However, inferences made across story events posed some challenges for the younger children. That is, children 11-years and older were sensitive to the number of connections between these episodes, but the 8-year-olds were less sensitive to these differences. Furthermore, when asked to answer Why-questions, responses that crossed episodic boundaries increased with age. Older children were more likely than younger children to provide responses that involved inferences across story events. These findings indicate that younger children are not as likely to integrate parts across the text. Thus, children may miss the author's intended message because connections between episodes often hint at the theme of the passage (Kendeou et al., 2007).

To conclude, young children are able to engage in the inferential process, but young children are less likely to make inferences that are crucial to the overall message of a story (van den Broek, 1989a; 1989b van den Broek et al., 2005). Once a proficient reader, the inferential process becomes automatic and implicit (van den Broek et al., 2005). Yet, it may be necessary

for teachers to have explicit knowledge of this process in order to scaffold their students'

understanding.

Inference Types

Inferences are made throughout the text: at the sentence level, within a paragraph, across

paragraphs and finally tying the overall theme or message of the passage together (Kispal, 2008;

Yeh et al., 2012; Yuill, & Oakhill, 1988). Evidence suggests that it is uncommon for children to

have general inferencing deficits. Rather, the data suggest that certain types of inference

questions may be more difficult for children (Bowyer-Crane & Snowling, 2005; Cain & Oakhill,

1999; Cain et al., 2001). Specifically, text-to-text and text-to-world inferences pose challenges.

Text-to-text inferences. Text-connecting inferences involve linking information from

different parts of a text together to form a coherent story (Cain & Oakhill, 1999). For example, in

a study by Oakhill (1982), less skilled comprehenders' were compared with good readers. Seven

and 8-year-olds were matched on their decoding abilities, but differed in comprehension scores.

To assess text-connecting inference abilities, the experimenter read aloud a short story of three

sentences in length. After a brief distracter task, the children were presented with various

sentences and were asked to identify if the sentences were in the stories they had heard

previously. Two of the original sentences were presented along with two foil sentences. One foil

sentence was a semantically congruent inference that could be drawn from the passage, while the

other was an incongruent inference that conflicted with the passage meaning. Results indicated

that skilled comprehenders were more likely to misattribute congruent inference foils as being

from the passage than less skilled comprehenders. Less skilled comprehenders were more likely

to 'remember' congruent foils than incongruent foils, but they falsely identified more

incongruent foils than their skilled peers. These finding suggests that skilled comprehenders are

more involved in the active process of constructing meaning from text and making appropriate

inferences, while poor comprehenders are less likely to draw appropriate inferences.

Text-to-world inferences. Text-to-world inferences involve using world knowledge to

link important parts of the story structure together (causal inference) or embellish the story to

create a richer representation of the text (informational inference) (Bowyer-Crane & Snowling,

2005; Cain & Oakhill, 1999, van Kleeck, 2008).

Bowyer-Crane and Snowling (2005) illustrated that less skilled comprehenders'

performance on text-to-world inference questions were significantly lower compared to both

inference questions and literal questions. Interestingly, the issue involved in drawing these types

of inferences does not seem to be due to a lack of background knowledge. Cain et al. (2001)

controlled for background knowledge by teaching children about an imaginary planet. The

experimenters then read participants a story about this planet, followed by comprehension

questions. When asked inference questions that involved drawing on the newly learned

information about a planet, poor comprehenders performed significantly lower on text-to-world

inference questions than skilled comprehenders. This finding was not attributed to memory of the

planet information because retention of the information was tested. Therefore, failure to make

text-to-world inferences does not seem to be due to readers' differences in background

knowledge.

Additional evidence suggests that text-to-world inferences pose greater challenges than

text-to-text inferences (Cain & Oakhill, 1999). The authors compared inference abilities in three

groups of children: skilled comprehenders, less skilled comprehenders and younger,

comprehension age-matched controls (CAM). The results indicated that less skilled

comprehenders performed significantly lower than skilled comprehenders and CAM for text-

connecting inferences. However, *both* less skilled and CAM groups performed poorly on text-to-world inferences compared to their skilled peers. When the experimenters provided the text for children to look back on, performance on all questions improved for all groups, and less skilled comprehenders no longer differed in their performance on text-connecting inference. Nevertheless, less skilled and CAM groups still lagged behind on text-to-world inferences compared to the skilled peers. Finally, even when the experimenter hinted to the area in the text for clues, children could not make all the text-to-world inferences. Thus, it seems text-to-world inferences are more challenging than text-connecting inferences, as even when the text is available and the experimenter is providing assistance, younger children and children who were less skilled comprehenders were not able to make the inferences.

To summarize, the inferences that are challenging for students are those that connect different sentences together, those that involve drawing on prior knowledge, and those that enhance text representation. Asking questions that target these types of inferences would seem important in order to help children understand text. Text-to-world inferences (both causal and informational inferences) are of interest in this study since they pose the most difficulty to children.

Facilitating the Inferential Process

Similar to explicit teaching of phonological and phonics skills, explicit instruction can improve students' understanding of text (Boulware-Gooden, 2007; Pressley et al., 1998; Yeh et al., 2012). A number of strategies, such as activating prior knowledge, comprehension monitoring, knowledge of text structures and summarizing and questioning, are all effective strategies for fostering reading comprehension (NRP, 2000; Oakhill & Cain, 2007). With regards to inferential processing, there is evidence to suggest that explicit instruction, inference

awareness training and questioning are effective ways to foster this skill (McGee & Johnson, 2003, McKeown, Beck, & Blake, 2009; Yuill & Oakhill, 1988).

Yuill and Oakhill (1988) illustrated that inference awareness training helped facilitate reading comprehension in 7-to 8-year-old children. The same pattern of findings was reported with children as young as 6-years-old (McGee & Johnson, 2003). The inference training involved teaching children to notice clue words in sentences and encouraged children to generate questions and make predictions. The intervention was implemented in a small group setting of three to five students twice a week over 4-weeks. Post intervention, both skilled and less skilled children's reading comprehension improved on a standardized measure of reading comprehension. However, the less skilled comprehenders benefitted more from the inference training than the skilled comprehenders. Poor comprehenders scores improved at posttest by an increase of 17-months in age over the course of the intervention compared to their pretest scores. Also, 9 out of 13 of the children who were classified as poor comprehenders during pretest no longer fit the criteria at posttest. Overall, the inference awareness training was as helpful as the comprehension exercise comparison group, involving comprehension strategies and questions asked by the teacher. Thus, Yuill and Oakhill concluded that focusing specifically on inferencing is as effective as focusing on comprehension in general.

More recent evidence suggests that promoting inferencing may be *more* effective than promoting other comprehension strategies (McGee & Johnson, 2003; McKeown et al., 2009). McKeown et al. compared the effectiveness of two intervention programs implemented in fifth grade classrooms. One intervention focused on comprehension strategies by using a number of techniques such as summarizing, predicting, generating questions and comprehension monitoring. The other intervention focused on the inferential process to build a coherent

representation of the text by asking children meaningful questions (i.e., how does this relate to what we read so far?) throughout the text. This allowed students to identify new pieces of information and relate them to what they not only had already read but to their background knowledge as well. The interventions took place over 5-weeks for 45-minutes per week. Teachers implemented the intervention with a whole class. Reading comprehension was measured through assessment of story recall. The results indicated that children in the intervention that focused specifically on inferencing had significantly longer story recall (measured by the number of story events mentioned), and their stories were also higher quality (measured by the level of important story events that were included), compared to the comprehension intervention group. Thus, this evidence suggests that engaging students in the inferential process may be a greater benefit compared to teaching of other comprehension strategies.

Lastly, McMaster et al. (2012) illustrated that the types of connections elicited by questions influence comprehension. The authors investigated the effects of three types of questioning: causal questions, general questions, and literal questions. The intervention was implemented over 9-weeks, three times a week for 20-minutes in fourth grade classrooms. Struggling, average, and good readers participated and worked in groups with a stronger reader being the helper to a weaker reader. The results indicated that all three-question types improved the comprehension of children from pre to posttest scores, suggesting that questioning during reading helped with story recall. Furthermore, the authors illustrated that certain types of questions could help with certain types of readers' understanding of text. Specifically, causal inference questions helped children who originally made incorrect inferences, while general questions aided those who originally failed to make inferences. Thus, questioning presented as a

means of fostering comprehension; more specifically, different types of questions may be more helpful to a range of students with differing reading abilities.

However, not all questions types offer children comprehension support. For example, Tansey (2014) investigated the influence of three question-types on story recall: literal detail questions, causal inference questions and embedded inferences questions. Reading comprehension of average readers in Grade 5 and 6 were assessed by analyzing story retells. Embedded inferences, inferences that are made by the questioner and framed within the question, resulted in story retells equivalent to the control condition where no questions were asked. Literal detail and causal inference questions yielded story retells that were significantly better than asking no questions. Tansey hypothesized children tended to reread the text when answering both literal detail questions and causal inference, which may have led to general comprehension benefits. Therefore, certain types of questions offer more support in comprehension than others.

To summarize, the studies highlighted here demonstrate the benefits of providing explicit instruction of the inferential process. The research suggests that inference awareness training and questioning are both feasible and effective approaches to implement in classrooms. Furthermore, with training and guidance, teachers are able to implement these types of programs in the classroom (McKeown et al., 2009; McMaster et al., 2012). However, even though these intervention studies provide insightful information with regards to fostering comprehension, little is known about how teachers currently incorporate this information in their curriculum.

How are Teachers Using Inference Questions in the Classroom?

Despite the benefits outlined by intervention studies on the effectiveness of inference training and questioning, there seems to be a lack of observational data that reveals how teachers approach this comprehension skill in their classroom.

Scheiner and Gorsetman (2009) examined the types of questions preschool educators consider while book sharing with three to five-year-olds. The researchers gave preschool educators three books to look over and to prepare questions that they believed would help preschoolers' understanding of the story. The results revealed that in particularly difficult areas of the books, where an inference was required, about half of the responses by educators failed to address the inference.

In line with this study, Paor, Tansey and Martin-Chang (2013) investigated the types of questions teachers prepared for students in fifth grade by having them read a passage from a novel and generate questions that would help students' understanding. The results revealed that roughly 17 percent of the questions generated were phrased as embedded inferences, which Tansey (2014) demonstrated as offering much less benefit than other types of questions. When examining question types, detail questions were negatively correlated with inference-type questions, while causal and informational inference questions were positively correlated. This pattern suggests that the more focus put on detail questions, the less likely an inference question will be asked. In accordance with the literature of teacher knowledge, the self-perceptions of teaching reading comprehension were poorly calibrated with this samples' measures of comprehension knowledge. Teachers scored relatively low (41%) on measures of reading comprehension knowledge. To date, it remains unknown how knowledge of reading comprehension influences classroom practice. Therefore, focus in this direction merits consideration. A good starting point would be to explore the relationship between preservice teachers' knowledge and the ability to prepare classroom material.

Present Study

The research outlined in the literature review illustrates that teacher content knowledge is an important factor to fostering reading development. Yet there seems to be little evidence about teachers' knowledge of reading comprehension strategies. The ability to make inferences is an important component to comprehension. As previously stated, young children and less skilled readers can have difficulties with this process. Intervention studies suggest that inference training positively impacts reading comprehension; questioning children about what they have read is an effective way to scaffold the inferential process. However, there is scarce information on the types of questions teachers plan to use in their practice and the type of knowledge that influences this. The objective of this study was to examine the effect of a lesson on literal and inferential comprehension on preservice teachers' explicit knowledge of inferencing and ability to prepare instructional material. Explicit knowledge involved defining and identifying different question types. Ability to create instructional material assessed comprehension questions targeting inferential and literal information. Finally, given the abundance of information on the state of teachers' reading related knowledge, the study also sought to clarify whether knowledge of basic language constructs and knowledge of children's literature influenced how preservice teachers plan for instruction. The research questions are as follows.

1) Did a lesson increase preservice teachers' explicit knowledge of literal and inferential comprehension?

2) How will the information from the lesson influence preservice teachers' ability to create instructional materials? Specifically, can the lesson increase the quantity and variety of questions and the number of inference questions generated?

3)   Is there a relationship between RRK (basic language and print exposure measures), explicit knowledge of literal and inferential comprehension and measures of lesson preparation (quantity, variety and number of inference questions generated)?

Method

Participants

Experimental group. Consent was provided by thirty-nine preservice teachers recruited from an upper level literacy course, Teaching Language Arts II (EDUC 381) in the Early Childhood Education (ECEE) undergraduate program at Concordia University (see consent form, Appendix A). Four participants were eliminated, one because of multiple absences, and three for not following instructions. Therefore, a total of 35 participants were included in the final experimental group. Three participants were males and the rest females. The demographic questionnaire (see Appendix B) indicated that the ages ranged from 20-years-old to 52-years-old, ($M= 24.56$, $SD = 6.5$). English was the native language of 27 participants; all participants were fluent in English. The majority (63.8%) of participants were in their third or final year of the four-year program as EDUC 381 is an upper level course.

Comparison group. Participants from the comparison group were recruited by an email sent out to students in the Education program at Concordia, by notices posted in the department and by an announcement made in four different classrooms. A recruitment announcement was made in the following classes, Observation and Evaluation in Education (EDUC 297), in two Child Development II classes (EDUC 311), and Diversity Issues in Childhood (EDUC 402). Forty-five people initially demonstrated interest in the study by contacting the lab, however only twenty-two people signed up to participate in the study. Four participants were eliminated

because they did not follow instructions. This resulted in a total of 18 participants in the comparison group, 1 male and the rest female. Thirteen participants were from the Child Studies program and five participants were from the ECEE program. Two participants had previously taken EDUC 381, however the topics from this intervention were not covered when they had taken the course. The ages ranged from 18-years-old to 45-years-old, (M= 26.35, SD = 8.33). English was the first language for 15 participants, while all participants were fluent in English. The majority (50%) of participants were in their third or final year of the program.

Design

This study employed a quasi-experimental, pretest-posttest design. This was a nonequivalent group design, where the experimental group was exposed to a lesson on literal and inferential comprehension, while the comparison group did not receive any intervention. A 2x2 between subjects factor was implemented, the independent variable was the group (experimental versus control) and the dependent variable was time (pretest versus posttest).

Measures

Explicit knowledge on literal and inferential comprehension. This task involved defining various question types as well as classifying comprehension questions.

Defining question types. This was a multiple-choice task that entailed defining literal and inferential comprehension as well as various question types. Literal questions included definitions to *main ideas*, questions pertaining to the main elements in the story, and *detail* questions, pertaining to information not crucial to the understanding of the events in the story. Inference questions included definitions to *causal inferences*, information that draws on cause-and-effect relations in the text that are not explicitly stated, and *informational inferences*,

inferences that elaborate on the richness of the story. This survey measured participants'
declarative knowledge of literal an inferential questions. See Appendix C.

Responses were scored as right or wrong, and no partial marks were given. There were
six questions in all and they were combined with the score on the task outlined below to create a
composite score for explicit knowledge.

Classifying comprehension questions. This task measured participants' ability to
differentiate between different types of comprehension questions. Participants were asked to read
a short passage and classify 10 accompanying comprehension questions from a multiple-choice
list. Two passages adapted from McClintock, Pesco and Martin-Chang (submitted) were
counterbalanced from pre- and posttests. 'Mark Gives a Gift' consisted of 145 words and was at
a 2.6 grade level calculated by the Flesch-Kincaid readability. See Appendix D for this version.
'Anna and her Dog' consisted of 142 words and was at a 2.8 grade level calculated by Flesch-
Kincaid readability. See Appendix E.

The 10 comprehension questions consisted of both literal and inference type questions.
Literal questions included both main ideas and detail questions. To categorize these questions,
participants were required to know that the answers to these questions were found directly in the
text. Participants were required to discriminate which items were important to the understanding
of the story (main ideas) and information that was not crucial to overall comprehension but
enhanced the richness of the story by providing many details.

Inferential questions consisted of causal, informational and embedded inferences.
Participants were required to know that the answers to these questions were not directly found in
the text but require the reader to make meaningful connections to reach an answer. Causal
inference questions require the reader to draw on two pieces of information. For example, when

asked 'Why did Anna's dog run away?' the task would entail relating 1) The dog saw a cat 2) The dog was off leash. Informational inference type questions are similar to detail questions except the answer was not directly found in the text and required readers to draw on their background knowledge. For example, the answer to the question 'How old is Mark's sister?' is not stated in the passage, but the text does refer to the number of candles on the birthday cake. Drawing on one's experience with birthdays, we can guess that the number of candles on the cake reveal the birthday recipient's age. Lastly, embedded inferences are questions that included an inference generated in the question and require the responder to either confirm or disconfirm the question. For example, asking the question 'Was Mark upset he dropped the cake?' contains an inference made by the questioner about the character's emotions, compared to a more open ended question such as 'How did Mark feel after he dropped the cake?'. In all, there were five types of possible questions listed above (main idea, literal detail, causal inference, informational inference and embedded inference), and two examples of each type were included, for a total of ten questions.

For correctly identifying each question type a point was awarded, for a total of 10 points. This score was combined with the definition questions described in the task above to create a composite score. This composite score was out of a total of 16 items.

Comprehension abilities. To ensure participants understood the passage from the 'classifying comprehension questions' task and that they read and understood the questions as intended, participants were asked to provide a response to each question of the passage. Each correct response was awarded one-point, for a total of 10-points.

Creating instructional material. This task was used to assess the 1) total number of questions generated, 2) variety (how many different types), and 3) number of inference questions

generated by participants, to help their hypothetical students understand a passage. Participants

were given a passage taken from an authentic children's novel along with the following vignette:

> "The passage enclosed below was used last year as a novel unit in a Grade 5
>
> classroom. If you were the classroom teacher, what questions would you use
>
> to help guide the comprehension of your students? Please write the questions
>
> along with the correct answers".

Two texts were chosen from a fictional book series by Ingrid Law. A passage from the

first chapter of each book was counterbalanced from pre and posttests. 'Savvy' (Ingrid

Law, 2008) is the first book of the series. The passage taken from this text was 1165

words in length and rated a Grade level of 3.9 by Flesch-Kincaid readability formula

(see Appendix F for the passage).'Scumble' (Ingrid Law, 2010) is the second book of

the series. This passage is 1161 words in length, and rated a Grade level of 3.5 by

Flesch-Kincaid readability formula (see Appendix G). It is important to note that the

second book in the series, 'Scumble' is not a continuation from the first. Rather the

second book follows the same theme as the first but has a different main character.

> *Scoring.* A coding scheme from Paor et al. (2013) was used to code the questions. The

questions were separated into a number of different categories, such as main ideas, literal details,

causal inferences, informational inferences, vocabulary, and comparison questions. See

Appendix H for the coding scheme along with example questions from each of the passages. In

order to code the questions, participants must have provided a response to their proposed

questions; otherwise their data were eliminated.

> The number of total of questions written was tallied to create a total score. To assess the

variety of questions, participants were awarded one point for each new type of question asked.

For example, if a participant asked five literal detail questions, only 1 point was awarded. If a participant asked five different question types, 5 points were awarded. The highest score a participant could obtain for the variety of questions was 6 points. A composite score adding causal and informational inferences together was used to calculate the number of inference questions generated.

Reading related knowledge. A number of measures were used to obtain information on participants' RRK.

Basic language knowledge. This survey measured participants' knowledge of basic language constructs, specifically phonology, phonics and morphology (Binks-Cantrell et al., 2012). The survey consisted of both multiple-choice (17) and fill in the blank responses (21), for a total of 38 items altogether. There are twenty-one questions pertaining to phonology. Nine items are based on phonics and eight pertain to morphology. Out of the total survey, twelve items tap into participants' knowledge of concepts. An example of this type of question is, 'A morpheme refers to…a single unit of meaning', requiring the participant to define the term. Twenty-six items measure participants' 'abilities', such as counting the number of syllables, identifying initial sound, identifying individual phonemes and morphemes, as well as spelling patterns. For example, 'the reverse order of sounds in the word '*enough*' would be which following word?'. See Appendix I.

Responses were scored as right or wrong. Participants received 1 point if they answered correctly, or obtained zero points if they answered incorrectly. No partial marks were given. All items that were correct were summed, divided by 38, and converted to a percentage.

Print exposure measure. To obtain a proxy measure of how knowledgeable participants were of children and young adult literature, two print exposure measures were used

(Cunningham et al., 2004; Stanovich & West, 1989). The Author Recognition Test (ART) was a modified version from Ladd et al. (2011). This measure contained three sets of names: 67 authors of contemporary adult books, 23 authors of popular novels for young adults (ART-YA), and 23 names of individuals who are not authors (foils). All items were presented in one list organized in alphabetical order by surname (see Appendix J). Participants were given the standard instructions as described by Stanovich and West; They were asked to check off the names of real authors and were asked not to guess, as guessing could be easily detected.

A Title Recognition Test (TRT) was taken from Ladd et al. (2011) and contained a number of storybook titles from popular children's books. This measure had 35 storybook titles and 15 foil titles. The same instructions mentioned above were given to participants.

A score was calculated for each print exposure measure: ART-YA and TRT. For the ART-YA, the authors for young adult literature marked by the participant, as well as any foils were tallied. The sum of the foils marked by participants were divided by the total amount of foils. This proportion was subtracted from the sum of authors marked by participants divided by the total amount of authors for young adult literature. This score was then converted into a percentage (e.g., (score on the ART-YA/23)-(foils/23)*100). For the TRT, a similar procedure was used for the following equation (score on storybook titles/35)-(foils/15)*100).

Procedure

Experimental. Pretest and posttest measures were collected during class time, as the topics pertaining to these measures were part of the language arts (EDUC 381) curriculum. The class was scheduled once a week in the evenings from 6:00 pm to 8:15 pm. Participants were offered a children's books upon completion of the pretest and posttest, for a total of two

children's book as a thank you gift for participating. The graduate student conducting the study collected the pretest and posttest measures.

The order of the pretest tasks were as follows: creating instructional material, basic language survey, explicit knowledge, and print exposure measures. Creating instructional material was presented before the other surveys to reduce the chance that the topics of the surveys would influence the types of questions generated by participants. The pretest data were collected in two sessions. The first visit was after a course lecture. Participants completed the demographic questionnaire and created instructional material. Participants were given up to 20-minutes to create instructional material, which was indicated on a projector screen using an online timer. The remaining survey measures of the pretest were collected at the beginning of the following class. The order of the posttest tasks were as follows: creating instructional material and then the explicit knowledge measure. The posttest measures were collected the class following the lesson. The posttest was administered in one session at the beginning of class time.

Lesson. A lesson on literal and inferential comprehension was delivered to the class as a whole by the graduate student conducting this study. The lesson was 70-minutes long and was delivered in two sessions, 35-minutes each. The first session occurred during the second half of the class after a course exam. The second session took place the following week at the beginning of class. The lesson aimed at informing participants about literal and inferential comprehension, the importance of asking questions on student comprehension, and about different question types. The lesson was delivered via PowerPoint; see Appendix M, for the lesson material. There were also practice activities incorporated into the lesson that worked on identifying question types as well as creating questions. Two short passages from 'The Strange Case of Origami

Yoda' (Tom Angleberger, 2010) were used to practice with. See Appendix L for the class activities handout.

      Comparison. Participants in the comparison group were scheduled at a time that was convenient for them. The pretest tasks were completed in one session, and the tasks followed the same order as the experimental group. Creating instructional material was timed in the same manner as the experimental group and displayed on a computer monitor. The posttest was completed in one session and the tasks followed the same order as the experimental group. Participants completed the survey in a lab or small classroom, either individually or in a small group setting. The graduate student conducting this study administered both pre and posttests to the participants in this group. Participants were offered two children's books at the end of the posttest to thank them for participating.

<div align="center">

Results

</div>

Explicit Knowledge on Literal and Inferential Comprehension

      The first aim of this investigation was to assess whether an intervention on literal and inferential comprehension was enough to increase participants' ability to define and identify different types of comprehension questions.

      Table 1 shows that on average the two groups scored at, or near, 50% when they were asked to define and classify questions into different types during pretest. At posttest, the scores of both groups increased. A 2 x 2 mixed factorial ANOVA was conducted to analyze the effects of the lesson on participants' explicit knowledge. The between-subjects factor was group (experimental versus comparison), and the within-subjects factor was time (pretest versus posttest). The dependent variable was scores on the explicit knowledge measure.

No main effect of group was observed, $F(1, 51) = 1.35$, $MSE = 7.80$, $p = .251$, $\eta_2 = .026$, indicating that both groups performed similarly overall. However, a main effect of time was found, $F(1, 51) = 15.47$, $MSE = 3.71$, $p < .001$, $\eta_2 = .233$, indicating that the scores at posttest were higher than the scores at pretest. The Group x Time interaction was not significant, $F(1, 51) = .705$, $MSE = 3.71$, $p = .405$, $\eta_2 = .014$, indicating that both groups improved at a similar rate from pre to posttest.

Considering how poorly the participants did on the explicit knowledge task – even after the intervention was completed – it seemed prudent to ask whether they had actually read and understood the questions. In other words, were the participants able to answer the questions themselves? To check this, the participants' comprehension scores were calculated by totaling the number of questions (out of 10) they could answer correctly (regardless of whether they had been be able to classify them correctly). The means from Table 1 show that participants in both groups had scored near ceiling on comprehension questions intended for children at both time periods. To verify that there were no group differences in participants' ability to answer comprehension questions (i.e., a potential confound for the findings), a 2 x 2 mixed factorial ANOVA was conducted. The between-subjects factor was group (experimental versus comparison), and the within-subjects factor was time (pretest versus posttest). The dependent variable was the score on the comprehension task.

There was no main effect of group, $F(1, 51) = .063$, $MSE = .927$, $p = .803$, $\eta_2 = .001$, which confirmed that both groups were able to answer elementary level questions. There was also no main effect of time, $F(1, 51) = .012$, $MSE = .70$, $p = .912$, $\eta_2 = .000$, illustrating that participants comprehension abilities were equal at both points. There was no significant Group x Time interaction, $F(1,51) = .917$, $MSE = .70$, $p = .344$, $\eta_2 = .021$.

Table 1

Participants mean and standard deviation of explicit inference knowledge, and comprehension abilities (expressed as raw scores).

	Explicit Knowledge		Comprehension Abilities	
	Pretest	Posttest	Pretest	Posttest
Experimental Group	8.0	9.89	9.50	9.30
(*n* = 35)	(2.20)	(2.35)	(.86)	(.99)
Comparison Group	7.66	8.89	9.40	9.60
(*n* = 18)	(2.77)	(2.49)	(.98)	(.63)

Note. Explicit Knowledge was out of 16 questions. Comprehension Abilities was out of 10 questions

Creating Instructional Material

Considering that 18.9% of the total sample did not generate any inference questions at pretest, the second goal was to assess how preservice teachers could use the information taught in the lesson to create instructional materials. Specifically, it aimed to assess whether the lesson would increase the total number of questions, the variety of questions, and the number of inference questions that participants generated in response to a passage from a young adult novel.

Number of questions. A 2 x 2 mixed factorial ANOVA was conducted to determine whether or not the lesson had increased the total number of questions participants wrote in response to a Grade 5 passage. The between-subjects factor was group (experimental versus comparison), and the within-subjects factor was time (pretest versus posttest). The dependent variable was the number of questions generated.

As seen in Figure 3, the experimental group appeared to have written fewer questions than the comparison group at pretest; yet, the number of questions written by both groups were similar at posttest. The ANOVA revealed that neither main effect of group, $F(1, 51) = 3.82$, $MSE = 9.97$, $p = .056$, $\eta_2 = .070$, nor time, $F(1, 51) = 2.01$, $MSE = 1.97$, $p = .162$, $\eta_2 = .038$, were significant. However, this was qualified by a significant Group x Time interaction, $F(1, 51) = 11.22$, $MSE = 1.97$, $p = .002$, $\eta_2 = .180$. Simple effect analyses revealed that the experimental group wrote more questions from pretest to posttest, $t(34) = -4.09$, $p = .000$, whereas the number of questions written by the comparison group did not significantly differ across time, $t(17) = 1.19$, $p = .240$. This suggests that the lesson had a greater impact on the experimental group in terms of the number of questions they wrote.
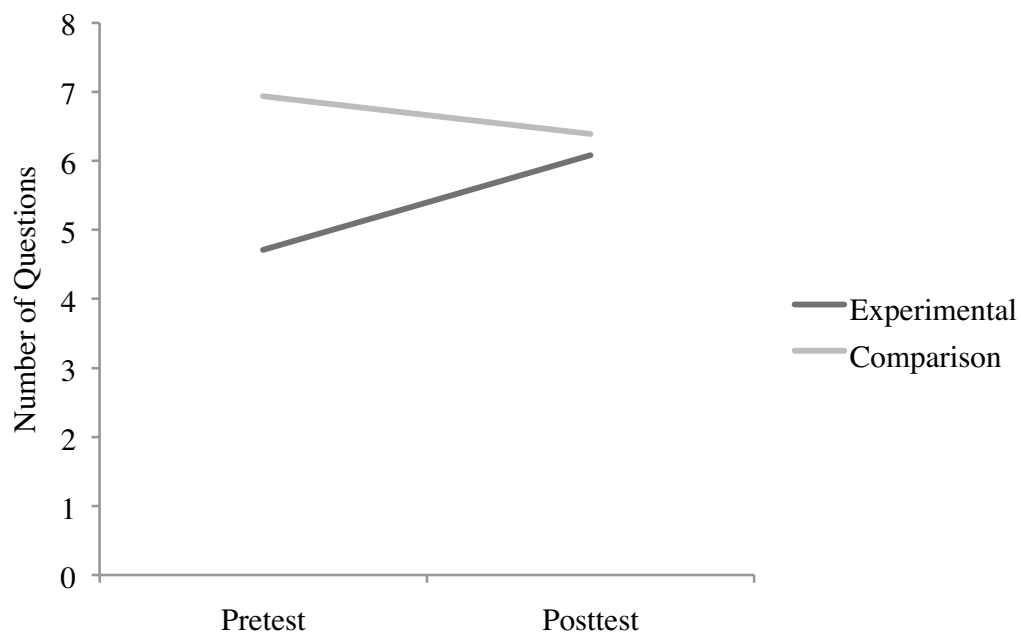
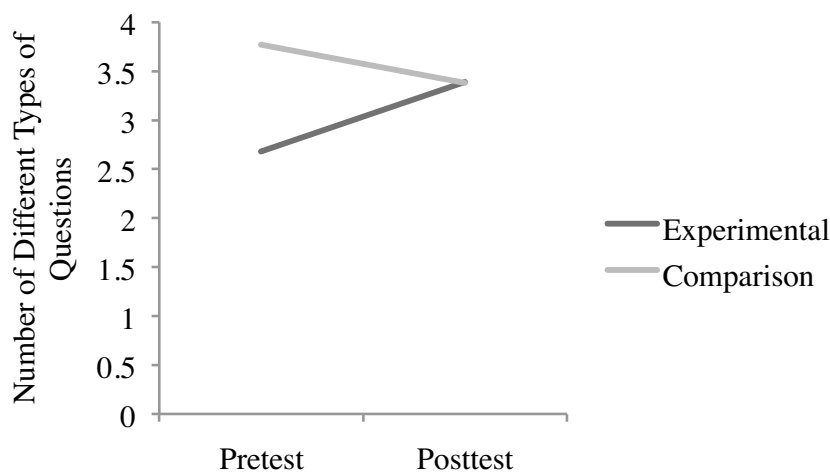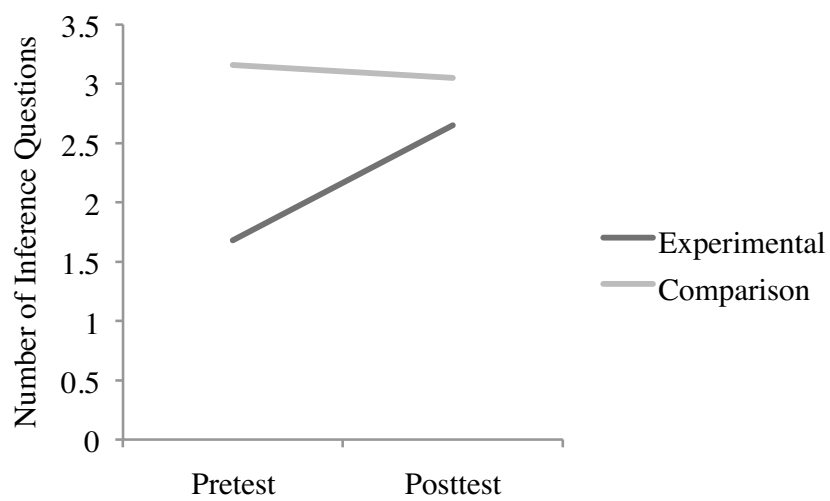*Figure 3*. Total Number of questions generated. This figure illustrates the mean scores of the two groups across the two time points.

Variety of questions. A 2 x 2 mixed factorial ANOVA was also conducted to observe the effect that the lesson had on the variety of questions participants wrote. The between-subject factor was group (experimental versus comparison), and the within-subjects factor was time (pretest versus posttest). The dependent variable was the number of different types of questions participants wrote.

In Figure 4, it appears that the experimental group had less variety in their questions than the comparison group at pretest. However, at posttest the types of questions written by both groups were relatively similar. The main effect of group was significant, $F(1, 51) = 5.88$, $MSE = 7.69$, $p = .019$, $\eta_2 = .103$, indicating that the questions written by the experimental group contained less variety than the comparison group. There was no main effect of time, $F(1, 51) = .518$, $MSE = .825$, $p = .475$, $\eta_2 = .010$. There was a significant Group x Time interaction, $F(1, 51) = 7.88$, $MSE = .825$, $p = .003$, $\eta_2 = .134$. Simple effect analyses revealed that the experimental group wrote more of a variety of questions from pretest to posttest, $t(34) = -3.02$, $p = .004$, than the comparison group that did not significantly differ across time, $t(17) = 1.28$, $p = .205$.

Figure 4. Variety of questions generated. This figure illustrates the mean scores of the two groups across two time points.

Inference questions. A 2 x 2 mixed factorial ANOVA was conducted to observe the effect that the lesson had on the number of inference questions participants wrote. The between-subjects factor was group (experimental versus comparison), and the within-subjects factor was time (pretest versus posttest). The dependent variable was the number of inference questions participants wrote.

As depicted in Figure 5, it appears once again that the experimental group wrote fewer inference questions at pretest in relation to the comparison group. There was a main effect of group, $F(1, 51) = 5.93$, $MSE = 3.53$, $p = .018$, $\eta_2 = .104$, indicating the comparison group wrote more inference questions overall compared to the experimental group. There was no main effect of time, $F(1, 51) = 2.66$, $MSE = 1.65$, $p = .109$, $\eta_2 = .050$. There was a significant Group x Time interaction, $F(1, 51) = 4.21$, $MSE = 1.65$, $p = .045$, $\eta_2 = .076$. Simple effect analyses revealed that the experimental group increased in the number of inference questions generated from pretest to posttest, $t(34) = -3.16$, $p = .003$, while the comparison group did not significantly differ across time, $t(17) = .258$, $p = .797$.

Figure 5. Total number of inference questions generated. This figure illustrates the mean scores of the two groups across two time points.

Relationship between RRK, Inference Knowledge and Inference Questions

The third aim of this investigation was to explore whether there was a relationship between participants' knowledge of language constructs, knowledge of children and youth literature, explicit knowledge of literal and inferential comprehension, and ability to create instructional material. An independent t-test, $t(51) = 4.66$, $p < .001$, revealed that the experimental group ($M = 68.12$, $SD = 12.09$) performed higher on the basic language survey than the comparison group ($M = 50.29$, $SD = 15.12$). In contrast, the comparison group ($M = 29.47$, $SD = 17.80$) scored higher than the experimental group ($M = 21.24$, $SD = 9.65$) on the measure of young adult literature, $t(51) = -2.19$, $p = .033$. There were no group differences on knowledge of children's literature $t(51) = -.650$, $p = .519$. The groups were combined to increase numbers to perform a correlational analysis. The correlations, means and standard deviation on knowledge measures are shown in Table 2.

As seen in Table 2, the print exposure measures were positively correlated with each other, and the basic language survey was positively correlated with knowledge of children's literature. There was a strong positive correlation between scores on the posttest measure of explicit knowledge of literal and inferential comprehension and on the basic language survey. Surprisingly, explicit knowledge was not correlated with any of the posttest measures of creating instructional materials. The measures of creating instructional materials (quantity, variety, and number of inference questions generated) were positively correlated with each other. However, the quantity and variety of questions generated were not correlated with any RRK measures. Interestingly, the number of inference questions written were positively correlated with knowledge of young adult literature.

Table 2

Correlations between reading related knowledge, inference knowledge and inference questions across both conditions

Knowledge Measures	1	2	3	4	5	6	7
1. Basic Language	-						
2. ART-YA	.072	-					
3. TRT	.291*	.516**	-				
4. Explicit Knowledge	.450**	.128	.067	-			
5. Number of Questions	-.045	-.042	-.054	.032	-		
6. Variety of Questions	.040	.024	-.088	.134	.498**	-	
7. No. Inference Questions	.066	.316*	.046	.117	.357**	.273**	-
Mean	62.07	24.04	18.00	9.54	6.1	3.36	2.79
SD	15.59	13.42	13.40	2.42	2.39	1.04	1.70
Range	23.68 - 89.47	4.35 – 73.91	-1.90 – 51.43	5-14	3-17	1-5	0-9

Note. N = 53. ART-YA: Author recognition task-young adult literature. TRT: Title recognition task, Explicit knowledge: explicit knowledge of literal and inferential comprehension, #4-7 were posttest data

* p < .05, ** p < .01, one-tailed.

Discussion

Current research suggests that preservice teachers are lacking the content knowledge they need in order to be effective literacy instructors and that this content knowledge can be improved with targeted instruction (e.g., McCutchen, Abbott, et al., 2002). The data reported here are in partial agreement with this literature; while the experimental group of preservice teachers was performing at, or below, the level of the comparison group at the beginning of the study, a lesson on literal and inferential comprehension seemed to influence preservice teachers' ability to create instructional material but not their explicit knowledge of literal and inferential comprehension.

In the field, teachers must be able to differentiate between literal and inferential questions because children tend to score substantially higher on literal questions compared to inferential questions (Bowyer-Crane & Snowling, 2005; Tansey, 2014). For example, Tansey (2014) illustrated that average readers in Grade 5 and 6 scored 31% higher on literal detail questions compared to causal inference questions. Therefore, teachers who create materials that are made up predominately of literal detail questions might overestimate their students' comprehension. This notion was illustrated by Bowyer-Crane and Snowling (2005) who examined two standardized tests of reading comprehension that differed in the degree of literal and inferential questions they contained. This resulted in some students being categorized as poor comprehenders in one test, while these same students were labeled as average readers on the other test. Knowledge of this information is important for teachers when creating instructional material because some questions work against the ultimate goal of student comprehension. For example, embedded inference questions, where the inference is phrased as part of the question, offered no additional help in story retells compared to asking no questions at all (Tansey, 2014).

Based on the sample tested here, it appears that familiarity with the various question-types is not common among university students; the scores on the categorizing and defining task

were only at 50% at the beginning of the study. A lesson that focused on defining the various question-types, followed by practice to identify different literal and inferential questions and finally practice to write different types of questions was not sufficient to increase knowledge in this domain. This finding was not due to a lack of compliance regarding reading the passage or questions or to a lack of understanding of the questions because participants demonstrated high comprehension of the passage by providing appropriate responses.

The lack of an interaction on the explicit knowledge measure was disappointing and unexpected. It could be that not enough time was dedicated to the intervention. In other teacher training studies, the time dedicated to professional development varied from 6 hours with ongoing supervision (Spear-Swerling & Brucker, 2004) to 60 hours (Carreker et al., 2007) to 2 weeks with follow-up meetings (McCutchen, Abbott et al., 2002). It could be that this type of material requires more practice and one-on-one feedback. During the class activities, preservice teachers were given the opportunity to practice identifying question types and to generate various questions. Participants who were willing to share their responses provided answers and thus feedback was given to those participants. Any sort of clarifications was addressed to help preservice teachers reach the correct answer. Because this format was voluntary, not everyone elected to share his or her responses and receive feedback. Therefore, some participants may have misunderstood the information without realizing it.

Perhaps the lack of knowledge gains following the lesson could be attributed to participant motivation. Although the primary instructor emphasized the importance of this topic, participants in the experimental condition were told that the data would be confidential and would not affect their grade or be seen by the primary instructor. This could have affected motivation to participate fully in the tasks. The lesson was split up over two classes and it was

observed that a number of participants forgot to bring handouts that were given the previous class to help retain this information. This could be an indication that participants were not taking the lesson seriously. Part of the lesson took place after an exam, and although the class seemed to be engaged, this may have impacted the retention of the lesson material. Perhaps the anonymity aspect of the study may have made participants hesitant to ask for clarification during the lesson. It was noted that during some of the practice activities in class, the primary instructor had to encourage participants to share their responses.

Although preservice teachers were not able to identify and define the different types of questions being asked, they did seem to be able to generate the inferences themselves, as demonstrated by their high scores on the comprehension task. This pattern mirrors what is noted in the literature about teachers' own reading abilities (high) relative to their explicit reading related knowledge (low). Understanding the structure of language at a tacit level requires intense training to bring the components of language to teachers' awareness (Moats, 2009b). Interestingly, in this study there was a positive correlation between scores on the basic language survey and scores on the explicit knowledge measure of literal and inferential comprehension. This illustrated that the more explicit knowledge participants had of the English language, the more they also knew about the literal and inferential process, and various question types. Therefore, helping teachers understand one aspect of reading at the explicit level may also help them to seek out more information about the reading process.

In spite of the fact that I was not able to improve the preservice teachers' explicit knowledge about inferences, the lesson on literal and inferential comprehension seemed to improve preservice teachers' ability to create instructional materials focused on improving comprehension. Preservice teachers were asked to create questions that would help Grade 5

students understand a passage. Following the intervention, the experimental groups number of total questions, variety of questions and number of inference questions increased.

While there is no research illustrating the ideal number of questions necessary to help students comprehend a passage, asking questions following a passage has been shown to aid in comprehension. McMaster et al. (2012) revealed that the three question conditions (causal questions, general questions, and literal questions) improved story comprehension significantly from pretest to posttest. However, McMaster et al. did not have a control group, therefore, it is difficult to say how these findings would have compared to a condition in which no questions were asked.

In another study conducted with Grade 5 and 6 students, the condition that did not have questions to answers after a text was read, had significantly lower retell scores compared to asking literal detail and causal inference questions (Tansey, 2014). In fact, asking six questions were sufficient to significantly aid in the retention of the passage as long as the questions were asking about literal details or causal inferences. Tansey hypothesized that any question that required the child to reread the text would ultimately improve recall. Of interest to the present study, the preservice teachers generated an average of six questions following the intervention.

The work by Tansey (2014) also demonstrates that students' comprehension can be improved by asking a variety of questions. In line with this view, McMaster et al. (2012) illustrated that depending on students' abilities, some questions offered more support in student comprehension than others. For example, being prompted with causal inference questions helped students who made inaccurate inferences, whereas being asked general questions helped students who made fewer inferences. Therefore, when teachers are preparing instructional materials, writing a variety of questions would potentially help a larger range of students in their classes.

A second reason to ask a variety of questions is to keep students' morale high. Tansey (2014) reported that students rated literal detail questions as more enjoyable than causal inference questions and the sample was better able to calibrate their abilities on these questions. In other words, because information to literal detail questions can be found directly in the text, students can refer back to the passage to verify their answer, thus improving their confidence in their response. Furthermore, literal detail questions offered as much support in story comprehension, measured by retells, as causal inference questions. In this study, preservice teachers started out asking only a couple of different types of questions. However, following an intervention, the experimental group increased in the variety of comprehension questions they created when preparing lesson materials.

While asking a variety of questions is important, it is crucial that the variety include at least some questions targeting inferencing skills. In this total sample, 18.9% of participants asked no inference questions at pretest when creating instructional material. A lecture dedicated to this topic seemed to influence the experimental group's number of inference questions, as they illustrated a greater increase in the number of inference questions generated from pretest to posttest compared to a group that received no lesson on this topic.

A general pattern was observed for the total number, the variety, and the number of inference questions: an increase in the experimental group from pretest to posttest. However, the data showed that the experimental group consistently started out lower at pretest relative to the comparison group. Due to the initial differences between the two groups it is difficult to conclude whether the change in the experimental group's ability to create instructional material was due to the influence of the lesson alone or whether it could be attributed to regression to the mean. The perplexing performance of the experimental group at pretest might be due to a

number of factors. For example, the comparison group demonstrated levels of higher print exposure in young adult literature. The difference in print exposure might explain why the comparison group wrote more questions, more variety and more inference questions at pretest. In the task involving creating instructional material, a passage from a young adult novel was provided. Perhaps the comparison group had an advantage because they had more experience with this type of material. In a correlation analysis, young adult literature was positively correlated with the number of inference questions generated, meaning that the more youth literature the participants had read, the more inference questions they created. The difference between groups on young adult literature knowledge might explain the discrepancy between scores at pretest.

Testing conditions could have also contributed to differences in scores at pretest. Creating comprehension questions was one of the more taxing tasks during the data collection process. Data collection for the experimental condition took place during class time in a group setting, whereas the participants in the comparison condition completed the tasks in a quiet lab or small group setting, and they came in at a time that was convenient for them. To ensure that the topics elicited in the other tasks would not influence the types of questions written, the question generation task was the first to be implemented. For the experimental group this occurred in the evening, during the second part of class, following a lecture. It could be that participants in the experimental group were tired or eager to leave class, which alludes to participant motivation.

An incentive that was used to recruit participants for the comparison group was that partaking in the study would introduce them to important literacy concepts. It is not uncommon for students eager to be accepted into Concordia's teacher training program to begin in the Child Studies program until they are accepted. It could be that the participants in the comparison group

were eager and more invested during the testing phases. For example, participants had up to 20-minutes to complete the question generation task and it was observed that many participants in the experimental group finished prior to the timer ending, whereas most participants in the comparison group used all of the time they were given to complete this task. Certainly, the increase in performance scores on the explicit knowledge measure for the comparison group demonstrated their motivation to learn this material.

Another interest of this study was to investigate the influence that reading related knowledge contributed to creating instructional material. Surprisingly, there was no relationship found between explicit knowledge of question types and the total number, the variety, and the number of inference questions generated. This could be because the lesson did not improve participants' explicit knowledge in this domain, or perhaps this measure was not sensitive enough to capture their knowledge gains following the lesson. Interestingly, knowledge of young adult literature was positively correlated with the number of inference questions generated. However, there was no relation between knowledge of youth literature and the quantity or variety of questions generated. Stories have a causal structure and comprehension involves understanding how events in the passage are connected (Kendeou et al., 2007; Kendeou et al., 2009; van den Broek, 1989a). Perhaps participants who have more experience with youth literature can better identify the key elements in a story that are necessary for comprehension and are better able to inquire about these areas.

Limitations and Future Research

This study extended the literature on teacher reading related knowledge by exploring what preservice teachers understand about comprehension skills. This study also documented the outcomes of a lesson that focused on literal and inferential comprehension on the creation of

instructional classroom material. However, some limitations of this study should be taken into consideration when interpreting the results. First, the explicit knowledge measure seemed to show test-retest effect. This could be controlled for in future studies by only implementing this measure at post-test or by measuring explicit knowledge on multiple occasions before and after the lesson.

For the implementation of the lesson, there was concern that the experimental group was not fully engaged or that there was not enough opportunities to verify if preservice teachers had understood the material. Future studies could use iClickers as a way to ensure participation on behalf of all preservice teachers and it is also an anonymous way for the lecturer to gauge where participants are having trouble and need more clarification.

Data on the creation of instructional material illustrated a selection-regression threat, where the experimental group started off lower at pretest. This could be attributed to differences in testing environment, participant motivation, and differences in initial knowledge. To rule out the influence of these factors in future studies, the use of random assignment would be necessary, which brings up the next topic of methodological design.

Quasi-experimental designs are suitable in educational settings when it is not possible to divide a class due to limited resources, limited class time and a concern of only half the class receiving information from the lesson. For these reasons a true experiment was not feasible in this study. To reduce the limitations of a one-group pretest-posttest design a comparison group was added. However, due to the lack of random assignment as a control method, it is not possible to make causal links from the effects of the lesson. Converging data from an experimental design would provide more insight into the results found here. Nevertheless, this was a first-attempt

exploring new territory of reading related knowledge and to investigate how preservice teachers respond to this type of teaching material.

Implications

Some valuable educational and practical implications can be drawn from this study. Based on this sample, it seems that knowledge of literal and inferential questions is not common knowledge. Thus, it is crucial that this material be taught in teacher training programs. Sheer exposure to this material seemed to increase awareness on the topic, as both groups increased in their scores on the explicit knowledge measure. Therefore, this task may be a good practice activity to accompany lectures. Even though the scores at posttest were higher, they were still less than 62%. To deepen preservice teachers' knowledge in this area it may be necessary to devote more than one lecture to this topic. Another topic that should also be incorporated into teacher training programs is the importance of print exposure, specifically young adult literature. Knowledge of young adult literature was positively correlated with the number of inference questions generated. Incorporating authentic literature into class assignments would be a feasible way to encourage preservice teachers to explore youth literature.

Asking comprehension questions is a traditional classroom practice. Observing the total number of questions and the number of inference questions generated by the sample as a whole, it seems this task may be more challenging than anticipated. In practice, teachers should dedicate time during their lesson planning to create comprehension questions. Otherwise if these questions are formulated without much consideration, they may not be targeting their students' comprehension effectively.

Conclusion

Over the past decade research on teacher reading related knowledge has focused on several aspects of decoding. However, few studies have been dedicated to understanding teachers' knowledge of reading comprehension, especially inferential processes. It is particularly important to understand how this type of knowledge influences classroom practice. This study demonstrated that explicit knowledge of inferencing is not common knowledge and thus is an important topic to cover in teacher training programs. Although one lecture was not sufficient to increase knowledge in this area, one lesson seemed to influence how preservice teachers create instructional material.

References

Angleberger, T. (2010). The strange case of origami yoda. New York, NY: Abrams

Binks-Cantrell, E., Washburn, E. K., Joshi, R., & Hougen, M. (2012). Peter effect in the
preparation of reading teachers. *Scientific Studies of Reading*, *16*, 526-536.
doi:10.1080/10888438.2011.601434

Bos, C., Mather, N., Dickson, S., Podhajski, B., & Chard, D. (2001). Perceptions and knowledge
of preservice and inservice educators about early reading instruction. *Annals of Dyslexia*,
51, 97-120. doi:10.1007/s11881-001-0007-0

Boulware-Gooden, R., Carreker, S., Thornhill A., Joshi, M. (2007). Instruction of metacognitive
strategies enhances reading comprehension and vocabulary achievement of third-grade
students. *The Reading Teacher, 61*, 70–77. doi:10.1598/RT.61.1.7

Bowyer-Crane, C., & Snowling, M. J. (2005). Assessing children's inference generation: What
do tests of reading comprehension measure?. *British Journal of Educational Psychology*,
75, 189-201. doi:10.1348/000709904X22674

Cain, K., & Oakhill, J. V. (1999). Inference making ability and its relation to comprehension
failure in young children. *Reading and Writing*, *11*, 489-503.
doi:10.1023/A:1008084120205

Cain, K., & Oakhill, J. (2006). Profiles of children with specific reading comprehension
difficulties. *British Journal of Educational Psychology, 76*, 683-696. doi:
10.1348/000709905X67610

Cain, K., Oakhill, J. V., & Barnes, M. A. (2001). Comprehension skill, inference-making ability,
and their relation to knowledge. *Memory & Cognition*, *29*, 850-859. doi:
10.3758/BF03196414

Cardoso-Martins, C., Mesquita, T., & Ehri, L. (2011). Letter names and phonological awareness help children to learn letter–sound relations. *Journal of Experimental Child Psychology*, *109*, 25-38. doi:10.1016/j.jecp.2010.12.006

Carreker, S. H., Neuhaus, G. F., Swank, P. R., Johnson, P., Monfils, M. J., & Montemayor, M. L. (2007). Teachers with linguistically informed knowledge of reading subskills are associated with a matthew effect in reading comprehension for monolingual and bilingual students. *Reading Psychology, 28*, 187-212. doi: 10.1080/02702710601186456

Cunningham, A. E., Perry, K. E., Stanovich, K. E., & Stanovich, P. J. (2004). Disciplinary knowledge of K-3 teachers and their knowledge calibration in the domain of early literacy. *Annals of Dyslexia*, *54*, 139-167. doi:10.1007/s11881-004-0007-y

Cunningham, A. E., Zibulsky, J., Stanovich, K. E., & Stanovich, P. J. (2009). How teachers would spend their time teaching language arts: The mismatch between self-reported and best practices. *Journal of Learning Disabilities*, *42*(5), 418-430. doi:10.1177/0022219409339063

Florit, E., Roch, M., & Levorato, M. (2011). Listening text comprehension of explicit and implicit information in preschoolers: The role of verbal and inferential skills. *Discourse Processes*, *48*, 119-138. doi:10.1080/0163853X.2010.494244

Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education, 7*, 6-10. doi:10.1177/074193258600700104

Joshi, R., Binks, E., Graham, L., Ocker-Dean, E., Smith, D. L., & Boulware-Gooden, R. (2009). Do textbooks used in university reading education courses conform to the instructional recommendations of the National Reading Panel?. *Journal of Learning Disabilities*, *42*, 458-463. doi:10.1177/0022219409338739

Joshi, R., Binks, E., Hougen, M., Dahlgren, M. E., Ocker-Dean, E., & Smith, D. L. (2009). Why elementary teachers might be inadequately prepared to teach reading. *Journal of Learning Disabilities*, *42*, 392-402. doi:10.1177/0022219409338736

Kendeou, P., van den Broek, P., White, M., & Lynch, J. (2007). Comprehension in preschool and early elementary children: Skill development and strategy interventions. In D. S. McNamara (Ed.) , *Reading comprehension strategies: Theories, interventions, and technologies* (pp. 27-45). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

Kendeou, P., van den Broek, P., White, M., & Lynch, J. S. (2009). Predicting reading comprehension in early elementary school: The independent contributions of oral language and decoding skills. *Journal of Educational Psychology, 101*, 765-778. doi:10.1037/a0015956

Kintsch, W., & Kintsch, E. (2005). Comprehension. In S. G. Paris, S. A. Stahl (Eds.), *Children's reading comprehension and assessment* (pp. 71-92). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

Kispal, A. (2008). Effective teaching of inference skills for reading. literature review. Research report DCSF-RR031. Berkshire, UK: National Foundation for Educational Research.

Kleeck, A. (2008). Providing preschool foundations for later reading comprehension: The importance of and ideas for targeting inferencing in storybook-sharing interventions. *Psychology in The Schools*, *45*, 627-643. doi: 10.1002/pits.20314

Ladd, M., Martin-Chang, S., & Levesque, K. (2011). Parents' reading-related knowledge and children's reading acquisition. *Annals of Dyslexia*, *61*, 201-222. doi: 10.1007/s11881-011-0053-1

Law, I. (2008). Savvy. New York, NY: Penguin group.

Law, I. (2010). Scumble. New York, NY: Penguin group.

Levin, I., & Ehri, L. C. (2009). Young children's ability to read and spell their own and classmates' names: The role of letter knowledge. *Scientific Studies of Reading*, 13, 249-273. doi:10.1080/10888430902851422

Mather, N., Bos, C., & Babur, N. (2001). Perceptions and knowledge of preservice and inservice teachers about early literacy instruction. *Journal of Learning Disabilities*, *34*, 472-482. doi:10.1177/002221940103400508

McClintock, B., Pesco, D., & Martin-Chang, S. (in press). Reading between the lines: Inferences by children with specific language impairment and their peers.

McCutchen, D., Abbott, R. D., Green, L. B., Beretvas, S., Cox, S., Potter, N. S., & ... Gray, A. L. (2002). Beginning literacy: Links among teacher knowledge, teacher practice, and student learning. *Journal of Learning Disabilities*, *35*, 69-86. doi:10.1177/002221940203500106

McCutchen, D., Harry, D. R., Cunningham, A. E., Cox, S., Sidman, S., & Covill, A. E. (2002). Reading teachers' knowledge of children's literature and English phonology. *Annals of Dyslexia*, *52*207-5228. doi:10.1007/s11881-002-0013-x

McGee, A., & Johnson, H. (2003). The effect of inference training on skilled and less skilled comprehenders. *Educational Psychology*, *23*, 49-59. doi:10.1080/01443410303220

McKeown, M. G., Beck, I. L., & Blake, R. K. (2009). Rethinking reading comprehension instruction: A comparison of instruction for strategies and content approaches. *Reading Research Quarterly*, *44*, 218-253. doi:10.1598/RRQ.44.3.1

McMaster, K. L., van den Broek, P., Espin, C. A., White, M., Rapp, D. N., Kendeou, P., & ... Carlson, S. (2012). Making the right connections: Differential effects of reading

intervention for subgroups of comprehenders. *Learning and Individual Differences*, *22*, 100-111. doi:10.1016/j.lindif.2011.11.017

Melby-Lervåg, M., Lyster, S., & Hulme, C. (2012). Phonological skills and their role in learning to read: A meta-analytic review. *Psychological Bulletin*, 138, 322-352. doi:10.1037/a0026744

Moats, L. (1994). The missing foundation in teacher education: Knowledge of the structure of spoken and written language. *Annals of Dyslexia, 44*, 81-104.

Moats, L. (2009a). Knowledge foundations for teaching reading and spelling. *Reading and Writing*, *22*, 379-399. doi:10.1007/s11145-009-9162-1

Moats, L. (2009b). Still wanted: Teachers with knowledge of language. *Journal of Learning Disabilities*, *42*, 387-391. doi:10.1177/0022219409338735

National Center for Education Statistics (2013). The nation's report card: National Assessment of Educational Progress at Grades 4 and 8. NCES 2014–451, U.S. Washington DC: Department of Education. Retrieved from http://nces.ed.gov/nationsreportcard/subject/publications/main2013/pdf/2014451.pdf

National Reading Panel. (2000). Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction. Washington, DC: National Institutes of Health. Retrieved from https://www.nichd.nih.gov/publications/pubs/nrp/Pages/smallbook.aspx

Oakhill, J. (1982). Constructive processes in skilled and less skilled comprehenders' memory for sentences. *British Journal of Psychology, 73*, 13-20. doi: 10.1111/j.2044-8295.1982.tb01785.x

Oakhill, J., & Cain, K. (2007). Issues of causality in children's reading comprehension. In D. S. McNamara (Ed.), *Reading comprehension strategies: Theories, interventions, and technologies* (pp. 47-71). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

Oakhill, J. V., & Cain, K. (2012). The precursors of reading ability in young readers: Evidence from a four-year longitudinal study. *Scientific Studies of Reading, 16,* 91-121. doi:10.1080/10888438.2010.529219

Oakhill, J., Yuill, N., & Parkin, A. (1986). On the nature of the difference between skilled and less-skilled comprehenders. *Journal of Research in Reading*, *9*, 80-91. doi:10.1111/j.1467-9817.1986.tb00115.x

Ouellette, G. P. (2006). What's meaning got to do with it: The role of vocabulary in word reading and reading comprehension. *Journal of Educational Psychology*, *98*, 554-566. doi:10.1037/0022-0663.98.3.554

Ouellette, G., & Beers, A. (2010). A not-so-simple view of reading: How oral vocabulary and visual-word recognition complicate the story?. *Reading and Writing*, *23*, 189-208. doi:10.1007/s11145-008-9159-1

Paor, A., Tansey, S., & Martin-Chang, S. (2013, May). *"It didn't say that": Teacher's knowledge and ability to foster inference-making skills*. Poster presentation for the International Workshop on Reading and Developmental Dyslexia, San Sebastian, Spain.

Podhajski, B., Mather, N., Nathan, J., & Sammons, J. (2009). Professional development in scientifically based reading instruction: Teacher knowledge and reading outcomes. *Journal of Learning Disabilities*, *42*, 403-417. doi:10.1177/0022219409338737

Potocki, A., Ecalle, J., & Magnan, A. (2013). Narrative comprehension skills in 5-year-old children: Correlational analysis and comprehender Profile. *The Journal of Educational Research*, 106, 14-26. doi:10.1080/00220671.2012.667013.

Pressley, M., Wharton-McDonald, R., Mistretta-Hampston, J., & Echevarria, M. (1998). The nature of literacy instruction in ten grade-4/5 classrooms in upstate New York. *Scientific Studies of Reading*, *2*, 159-194. doi:10.1207/s1532799xssr0202_4

Riordan, R. (2008). The 39 clues book one: The maze of bones. New York, NY: Scholastics Inc.

Scheiner, E., & Gorsetman, C. (2009). Do preschool teachers consider inferences for book discussions? *Early Child Development and Care, 179,* 595-608. doi: 10.1080/03004430701425851

Shmidman, A., & Ehri, L. (2010). Embedded picture mnemonics to learn letters. *Scientific Studies of Reading*, *14*, 159-182. doi:10.1080/10888430903117492

Snowling, M. J., & Hulme, C. (2011). Evidence-based interventions for reading and language difficulties: Creating a virtuous circle. *British Journal of Educational Psychology*, *81*, 1-23. doi:10.1111/j.2044-8279.2010.02014.x

Spear-Swerling, L., & Brucker, P. (2004). Preparing novice teachers to develop basic reading and spelling skills in children. *Annals of Dyslexia*, *54*, 332-359. doi:10.1007/s11881-004-0016-x

Spear-Swerling, L., & Cheesman, E. (2012). Teachers' knowledge base for implementing response-to-intervention models in reading. *Reading and Writing*, *25*, 1691-1723. doi:10.1007/s11145-011-9338-3

Stanovich, K. E., & West**,** R. F. (1989). Exposure to print and orthographic processing. *Reading Research Quarterly*, 24, 402-433. doi: 10.2307/747605

Tansey, S. (2014). *Ask me about it: The role of inferencing questions in fostering students' reading comprehension*. (Unpublished master's thesis). Concordia University, Montreal. Retrieved from: http://spectrum.library.concordia.ca/979090/1/Tansey_MA_F2014.pdf

van den Broek, P. (1989a). Causal reasoning and inference making in judging the importance of story statements. *Child Development, 60*, 286-297.doi: 10.2307/1130976

van den Broek, P. (1989b). The effects of causal structure on the comprehension of narratives: Implications for education. *Reading Psychology*, *10*, 19-44. doi:10.1080/0270271890100103

van den Broek, P., Kendeou, P., Kremer, K., Lynch, J., Butler, J., White, M., & Lorch, E. (2005). Assessment of comprehension abilities in young children. In S. G. Paris, S. A. Stahl (Eds.), *Children's reading comprehension and assessment* (pp. 107-130). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

van Kleeck, A. (2008). Providing preschool foundations for later reading comprehension: The importance of and ideas for targeting inferencing in storybook-sharing interventions. *Psychology in the Schools, 45*, 627-643. doi:10/1002/pits.20314

Washburn, E. K., Joshi, R., & Binks-Cantrell, E. S. (2011a). Are preservice teachers prepared to teach struggling readers?. *Annals of Dyslexia*, *61*, 21-43. doi: 0.1007/s11881-010-0040-y

Washburn, E. K., Joshi, R., & Binks-Cantrell, E. S. (2011b). Teacher knowledge of basic language concepts and dyslexia. *Dyslexia: An International Journal of Research and Practice*, *17*, 165-183. doi:10.1002/dys.426

Yeh, Y., McTigue, E. M., & Joshi, R. (2012). Moving from explicit to implicit: A case study of improving inferential comprehension. *Literacy Research and Instruction*, *51*, 125-142. doi:10.1080/19388071.2010.546492

Yuill, N., & Oakhill, J. (1988). Effects of inference awareness training on poor reading

comprehension. *Applied Cognitive Psychology*, *2*, 33-45. doi:10.1002/acp.2350020105

Appendix A

Letter of Consent

CONSENT TO PARTICIPATE IN:
Concordia Reading Investigation

This is to state that I agree to participate in a program of research being conducted by Dr. Sandra Martin-Chang of the Department of Education at Concordia University. She may be reached by phone (514) 848-2424 x8932, or email at smartinc@education.concordia.ca.

A. PURPOSE
I have been informed that the purpose of the research is to study how reading interest and knowledge are related to the instruction of reading comprehension. The survey is designed to inform our teaching for preservice teachers in primary teacher certification.

B. PROCEDURES
I will be asked to fill out a 60-minute questionnaire about my knowledge of reading comprehension. I will participate in a reading workshop, followed by a 45-minute questionnaire. I have been informed that all of these tasks will take place during class time. I understand that my answers on the questionnaire will be completely confidential, and a participant number will used beyond this point. Data will be kept in a locked room at all times, and will be destroyed after a period of 5 years. Only group data from this project will be published.

C. RISKS AND BENEFITS
I have been informed that there is minimal risk to my involvement in this study. On the contrary, the researchers hope that I will directly benefit from my participation by learning about the types of reading-related knowledge that contribute to literacy. Upon completion of my questionnaire, I will also be receiving children's books for participation.

D. CONDITIONS OF PARTICIPATION
- I understand that I am free to withdraw my consent and discontinue my participation at any time without negative consequences.
- I understand that my participation in this study is confidential.
- I understand that neither the school nor the Professor will have access to individualized results of this study at any time.
- I understand that the data in this study may be published.

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

NAME (please print): _____
SIGNATURE: _____
If at any time you have questions about your rights as a research participant, please contact the Research Ethics and Compliance Advisor, Concordia University, Dr. Brigitte Des Rosiers, at (514) 848-2424 x7481 or by email at bdesrosi@alcor.concordia.ca

Appendix B

Demographic Questionnaire

1. Please circle your **GENDER:**
                Male   Female

2. Please provide your **AGE:**
_____

3. What ethnicity do you identify with?
_____

4a. Please provide your **NATIVE** language:
_____

4b. Do you speak any other languages? If yes, please specify below.
_____

5. Do you have a previous University degree? Please indicate the degree
       No   Yes, specify_____

6.Please indicate the year in the Early Childhood Education Program you are in:
            1st   2nd   3rd   4th   other: _____

7. Do you have a minor degree? If so, please specify
       No   Yes, specify_____

8a. Please provide the <u>number</u> of course (s) you have taken related to reading education
_____

8b. Please provide the reading education course subject(s) you have taken (e.g., introduction to elementary-level reading, assessment in early childhood reading, children's literature, content area literacy, etc.):

Appendix C

Defining Question Types

1.   Reading a text and answering questions based on explicit information found within the text describes:

    a.   inferential comprehension
    b.   literal comprehension
    c.   summarization
    d.   question generation
    e.   no idea

2.   Questions that combine background knowledge and text information to create a response describes which of the following:
    a.   inferential comprehension
    b.   literal comprehension
    c.   summarization
    d.   question generation
    e.   no idea

3.   _____ are the unstated links in a text that explain how or why two parts of the text are connected:
    a.   Causal inferences
    b.   Informational inferences
    c.   Main ideas
    d.   Summaries
    e.   Details
    f.   no idea

4.   _____ allow readers to go beyond what is written about the setting, characters etc. to create richer text representations.
    a.   Causal inferences
    b.   Informational inferences
    c.   Main ideas
    d.   Summaries
    e.   Details
    f.   no idea

5.   _____: the gist(s) of the authors intended message. In narratives, they often deal with initiating events, roadblocks, and resolutions.
    a.   Causal inferences
    b.   Informational inferences
    c.   Main ideas
    d.   Semantic mapping
    e.   Details
    f.   no idea

6.   _____ can be major or minor. They support comprehension by informing the reader of how, what, when, where, why, how much and how many.
    a.   Causal inferences
    b.   Informational inferences
    c.   Main ideas
    d.   Semantic mapping
    e.   Details
    f.   no idea

Appendix D

Identifying Comprehension Questions Version A

INSTRUCTIONS: Please read the following passage, <u>answer the questions</u>, and identify the question types.

Mark gives a gift

Mark wanted to give his sister a gift for her birthday. He wanted it to be very special. Mark thought for a long time. He knew that chocolate cake was his sister's favorite dessert. Mark found all of the ingredients. He followed the instructions. First he mixed in the sugar, butter and eggs. He poured the batter into the pan. He put the cake in the oven. Mark was taking the cake out of the oven when he dropped the pan. He ran to the sink, and stuck his right hand under running water. "All that work for nothing" he thought. Then he looked at the cake more closely, it seemed okay but it had a crack in the middle. Mark had an idea. He made some icing. He put lots of icing on the cake. He lit seven candles. Mark's sister was very happy.

E.g. How did Mark's sister feel at the end of the story?

Answer: _Mark's sister was happy._

E.g. What type of question was this?

       a)   Literal: Main idea

       b)   Literal: Details

       c)   Inference: Causal

       d)   Inference: Informational

       e)   Embedded Inference

       f)   I'm not sure

1.Why did Mark want to give his sister a gift? (*Because it was her birthday)*
Answer:_____
What type of question was this?
- a)   Literal: Main idea
- b)   Literal: Details
- c)   Inference: Causal
- d)   Inference: Informational
- e)   Embedded Inference
- f)   I'm not sure

2. What did Mark mix in the cake batter first? *(Sugar, butter and eggs)*
Answer:_____
What type of question was this?
- a)   Literal: Main idea
- b)   Literal: Details
- c)   Inference: Causal
- d)   Inference: Informational
- e)   Embedded Inference
- f)   I'm not sure

3.Why did Mark put his hand under running water? *(Because he burnt his hand on the pan)*
Answer: _____
What type of question was this?
- a)   Literal: Main idea
- b)   Literal: Details
- c)   Inference: Causal
- d)   Inference: Informational
- e)   Embedded Inference
- f)   I'm not sure
- g)

4. What hand did he put under running water? *(right hand)*
Answer:_____
What type of question was this?
- a)   Literal: Main idea
- b)   Literal: Details
- c)   Inference: Causal
- d)   Inference: Informational
- e)   Embedded Inference
- f)   I'm not sure

5. What happened to the cake after it dropped? *(It had a crack in the middle)*
Answer:_____
What type of question was this?
- a)   Literal: Main idea
- b)   Literal: Details
- c)   Inference: Causal
- d)   Inference: Informational
- e)   Embedded Inference
- f)   I'm not sure

6. What color is the cake? *(brown)*
Answer:_____
What type of question was this?
- a)   Literal: Main idea
- b)   Literal: Details
- c)   Inference: Causal

d)   Inference: Informational
e)   Embedded Inference
f)   I'm not sure

7. How old is Mark's sister? *(Seven-years-old)*
Answer:_____
What type of question was this?
     a)   Literal: Main idea
     b)   Literal: Details
     c)   Inference: Causal
     d)   Inference: Informational
     e)   Embedded Inference
     f)   I'm not sure

8. How did Mark feel at the end of the story? *(Proud, happy)*
Answer:_____
     What type of question was this?
     a)   Literal: Main idea
     b)   Literal: Details
     c)   Inference: Causal
     d)   Inference: Informational
     e)   Embedded Inference
     f)   I'm not sure

9. Was Mark upset he dropped the cake? Explain. *(Yes, he says, "all that work for nothing")*
Answer:_____
What type of question was this?
     a)   Literal: Main idea
     b)   Literal: Details
     c)   Inference: Causal
     d)   Inference: Informational
     e)   Embedded Inference
     f)   I'm not sure

10. Does Mark have a good relationship with his sister? Explain. (*yes he wanted to do something special for her birthday)*
Answer:_____
What type of question was this?
     a)   Literal: Main idea
     b)   Literal: Details
     c)   Inference: Causal
     d)   Inference: Informational
     e)   Embedded Inference
     f)   I'm not sure

Appendix E

Identifying Comprehension Questions Version B

INSTRUCTIONS: Please read the following passage, <u>answer the questions</u>, and identify the question types.

Anna and her Dog

Anna walked her dog through the park. They stopped by the swings to play fetch. Anna threw the ball over and over again until her arm was getting tired. Suddenly, a cat crossed their path and her dog chased after it. Anna called out her dog's name but he did not return. Anna looked by the water fountain. Her dog was not there. She looked by the baseball field. The baseball players had not seen her dog. Anna asked for their help and the team split up to find the dog, but had no luck. Anna looked until it was getting dark. Finally, she started to walk home. She passed by the swings on her way. Her dog was waiting for her with the ball. Anna ran and gave her dog a hug. When Anna got home she decided she would call the dog trainer the next day.

E.g. What did Anna do when her dog did not return to her call?

Answer: *She went looking for her dog*

E.g. What type of question was this?

- a) Literal: Main idea
- b) Literal: Details
- c) Inference: Causal
- d) Inference: Informational
- e) Embedded Inference
- **f) I'm not sure**

1.Where did Anna walk her dog? *(through the park)*

Answer:_____

What type of question was this?

      a) Literal: Main idea
      b) Literal: Details
      c) Inference: Causal
      d) Inference: Informational
      e) Embedded Inference
      f) I'm not sure

2. What game did Anna and her dog play? *(They played fetch)*

Answer:_____

What type of question was this?

      a) Literal: Main idea
      b) Literal: Details
      c) Inference: Causal
      d) Inference: Informational
      e) Embedded Inference
      f) I'm not sure

3.Did Anna and her dog play for a long time? (*Yes because Anna's arm was tired)*

Answer: _____

What type of question was this?

      a) Literal: Main idea
      b) Literal: Details
      c) Inference: Causal
      d) Inference: Informational
      e) Embedded Inference
      f) I'm not sure

4. What did Anna's dog do when the cat crossed their paths? (*Chased after it)*

Answer:_____

What type of question was this?

      a) Literal: Main idea
      b) Literal: Details
      c) Inference: Causal
      d) Inference: Informational
      e) Embedded Inference
      f) I'm not sure

5. Why did Anna pass the swings on her way home? *(Because that's where she stopped to play)*

Answer:_____

What type of question was this?

      a) Literal: Main idea
      b) Literal: Details
      c) Inference: Causal
      d) Inference: Informational
      e) Embedded Inference
      f) I'm not sure

6. Where did Anna find her dog? (*Anna found her dog by the swings)*

Answer:_____

What type of question was this?

      a) Literal: Main idea
      b) Literal: Details

c)   Inference: Causal
d)   Inference: Informational
e)   Embedded Inference
f)   I'm not sure

7. Was Anna happy to find her dog? (*Yes she hugged him*)
Answer:_____
What type of question was this?

    a)   Literal: Main idea
    b)   Literal: Details
    c)   Inference: Causal
    d)   Inference: Informational
    e)   Embedded Inference
    f)   I'm not sure

8. What time of the day was it when Anna got home? *(night because it was dark)*
Answer:_____
What type of question was this?

    a)   Literal: Main idea
    b)   Literal: Details
    c)   Inference: Causal
    d)   Inference: Informational
    e)   Embedded Inference
    f)   I'm not sure

9. What did Anna decide to do when she got home? *Call the dog trainer*
Answer:_____
    What type of question was this?

    a)   Literal: Main idea
    b)   Literal: Details
    c)   Inference: Causal
    d)   Inference: Informational
    e)   Embedded Inference
    f)   I'm not sure

10. **Why did Anna decide to call the dog trainer?** *(because her dog chased the cat and didn't return when she called him)*
Answer:_____
What type of question was this?

    a)   Literal: Main idea
    b)   Literal: Details
    c)   Inference: Causal
    d)   Inference: Informational
    e)   Embedded Inference
    f)   I'm not sure

Appendix F

Creating Instructional Material from Savvy

INSTRUCTIONS: The passage enclosed below was used last year as a novel unit in a Grade 5 classroom. If you were the classroom teacher, what questions would you use to help guide the comprehension of your students? Please write the questions along with the correct answers.

Chapter 1

WHEN MY BROTHER FISH TURNED THIRTEEN, we moved to
the deepest part of inland because of the hurricane and, of
course, the fact that he'd caused it. I had liked living down
south on the edge of land, next to the pushing-pulling waves.
I had liked it with a mighty kind of liking, so moving had
been hard—hard like the pavement the first time I fell off
my pink two-wheeler and my palms burned like fire from
all of the hurt just under the skin. But it was plain that Fish
could live nowhere near or nearby or next to or close to or
on or around any largish bodies of water. Water had a way
of triggering my brother and making ordinary, everyday
weather take a frightening turn for the worse.

1
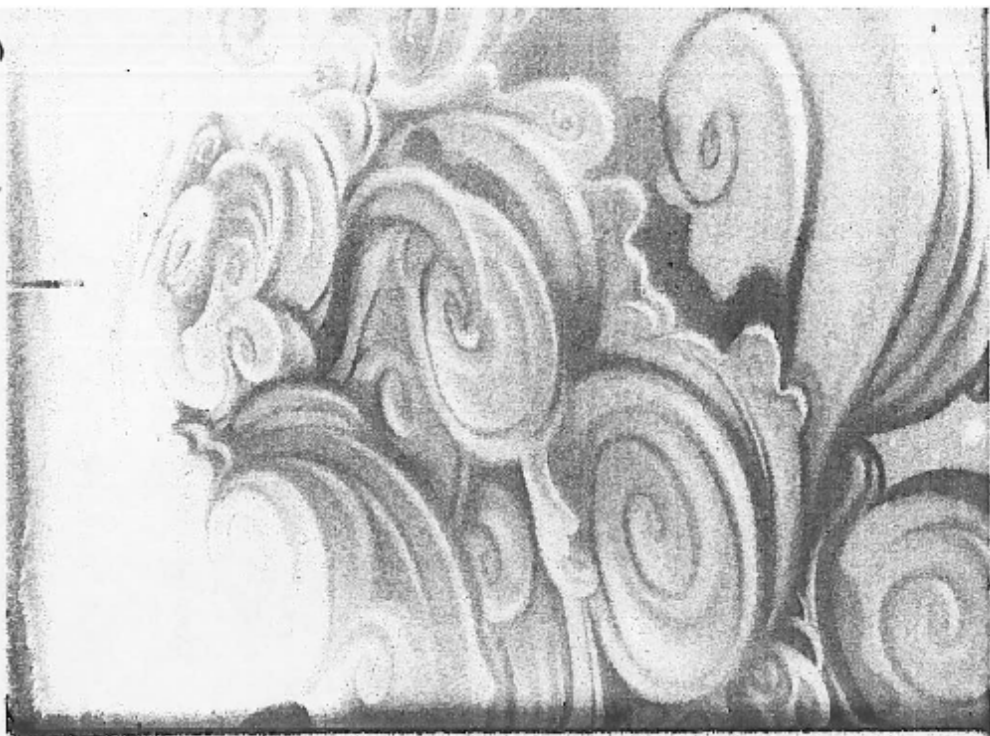
Unlike any normal hurricane, Fish's birthday storm had started without warning. One minute, my brother was tearing paper from presents in our backyard near the beach; the next minute, both Fish and the afternoon sky went a funny and fearsome shade of gray. My brother gripped the edge of the picnic table as the wind kicked up around him, gaining momentum and ripping the wrapping paper out of his hands, sailing it high up into the sky with all of the balloons and streamers rolling together and disintegrating like a birthday party in a blender. Groaning and cracking, trees shuddered and bent over double, uprooting and falling as easily as sticks in wet sand. Rain pelted us like gravel thrown by a playground bully as windows shattered and shingles ripped off the roof. As the storm surged and the ocean waves tossed and churned, spilling raging water and debris farther and farther up the beach, Momma and Poppa grabbed hold of Fish and held on tight, while the rest of us ran for cover. Momma and Poppa knew what was happening. They had been expecting something like

2

this and knew that they had to keep my brother calm and help him ride out his storm.

That hurricane had been the shortest on record, but to keep the coastal towns safe from our Fish, our family had packed up and moved deep inland, plunging into the very heart of the land and stopping as close to the center of the country as we could get. There, without big water to fuel big storms, Fish could make it blow and rain without so much heartache and ruin.

Setting directly between Nebraska and Kansas in a little place all our own, just off Highway 81, we were well beyond hollering distance from the nearest neighbor, which was the best place to be for a family like ours. The closest town was merely a far-off blur across the highway, and was not even big enough to have its own school or store, or gas station or mayor.

Monday through Wednesday, we called our thin stretch of land Kansaska. Thursday through Saturday, we called it Nebransas. On Sundays, since that was the Lord's Day, we called it nothing at all, out of respect for

3

His creating our world without the lines already drawn on its face like all my grandpa's wrinkles.

If it weren't for old Grandpa Bomba, Kansaska-Nebransas wouldn't even have existed for us to live there. When Grandpa wasn't a grandpa and was just instead a small-fry, hobbledehoy boy blowing out thirteen dripping candles on a lopsided cake, his savvy hit him hard and sudden—just like it did to Fish that day of the backyard birthday party and the hurricane—and the entire state of Idaho got made. At least, that's the way Grandpa Bomba always told the story.

"Before I turned thirteen," he'd say, "Montana bumped dead straight into Washington, and Wyoming and Oregon shared a cozy border." The tale of Grandpa's thirteenth birthday had grown over the years just like the land he could move and stretch, and Momma just shook her head and smiled every time he'd start talking tall. But in truth, that young boy who grew up and grew old like wine and dirt, had been making new places whenever and wherever he pleased. That was Grandpa's savvy.

My savvy hadn't come along yet. But I was only two days away from my very own thirteen dripping candles—though my momma's cakes never lopped to the side or to the middle. Momma's cakes were perfect, just like Momma, because that was her savvy. Momma was perfect. Anything she made was perfect. Everything she did was perfect. Even when she messed up, Momma messed up perfectly.

I often reckoned what it would be like for me. I pictured myself blowing out the candles on my cake and fires dying in chimneys across four counties. Or I imagined making my secret birthday wish—getting my cheeks full and round with air—then floating up toward the ceiling like my very own happy birthday balloon.

"My savvy is going to be a good one," I told my brother Rocket. "I just know it."

"Girls don't get the powerful jujubes," said Rocket, running one hand through his dark shock of unkempt hair with a crackle of static. "Girls only get quiet, polite savvies—sugar and spice and everything humdrum

savvies. It's boys who get the earthshaking kinds of savvy."

I had scowled at my brother and stuck out my tongue. Rocket and I both knew that there were plenty of girls climbing round our family tree that had strong and sturdy savvies, like Great-aunt Jules, who could step back twenty minutes in time every time she sneezed; or our second cousin Olive, who could melt ice with a single red-hot stare.

Rocket was seventeen and full of junk that I wasn't allowed to say until I got much, much older. But he was electric through and through, and that had always gone to his head. For fun, Rocket would make my hair stand on end like he'd rubbed it with a balloon, or hit Fish with a wicked zap from the other side of the room. But Rocket could keep the lights on when the power went out, and our family sure liked that, especially the littler Beaumonts.

Rocket was the oldest, with Fish and me following after. Born only a year apart, Fish and I were nearly the same height and looked a lot alike, both with hair like

sand and straw—hair like Momma's. But while I had Poppa's hazel eyes, Fish had Momma's ocean blue ones. It was as if we'd each taken a little bit of Momma, or a little bit of Poppa, and made the rest our own.

I wasn't the youngest or the smallest in the family; broody Samson was a dark and shadowy seven, and doll-faced Gypsy was three. It was Gypsy who started calling me Mibs, when my full name, Mississippi, became far too much for her toothsome toddler tongue to manage. But that had been a relief. That name had always followed me around like one of Fish's heavy storm clouds.

Appendix G

Creating Instructional Material from Scumble

INSTRUCTIONS: The passage enclosed below was used last year as a novel unit in a Grade 5 classroom. If you were the classroom teacher, what questions would you use to help guide the comprehension of your students? Please write the questions along with the correct answers.
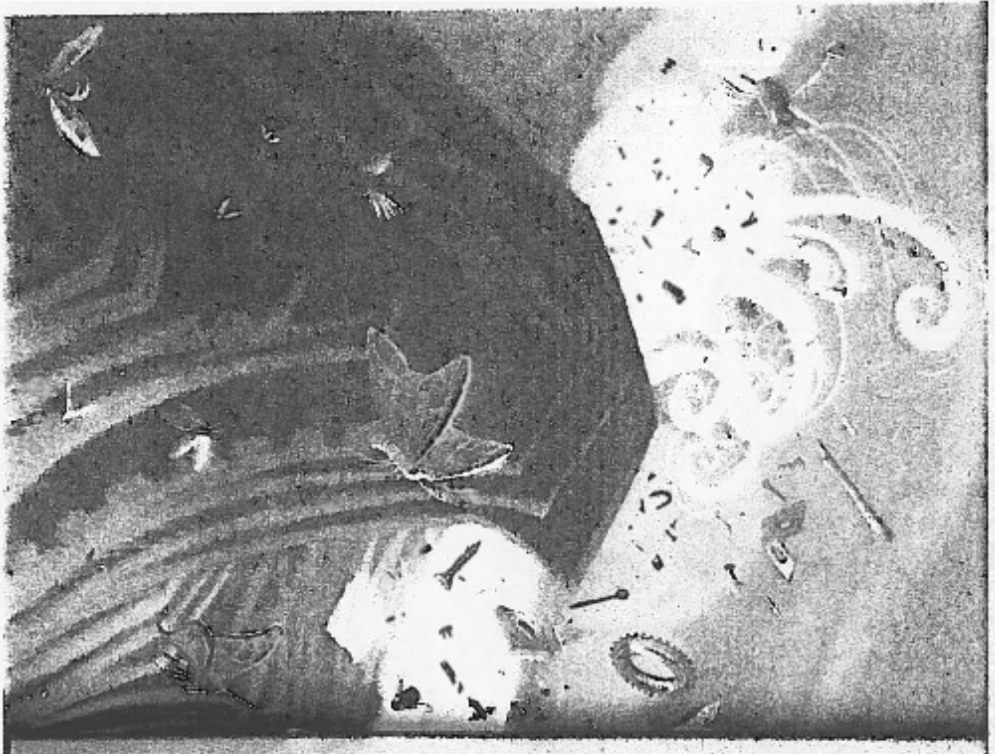
Chapter 1

MOM AND DAD HAD KNOWN ABOUT the wedding at my uncle Autry's ranch for months. But with the date set a mere ten days after my thirteenth birthday, my family's RSVP had remained solidly unconfirmed until the last possible wait-and-see moment. We had to wait until my birthday came and went. We had to see if anything exploded, caught fire, or flooded before committing to a long-haul trip across four states in the minivan. In my family, thirteenth birthdays were like time bombs, with no burning fuse or beeping countdown to tell you when to plug your ears, duck, brace yourself, or turn tail and get the hay bales out of Dodge.

1

I'd known for years that something in my blood and guts and brains and bones was poised to turn me tall-tale, gollywhopper weird. On my thirteenth birthday, a mysterious ancestral force would hit like lightning, giving me my very own off-the-wall talent. My very own *savvy*. Making me just like the rest of the spectacular square pegs I was related to.

My mom's side of the family had always been more than a little different. I doubted there were many people with a time-hopping great-aunt, a grandpa who shaped mountains and valleys out of land once pancake-flat, and a mix of cousins who ranged from electric to mind-reading to done-gone vanished—*Poof!* I'd even had a great-uncle who could spit hailstones like watermelon seeds, or gargle water into vapor and blow it out his ears. When Great-uncle Ferris turned thirteen, his savvy had stunned him with a sudden, sunny-colored snowstorm inside the family outhouse, toppling the small shack like an overburdened ice chest that rolled down the hill with him still inside it.

As for me, I'd been sure my birthday would treat me better—sure I had the perfect mix of genes to make me supersonically swift. Unlike Mom, Dad was ordinary, but even without a savvy, he was still one of the best runners in Vanderburgh County. So it was practically destiny that I'd become the fastest member of the Theodore Roosevelt Middle School track team. The fastest kid on the *planet*.

Nothing worked out the way I'd hoped.

On my thirteenth birthday, I didn't get bigger, better, stronger muscles, or start racing at the speed of light. I didn't get the ability to whiz blizzards in the blaze of summer, either. But it wasn't like I hadn't gotten a savvy of my own.

Watches and windshield wipers everywhere, look out! I could blow stuff apart without a touch, dismantling small things in bursts of parts and pieces: a light switch here, a doorknob there, garage door opener, can opener, Dad's stop watch, his electric nose-hair trimmer too. After the first few episodes, I shoved whatever I couldn't fix underneath my bed. I didn't want Mom and Dad to know how much stuff I was breaking. Already,

I could see my future: No more training with Dad for the father-son half marathon in the fall. No track team, no more school, no friends. Rather than flinging crinkle-cut dills in the cafeteria, I'd be staying home to grow moss in pickle jars like my Beaumont cousins. Because if I hit Josh and Ryan and Big Mouth Brody Sandoval with baby gherkins, Josh and Ryan might laugh it off, but Big Mouth Brody would tell for sure—and that wouldn't go over well at home.

Family rules said *keep quiet*. No one risked the consequences of sharing the family secret unless they had to; it was impossible to know what might happen if people found out that we weren't normal. Nicer folks might want to hire us for our skills. Less nice ones might want to put us in a freak show, or lock us up to study us and try to decode our genomes.

Well, secrecy was fine by me. The ability to bust apart a toaster wasn't something I cared to boast about. It helped that Dad was clearly in denial, while Mom believed she had everything under control. As far as

my parents were concerned, I was simply Ledger Kale, doohickey-destructo boy less-than extraordinaire. And I was happy to let them think it.

So, nine days after I turned thirteen, Mom and Dad confirmed our family's RSVP and we packed our bags, preparing to hightail our way west from Indiana to Wyoming.

It wasn't long before everyone regretted the decision. As Dad pushed the minivan to its limits, trying to make it to the wedding on time, we were stalled again and again by a procession of problems along the interstate. I mislaid the muffler in Missouri, busted needle bearings in Nebraska, and sent us skidding in South Dakota, three wheels on our wagon. Helping Dad chase down our wayward tire, I worried the whole transmission might be next.

I sank lower in my seat with each new mishap, willing my savvy to go away, ignoring my sister as she shook her head inside the oversized football helmet she'd worn nonstop since my birthday.

"Ledger!" Mom turned to face me in the van. "If you're causing this trouble, *stop*."

"Yeah," Fedora piped up. "Safety starts with S, Ledge, but it begins with *you*." My sister's second-grade teacher had been a stickler for safety, and Fe carried her most memorable sayings inside her head, handing them out like toothbrushes on Halloween.

"I mean it, Ledge," Mom continued. "Keep it together—keep *everything* together—until we reach Wyoming." She smiled her best bulldozer smile, the one hardly anyone in the world could stand against. Mom's savvy word-and-smile combo had been making me and my sister eat our broccoli and keep our rooms clean forever, and Dad never forgot to take out the trash, though sometimes he did roll his eyes as he stepped out the door. Dinah Kale's savvy put her in control. She'd even stopped a bank robber once just by telling him to sit down and be still, shackling him with five words and a smile until the police arrived.

Now I could see that Mom was beginning to understand—the longer I sat trapped in the van, the more danger there was of me turning it into a unicycle. Already I could feel the itch and buzz of my savvy zinging beneath my skin. Another incident like the one with the tire, and my parents might be forced to ship me to Antarctica, where only seals and penguins would come out to watch me run the local half marathon.

Knowing there were some normal human things my Mom wouldn't stop me from doing, I started downing Gatorade like Uncle Ferris preparing to create a winter storm. By the time I spied the sign for Sundance, Wyoming, the closest spot on the map to my uncle Autry's ranch, there were four empty bottles at my feet, and I had to water the cactuses in a serious way.

Appendix H

Coding Scheme for Comprehension Questions

Question Type	Definition and Examples
Literal main	Questions with answers that were explicitly stated in the text, main ideas related to major story-grammar elements (main characters, initiating events, roadblocks and resolutions).
	Examples Savvy: Who caused the hurricane at the beginning of the story? (Fish living near water triggers him and makes his condition worse.) Scumble: At what age did Ledger get his special talent? (13 years-old)
Literal detail	Questions asked about small features or nuances that were explicitly stated in the text.
	Examples Savvy: How old is rocket? (17) Scumble: How much time passed until the family RSVP? (9 days)
Causal inference	Questions asked about cause and effect relationships that were not explicitly stated in the text; these were often worded as 'how' or 'why' questions and could deal with physical, or psychological, causation.
	Examples Savvy: Why did fish's mom and dad have to grab hold of him while everyone else ran for cover? (Because fish was causing a big wind storm, and they were trying to calm him down) *Scumble:* Why did the family have to wait until after Ledger's 13th birthday to RSVP the wedding? (Because they needed to see if Ledger would cause any damage when he got his savvy.)

Informational inference	Questions asked students to extend what was stated in the text; these questions frequently concerned the characters or setting and were often worded as 'what' or "where'.
	Examples Savvy: What was rockets savvy? (He's electric) Scumble: Where does Ledger get his savvy from? (His mom's side)
Vocabulary	Questions revolved around students understanding of words.
	Examples What is a savvy? (A special power)
Comparison	Questions asked the student to make text-to-text, text-to-world or text-to-self comparisons.
	Examples What type of savvy would you like? (Variable responses)

Appendix I

Basic Language Knowledge (Binks-Cantrell et al. 2012).

| | 1. | A phoneme refers to |

    a.   a single letter.
    b.   a single speech sound.
    c.   a single unit of meaning.
    d.   a grapheme.
    e.   no idea

| | 2. | If tife is a word, the letter "i" would probably sound like the "i" in: |

    a.   if
    b.   beautiful
    c.   find
    d.   ceiling
    e.   sing
    f.   no idea

| | 3. | A combination of two or three consonants pronounced so that each letter keeps its own identity is called |

    a.   silent consonant
    b.   consonant digraph
    c.   diphthong
    d.   consonant blend
    e.   no idea

4. How many speech sounds are in the following words? For example, the word "cat" has 3 speech sounds 'k'-'a'-'t'. Speech sounds do not necessarily equal the number of letters.

4	box
4	grass
3	ship
3	moon
4	brush
2	knee
3	through

| | 5. | What type of task would the following be? "Say the word 'cat.' Now say the word without the /k/ sound." |

    a.   blending
    b.   rhyming
    c.   segmentation
    d.   deletion
    e.   no idea

| | 6. | A "soft c" is in the word: |

    a.   Chicago
    b.   cat
    c.   chair
    d.   city
    e.   none of the above
    f.   no idea

	7.	Identify the pair of words that begins with the same sound:

- a. joke-goat
- b. chef-shoe
- c. quiet-giant
- d. chip-chemist
- e. no idea

(The next 2 items involve saying a word and then reversing the order of the sounds. For example, the word "back" would be "cab.")

	8.	If you say the word, and then reverse the order of the sounds, **ice** would be:

- a. easy
- b. sea
- c. size
- d. sigh
- e. no idea

	9.	If you say the word, and then reverse the order of the sounds, **enough** would be:

- a. phone
- b. funny
- c. one
- d. ghuone
- e. no idea

	10.	All of the following nonsense words have a silent letter, except:

- a. bamb
- b. wrin
- c. shipe
- d. knam
- e. phop
- f. no idea

11. For each of the words on the left, determine the number of syllables and the number of morphemes. (**Please be sure to give both the number of syllables and the number of morphemes, even though it may be the same number.**)

		# of syllables		# of morphemes
Example: Butter		**2**		**1**
Disassemble		4		2
Heaven		2		1
Observer		3		2
Spinster		2		1
Pedestal		3		2
Frogs		2		2
Teacher		2		2

	12.	Which of the following words has an example of a final stable syllable?

- a. wave
- b. bacon

c. paddle
d. napkin
e. none of the above
f. no idea

| 13. | Which of the following words has 2 closed syllables? |

a. wave
b. bacon
c. paddle
d. napkin
e. none of the above
f. no idea

| 14. | Which of the following words contains an open syllable? |

a. wave
b. bacon
c. paddle
d. napkin
e. none of the above
f. no idea

| 15. | Phonological awareness is: |

a. the ability to use letter-sound correspondences to decode.
b. the understanding of how spoken language is broken down and manipulated.
c. a teaching method for decoding skills.
d. the same as phonics.
e. no idea

| 16. | Phonemic awareness is: |

a. the same as phonological awareness.
b. the understanding of how letters and sounds are put together to form words.
c. the ability to break down and manipulate the individual sounds in spoken language.
d. the ability to use sound-symbol correspondences to read new words.
e. no idea

| 17. | What is the rule that governs the use of 'c' in the initial position for /k/? |

a. 'c' is used for /k/ in the initial position before e, i, or y
b. the use of 'c' for /k/ in the initial position is random and must be memorized
c. 'c' is used for /k/ in the initial position before a, o, u, or any consonant
d. none of the above
e. no idea

| 18. | What is the rule that governs the use of 'k' in the initial position for /k/? |

a. 'k' is used for /k/ in the initial position before e, i, or y
b. the use of 'k' for /k/ in the initial position is random and must be memorized
c. 'k' is used for /k/ in the initial position before a, o, u, or any consonant
d. none of the above
e. no idea

| 19. | A morpheme refers to: |

a. a single letter
b. a single speech sound
c. a single unit of meaning
d. a grapheme
e. no idea

Appendix J

Measure of Young Adult Print Exposure

Author Checklist

Below you will find a list of names. Some of these names are popular authors and some are not. Please read the titles and put an **'x'** beside the names that you recognize as being **real authors**. Please do not guess. Remember, some of the names are not real, so guessing can be easily detected. Once again, **please do not consult outside resources.**

EXAMPLE:

Author	'x' real author
Dr. Suess	X
Jane Doe	
John Smith	

If you knew that Dr. Suess was an author, then you would place an 'X' beside his name. if you weren't sure whether Jane Doe or John Smith were authors, then you would NOT place an 'X' beside their names.

Author	Pls 'x' real authors		Author	Pls 'x' real authors	
V. C. Andrews	Adult		Robert Emery	Foil	
Isaac Asimov	Adult		Jeffery Eugenides	Adult	
Margaret Atwood	Adult		James Dashner	Young Adult	
Jean M. Auel	Adult		Timothy Findley	Adult	
Russell Banks	Adult		John Flanagan	Young Adult	
David Baldacci	Adult		Robert Fulghum	Adult	
Sharon Creech	Young Adult		Diana Gabaldon	Adult	
James Dashner	Young Adult		Howard Gardner	Young Adult	
Roald Dahl	Young Adult		Elizabeth George	Adult	
Martin Ford	Foil		Stephen J. Gould	Adult	
Cornelia Funke	Young Adult		Sue Grafton	Adult	
Elliot Blass	Foil		Andrew Greeley	Foil	
Christopher Barr	Foil		Sheryl Green	Foil	
Lauren Benjamin	Foil		John Grisham	Adult	
Carol Berg	Adult		Alex Haley	Adult	
Pierre Berton	Adult		Mimi Hall	Foil	
Thomas Bever	Foil		Frank Herbert	Adult	
Maeve Binchy	Adult		S. E. Hinton	Young Adult	
Judy Blume	Young Adult		Erin Hunter	Young Adult	
Dan Brown	Adult		John Jakes	Adult	
Jennifer Butterworth	Foil		E.L. James	Adult	
Katherine Carpenter	Foil		Erica Jong	Adult	
Barbara Cartland	Adult		Wayne Johnston	Adult	
Agatha Christie	Adult		Robert Jordan	Adult	
Noam Chomsky	Adult		Frank Kiel	Foil	
Wayson Choy	Foil		Laurie King	Adult	
Tom Clancy	Adult		Stephen King	Adult	
Arthur Clarke	Adult		Jeff Kinney	Young Adult	
Suzanne Clarkson	Foil		Naomi Klein	Adult	
James Clavell	Adult		Sophie Kinsella	Adult	
Suzanne Collins	Young Adult		Dean Koontz	Adult	
Jackie Collins	Adult		Judith Krantz	Adult	
Stephen Coonts	Adult		Louis L'Amour	Adult	
Edward Cornell	Foil		Margaret Laurence	Adult	
Patricia Cornwell	Adult		Ursula LeGuin	Adult	
Robertson Davies	Adult		Madeleine L'Engle	Adult	
W. Patrick Dickson	Foil		Pricilla Levy	Foil	
C. S. Lewis	Young Adult		Gary Paulsen	Young Adult	
Lois Lowry	Young Adult		Philip Pullman	Young Adult	
Robert Ludlum	Adult		Daniel Quinn	Adult	
Alex Lumsden	Foil		Anne Rice	Adult	
George R.R. Martin	Adult		Mordecai Richler	Adult	
Ann Marie McDonald	Adult		Rick Riordan	Young Adult	
Morton Mendelson	Foil		J.K. Rowling	Young Adult	
Stephenie Meyer	Young Adult		Rachel R. Russell	Young Adult	

Janet Evanovich	Adult		Robert J. Sawyer	Adult	
James Michener	Adult		Miriam Sexton	Foil	
Rohinton Mistry	Adult		Carol Shields	Adult	
Christopher Moore	Adult		Sidney Sheldon	Adult	
Lucy Maud Montgomery	Young Adult		Robert Siegler	Foil	
Michael Moore	Adult		Lemony Snicket	Young Adult	
James Morgan	Foil		Danielle Steel	Adult	
Alice Munro	Adult		Mark Strauss	Young Adult	
M. Scott Peck	Adult		Amy Tan	Adult	
David Perry	Foil		Miriam Toews	Adult	
Kate Pullinger	Adult		Alvin Toffler	Adult	

Appendix K

Measure of Knowledge of Children's Literature

Children's Title Checklist

Below you will find a list of names. Some of the titles are popular children's books and some are not. Please read the titles and put an **'x'** beside those that you recognize as coming from real books. **Please do not guess**. Remember, some of the titles are not real, so guessing can be easily detected. Once again, **please do not consult outside resources**.

Children's Title	"x" real Title		Children's Title	"x" real Title
Are You My Mother?	X		Goodnight Moon	X
Backyard Safari	Foil		Grandma and the Pirates	Foil
Bartholomew and the Oobleck	X		Guess How Much I Love You	X
Because I Love You	X		Harold and the Purple Crayon	X
Bedtime for Frances	X		House on East Eighty-Eighth Street	X
Biscuit	X		If You Give a Pig a Pancake	X
Blame it on Billy	Foil		Jamberry	X
Blueberry Kazoo	Foil		Kofi and his Magic	X
Brown Bear, Brown Bear, What Do You See?	X		Moo Baa La La La	X
Chicka Chicka Boom Boom	X		My Friend the Mailman	Foil
Chrysanthemum	X		Oh, the Places You'll Go!	X
Clean up, Carter!	Foil		Open Up	Foil
Click, Clack, Moo: Cows That Type	X		The Runaway Bunny	X
Cootie Catchers	Foil		The Adventures of Chatterer the Red Squirrel	X
Corduroy	X		Lazy Cat, Lazy Cat	Foil
Cups for Sale	X		Colors of Me	X
Danny and the Dinosaur	X		The Fall of Freddie the Leaf	X
Dog Heaven	X		The Going to Bed Book	X
Down by David's Pond	Foil		The Last of the Really Great Whangdoodles	X
Down by the Sea	Foil		The Muffin Maker	Foil
Eloise	X		The Rabbit Acrobats	Foil
Father Bear Comes Home	X		The Story of Ferdinand	X
Flat Stanley	X		Wacky Wendell	Foil
Follow The Drinking Gourd	X		What Rhymes with Orange?	Foil
Gerald McBoing Boing	X		Where the Wild Things Are	X

Appendix L
Class Handout During Lesson

<u>Definitions of Question Types</u>

Example:

"Cheerleading in my college was cool. The football players were so jealous, they wouldn't even let me and my buddies, Trevor, Scotty, and Ling go to any of their parties."   -Phil Dunphy

Question Type
1) **Literal Questions: found in text, can be underlined**
1A) Main Ideas: Information related to story grammar e.g. main characters, initiating events, roadblocks, resolutions   *Example: Who wrote this quote?*
1B) Literal detail: Small points of information that are explicitly stated in the text   *Example: What were Phil's buddies names?*
2) **Inference Questions: not in text, answers combine background knowledge and textual evidence.**
2A) Informational Inference: allow readers to go beyond what is written about the setting, characters etc. to create richer text representations.   *Example: How old was Phil when he was cheerleading?*
2B) Causal Inference: Unstated links in a text that explain a cause and effect <u>relationship</u> (e.g. how or why)   *Example: Why wouldn't the football players let Phil and his buddies go to any of their parties?*
2C) Embedded Inference: questions that already have an inference generated and asks the student to confirm/disconfirm it.   *Example: Were Phil and his buddies not invited to parties because cheerleading was not cool? How do you know?*

Identify the Questions

Instructions: Read 'Origami Yoda and the embarrassing stain' and determine which type of questions these are: (main idea, details, causal inference, informational inference, embedded inference)

Question Type:	Question
1. Causal	Why did Kellen erase what was on the wall? Because he didn't want people to think he drinks pee.
2. Main	What happened to kellen's pants when he tried to erase the message on the wall? His pants got all wet in the front and it looked like pee.
3.Detail	What color were Kellen's pants? Light brown pants
4.Deatail	What design was on Kellen's shirt? ScoobyWoo
5.Causal	Why was it important for Kellen to be on time for class? Because he would get a suspension and a call home from the school and his parents would take away his playstation
6. Embedded	Would kellen be in trouble if he was late for class? Yes a suspension and no playstation at home. / did lance help kellen?
7. Informational	How did Kellen's parents feel about Kellen's schooling? Probably strict because they would punish him if he got a suspension
8.Informational	Where did the story take place?/how old is kellen? Bathroom,
9. Embeded	Does Kellen have a crush on Rhondella? Probably, he doesn't want her to see the stain on his pants
10. Main	What did kellen do to finally solve his problem? Wet all of his pants.

What happened to me was this: I was in the bathroom right before school and I saw that someone—probably Harvey—had written "Kellen Drinks Pee" on the wall over the sink, so I leaned across the sink to erase it and I had on these light brown pants and they got all wet right across the front.

It seriously looked like I had peed in my pants. Really bad. I tried to cover it with my shirt, but it was that really shrimpy shirt of mine with Scooby-Doo on it and it wasn't long enough to cover the pee part. Which wasn't really pee, of course.

Lance was in there, too.

"Dude," he said, "that doesn't even begin to hide your pee stain."

"Lance! You saw this isn't a pee stain, right? It's just water from the sink."

"Yeah, I saw that, but, man, it totally looks like you peed in your pants!"

"But you'll tell people the truth, right?"

"What am I supposed to do? Follow you around and tell people, 'It's not pee, it just looks EXACTLY like pee'?"

Then the warning bell rang for homeroom! That meant I had one minute to get to class. There was no way I could get the pants dry in one minute, and there was no way I could go to class with a giant pee stain! Which really wasn't pee.

For one thing, Harvey is in my homeroom, and you know he's a total dipwad about stuff like that and he would say something loud, and everybody would see it, even people who don't normally look at me. Even worse, Rhondella is there, too, and the last thing in the world I need is for Rhondella to see me with a pee stain. Which wasn't really pee, you know.

Then I had an idea.

"Hey, Lance, will you run to class and get my coat? I think it's long enough to hide the spot."

"No time, dude, I'd never make it back

here and then back to class in one minute. Speaking of which, I got to get to class now, dude! You got about forty seconds left! See ya, Kellen."

So Lance left. Thanks, Lance.

Right now you might be thinking, so what, just show up to homeroom a little late. Great idea, except for various reasons I've shown up a little late about twenty times this year and Mr. Howell said the next time it happened, I'd have to spend the rest of the day in ISS. (That's in-school suspension and it's more boring than anything you could imagine.) Plus, every time I get sent there, Principal Rabbski sends a note home to my parents and I lose my PlayStation for two weeks.

So I had to get the pants dry in forty seconds, except for the fact that it was physically impossible to do that.

Then Dwight came out of one of the stalls. (You know, it seems like he's in the bathroom every single time I go in there.)

"Look at my pants, Dwight. You got any ideas?"

"I'm getting the idea that you peed in your pants."

"No, I didn't. And I meant do you have any ideas that would help me?"

"No," he said, and then he held up Origami Yoda, which was on his finger. "But Yoda might."

"whatever," I said.

Then Dwight did his Yoda voice, which Harvey is right about being totally the worst Yoda impression of all time. I do it a lot better.

But anyway, Yoda said:

"All of pants you must wet."

"what?"

"I guess," said Dwight in his normal voice, "he means you need to make all of your pants wet, so it doesn't look like a pee stain anymore."

Then he left for class, too.

I turned on the water and splashed myself

all over. My pants and my shirt, too.

Then I ran to class and got there just before Mr. Howell was shutting the door.

"Should I even ask why you're all wet, Kellen?" asked Mr. Howell.

"Nope," I said, and sat down real quick.

He was skeptical, but he went ahead and took roll. After homeroom, I had P.E., so I was able to switch to my sweatpants for the rest of the day.

Everybody wondered why I was wet, and sure, it was cold and uncomfortable for a while, but the important thing is that I didn't get sent to the office, I didn't lose my PlayStation for two weeks, and nobody—including Rhondella—thought I had peed in my pants!

That's when I knew that Origami Yoda is for real, man! He's totally Jedi wise!

AFTER AFTER

WISE→

Harvey's Comment

what a bunch of malarkey. If Paperwad Yoda was real—which it isn't—surely it could come up with
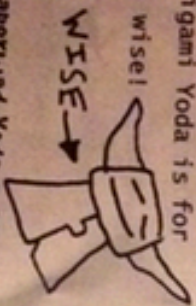
something better than going to class in soaking-wet pants. The real Yoda would have dried them with his mind or something.

Also, I have to point out that according to Kellen's story, Dwight walked out of a bathroom stall with Paperwad Yoda on his finger. That's just gross, folks!

My Comment: I agree that the solution was not perfect, but it's better than anything I can think of. Remember that Kellen only had a few seconds left. I think it was pretty good advice, and probably better than anything Dwight would have come up with.

That's what really blows my mind. Dwight can barely function! He walks around school with his shoes untied and his hair uncombed. He is always getting terrible grades and getting sent to the office for being late or falling asleep in class or whatever. And he DOES come to class with weird stains on his clothes.

If you asked his advice, it would be terrible. But if you ask him for Yoda's advice, you get something

Generate Questions

Instructions: Read 'Origami Yoda VS the Vampyre' and write a question for each question type.

1. Main Idea	
2. Detail	
3. Causal inference	
4. Informational inference	
5. Embedded inference	

ORiGAMi YODA VS. THE VAMPYRE

BY LANCE

Everybody was going to this movie called *Parasite Within: Legend of Vampyre*. But my parents won't let me go see R-rated movies. But everybody was going. But if you say that to my parents, they make some kind of sarcastic remark about jumping off a bridge, which makes no sense.

I asked Yoda what to do, and Dwight makes this croaky voice and says: "Stinks movie does."

So then I said to Dwight, "But I thought you were dying to see it."

"I am," Dwight said. "It's gonna be awesome!"

And then a second later he switches to his Yoda voice and waves the paper Yoda and says, "Down two thumbs are. Cheesy are the effects special. Money save you will."

So I ended up not going—not that I had any choice, because of my parents.

On Monday I asked everybody how it was and they all said it stunk and that the special effects were cheesy and they had wasted their money! Even Dwight.

YEAH, IT REALLY WAS!

BUT "PARASITE WITHIN II" WILL BE EVEN WORSE!

Appendix M

Lesson on Literal and Inferential Comprehension

LITERAL AND INFERENTIAL COMPREHENSION

APRIL PAOR

John dropped the banana peel on the floor.
Mary fell on her back.

Why did Mary fall?

John dropped the banana peel on the floor.
Mary fell on her back.

Who dropped the the banana peel?

John dropped the banana peel on the floor. Mary fell on her back.

LITERAL INFORMATION

IN TEXT

Can <u>LITERALLY</u> underline it!!

DEFINITIONS

Literal Comprehension:

- Reading a text and answering questions based on *explicit information.*

INFERENTIAL INFORMATION

NOT IN TEXT

DEFINITIONS

Inferential Comprehension:
- Answering questions that combine
  - 1) background knowledge
  - 2) textual evidence

WHY IS IT IMPORTANT TO UNDERSTAND INFERENCING?

- Not automatic for children

- Provide feedback to students

- Create your own material

TYPES OF LITERAL AND INFERENTIAL MATERIAL

1) Inferential

A) Informational inference

B) Causal inference

C) Embedded inference

2) Literal

A) Main idea

B) Details

EXAMPLE

INFORMATIONAL INFERENCES

■ How old was Phil when he was cheerleading?
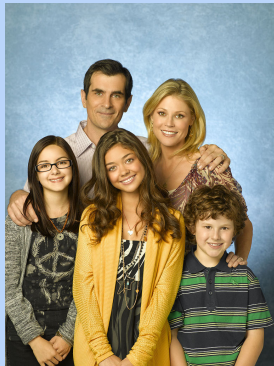
"Cheerleading in my college was cool. The football players were so jealous, they wouldn't even let me and my buddies, Trevor, Scotty, and Ling go to any of their parties."

-Phil Dunphy

INFORMATIONAL INFERENCES
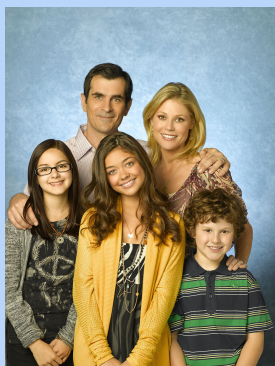
- Unstated elaborations concerning <u>characters or setting</u> to create a richer representation.

EMBEDDED INFERENCE

- Inference already generated and the student has to confirm/disconfirm the question
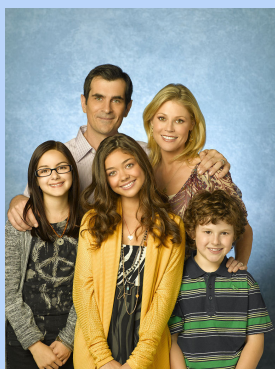
EMBEDDED INFERENCE

- How old was Phil when he was cheerleading?
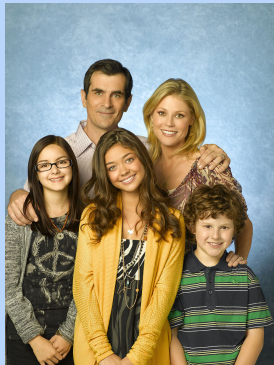
- Was Phil in his twenties when he was a cheerleader?

CAUSAL INFERENCES

- Why wouldn't the football players let Phil and his buddies go to any of their parties?

"Cheerleading in my college was cool. The football players were so jealous, they wouldn't even let me and my buddies, Trevor, Scotty, and Ling go to any of their parties."

-Phil Dunphy

CAUSAL INFERENCES

- Unstated links in a text that explain a *cause and effect relationship*

(e.g. how or why)

EMBEDDED INFERENCE

- Why wouldn't the football players let Phil and his buddies go to any of their parties?

- Was Phil excluded from parties because he wasn't cool?

MAIN IDEAS

- Information related to story grammar

  e.g. main characters, initiating events, obstacles, resolutions

"Cheerleading in my college was cool. The football players were so jealous, they wouldn't even let me and my buddies, Trevor, Scotty, and Ling go to any of their parties."

-Phil Dunphy

MAIN IDEAS

- Who is the main character?

"Cheerleading in my college was cool. The football players were so jealous, they wouldn't even let me and my buddies, Trevor, Scotty, and Ling go to any of their parties."

-Phil Dunphy

LITERAL DETAILS

- Small points of information that are explicitly stated in the text.
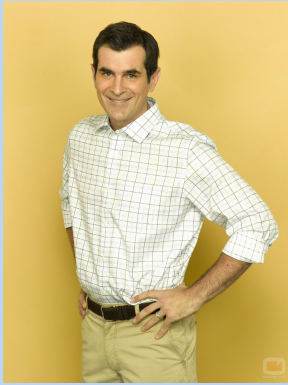
"Cheerleading in my college was cool. The football players were so jealous, they wouldn't even let me and my buddies, Trevor, Scotty, and Ling go to any of their parties."

-Phil Dunphy

LITERAL DETAILS

- What were Phil's buddies' names?
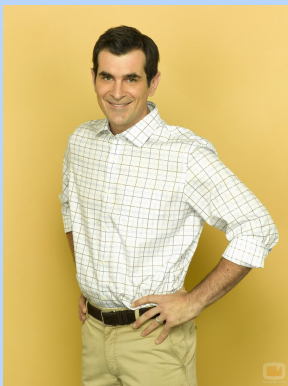
"Cheerleading in my college was cool. The football players were so jealous, they wouldn't even let me and my buddies, Trevor, Scotty, and Ling go to any of their parties."

-Phil Dunphy

COMPARING MAIN IDEAS AND DETAILS

"Cheerleading in my college was cool. The football players were so jealous, they wouldn't even let me and my buddies, Trevor, Scotty, and Ling go to any of their parties."

-Claire Dunphy

INFERENCE: SUMMARY

- Both causal and informational inferences:

  - Use background knowledge to fill in what is not overtly stated in the text

  - Based on textual evidence

- Causal -answers how/why

- Informational -extends the text

CLASS ACTIVITY

Identifying
Questions

BOOK ACTIVITY

TOM ANGLEBERGER

THE STRANGE CASE OF ORIGAMI YODA
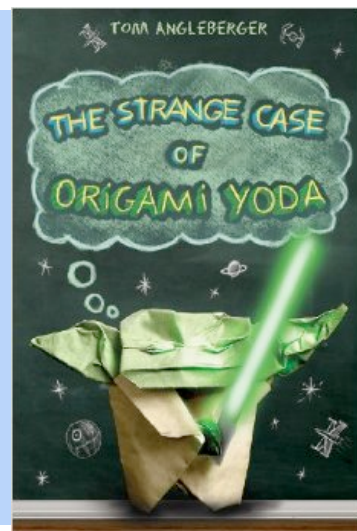
- Ages: 9-12
- 1st book of a series
- A series of short stories
- Currently using for a study with Grade 5 students

SUMMARY

Literal Information: ✅ in text

Main Ideas= big picture points in the story
Details= small points of information

Inferential information: 🚫 Not in text

I- informational= more _information_ about text
C- Causal= _Cause_ and effect relations (Why…? Be**cause**…)
E- Embedded= inference embedded in question

IDENTIFY THE TYPE OF QUESTION

1. **Why** did Kellen erase what was on the wall?

> What happened to me was this: I was in the bathroom right before school was about to start and I saw that someone—probably Harvey—had written "Kellen Drinks Pee" on the wall over the sink, so I leaned across the sink to erase it and I had on these light brown pants and they got all wet right across the front.

BEFORE

Response: Be**cause** he didn't want people to think he drinks pee

Question Type: Causal Inference

IDENTIFY THE TYPE OF QUESTION

2. What happened to Kellen's pants when he tried to erase the message on the wall?

> What happened to me was this: I was in the bathroom right before school was about to start and I saw that someone—probably **BEFORE** Harvey—had written "Kellen Drinks Pee" on the wall over the sink, so I leaned across the sink to erase it and I had on these light brown pants and they got all wet right across the front.

IDENTIFY THE TYPE OF QUESTION

2. What happened to Kellen's pants when he tried to erase the message on the wall?

> What happened to me was this: I was in the bathroom right before school was about to start and I saw that someone—probably **BEFORE** Harvey—had written "Kellen Drinks Pee" on the wall over the sink, so I leaned across the sink to erase it and I had on these light brown pants and they got all wet right across the front.

Question Type: Main Idea

IDENTIFY THE TYPE OF QUESTION

4. What was the design on Kellen's shirt?

> I tried to cover it with my shirt, but it was that really shrimpy shirt of mine with Scooby-Doo on it and it wasn't long enough to cover the pee part.

IDENTIFY THE TYPE OF QUESTION

4. What was the design on Kellen's shirt?

> I tried to cover it with my shirt, but it was that really shrimpy shirt of mine with Scooby-Doo on it and it wasn't long enough to cover the pee part.

Question Type: Details

IDENTIFY THE TYPE OF QUESTION

7.How did Kellen's parents feel about his schooling?

I'd have to spend the rest of the day in ISS.

Plus, every time I get sent there, Principal Rabbski sends a note home to my parents and I lose my PlayStation for two weeks.

Response: They probably cared because they punished him when he gets into trouble at school

Question Type: Informational inference
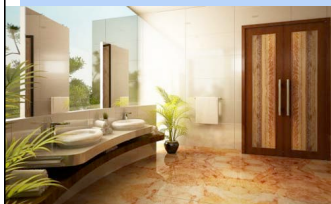
IDENTIFY THE TYPE OF QUESTION

9. Does Kellen have a crush on Rhondella?

> Even worse, Rhondella is there, too, and the last thing in the world I need is for Rhondella to see me with a pee stain. Which wasn't really pee, you know.

Response: Probably because he doesn't want her to see the pee stain

Question Type: Embedded inference

DRAWING MULTIPLE INFERENCE

- Why didn't Kellen want Rhondella to see the pee stain?

> For one thing, Harvey is in my homeroom, and you know he's a total dipwad about stuff like that and he would say something loud, and everybody would see it, even people who don't normally look at me. Even worse, Rhondella is there, too, and the last thing in the world I need is for Rhondella to see me with a pee stain. Which wasn't really pee, you know.

- Maybe he has a crush on her
- Maybe she's a gossip and will tell everyone
- Maybe she's a mean girl (like Harvey) and will make fun of him

STUDY GUIDE

Literal Information: ✅ in text

Main Ideas= big picture points in the story
Details= small points of information

Inferential information: 🚫 Not in text

I- informational= more <u>information</u> about text
C- Causal= <u>Cause</u> and effect relations (Why…? Be**<u>cause</u>**…)
E- Embedded= inference embedded in question

ANSWERS

3. Detail

5. Causal Inference

6. Embedded Inference

8. Informational Inference

10. Main Idea

WHICH SET OF QUESTIONS IS BETTER?

- What time of the day was Kellen in the bathroom?

- What color were Kellen's pants?

- What design was on Kellen shirt?

- How long would Kellen lose his playstation for?

- What class did Kellen have after homeroom?

- Why did Kellen erase what was on the wall?

- Why was it important that Kellen was on time for class?

- Why didn't Kellen want to go to class with the stain?

- What did Kellen do to solve his problem?
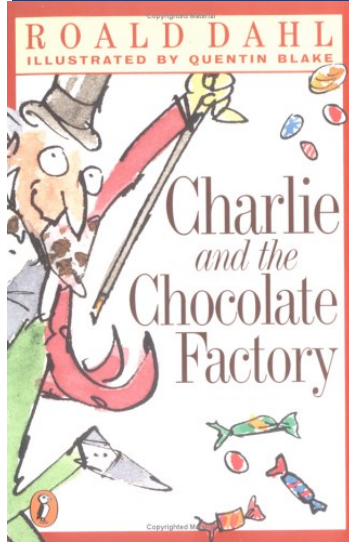
BALANCE
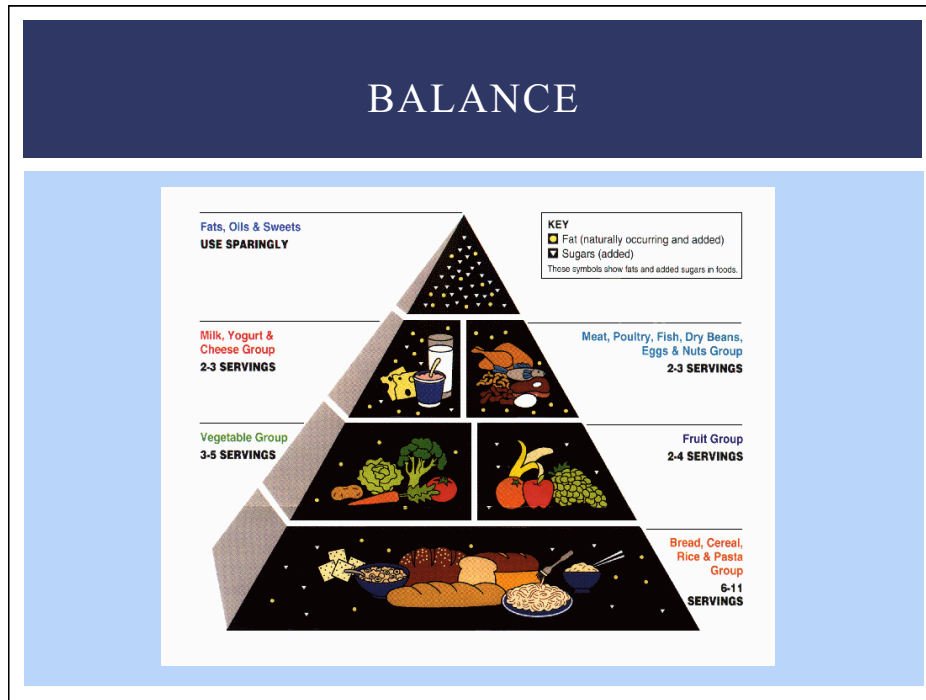
OTHER TYPES OF QUESTIONS

<u>Vocabulary</u>
- UK language
  - E.g. rubbish
- Rowling language
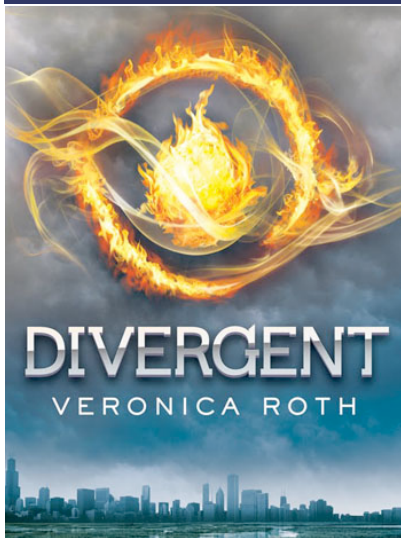 - E.g. muggle/ squib, Quidditch
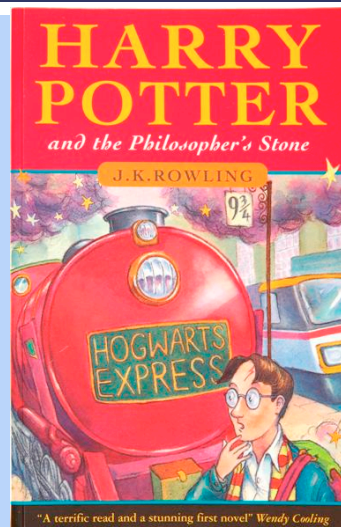
OTHER TYPES OF QUESTIONS

Predictions

- Who do you think will win a golden ticket?
- What do you think we will find in the chocolate factory?

OTHER TYPES OF QUESTIONS

Text-to-self comparisons

- Which faction would you belong to?
  - The Selfless
  - The Intelligent
  - The Brave
  - The Peaceful
  - The Honest

OTHER TYPES OF QUESTIONS

Text-to-text comparisons

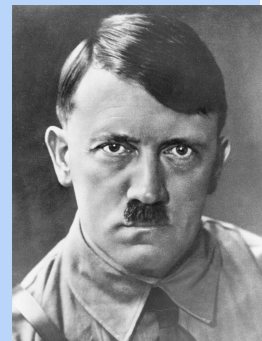- What are the similarities between Harry Potter and Percy Jackson?

OTHER TYPES OF QUESTIONS

Text-to-world comparisons

- How are Lord Voldemort and Hitler alike?

CLASS ACTIVITY

Generating Questions

GENERATING QUESTIONS

1) Literal Questions
- 1A) Main idea
- 1B) Literal detail

2) Inference Questions
- 2A) Informational inference
- 2B) Causal inference
- 2C) Embedded inference

CONCLUSION

- Important to teach skills before assessing them

- Questioning is a great way to not only assess but FOSTER comprehension

- Knowing the different types of questions can inform your practice