
2: Language and Being (pages 45–76)

Reading 1: “Approximating Life”

Pre-Reading (page 46)

Students usually find that the pre-reading questions tend to stimulate debate between those who imagine that technology might indeed open up frontiers that to others are utterly unimaginable. Ask students to organize themselves in small groups and discuss the pre-reading questions. The activity generally works best if you have one member of the group be responsible for listing on a sheet of paper ideas mentioned by other group members, especially for Pre-Reading Question 1. The teacher can then circulate among groups and find out rather quickly whether students are able to come up with appropriate examples. If you see that some groups are stuck for examples, switch to a whole-class format, elicit examples from groups that have been more productive, and list these ideas on the board. Or conduct the exercise as a whole class activity from the beginning.

The first activity in **For Discussion** (page 58) can also be used to good effect as a pre-reading activity rather than a post-reading activity. It involves chatting with ALICE (the creation of Richard Wallace who is the personal interest story within “Approximating Life”). If your class has access to a computer lab, you can have the students access www.alicebot.org (or if the site has been discontinued try an Internet search for **chatbot ALICE**). At this point the instruction to “conduct your own Turing Test” will not be clear, but that is not important. Just explain that the students are to find out whether ALICE is able to understand and answer questions in an online chat environment. In the event that ALICE is nowhere to be found, a general search for **Chatbots** should yield other possibilities. The crucial factor is that students will need an interactive site connected to a chatbot—a computer program designed to simulate intelligent conversation.

Another alternative is to arrange for the pre-reading discussion to fall near the end of a class, and as homework, assign the first **For Discussion** activity on page 58 (alone or along with a first reading of the article). Then, the next time the class meets, students can discuss their experiences with ALICE. This is often entertaining as students report on the ways in which ALICE has succeeded or failed as a savvy conversationalist.

Reading (pages 47–53)

The reading can be assigned as homework and discussed during the next class session. It works well if it is assigned in combination with the first **For Discussion** activity on page 58. When the class meets again, students can then review the reading and answer the **Getting at the Matter** questions and then share their experiences with ALICE before moving on to the **Critical Focus**.

Critical Focus: Recognizing and Examining Assumptions (page 54)

A useful way to start is to first discuss the concept of assumption. Ask students to make a list of assumptions that they make in their everyday lives. For example:

- If I wake up and it is getting light outside, I assume morning has come.
- I am driving toward an intersection and I have a green light; I assume the traffic on the cross street has a red light.
- A couple of about the same age is introduced to me as Mr. and Mrs. Smith. I assume they are husband and wife.

Next ask the students to read through the **Critical Focus** explanation, and then move on to the **Critical Focus: Application** exercise.

Critical Focus: Application (page 55)

The first item has been done as an example, but you might want to prepare a transparency so you can work through the example step by step. First, show the claim. Cover the evidence and assumptions. Have students find evidence for the claim in the text. Then reveal the evidence. Next have students try to state the assumptions underlying the claim. Reveal the suggested answer. Students can then work on the remaining items in small groups. Another effective way to do the exercise is as a whole group activity. Using the teacher's notes, make a transparency for all of the exercises and working through all four exercises as a group.

Suggested answers:

2. **Claim:** “A few thousand statements make up the bulk of conversation—the everyday, common place chitchat that humans engage in at work, at the water cooler, and in online discussion groups.” (Paragraph 14)
Evidence: Computer users who accessed ALICE tended to ask her predictable questions and Wallace had been able to write a program that addressed a few hundred of the most common conversational openings.
Assumption: The bulk of everyday conversation is as predictable as the opening questions of those who engage in on-line chat.
3. **Claim:** By “teaching ALICE a new response every time he saw it baffled by a question, he would eventually cover all the common utterances . . .” (Paragraph 14)
Evidence: Wallace’s initial programming allowed ALICE to successfully respond to several hundred conversational openings.
Assumption: Human conversation is limited enough that the continued application of this strategy will in fact result in satisfactory coverage of all common utterances.
4. **Claim:** “Considering the vast size of the set of things people could possibly say, that are grammatically correct or semantically meaningful . . . the number of things people actually do say is surprisingly small.” (Paragraph 28)
Evidence: The people accessing ALICE tend to ask many of the same questions.
Assumption: What people accessing ALICE say is representative of human communication in general.

Getting at the Matter (page 56)

Suggested answers:

1. Richard Wallace is a computer scientist and the creator of ALICE. ALICE is a chatbot.
2. A chatbot is a computer program designed to try to simulate human conversation.
3. The Turing Test is a kind of definition of artificial intelligence. Students should be able to paraphrase the procedure as described in the reading. To summarize from the reading, if a human observer interacts with a human being and with a machine and cannot tell the difference between the output of the machine and that of the human, Alan Turing insisted that the machine must be judged to be intelligent. The question it resolves is whether or not a machine can be said to be intelligent.
4. The Loebner Competition is, in fact, a kind of Turing Test. The judges are looking for a chatbot that is able to appear to be human in its conversational ability.
5. “Approximating Life” might refer to ALICE. Richard Wallace’s project of endowing her with the capacity for carrying on a credible conversation and gradually improving on her capacity through collection of data and writing of responses to frequently asked questions might be seen as a way of bringing ALICE closer and closer to life. It might also refer to Richard Wallace himself, who because of his bipolar disorder has had difficulties having a “normal” work life and social life, but who, through ALICE, approximates a more “normal” life.

Academic Vocabulary Focus (page 57)

- | | |
|------|-------|
| 1. e | 9. o |
| 2. i | 10. m |
| 3. l | 11. d |
| 4. h | 12. g |
| 5. a | 13. k |
| 6. n | 14. f |
| 7. b | 15. j |
| 8. c | |

Reading 2: “Form and Meaning in Natural Languages”

Pre-Reading (page 59)

The pre-reading questions are quite challenging, and a capable class can spend quite a bit of time discussing them. If time is limited, consider having students choose one of the two questions to discuss, or assign each question to different groups. Group members should take notes on the discussion so they can summarize it later. Ask each group to report to the whole class the ideas the group members generated.

Reading (page 61)

Unlike most readings in the book, this one is quite brief; however, sentence length, vocabulary, and grammatical complexity make it a challenging reading. Have students read it through once or twice in class and see if they can pick out the main idea.

Main Idea:

Having mastered a language, one is able to understand an indefinite number of expressions that are new to one’s experience, that bear no simple physical resemblance, and are in no simple way analogous to the expressions that constitute one’s linguistic experience; and one is able, with greater or less facility, to produce such expressions on an appropriate occasion, despite their novelty and independently of detectable stimulus configurations, and to be understood by others who share this still mysterious ability.

Getting at the Matter (page 63)

Suggested answers:

1. True mastery means that an individual is able to produce and understand an indefinite number of expressions regardless of whether he or she has heard them before. The individual is able to invent expressions not necessarily ever heard before.
2. The second sentence of Paragraph 2 describes a situation very much like that of ALICE. Chomsky’s assessment would be that because ALICE’s language repertory is confined strictly to a habitual set of responses to particular expressions that she has encountered before, ALICE is “mentally defective”.
3. In the last paragraph, Chomsky says that we may never understand the creativity of human language. If Chomsky believes that we cannot hope to understand how human language works, it doesn’t seem likely that he would have much faith in the possibility of programming a machine to simulate human language.

Critical Focus: Application (page 64)

The first exercise, creating a chart to compare the views of Wallace and Chomsky, is the easier of the two although some students may have a hard time paraphrasing and coming up with contrasts that involve going beyond what is directly stated in the text. Several suggested points of contrast are shown.

Wallace	Chomsky
<ul style="list-style-type: none"> • Everyday language consists mostly of a limited number of expressions that are continually repeated. 	<ul style="list-style-type: none"> • The way humans use language is innovative, and responsive to changing situations.
<ul style="list-style-type: none"> • Programming a chatbot with about 40,000 expressions will give it a human-like command of language. 	<ul style="list-style-type: none"> • A pre-programmed set of responses to specific stimuli is not the same as language.
<ul style="list-style-type: none"> • The way humans use language is not especially creative. The number of things people say is very limited. 	<ul style="list-style-type: none"> • The normal use of language is creative. Humans routinely come up with novel expressions.
<ul style="list-style-type: none"> • Language obeys Zipf’s Law. 	<ul style="list-style-type: none"> • Zipf’s Law might describe but does not govern language.

The second exercise, creating a hypothetical dialog between the two scientists, is more difficult. There are two ways to approach it:

1. Allow students to use language directly from the articles to piece together a dialogue.
2. Encourage students to be more creative in imagining the kind of verbal exchange the two scientists might have. Some students will have a tendency to produce a very short dialogue filled with facile bantering. For this to be a thoughtful exercise, the instructor might want to encourage students to imagine that the exchange takes place in a formal setting where the discussion must be conducted in more academic terms.

Academic Vocabulary Focus (page 65)

Circle the one word or phrase that is most unrelated to the others.

analogous (Par. 1):	alike	comparable	similar	<u>different</u>
aspect (Par. 1):	characteristic	<u>examination</u>	feature	part
constitute (Par. 1):	comprise	form	<u>control</u>	make up
core (Par. 1):	center	<u>difficult</u>	heart	main
detectable (Par. 1):	<u>invisible</u>	measurable	noticeable	obvious
facility (Par. 1):	ability	competence	skill	<u>speed</u>
incapable (Par. 1):	helpless	<u>impractical</u>	powerless	unable
innovative (Par. 2):	creative	inventive	<u>curious</u>	<u>original</u>
insight (Par. 3):	discovery	<u>impression</u>	perceptive view	understanding
involve (Par. 3):	<u>be interested in</u>	be part of	be mixed up with	include
restrict (Par. 2):	<u>act freely</u>	confine	hold back	limit
unique (Par. 1, 3):	distinctive	exclusive	only one of a kind	<u>universal</u>

For Discussion (page 65)

While the topics are intended for oral discussion, they could also be assigned as brief writing assignments.

Reading 3: "Designing the Superman"

Pre-Reading (page 66)

Students generally find the pre-reading questions fairly straightforward. Allow 10–15 minutes for groups to discuss them, and then discuss the questions as a whole class.

Other topics for pre-reading discussion could revolve around Isaac Asimov. Who was he?

Answer: A Russian-born American writer well known for his science fiction novels and popular science books.

Students might be familiar with the 2004 movie, *I, Robot*, starring Will Smith, based on one of Asimov's science fiction novels. If so, ask those who are familiar to say briefly what the movie is about.

Reading (page 68)

Start by reading aloud or asking the students to read silently the first four paragraphs of Asimov's essay and then pause to explore students' background knowledge related to the content. Students are often familiar with Superman, but they may not know anything about the TV show, *The Six-Million-Dollar Man*. It is a good idea to discuss these superheroes and especially the premise of *The Six-Million-Dollar Man* before proceeding with the entire essay.

On the other hand, detailed knowledge of Superman and *The Six-Million-Dollar Man* are not absolute prerequisites to understanding Asimov's piece, so if you are not familiar with them, don't worry. They are glossed in the text, and this glossed information should be sufficient for understanding the reading.

After these preliminary discussions, ask students to read the entire essay either in class or as homework.

Critical Focus: Tracing the Steps of an Argument (page 72)

Have students read the **Critical Focus** material. Go over the distinction between the two questions around which the **Critical Focus** revolves: **What does the passage say?** This merely requires a literal understanding of a claim from the passage. **What does the passage do?** This requires an analysis of the function of the passage—not what the passage says, but what purpose is accomplished by the passage. Examine with the students the completed example (the first item of the **Critical Focus: Application** exercise).

Critical Focus: Application (page 73)

Doing this task will engage students in a deeper reading of the essay and should facilitate a more thorough understanding of the essay. Tracing the steps of the argument and striving to summarize and discern purpose at each step along the way forces students to attend more closely to the way the essay unfolds. After this task, students are generally in a much better position to answer **Getting at the Matter**.

Since college students are expected to express their understanding of what they read in their own words, encourage students to summarize in their own words the main points made at various points in the argument. They could do this individually and then compare with a partner. Or they might do it in pairs and then compare their answers with other pairs. Go around and monitor students' progress. If they are not able to do the task, review several examples as a whole class. Then let students try it again, identifying additional steps in the argument from Paragraph 6 until the end.

Suggested answers (Paragraphs 4–6).

Paragraph 4

- What does it say? Maybe millionaires could make themselves into superbeings. In the future, even workers with average earnings could do it.
- What does it do? Moves the fictional situation closer to the real world.

Paragraphs 5

- What does it say? It's not strange to think that we will be able to continue making improvements to the human body; we have been doing it throughout history.
- What does it do? Makes the idea more believable by appealing to history. Prepares the way for another step.

Paragraph 6

- What does it say? Humans use tools to improve the abilities of their bodies.
- What does it do? Makes an obvious, non-controversial observation.

Getting at the Matter (page 74)

This section can be done either before or after the **Critical Focus**; however, if done after, students may benefit from having done several close readings of the essay.

Suggested answers:

1. The stages of evolution are from org (organism) to cyborg to cyb. The organic stage is “natural” evolution in which the organism undergoes gradual changes over billions of years until eventually a species emerges that is intelligent enough to take control of the evolutionary process. At first, this is through the invention of tools, which are merely improved body parts. Advanced technology is only an extension of this. During the second stage, the cyborg stage, the intelligent species begins to understand the brain and nervous system and can engineer artificial body parts that will respond to signals from the brain. Finally, it will become possible to replace the brain with a kind of supercomputer capable of doing everything the brain now does. Then mankind can evolve into a cyb—a completely mechanical-cybernetic life form.
2. Asimov's claims about tools being improved body parts are relatively non-controversial, and these claims come first. We are also fairly familiar with prosthetics (e.g., artificial arms or legs) pace-makers, etc., and most readers would probably not find these objectionable. Asimov introduces these next. As Asimov continues replacing body parts one after another, the reader might begin to think that at some point this must stop. When Asimov gets to the brain, many readers are likely to object that this is going too far. Asimov organizes his claims from the easier to accept claims to the harder (or even impossible to accept) claims. He does this to gradually lead the reader toward the conclusion that he wishes them to accept.
3. Asimov suggests that identity is rooted in the brain. In his discussion of John Smith, he suggests that if all of John Smith's body parts were replaced with mechanical parts, John Smith's identity would remain intact as long as his brain is left untouched. The implication is that at if we begin intruding into the brain, and certainly if we replace it with an artificial brain, we will have crossed the boundary between man and machine. (It is the John Smith scenario that Asimov uses to accomplish his purpose.)
4. The tone of the essay is informal, conversational, somewhat humorous, at times joking. The manner of presentation is designed to entertain. In fact, Asimov's argument might be described as at times tongue-in-cheek. For example, Paragraph 19: “In fact, come to think of it, the brain is a serious drawback.” Look at Paragraphs 21, 23, 26, and 27 for other possibilities. Although Asimov seems serious in the beginning, the reader might begin to suspect, especially near the end, that he is not entirely serious.

Asimov starts with propositions that are easy to agree to but moves toward propositions that become more and more fantastic, as if trying to see how far he can get the reader to come. In this sense, Asimov does seem to be playing with the reader. The final paragraph almost seems to turn the essay into a spoof.

Academic Vocabulary Focus (page 75)

As with all vocabulary tasks, the teacher can choose to do them earlier in the post-reading stage. Answers to this vocabulary focus may vary.

For Discussion (page 76)

Responses to the discussion questions will vary.