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Knowledge Matters

Restoring Wonder and Excitement to the Classroom

Inside the Common Core Reading Tests: Why the Best Prep Is a Knowledge-Rich Curriculum

By Ruth Wattenberg

Who hasn't experienced something like this? *I just received in the mail yet another "explanation" from my health insurance company, which had denied several claims. I called to find out why, since the form in the mail was—to me at least—incomprehensible. By the end of the call, I was reeling: Something about the diagnostic codes had changed and our doctor hadn't used the new codes. Something about the distinction between preventive care that does one thing and preventive care that does something else. The amount of time that has to pass—or can't pass!—between two procedures, depending on some concept that I didn't understand, etc. Then more calls in which the agent referred to issues raised previously that I hadn't fully registered because they didn't make any sense to me. There was vocabulary that I didn't understand, reasoning that made no sense, details I couldn't absorb, unstated premises I couldn't intuit. My frustration was total. And I realized: This is exactly the frustration, the total mental confusion and, ultimately, paralysis and lost motivation that is experienced by students who can "read" but don't have the content, the knowledge, the background, to make sense of what they're reading. In general, I can follow logic and grasp details. But I knew too little about health care and insurance rules to make sense of either the written or verbal responses to my inquiries. This is the opposite of the joy of learning, yet it's what too many students face in school day after day.*

Each spring, American students take assessments in "reading/language arts." According to the Common Core State Standards (CCSS) on which most of these tests are based,* students are supposed to be mastering such reading comprehension skills as "recount the key details and explain how they support the main idea," "make logical inferences from [the text]," "describe the logical connection between particular sentences and paragraphs" using "sequence," "use information gained from illustrations … and the words in a text to demonstrate understanding" etc.

*As of May 2016, 37 states were using Common Core State Standards. Most of the remaining states have similar standards. The standards quoted are from either the CCSS anchor standards or the grade three CCSS standards.

Top Three Takeaways

1. Reading comprehension depends on the reader's skills and background knowledge, with the relative importance of background knowledge increasing with more complex texts.

2. The reading passages in the Common Core ELA assessments also depend on skills and knowledge. The passages reference a variety of topics, especially from science and social studies.

3. The best preparation for these assessments—and for college, career, and citizenship—is a well-rounded education that includes science, history, geography, civics, and the arts.

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Do weak readers need more general reading practice or do their scores reflect insufficient knowledge?

Comprehension strategies can be leveraged only if the student has the relevant vocabulary and background knowledge.

When students score poorly on these Common Core-aligned tests, a typical response in many schools and districts is to double down on reading instruction and give students extra time and support in learning and practicing these skills. In elementary schools, time for science, social studies, and arts is often squeezed out in favor of more time for reading.[1] At the middle and high school levels, students who continue to struggle with reading may get enrolled in special reading skills classes, reducing yet again the time available to them for other courses.[2]

But do these weak readers most need more general reading practice, which is the likely focus of such classes? Or, like me in struggling with my health insurance, do their weak comprehension scores reflect insufficient knowledge of the relevant topics?

We know from decades of research that reading comprehension depends on both fluent skills (e.g., fast and accurate word recognition) and a very broad base of knowledge, including topical knowledge, academic vocabulary, and discourse elements of academic texts. We also know that as students age and gain basic skills, the lack of knowledge typically becomes the much greater obstacle to good reading. Nonie K. Lesaux, a literacy researcher at Harvard, summed up this body of research in a recent article:[3]

> Skills-based competencies are those that allow students to master the mechanics of reading. They are highly susceptible to instruction, are learned in the primary grades by the average student, and for the great majority of students are not a lasting source of difficulty.... These skills relate mostly to the "mechanics" of reading—the ability to map the letters onto their respective sounds in combinations, and thus read words....
>
> Knowledge-based competencies, by contrast, must be developed over many years and are key sources of lasting individual differences in reading ability.... At a minimum, to make meaning from text, the reader needs relevant background knowledge related to the text's vocabulary, topic, and structure....
>
> Without a significant grasp of the knowledge-based competencies, vulnerable populations of students reach middle school with serious reading problems. For example, comprehension strategies often taught as part of today's standard instruction—predicting, summarizing, making inferences—can be leveraged only if the student has the relevant vocabulary and background knowledge needed for the passage.

Researchers have identified many ways in which background knowledge aids comprehension. Here are four important ones: First, vocabulary tends to grow along with knowledge, but when just 2% of the words in a passage are not known, comprehension begins to drop.[4] Second, the ability to process multiple details in a reading passage is severely restricted when readers aren't familiar with the topic(s) in the passage; cognitive scientist Daniel Willingham says that without adequate background knowledge, "chains of logic more than two or three steps long" can't be well comprehended.[5] Third, when we know a little about a topic (e.g., that Alaska is freezing cold), we use that bit to generate a picture in our mind that helps us make sense of a related passage (e.g. that animals without heavy coats or other means of

staying warm will struggle to survive in Alaska). Fourth, when we already know much of what's in a passage, we don't have to focus on its basics, and we can think critically: Does this passage make sense? Do I agree with its argument? How do the different items and ideas in this or several passages relate to each other? [6]

A previous generation of reading tests sought to minimize the effect of students' content knowledge on reading scores by squeezing knowledge out of test passages—and thus not penalizing students who had less of it. The Common Core standards are explicit that to meet the standards, kids must read and comprehend grade-level complex text. While the ten discrete CCSS anchor standards focus on reading skills and process as noted above, the longer CCSS narrative (often not as well disseminated as the ten anchor standards) calls for using authentic texts in instruction and explicitly calls for students to be educated in a way that develops their "base of knowledge across a wide range of subject matter,"[7] further noting that this is "the foundation of knowledge" that will "give them the background to be better readers in all content areas."

Do the Common Core assessments reflect this? What knowledge and vocabulary must a student have to understand the reading passages used by the assessments? How much of doing well on the assessment is the result of having relevant background knowledge? To what extent are scores likely to rise with extra reading skills instruction—or with more time learning social studies, science, and the arts?

To answer these questions, I reviewed the test items that have been publicly released by the two main Common Core testing groups*—the Partnership for Assessment of Readiness for College and Careers (PARCC) and the Smarter Balanced Assessment Consortium (SBAC). PARCC was used in 11 states (including DC) in 2015 and SBAC was used in 17. Both PARCC and SBAC regard their released items as good reflections of the actual tests taken by students in 2015 in terms of the rigor of the items, the standards assessed, and the mix of informational and literary texts.[8]

To understand the reading passage sufficiently to answer the questions, students at every grade need command of substantial subject-matter knowledge.

I thoroughly reviewed the released third-grade test items, which arguably would be the least knowledge-dependent and most skills-heavy of all the tests.[9] For this report, I focused on the assessment items that were based on informational reading or listening passages.† I excluded freestanding questions specifically aimed at measuring other aspects of language development such as writing, language conventions, and spelling. I also conducted a more cursory review of the fifth- and eighth-grade tests to see if my findings about third grade held up in the later grades.

What did I find? On the surface, many items appear to test the skills set forth in the CCSS. For example, a good number ask students to find the main idea, use context to decipher vocabulary, identify how captions or photos contribute to understanding, and make inferences, all paralleling Common Core standards.

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* I reviewed the actual 2015 test items that were released by PARCC. For Smarter Balanced, I reviewed their "practice test" items, which are comprised of items that were field tested for, but not used in, the 2015 test.

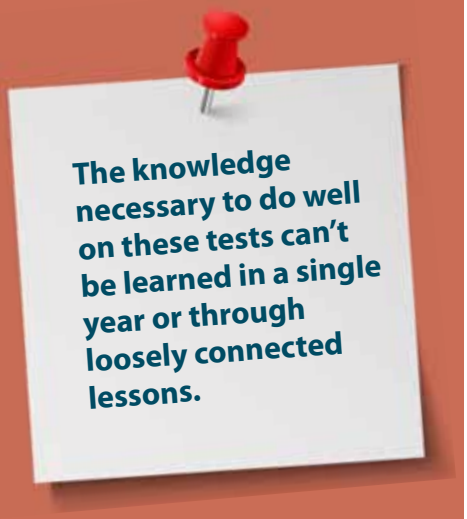
†It's important to note that many of the assessments' literary texts not included in my analysis also depend on substantial background knowledge.

But to understand the reading passage sufficiently to answer the questions, students at every grade need command of substantial subject-matter knowledge. Specifically, to do well on the third-grade items that I reviewed, students need familiarity with a wide range of content, including:

- **basic place geography** (the names and general locations of continents, commonly discussed countries, states, and regions; basic relationships among these entities; north, south, east, west);
- **basic physical geography** (names and basic characteristics of forest and tundra), etc.;
- **basic astronomy** (planets, stars, space, orbits, etc.);
- **seasons** and their basic characteristics;
- **a wide variety of animals**, their basic characteristics and habitats, how they adapt to their environments;
- **the basic idea of cultural adaptation**;
- **basic units (and abbreviations) of measurement**, specifically pounds, kilograms, and miles; and
- **common tropes**, including the collision of indigenous culture and modern life, environmental degradation leading to vanishing species, and space travel.

While none of the released items on these third-grade tests addressed history or the arts, fifth- and eighth-grade items did include these topics, suggesting that non-released items in third grade may address these topics as well. (I hope so.)

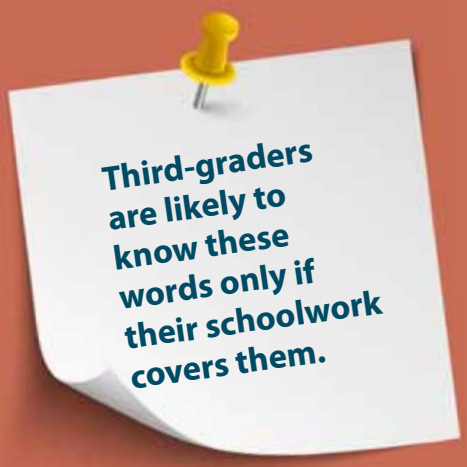
Critically, these are just the topics addressed in released items for third grade for 2015. Presumably, the full universe of topics addressed in the third-grade tests, as well as tests for other grades, is many times the size of the above list. The knowledge necessary to do well on these tests can't be learned in a single year or through occasional, loosely connected lessons and units. The range and depth of learning necessary to score well on these tests can only emerge from instruction that is based on a curriculum rich in geography, history, social studies, science, and the arts that starts in the earliest grades, with one year's learning building systematically on the previous year's. Just as importantly, this rich curriculum must involve students in a variety of reading, writing, discussions, and projects that will cultivate deep understanding and long-term memory. *This is the same learning that will prepare students to read the increasingly advanced science and social studies materials they will encounter in middle and high school (and even, hopefully, in late elementary school).*

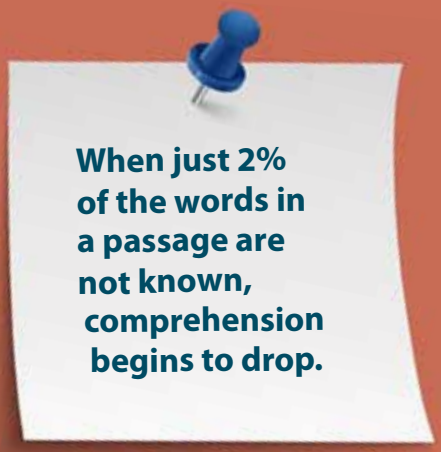


The Assessments

1. Vocabulary

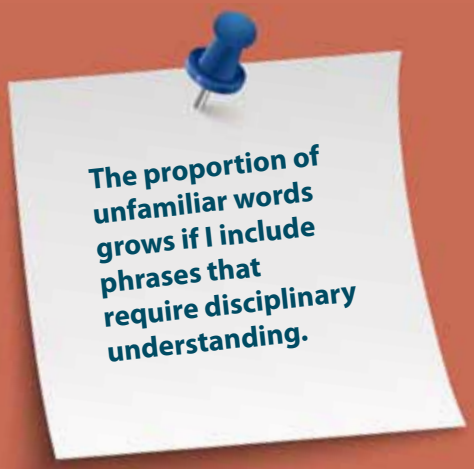
The released items for PARCC's third-grade assessment include three informational reading passages, "Adorable Dormice," "Inuit," and "Life in a Deep Freeze." In "Life in a Deep Freeze," I count 75 challenging words, including proper names, out of 732 words total, meaning roughly 10% could be unfamiliar to students who aren't familiar with the passage's content. (My judgments about word difficulty are subjective. Use the chart on the page below to make your own judgments.)





Estimated Percentage of Challenging Vocabulary

Test	Reading passage	Challenging vocabulary, terms, ideas	Estimated percent
PARCC	"Adorable Dormice"	dormouse, mousey, rodent, species, markings, scurrying, chipmunk, predators, vanished, formula, eyedropper, woodpile, beetles, nocturnal, body temperatures, hibernation, live off their fat, torpor, torpid, food stores, Europe, Asia, Africa, Germany, tassels, hooked, gorge, goodies, snooze, cushion, scarf down, in the wild, built for life in trees, raised them by hand, all-you-can-eat buffet, sacked out, conk out	5%
PARCC	"Inuit"	remote, Canadian Arctic, survived, thousand, Inuit, teeming, caribou, herds, polar bears, Beluga whales, adapted, regions, inhabit, lifestyle, dramatically, decade, southern technology, way of life, rediscovering, heritage, govern, environment, modern, pride, caribou seal, ivory, walrus, musk ox, edible, scarce, walruses, arctic hares, musk oxen, ptarmigan, arctic char, salmon, whitefish, berries, intestine, scraped, soaked, parkas, Canada, sewn, cloth, climate, wooden frames, sod, whalebone, platforms, igloos, dome, temporary shelter, inventions, construct, settle, villages.	10%
PARCC	"Life in a Deep Freeze"	region, harshest environment, landscape, tundra, plain, layer of soil, adapted, surroundings, survival tactics, minus 30°F	10%
SBAC	"What's That in Your Backpack?"	papermaking, logs, logging, paper mill, mill, bark, chipped, chemicals, wood (in sense of logs), mushy, pulp, bleached, rolls (as in large cylinders of a machine), cedar, slats, grooves, graphite, lead (as in of a pencil), slats, sap, maple, tap, tube, sap, sugarhouse, crystallizes, maple sugar, molds, read the signs of the season, sandwiching, 50,000 pounds, chunky, daytime and nighttime temperatures, explore, stacked	7%
SBAC	"What Is the International Space Station?"	National Aeronautics and Space Administration, NASA, space station, spacecraft, orbits, astronauts, science lab, space, 220 miles, explore, labs, research, scientists, future, deeper into space, journey	18%
SBAC	"Northern Lights"	Aurora Borealis, North Pole, planets, space, "sheets of light dancing across the night sky," Canadian, Alaska, South Pole, continent, Antarctica, atmosphere, 60 miles/100 kilometers	12%



The proportion of likely unfamiliar words grows if I include phrases that require greater disciplinary understanding than the words themselves, for example, "internal temperature," "stored fat," and "new coat" (used to mean the fur that an animal grows for the winter).

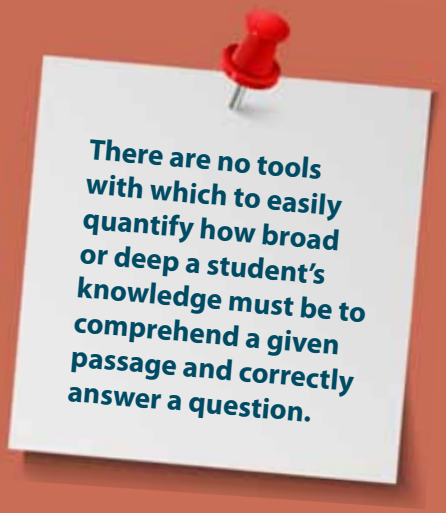
In "Inuit," the first paragraph includes such vocabulary as "remote," "teeming," "caribou," "herds," "adapted," and "inhabit." Plus, it includes a number of geographic and social studies references, including, "Canadian," "Arctic," and "Inuit." By my estimate, as many as 24 discrete words out of 118 words in the first paragraph are easily beyond the knowledge of a third-grader *who hasn't been repeatedly exposed to the kinds of topics and books that would include such words.* For the whole passage, the proportion is about 10%. To be clear, the point here is not that third-graders can't or shouldn't know these words and the knowledge they reflect—but that they are likely to know them only if their schoolwork covers them, with some deliberation and constancy.

In "Dormice," the vocabulary is more modest, but still substantial—with roughly 5% of the words potentially challenging, including such uncommon, informal language as "sacked out" and "scarfed down."

The reviewed items from the Smarter Balanced third-grade assessment include one* informational reading passage, "What's That in Your Backpack?" and two oral presentations of informational content, "What Is the International Space Station?" and "Northern Lights."

"What's That in Your Backpack?" includes about 30 discrete challenging words, 7% of the roughly 450 words in the passage. Among them: mushy, pulp, grooves, sap, tap (as in tapping a tree for syrup), chemicals, mill.

The oral presentation, "What Is the International Space Station?" assumes familiarity with space stations (used nine times), spacecraft (2x), orbit (3x), space (4x), scientists, countries, science, research, and international. "Northern Lights," also a listening comprehension item, assumes general awareness of planets, space, Canada, Alaska, atmosphere, continent, South Pole, and Antarctica. With this prior knowledge, students could make sense of such new ideas as auroras, the Aurora Borealis, and what the northern lights are. The proportion of challenging words in these oral presentations is even higher than in the written passages, roughly 18% for "Space Station" and 12% for "Northern Lights."



II. Sample Questions

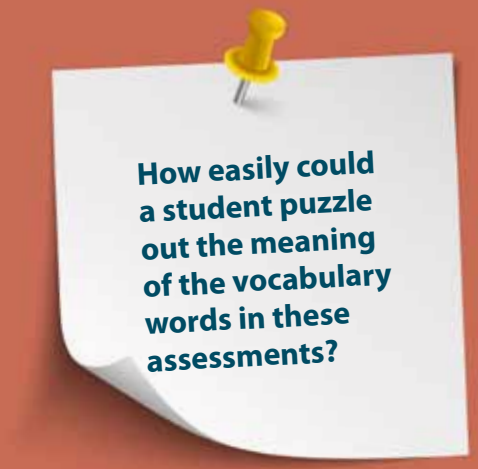
As proxies for the knowledge that's embedded in the assessment reading passages, these vocabulary words capture the range of knowledge that would enable full and facile comprehension; some questions are more knowledge-dependent, others less. To date, there are no tools with which to easily quantify how broad or deep a student's knowledge must be to comprehend a given passage and correctly answer a question.

Of the 28 questions reviewed (14 from each test), 8 questions (4 from PARCC and 4 from SBAC) arguably require the student to grasp the gist[10] of an entire

* SBAC also includes a number of short texts of one to several sentences that are generally the basis for assessing language conventions, spelling, etc. They are not reviewed here, although an occasional question based on them can result in an insignificant addition to the reading score.

passage or paragraph, sometimes with questions that ask for the main idea, sometimes with other questions such as what the "author's point of view" is or "what can be concluded" from the passage. Four questions (3 from PARCC and 1 from SBAC) ask students to figure out a vocabulary word[11] based on context. Others require students to organize details into categories; identify the details that back up a certain claim; comprehend a particular point, sentence, or idea; or use text features to answer questions, and more.

But, it's not really the type of question that makes it more or less knowledge-dependent. It's the interaction of the question and the passage: How much of the passage must a student understand and how difficult is that part of the passage? I've chosen six of the more difficult questions as examples to illustrate how and to what extent knowledge is tapped.



A. Deciphering vocabulary in context: Is knowledge necessary?
The Common Core grade-three standards (RI4 and L4) require students to determine word meanings and use context to do so. Both assessments include questions to measure student ability in this area. How easily could a student puzzle out the meaning of the vocabulary words tested in these assessments if he or she didn't already know the meaning of the word and other words around it?

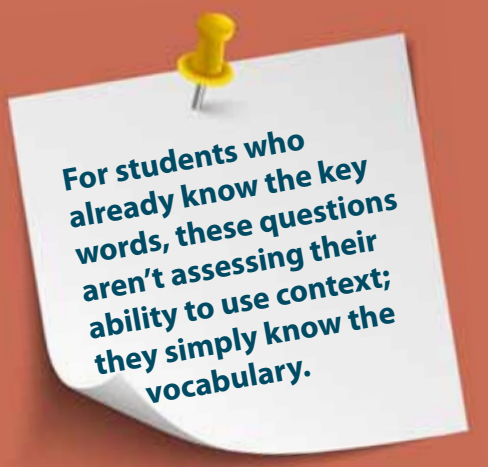
To provide a sense of what students with limited vocabularies experience, I've replaced a vocabulary word in this excerpt from a PARCC passage with the nonsense word "pondit." Can you figure out its correct definition based on this?

> [Dormice] also snack on berries, fruits, and nuts such as the beech nut. In the summer, dormice *pondit* on these goodies. They need to fatten up—sometimes doubling their weight—for the long winter sleep ahead.
>
> *A. to taste things that grow in the wild*
> *B. to eat as much as possible*
> *C. to nibble on insects*
> *D. to munch on food*

If you know that "pondit" means "gorge," you know that B is the best and obvious response. But, to a student with limited vocabulary, already struggling to envision and comprehend the topic being discussed, A and D may both seem reasonable answers.

Now read this excerpt from SBAC's "What's That in Your Backpack?" in which students are asked to choose which of five italicized words in the passage means "placed one on top of another." I have replaced the three most difficult of these italicized words with nonsense words to mimic how the passage might read to a student who didn't know the meaning of these words.

> Once the trees are cut, the biggest branches are removed. The logs, as they are now called, are ***ferroed*** in huge piles at the edge of the forest…. At the mill, the logs go through many steps to be made into paper. After the bark is *removed*, the wood is ***gervoled***, then cooked with chemicals. This turns the wood into a mushy pulp. Next, the pulp is washed, bleached, and *drained*. Then it is ***corayed*** onto big screens to dry.



Based on this passage, a knowledgeable reader can use context to figure out which italicized word means "placed one on top of another," But for the reader who knows so little about logging or mills that she can't picture piles of logs awaiting pick up? For that student, knowing how to use context to derive meaning won't be enough. Moreover, for those students who already know the meanings of "gorge" and "stacked"—perhaps all of the strongest readers—these questions aren't in fact an assessment of their ability to use context; they simply know the vocabulary.

B. The forest and the trees: Keeping track of details while getting the gist

To understand the dance between individual details and grasping the gist of a text, let's start with a relatively easy passage and a relatively easy question. This is the relevant excerpt, also from SBAC's "What's That in Your Backpack?":

> People who make maple syrup must read the signs of the seasons to know when to get to work. In the early spring when daytime and nighttime temperatures are just right, the trees can be tapped. First, a small hole is drilled into the tree. Then the tap—a short tube—is placed into the hold. Sap drips through the tap into a bucket. When the bucket is full the sap is taken to the sugarhouse. There, the sap is boiled and boiled until it thickens into syrup. If you boil the syrup even longer, it crystallizes (hardens) into maple sugar. Then, it is quickly put into molds to give it a pretty shape. Paper. Pencils. Candy. Your backpack is full. Can you believe that so many things you carry around every day come from forests?

Depending on how you count them, the syrup-making process described here takes roughly 10 to 13 steps. *For students unfamiliar with this process*—who don't know what sap is, who have never witnessed a boiled liquid hardening, who have never heard of a sugarhouse, and who don't have a picture in their head of how trees are tapped—*this passage could easily overwhelm them*. For those students without the prior knowledge, this is simply too much new information to take in all at once.

The test questions on this passage don't require particularly high-level "critical" thinking or deep knowledge. But several do require that students grasp the gist of the overall process. One question asks students to choose the sentence that best describes what the information in the paragraph shows about the author's point of view:

A. The author believes that making maple syrup is easy.
B. The author believes that maple syrup is best when it is boiled.
C. The author believes that making maple candy takes careful planning.
D. The author believes that making candy from maple syrup is a wise idea.

Another question based on this passage asks the student to choose which sentence "gives the best conclusion about the people who make maple syrup."

A. They must protect trees.
B. They must pay attention to nature.
C. They must work outdoors all of the time.
D. They must like the taste of maple syrup.

What's hard about these two questions isn't recognizing the "author's point of view" *per se* or "mak[ing] an inference or provid[ing] a conclusion" *per se*, the standards that are assessed in these questions. Rather, the difficulty is in comprehending a 10- to 13-step process *if many elements of it are foreign to you*. In that case, it will be hard to find the forest ("the author believes that making candy takes careful planning") for the trees ("maple syrup is best when it is boiled" or "making candy from syrup is a wise idea"). In the second case, it's difficult to distinguish the inference that captures a central idea of the whole passage, "They must pay attention to nature," from inferences that are true but not central. Multiple answer options are reasonable takeaways from the passage. In each case, one is the best choice, though that is only apparent to the third-graders who can process the details and see the forest.

Similarly, a question about the listening passage, "What Is the International Space Station?" asks students "What is the **most likely** reason the author made the presentation?" Answer options are:

A. to tell about what scientists have learned
B. to show how astronauts plan for space travel
C. to describe who built the International Space Station
D. to explain why scientists use the International Space Station

Each answer option refers to actual information in the presentation, and several are plausible answers.

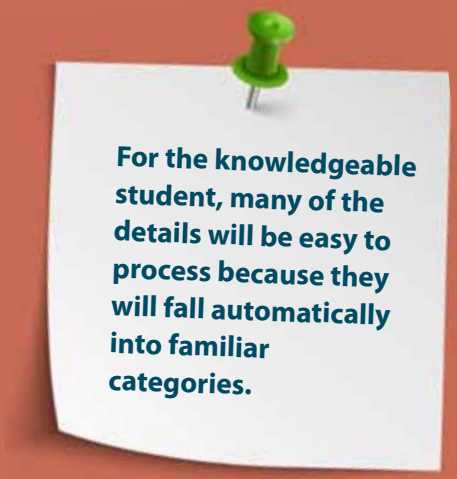
Each answer option refers to actual information in the presentation, and several are plausible answers. Only the most knowledgeable students—especially those who have read other texts about science, astronauts, and the nature of gravity in space—are likely to grasp that most of the answer options reference details from the presentation and that only the final option offers a strong, overarching reason for preparing the presentation.

C. The power of prior knowledge: Freeing brain power to focus on thinking

Consider this passage from PARCC, titled "Life in a Deep Freeze." Students are presented with information about how eight different animals survive the Arctic winter. The passage is full of interesting details about how the collared lemming "digs tunnels under the wind-packed snow"; and how the muskoxen "have curved hooves with sharp rims. That gives them solid footing on icy slopes." Here are a couple of sample paragraphs:

> This bear spends all spring, summer, and fall eating and storing up fat. Then the bear goes into a special type of sleep. During its winter sleep, the grizzly lives off its stored fat. To conserve energy, the bear's internal temperature drops a few degrees. Its heart slows down too.
>
> Under its inch-thick hide, the walrus has a nearly six-inch layer of blubber, or fat, to block out the cold. During deep-sea dives, warm blood shifts away from the skin surface to inside the body. This helps the walrus keep its body heat stable at about 99°F. When the walrus moves ashore, blood flows back to the skin.

As in the passage about maple syrup, there are lots of details to process. The test item requires students to organize each of six different characteristics of the described animals into one of three categories used as subheads in



the article: Escape Artists, the Layered Look, and Dressed for Winter. The characteristics are: "covered with feathers," "sleeping all winter," "using fat to block the cold," "growing another coat," "protected by blubber," and "digging under the snow."

For the knowledgeable student, many of the details will be easy to process because they will fall automatically into familiar categories—related to adaptation, camouflage, winter coats, stores of fat, warm-bloodedness, and so on. For the student who knows about bears and hibernation, the entire first paragraph above is a review, not a set of new, hard-to-follow details about his sleep, fat, changing body temperature, and heart rate. For the student who knows the role of blubber, all that's new in the second paragraph is applying it to the walrus. And, so on. For these students, plenty of brain power is available to think* about how the characteristics connect to the categories. The question is not an easy one, but it is manageable.

For the third-grader with limited prior knowledge—who is facing dozens of new facts and therefore minimal means to organize them—this is a daunting task of comprehension and analysis, requiring the student to track, process, and categorize dozens of details.

Test developers and officials in states that administer the test can accurately argue that for this question (and others) students don't need extensive prior knowledge. Other than the basics that all children are likely to know (e.g., what a bear is), all of the needed information is provided in the passage. Indeed, a student could conceivably slog through the passage, tediously finding each characteristic and assigning it to the subhead under which it falls (though even this would require inferring based on prior knowledge that, for example, "its fur grows thicker and longer in winter" is an example of "growing another coat"). Arguably, for most students, this effort will be a bridge too far. Moreover, in timed assessments, less-knowledgeable students may work diligently yet be unable to complete the assessment. On untimed assessments, these students will eventually be exhausted.

This next and final item is from PARCC and is based on "Adorable Dormice," a passage excerpted from *Ranger Rick*. It is written informally and with a relatively modest vocabulary, compared with "Inuit" and "Life in a Deep Freeze." But the knowledge embedded in the passage is not modest. In one question (and granted, this is one of the more difficult items in this question set), students are asked, "How does torpor benefit dormice?" The answer is to be found in these two paragraphs from the text:

> The sacked-out-dormouse (in the circle above) looks pretty cushion-like, too. Curled into a tight ball, it is in a long, deep sleep called *hibernation*. Garden dormice usually hibernate from October until April. Their body temperatures drop very low. Their hearts beat slowly. This helps them save their energy while food is scarce. Sometimes they wake briefly to scarf down food stores nearby. But mostly, they live off their fat.

* For an in-depth look at how prior knowledge improves thinking, see "Knowledge and Practice: The Real Keys to Critical Thinking" by Daniel Willingham.

> Hibernation isn't the only time dormice conk out to save energy. Even in the summer, if the weather is bad and food is hard to find, a dormouse may fall into *torpor*. Torpor is almost like a mini-hibernation. A torpid dormouse's heart rate and body temperature drop. But his deep sleep lasts less than a day. In a few hours, the dormouse is awake, ready for a meal—and another nap.

The answer options are:

> *A. Torpor allows dormice to keep up their strength.*
> *B. Torpor lets dormice sleep for months.*
> *C. Torpor enables dormice to hunt for food at night.*
> *D. Torpor assists dormice in locating meals.*

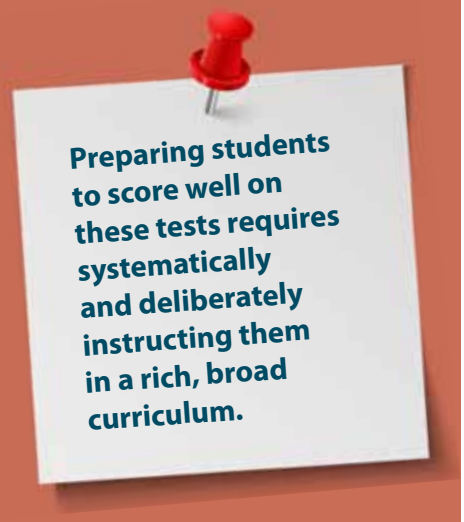
For the student who already knows about hibernation, it's a reasonable task to narrow in on the relevant sentence, "Hibernation isn't the only time dormice conk out to save energy," and pick the correct answer. For the student juggling lots of new, and therefore only loosely connected, details, it's much harder.

The reading passages of the third-grade assessments are content rich and contain challenging vocabulary.

The reading passages that underlie the released items of both PARCC's and SBAC's third-grade assessments are content rich and contain challenging vocabulary. The knowledge that is embedded in these passages ranges across basic astronomy (planets, stars, orbits, auroras, atmosphere); human and physical geography (including that there are such entities as countries and continents, that there are places called the North and South Poles, the Arctic, Africa, Canada, and Germany; that they have different climates and peoples, including the Inuit, that there are forests and tundra); cultural adaptation; units of measurement (the northern lights are 60 miles/100 kilometers above the atmosphere; rolls of paper weigh as much as 50,000 pounds); space travel (space stations, astronauts, weightlessness); biological, physical, and evolutionary processes (hibernation, gravity, adaptation); manufacturing processes such as logging and papermaking; and a heavy dose of animal characteristics and habitats.

A short review of the released items from the fifth-grade tests* turns up passages best comprehended by students who have been exposed to additional ideas, topics, and facts, including: the experience of immigration and the role of lighthouses in seagoing cultures (in two literary passages); the effect of humans on the environment and sea animals; crickets and the physiological process that promotes chirping; Renaissance Italy and the Leaning Tower of Pisa; evolution and animal behavior; and more. In eighth grade, released passages draw on knowledge of the invention process, how the telegraph and phonograph work; how sound waves function; the basics of business and commerce (patents, ventures, entrepreneurs); the meaning of radicalism; Ansel Adams and the art of photography; and familiarity with terms like finance minister, Federal Reserve Bank, inflation and taxes, and more. The range of topics and the depth with which they're addressed ratchet up with each grade.

*Since PARCC has not released most of its informational test items for fifth grade, I also looked at the literary and narrative passages used in both fifth-grade assessments.



This is, again, the knowledge that is embedded in the released items. We don't know the topics that are addressed in the non-released test items—for any grade. Nor do we know the universe of topics from which these items were chosen or from which future ones will be chosen. But the released items are consistent with the kinds of topics that are set forth in state and national science and social studies standards—and, happily, but, to a lesser extent, arts standards—for the items' respective grades. We can take a leap and surmise that the full range of topics and domains that are embedded in these assessments is much larger than what is found in these released items and that it is also consistent with these standards.

These reading tests tap, to a very substantial degree, students' content knowledge. Preparing students to score well on these tests requires systematically and deliberately exposing them to and instructing them in a rich, broad curriculum of science, history, geography, and (at least some) arts, starting at the earliest grades and continuing through every grade. Need I say: This is essentially the same curriculum that will prepare them well for their middle and high school classes in social studies and science. If the world of schools better understood that these assessments are substantially—even primarily—tests of knowledge, not just skills, they would realize that the best test prep for all our students is engaging instruction based on a rich, well-rounded curriculum.

Simply: a good education is the best prep for these tests.

Endnotes

[1] Ruth Wattenberg, "Complex Knowledge: Will The New English Standards Get the Curriculum They Need?," in *Knowledge at the Core*. Ed. Chester E. Finn, Jr. and Michael J. Petrilli. Thomas B. Fordham Institute, (2014), available at https://edex.s3-us-west-2.amazonaws.com/publication/pdfs/EDHirsch-Report-Papers-Final.pdf. See also Nell K. Duke and Meghan K. Block, "Improving reading in the primary grades." *The Future of Children*, (2012): 22(2), 55–72, 66, available at http://www.futureofchildren.org/futureofchildren/publications/docs/22_02_04.pdf.

[2] Shirley Dang, "Struggling students get double dose of basics," *East Bay Times* (May 27, 2007), available at http://www.eastbaytimes.com/argus/localnews/ci_6000854.

[3] Nonie K. Lesaux, "Reading and Reading Instruction for Children from Low-Income and Non-English-Speaking Households," *The Future of Children*, (2012): 22(2), 76-80, available at http://www.futureofchildren.org/futureofchildren/publications/docs/22_02_05.pdf.

[4] Ronald P. Carver, "Percentage of Unknown vocabulary words in text as a function of the relative difficulty of the text: Implications for Instruction." *Journal of Reading Behavior,* (1994): 26(4) and Ronald P. Carver, "Predicting accuracy of comprehension from the relative difficulty of the materials." *Learning and Individual Differences,* (1990a): 2, 405-422.

[5] Daniel Willingham, *Why Don't Students Like School?* Jossey-Bass, (2010): 18.

[6] Daniel Willingham, "How Knowledge Helps: It speeds and strengthens reading comprehension learning—and thinking," *American Educator,* (2006), available at http://www.aft.org/periodical/american-educator/spring-2006/how-knowledge-helps.

[7] Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects. PDF. Common Core State Standards Initiative, 33, available at http://www.corestandards.org/wp-content/uploads/ELA_Standards.pdf.

[8] Jeffrey Nellhaus, Chief of Assessment, PARCC, personal interview, and Nikki Elliott-Schuman, Director, English Language Arts and Literacy, SBAC, personal interview.

[9] For PARCC, I reviewed the items connected to "Adorable Dormice," "Inuit," and "Life in a Deep Freeze." For SBAC, I reviewed items connected to "What's That in Your Backpack?," "What Is the International Space Station," and "Northern Lights." For the complete text of the reading passages and items, see these websites: "Adorable Dormice," https://prc.parcconline.org/system/files/3rd%20Grade%20M_L%20Informational%20Text%20Set-Item%20Set.pdf and https://www.nwf.org/Kids/Ranger-Rick/Animals/Mammals/Dormice.aspx; "Inuit" and "Life in a Deep Freeze," https://prc.parcconline.org/system/files/3rd%20Grade%20-Research%20Simulation%20Task%20-%20Item%20Set_12016.pdf; and all SBAC items, https://www.smarterbalanced.org/wp-content/uploads/2015/11/G3_Practice_Test_Scoring_Guide_ELA.pdf and http://www.nthurston.k12.wa.us/site/handlers/filedownload.ashx?moduleinstanceid=21845&dataid=40294&FileName=3rd%20Grade%20ELA%20CAT%20-%20Audio%20Presentations.pdf.

[10] I categorized the following items as gist questions: PARCC—0510, 0792, 0518, 0228; SBAC—2692, 2660, 2663, 2684. Some questions, mainly in PARCC, have two parts, but I have counted them here as one question.

[11] The following questions ask students to infer vocabulary from context: PARCC—0508, 0513, 0814; SBAC—2685.

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