Building Background Knowledge

By: Susan Neuman, Tanya Kaefer, Ashley Pinkham

To comprehend a story or text, young readers need a threshold of knowledge about the topic, and new, tougher state standards place increasing demands on children's prior knowledge. This article offers practical classroom strategies to build background knowledge such as using contrasts and comparisons and encouraging topic-focused wide reading.

We've had our share of lively debates in the field of reading, but not on this particular topic: background knowledge. There is a virtual consensus that background knowledge is essential for reading comprehension. Put simply, the more you know about a topic, the easier it is to read a text, understand it, and retain the information. Previous studies (Alexander, Kulikowich, & Schulze, 1994; Shapiro, 2004) have shown that background knowledge plays an enormous role in reading comprehension (Hirsch, 2003).

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The contribution of background knowledge to children's comprehension became all that more clear for us in a recent three-part experiment including 4-year olds from low- and middle-SES (socioeconomic status) families (Kaefer, Neuman, & Pinkham, in press). In the first experiment, we assessed low- and middle-SES children's background knowledge about birds by creating a task with fictional characters and names: "This is a toma. A toma is a bird. Can a toma live in a nest?" and other items in a similar format. The experiment revealed stark differences in knowledge about birds between the two groups: ($t(43) = 3.22$, $p = .002$), Cohen's $d = .93$. Low-SES children had significantly more limited background knowledge than their middle-class peers.

So, to tap how these differences in background knowledge might relate to comprehension in text, we created an 18-page illustrated storybook in our second experiment that featured the adventures of four types of birds (named for extinct species): the moa, faroe, cupido, and kona. The book had a total of 238 words and shared a common plot and story grammar, including the setting (i.e., a house), problem, response, and resolution. Using a receptive comprehension measure that examined children's understanding of critical story events and their ability to make causal inferences, we found once again that the low-SES children experienced greater difficulty comprehending the story than their middle-SES peers. These children demonstrated significantly poorer comprehension of the text ($t(75) = 1.99$, $p = .050$), with a moderate effect size (Cohen's $d = .46$).

Consequently, in our third study, we attempted to neutralize background knowledge by introducing a storybook narrative context that would be novel to both groups. Here was our reasoning: If children's preexisting background knowledge underlies these differences in comprehension, then we would expect that there would be no differences in learning among our differing SES groups. For this study, we created an 18-page illustrated storybook similar to the one we used in our previous study—with one difference: The storybook used a novel category, wugs (a pseudo-word), and was designed around the adventures of four species of wugs. And our results sustained our hypothesis about background knowledge and comprehension. In this case, there were no differences between groups ($t(56) = .57$, $p = .569$, Cohen's $d = .15$). When we held background knowledge constant by introducing an unknown topic, there were no significant differences between SES groups in children's word learning, comprehension, or ability to make inferences. Taken together, these results suggest that differences in low-SES children's comprehension skills may be attributed, in part, to limitations in their preexisting knowledge base.

This research builds on a large body of work that has shown the effects of background knowledge and comprehension (Anderson & Nagy,1992; Anderson & Pearson, 1984). For example, studies have shown that individual differences in prior knowledge affect the ability to extract explicit and implicit information from text and integrate this text-based information in reading comprehension (Kintsch, 1988). Other studies (e.g., Cain, Oakhill, Barnes, & Bryant, 2001) have examined multiple factors, including the relative contributions of inferential processing, domain knowledge, metacognition, and working memory to learning from text. Our results are consistent with this research (Cain & Oakhill, 2011; Recht & Leslie, 1988), highlighting the role of background knowledge on children's comprehension as early as preschool.

Why is background knowledge so important?

It makes good sense that to comprehend a story or text, readers will need a threshold of knowledge about the topic. Sometimes we call it domain-specific knowledge or topical knowledge. Without such knowledge, it becomes difficult to construct a meaningful mental model of what the text is about. Consider the following examples.

Background knowledge enables readers to choose between multiple meanings of words

For example, think about the word *operation*. If you were to read the word in a sports article about the Yankees, you might think about Derek Jeter recovering from his latest baseball injury. If you read the word in a math text, on the other hand, you'd think about a mathematical process like multiplication or division. Words have multiple purposes and meanings, and their meanings in particular instances are cued by the reader's domain knowledge.

Reading and listening require readers to make inferences from text that rely on background knowledge

Even the most immediate oral language exchanges, like "What do you say?" to a young child who just received some Halloween candy, require some level of inferencing. From infancy on, oral language comprehension requires children to actively construct meaning by supplying missing knowledge and making inferences. This, of course, becomes even more complicated when we turn to written texts, since it may require students to make inferences based on limited information in the text itself. In fact, many of our greatest writers engage readers through their writing to think beyond the text.

Understanding text depends on readers supplying enough of the unstated premises to make coherent sense of what is being read. But to do this well, readers need to have a foundation of knowledge about the topic. Otherwise, as studies have shown, they can get caught on the "seductive details" (Garner, Gillingham, & White, 1989) of a text—highly interesting and entertaining information that is only tangentially related to the topic—which can distract the reader and disrupt the comprehension of text. Background knowledge, in contrast, acts as a road map for students, allowing them to stay on target despite the interesting details. This suggests that once print has been decoded into words, reading comprehension and listening comprehension requires the active construction of inferences that rely on background knowledge and are implicit in the text.

Literacy language requires background knowledge

Second-language learners know for certain that many metaphors, idioms, and other literary devices are based on background knowledge. For example, if we say that you "really hit the ball out of the park" after you gave a presentation to your colleagues, you would quickly understand the compliment. We know that it can't be taken literally because we know what the saying refers to. Writings are heavily dependent on metaphors and idioms. Studies (e.g., Ortony, Schallert, Reynolds, & Antos, 1978) have shown that idioms are often processed just as rapidly as literal meanings, indicating that we are constantly activating background knowledge in comprehension.

Informational text requires background knowledge

Informational text tends to have a greater density of vocabulary and concepts that are directly related to students' background knowledge (Price, Bradley, & Smith, 2012). And these demands placed on background knowledge only accelerate as students progress through the grade levels. Students will be required to apply previously learned concepts to increasingly complex text. They must read, discuss, and write about topics that are conceptually more difficult, and they will need to increasingly draw on intertextual linkages across subject areas. They'll be required to provide evidence from text, show deep and thorough understanding of these concepts, and think creatively about applying these concepts in new ways.

Consequently, in much of the literature in reading, we have focused on skills associated with comprehension: decoding, vocabulary development, strategy instruction, and metacognition, among many others. But what we can see from this brief summary is that we have given very little instructional time to a skill that can play an enormous role in comprehending text. We would venture to guess that students' understanding of text is unlikely to improve unless we begin to more deliberately teach background knowledge.

How to build background knowledge

The question then becomes, how do we build children's background knowledge? Core reading materials often encourage us to activate, support, build on, and tie to children's existing knowledge base. But what do we do when there is no existing knowledge base? Or when there is little to build on? If you asked us, for example, to read an elementary physics text building on our previous knowledge base of physics, you would likely see blank stares, akin to a deer in headlights.

This issue becomes even more complicated in the age of Common Core State Standards (CCSS). The CCSS place a premium on the amount of background knowledge we provide to children prior to reading a text. It's not that the standards negate background knowledge or its contribution to comprehension; rather, the authors of the publishers' guidance to the CCSS emphasize close reading, developing knowledge through text, regarding the deliberate and careful analysis of text as the gateway for developing independent readers (National Governors Association Center for Best Practices & Council of Chief State School Officers,2010).

Although at times, this clash of perspectives might seem like a catch-22, the problem is solvable. Teachers can effectively build children's background knowledge early on (Neuman & Wright, 2013). However, at the same time, we must recognize that knowledge is not just accumulating facts; rather, children need to develop knowledge networks, comprised of clusters of concepts that are coherent, generative, and supportive of future learning in a domain. Here's how we do it:

- **Begin by teaching words in categories.** For example, you can try something as simple as this: "I'm going to say the following words:*strawberries, bananas, papayas, pineapples*. They all are a type of… (fruit)." Categories of objects begin to develop concepts, and the use of generic nouns (*fruit*) has been shown to be highly related to language and vocabulary development.
- **Use contrasts and comparisons.** For example, you can give children puzzlers like, "Is an artichoke a type of fruit? Why is it or is it not a kind of fruit?" Puzzlers help children think outside the immediate context and consider the reasoning behind these contrasts and comparisons, which can further their understanding of categories and concepts.
- **Use analogies.** An analogy is another type of comparison, but this time the comparison is made between two things that are usually thought to be different from each other. Analogies help children build knowledge because they compare something new to something we already know. For example, try something like, "bird is to feather as dog is to… (fur)." Children can use similes (comparisons using the words *like* or *as*) or metaphors (comparisons without using *like* or *as*) to build new knowledge.
- **Encourage topic-focused wide reading.** Reading builds knowledge, but wide reading has typically been interpreted as reading about a lot of different topics, demonstrating breadth rather than depth in reading. Try this variation: Encourage children to identify an interest and read as many books as they can on one topic. What you find is that children will develop a deeper knowledge and expertise on a topic. These interests will drive children to read more.
- E**mbrace multimedia.** We often think that direct experiences are the most compelling ways to build knowledge. As many teachers can attest, there is nothing more thrilling than watching children engage in learning through direct experiences or seeing their delight and excitement on field trips and other activities. Although it is certainly not a replacement for real-life experiences, multimedia can often provide a wealth of information that we could only wish to experience firsthand. Further, it can introduce children to important words and concepts in a highly motivating way and build a shared knowledge base among all of your students.

Conclusion

The importance of background knowledge is especially salient in the age of Common Core. To meet the demands of these new standards, children will be expected to develop knowledge through text, both narrative and informational, within specified difficulty ranges at each grade level. Informational text, in particular, is likely to have a greater density of conceptual language and academic terms than typical storybooks or narrative texts. Consequently, these texts will place increasing demands on children's prior knowledge, further attenuating other risk factors.

Without greater efforts to enhance background knowledge, differences in children's knowledge base may further exacerbate the differences in children's vocabulary and comprehension. The imperative to foster children's background knowledge as a means for providing a firm foundation for learning, therefore, is greater than ever.

Biographies

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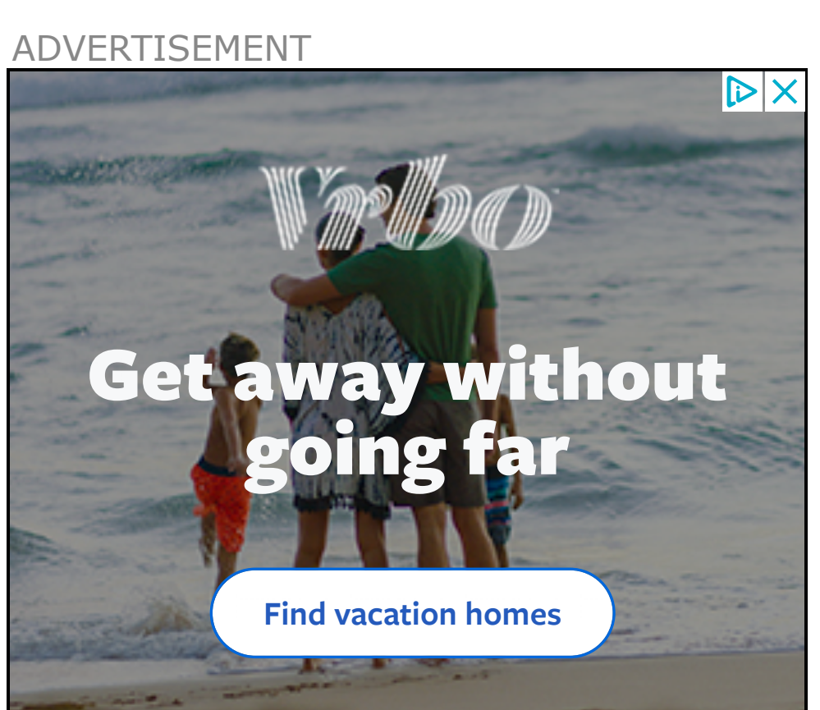
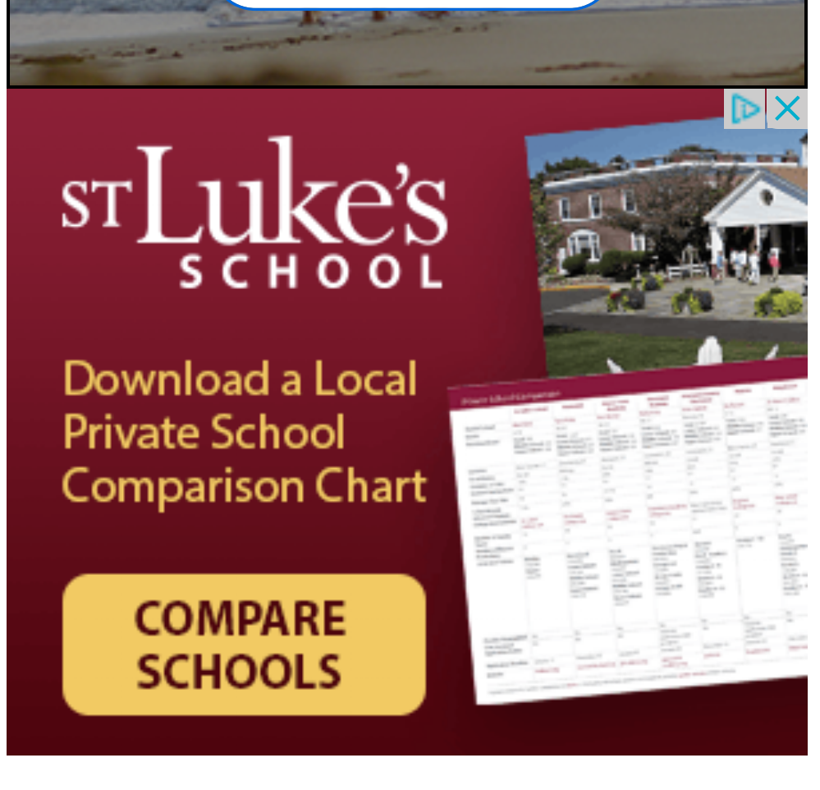

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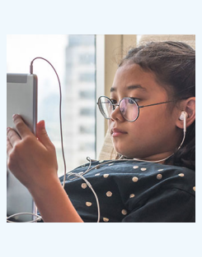
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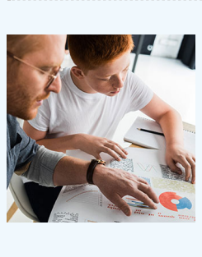
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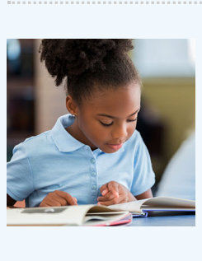
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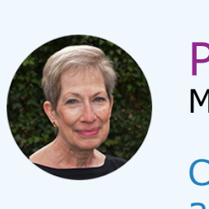
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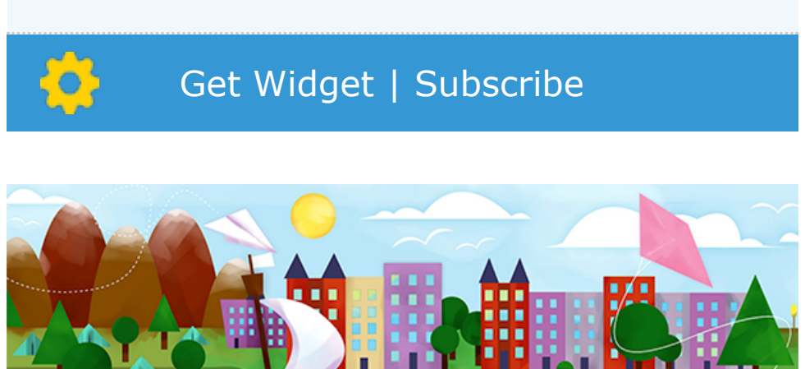

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