Chapter 11

Reading: Synthesis

Up until now in our discussion of the SAT Reading Test, most of the question types we've examined have focused on taking things (sentences, paragraphs, ideas) apart and examining them closely for their meaning or for their rhetorical purpose or effect. Synthesis questions on the Reading Test, by contrast, focus mainly on putting information and ideas together into a bigger whole to acquire a deeper, broader understanding of a topic. Also in contrast to questions in the Information and Ideas (Chapter 9) and Rhetoric (Chapter 10) categories, Synthesis questions appear only with selected passages — either paired passages or passages with one or more informational graphics.

Questions in this category are of two main types:

- **Analyzing multiple texts:** Making connections between topically related informational passages
- **Analyzing quantitative information:** Locating data in informational graphics such as tables, graphs, and charts; drawing reasonable conclusions from such graphics; and integrating information displayed graphically with information and ideas in a passage

Each of these categories is discussed in more detail in the following sections.

REMEMBER

Synthesis questions appear only with paired passages or passages that are accompanied by one or more informational graphics. Synthesis questions ask you to draw connections between related passages and to locate data in and draw reasonable conclusions from tables, graphs, and charts, as well as integrate information conveyed in graphics and in words.

ANALYZING MULTIPLE TEXTS

Each version of the Reading Test includes one set of two or more topically related informational passages on a subject in either history/social studies or science. We'll call all of these "paired passages" because in most cases there will be two passages in a set — one labeled Passage 1 and the other Passage 2. These pairings are chosen carefully to ensure that the passages are similar enough that meaningful connections can be drawn between the two.

As discussed earlier, the two passages may present opposing positions on the same issue, but it's more likely that the second passage will "respond" to the first in some more general way. The second passage may, for instance, provide a more detailed explanation of an idea that's only touched on in the first passage, or it may offer a practical application of a theoretical concept discussed in the first passage. The two passages will be different enough in content that you should be able to remember who said what if you've read

REMEMBER

The SAT Reading Test will include one set of topically related passages, or "paired passages," drawn from history/social studies or science. You'll be assessed on your understanding of each passage individually as well as your skill in drawing meaningful connections between the two.

them both carefully, but, as always, you can refer to the test book as often as you like and use notations such as underlines, numbers, and arrows if this will help you keep the two passages straight in your mind.

Here's an example that gives you an idea of how paired passages work.

Passage 1 is adapted from Susan Milius, "A Different Kind of Smart." ©2013 by Science News. Passage 2 is adapted from Bernd Heinrich, *Mind of the Raven: Investigations and Adventures with Wolf-Birds*. ©2007 by Bernd Heinrich.

Passage 1

In 1894, British psychologist C. Lloyd Morgan published what's called Morgan's canon, the principle that suggestions of humanlike mental processes behind an animal's behavior should be rejected if a simpler explanation will do.

Still, people seem to maintain certain expectations, especially when it comes to birds and mammals. "We somehow want to prove they are as 'smart' as people," zoologist Sara Shettleworth says. We want a bird that masters a vexing problem to be employing human-style insight.

New Caledonian crows face the high end of these expectations, as possibly the second-best toolmakers on the planet.

Their tools are hooked sticks or strips made from spike-edged leaves, and they use them in the wild to winkle grubs out of crevices. Researcher Russell Gray first saw the process on a cold morning in a mountain forest in New Caledonia, an island chain east of Australia. Over the course of days, he and crow researcher Gavin Hunt had gotten wild crows used to finding meat tidbits in holes in a log. Once the birds were checking the log reliably, the researchers placed a spiky tropical pandanus plant beside the log and hid behind a blind.

A crow arrived. It hopped onto the pandanus plant, grabbed the spiked edge of one of the long straplike leaves and began a series of ripping motions. Instead of just tearing away one long strip, the bird ripped and nipped in a sequence to create a slanting stair-step edge on a leaf segment with a narrow point and a wide base. The process took only seconds. Then the bird dipped the narrow end of its leaf strip into a hole in the log, fished up the meat with the leaf-edge spikes, swallowed its prize and flew off.

"That was my 'oh wow' moment," Gray says. After the crow had vanished, he picked up the tool the bird had left behind. "I had a go, and I couldn't do it," he recalls. Fishing the meat out was tricky. It turned out that Gray was moving the leaf shard too forcefully instead of gently stroking the spines against the treat.

The crow's deft physical manipulation was what inspired Gray and Auckland colleague Alex Taylor to test other wild crows to see if they employed the seemingly insightful string-pulling solutions that some ravens, kea parrots and other brainiac birds are known to employ. Three of four crows passed that test on the first try.

Passage 2

For one month after they left the nest, I led my four young ravens at least once and sometimes several times a day on thirty-minute walks. During these walks, I wrote down everything in their environment they pecked at. In the first sessions, I tried to be teacher. I touched specific objects—sticks, moss, rocks—and nothing that I touched remained untouched by them. They came to investigate what I had investigated, leading me to assume that young birds are aided in learning to identify food from the parents' example. They also, however, contacted almost everything else that lay directly in their own paths. They soon became more independent by taking their own routes near mine. Even while walking along on their own, they pulled at leaves, grass stems, flowers, bark, pine needles, seeds, cones, clods of earth, and other objects they encountered. I wrote all this down, converting it to numbers. After they were thoroughly familiar with the background objects in these woods and started to ignore them, I seeded the path we would later walk together with objects they had never before encountered. Some of these were conspicuous food items: raspberries, dead meal worm beetles, and cooked corn kernels. Others were conspicuous and inedible: pebbles, glass chips, red winterberries. Still others were such highly cryptic foods as encased caddisfly larvae and moth cocoons. The results were dramatic.

The four young birds on our daily walks contacted all new objects preferentially. They picked them out at a rate of up to tens of thousands of times greater than background or previously contacted objects. The main initial criterion for pecking or picking anything up was its novelty. In subsequent trials, when the previously novel items were edible, they became preferred and the inedible objects became "background" items, just like the leaves, grass, and pebbles, even if they were highly conspicuous. These experiments showed that ravens' curiosity ensures exposure to all or almost all items in the environment.

You can probably easily note, even before reading any of the associated test questions, why these two passages might have been chosen for pairing. The two texts share a broad topical similarity — animal intelligence — but if that were all, it probably wouldn't be a very meaningful activity to draw connections between them. Examining more closely, we note that both passages deal with the issue of bird intelligence, although Passage 1 mainly discusses New Caledonian crows while Passage 2 mainly discusses ravens. Delving more deeply still, we can grasp that both passages deal to some extent with the issue of humans' response to and interpretation of animals' signs of intelligence. Passage 1 is explicit about this, noting in the first three paragraphs that people have a tendency to see animals as thinking in humanlike ways even when simpler and perhaps more defensible explanations are possible. Passage 2 isn't as direct in this respect, but the author (the "I" in the passage)

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Paired passages will be topically related, as are these two passages that broadly deal with bird intelligence. The exact relationship between the two passages, however, may be nuanced.

definitely shows some of that tendency with regard to his ravens (e.g., "These experiments showed that ravens' curiosity ensures exposure to all or almost all items in the environment"). However, the two passages are different enough — at the most basic level, one is about crows and the other is about ravens — that it's fairly easy to keep the information and ideas in each passage separate after you've read both.

REMEMBER

Sets of questions associated with paired passages will begin with questions that focus on each passage separately and that will be similar in nature to the questions you'll see on nonpaired passages. Next, you'll see Synthesis questions that require you to draw on an understanding of both passages.

The questions you'll find with paired passages are of two general kinds. The first kind consists of questions about either Passage 1 or Passage 2 separately. These come in order — questions about Passage 1, then questions about Passage 2 — and are of the same types that we discussed in Chapters 9 and 10. The second kind consists of the actual Synthesis questions. These questions require you to draw meaningful connections between the two passages. They might ask about the information and ideas in the passages or about the rhetorical strategies used in them, just like questions about single (nonpaired) passages — except in these cases you'll have to draw on an understanding of both texts to answer the questions correctly.

Let's inspect two of the Synthesis questions associated with the paired passages presented earlier. (The questions and a full answer explanation for each can be found in Chapter 12.)

The first question asks you to recognize a relatively straightforward similarity between the animals discussed in the two passages.

The crows in Passage 1 and the ravens in Passage 2 shared which trait?

A) They modified their behavior in response to changes in their environment.
B) They formed a strong bond with the humans who were observing them.
C) They manufactured useful tools for finding and accessing food.
D) They mimicked the actions they saw performed around them.

To recognize choice A as the best answer, you'll need to note that both the crows described in Passage 1 and the ravens described in Passage 2 changed their behavior due to changes in their environment. As Passage 1 notes, the wild crows began "checking [a] log reliably" after the researchers "had gotten [them] used to finding meat tidbits" in holes in the log. Passage 2, meanwhile, mentions that the ravens "picked . . . out" objects newly introduced by the researcher into their environment "at a rate of up to tens of thousands of times greater than background or previously contacted objects." To answer the question correctly, you'll have to connect specific information found in each passage.

The second question we'll consider here is on a point that we touched on when discussing the passages themselves.

> Is the main conclusion presented by the author of Passage 2 consistent with Morgan's canon, as described in Passage 1?
>
> A) Yes, because the conclusion proposes that the ravens' behavior is a product of environmental factors.
> B) Yes, because the conclusion offers a satisfyingly simple explanation of the ravens' behavior.
> C) No, because the conclusion suggests that the ravens exhibit complex behavior patterns.
> D) No, because the conclusion implies that a humanlike quality motivates the ravens' behavior.

Compared to the first question, this one is broader and more abstract and complex. You have to understand (at least) both Morgan's canon, as described in Passage 1, and the main conclusion of Passage 2. We've already hinted at the answer to this question, which is choice D. Passage 1 defines Morgan's canon as "the principle that suggestions of humanlike mental processes behind an animal's behavior should be rejected if a simpler explanation will do." The author of Passage 2, however, indicates his belief that ravens display curiosity — a humanlike trait — and doesn't show any signs of having seriously considered other, simpler possibilities. The main point to remember here is that Synthesis questions aren't always about drawing simple point-A-to-point-B comparisons; some questions will require you to have a solid working knowledge of the subtleties of the passages.

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Higher difficulty questions associated with paired passages will require you to have a strong understanding of each passage individually and then to draw complex or subtle connections between the two. As you read the second passage in a pair, carefully consider how that passage relates to the first in terms of content, focus, and perspective.

ANALYZING QUANTITATIVE INFORMATION

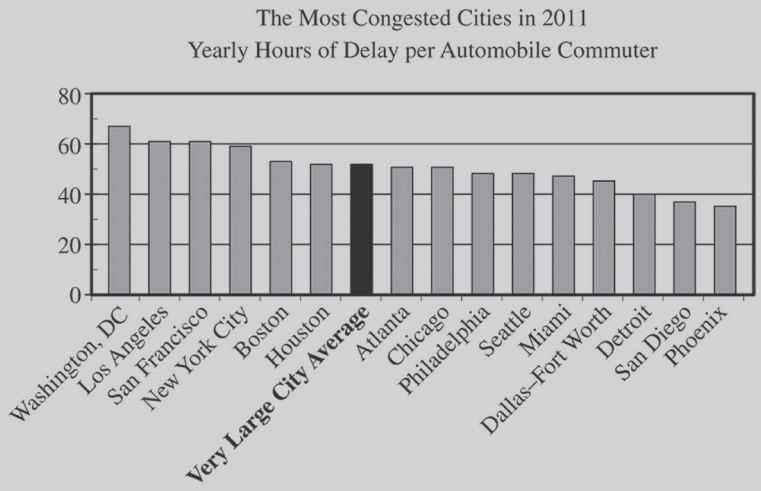
You'll find one or more informational graphics — tables, graphs, charts, and the like — accompanying one of the history/social studies passages and also one of the science passages on the test. There'll be questions about those graphics as well. These questions fall into three general kinds (although the first two are fairly similar):

- Questions that ask you to locate information in one or more informational graphics
- Questions that ask you to draw reasonable conclusions from data presented in one or more graphics
- Questions that ask you to connect the information displayed in one or more graphics with the information in the accompanying passage

The main difference between the first two types is simply in how explicit the information is. Sometimes we'll ask you to just locate a particular piece of information; in other cases, you'll need to interpret the data to make a reasonable inference. (This difference is analogous to the stated-implied distinction we talked about previously.) The third type of question, on the other

hand, will require you to understand both the passage and the graphic(s) and to integrate the information found in each.

Now we'll briefly examine two different questions involving graphics. The first question is a relatively simple one requiring a straightforward reading of a graphic that accompanies a social science passage on traffic. (As always, the passage, graphic, question, and answer explanation can be found in Chapter 12.)



Which claim about traffic congestion is supported by the graph?

A) New York City commuters spend less time annually delayed by traffic congestion than the average for very large cities.
B) Los Angeles commuters are delayed more hours annually by traffic congestion than are commuters in Washington, D.C.
C) Commuters in Washington, D.C., face greater delays annually due to traffic congestion than do commuters in New York City.
D) Commuters in Detroit spend more time delayed annually by traffic congestion than do commuters in Houston, Atlanta, and Chicago.

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Some Analyzing Quantitative Information questions, such as this one, will require you to locate information from a chart, table, or graph or to draw a reasonable conclusion from the data. Carefully analyze the data in the graph — for instance, by reading the title, determining what the axes represent, and understanding the scale or scales used — before selecting your answer.

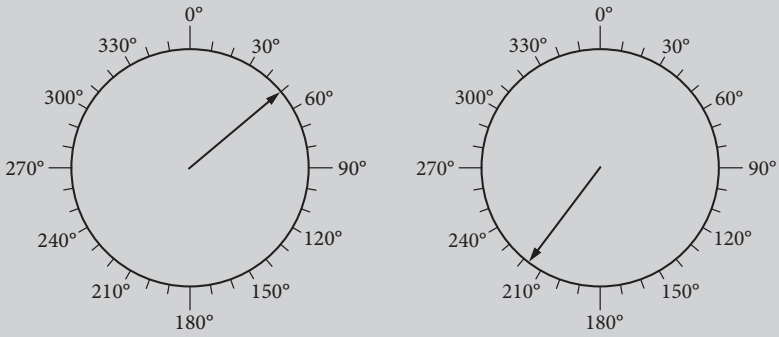
You can determine the best answer to this question, choice C, by understanding how the graph displays information. As its title indicates, the graph conveys data about the most congested U.S. cities in 2011 in terms of "yearly hours of delay per automobile commuter." A series of U.S. cities is listed on the horizontal (x) axis of the graph, while hours in increments of 20 are marked along the vertical (y) axis. Each light gray bar represents the yearly hours of delay per driver for a given city, with the dark gray bar near the middle representing the average delay for very large cities. Higher bars represent greater yearly delays than lower bars, so automobile commuters in the cities listed toward the left-hand side of the graph experienced longer annual delays than did the automobile commuters in the cities listed toward the right-hand side. Given that, it's a fairly simple matter to answer the question, as Washington, D.C., is to the left of New York City (and all other cities) on the graph.

The second question requires more genuine synthesis, as you'll have to understand both the passage and the graphic to get the question right. Because of this, we'll quote the most relevant bit from the passage and then follow that with the graphic. (In a real testing situation, you'd have to find this portion of the passage on your own. Chapter 12 contains the full passage as well as the question, graphic, and answer explanation.)

[. . .] Putman works in the lab of Ken Lohmann, who has been studying the magnetic abilities of loggerheads for over 20 years. In his lab at the University of North Carolina, Lohmann places hatchlings in a large water tank surrounded by a large grid of electromagnetic coils. In 1991, he found that the babies started swimming in the opposite direction if he used the coils to reverse the direction of the magnetic field around them. They could use the field as a compass to get their bearing. [. . .]

Adapted from Ed Yong, "Turtles Use the Earth's Magnetic Field as Global GPS." ©2011 by Kalmbach Publishing Co.

Orientation of Hatchling Loggerheads Tested in Magnetic Fields



Adapted from Nathan Putman, Courtney Endres, Catherine Lohmann, and Kenneth Lohmann, "Longitude Perception and Bicoordinate Magnetic Maps in Sea Turtles." ©2011 by Elsevier Inc.

Orientation of hatchling loggerheads tested in a magnetic field that simulates a position at the west side of the Atlantic near Puerto Rico (left) and a position at the east side of the Atlantic near the Cape Verde Islands (right). The arrow in each circle indicates the mean direction that the group of hatchlings swam. Data are plotted relative to geographic north (N = 0°).

It can reasonably be inferred from the passage and the graphic that if scientists adjusted the coils to reverse the magnetic field simulating that in the East Atlantic (Cape Verde Islands), the hatchlings would most likely swim in which direction?

A) Northwest
B) Northeast
C) Southeast
D) Southwest

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For passages that are accompanied by one or more informational graphics, be sure to carefully read all of the information given, including the title, labels, and captions of all graphics.

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A more challenging Synthesis question such as this one will require that you integrate a solid understanding of the passage with a strong interpretation of data presented in a chart, table, or graph.

While the first question we examined was just about finding some information in the graphic, this question requires multiple steps involving both the passage and the graphic. We know from the passage that loggerhead turtle hatchlings in a specially constructed tank in Ken Lohmann's lab will start "swimming in the opposite direction" if the direction of the magnetic field around them is reversed. From the graphic and its accompanying caption, we learn, among other things, that geographic north on the diagram is represented by 0 degrees and that loggerhead hatchlings swimming in a magnetic field simulating that of a position in the East Atlantic Ocean near the Cape Verde Islands will normally move in a southwesterly direction (around 218 degrees). Putting these bits of information together, we can reasonably infer that if the magnetic field affecting these "East Atlantic" turtles were reversed, the hatchlings would also reverse direction, swimming in a northeasterly direction. The best answer here, then, is choice B.

As you can tell, questions involving graphics can sometimes get complicated, but the basic set of knowledge and skills you'll apply is the same as you'd use with any other question on the Reading Test. Read carefully, figure out what the author says directly and indirectly, and, when necessary, draw reasonable conclusions supported by textual evidence.

CHAPTER 11 RECAP

The last of the three categories of Reading Test questions, Synthesis, includes just two main types: Analyzing Multiple Texts and Analyzing Quantitative Information. However, as the samples in this chapter (and in Chapter 12) suggest, there's a lot of variety in these sorts of questions, and they can range from relatively simple and straightforward to quite complex. Even when you encounter the more difficult ones, though, you should proceed calmly and thoughtfully. The knowledge and skills these questions call on are fundamentally the same as those needed for any other question on the test. In the end, it's all about reading closely, making use of textual evidence, and drawing supportable conclusions when needed.

Chapters 8 through 11 have covered the content of the SAT Reading Test in quite a bit of detail. The next chapter will present sample passages and questions, along with detailed explanations of how the answer for each question was reached and why the alternatives were not as good a choice in each case. Some of the material in the preceding four chapters will be presented again, but additional passages and questions are included as well.