Science Reasoning Test One—Scoring Key

	Key		Key
1.	B	21.	D
2.	J	22.	J
3.	A	23.	D
4.	J	24.	J
5.	B	25.	B
6.	H	26.	H
7.	A	27.	B
8.	J	28.	F
9.	A	29.	B
10.	G	30.	F
11.	B	31.	C
12.	J	32.	J
13.	A	33.	D
14.	F	34.	F
15.	B	35.	C
16.	F	36.	F
17.	B	37.	A
18.	H	38.	G
19.	D	39.	D
20.	H	40.	H

Total Number Correct for Science Reasoning Test   _____
                                                                                    (40)

Use the conversion chart on page 142 to convert the total number correct to the ACT Scoring Scale of 1 to 36.

Science Reasoning Test One—Answer Explanations

Passage 1

1. Locate 30 million years on the x-axis and draw a vertical line until it intersects the dashed line for Site II. Draw a horizontal line to the right side scale to read off the value of mean annual temperature, which corresponds to approximately 19°C. The answer is B.

2. Locate 40 million years on the x-axis and draw a vertical line until it intersects the dashed line for Site I. Draw a horizontal line to the left side scale to read off the value for the percentage of intact species, which corresponds to approximately 70%. The answer is J.

3. Looking at the lines for all three Sites, higher temperatures correspond to higher percentages of intact species and, conversely, lower temperatures correspond to lower percentages of intact species. Thus, as temperature increases, the percentage of intact species increases. The answer is A.

4. The shape of the graphs for Site I and Site III are almost identical. When the graph for Site I increases, so does the graph for Site III. When the graph for Site I decreases, so does the graph for Site III. Thus, these two sites have a positive linear relationship, which is represented by the graph in option J. The answer is J.

5. The graphs for Sites I and II climb as high as 99 and 65 percent, respectively. Site III, however, never reaches a level as high as 60% for the percentage of intact species. The answer is B.

Passage 2

6. From the table, as depth increases the following relationships occur with the other variables: Density increases; pressure increases; and acceleration due to gravity increases and then decreases (scan the numbers in each column to determine these relationships). For this question, the best answer is H.

7. As depth increases, acceleration due to gravity first increases (from 981 to 1050) and then decreases all the way to 122. The graph in option A depicts this relationship. The answer is A.

8. From the table, values for the depth of the inner core range from 5371 to 6071 kilometers. At this range, acceleration due to gravity decreases from 355 to 122. If the inner core extends to 6500 kilometers, we would predict that acceleration due to gravity would continue to decrease. The only two possible options are G and J. Since acceleration due to gravity seems to be decreasing dramatically (from 218 to 122) over 300 kilometers, the correct answer is probably J: acceleration due to gravity would decrease until it reaches 0. The answer is J.

9. Examine each variable. For density, the highest measurement in the crust is 2.80; twice this value is 5.60. None of the measurements in the mantle are this high. Roman numeral I is eliminated; so are options B, C, and D. Answer A must be correct. For pressure, the highest value in the crust is 5; twice this value is 10. All the values for pressure in the mantle are at least twice this value. The answer is A.

10. Locate the two new points. A density of 11.75 is between 11.69 and 12.12; an acceleration due to gravity of 550 is between 641 and 427. Both of these new values are between the depths of 4471 and 5156 in the outer core. The answer is G.

Passage 3

11. From the initial paragraph, carrying capacity is determined by both natural resources and space. From Experiment 3, carrying capacity is also determined by the number and type of predators. "The amount of algae present" is not identified as a factor determining carrying capacity. The answer is B.

12. This experiment implies that the number of blue-green algae is determined by the availability of nutrients: more nutrients, more algae. Use Figure 2. For the months listed in the options, the highest number of blue-green algae and, thus, the largest amount of nutrients occurs in the month of September. The answer is J.

13. If ideal conditions continue (that is, both natural resources and space were plentiful), the number of bacteria should continue to increase. The best answer is A.

14. Use Figure 3. The two graphs have an inverse relationship. When the number of hares (organisms) is large, the number of predators is small, and vice versa. Option F graphs this relationship. The answer is F.

15. Use Figure 2. For which two months is the amount of nutrients (that is, the number of blue-green algae) the lowest? The lowest periods on the graph occur between January and June. The answer is B.

16. From 1960 to 1980, the number of hares increases from its lowest point to its highest point. In the year 2000, we would predict that the number of hares would decrease again to a low point. The number of lynx follow the opposite twenty year pattern; thus, we would predict the number of lynx would be at a high point in the year 2000. The best answer is F.

Passage 4

17. From the table, find the intersection of latitude 40 S and the month of September. The value for total radiation is 14.3. The answer is B.
18. From the table, find 70 S and scan the row of data for a value of total radiation equal to 21.0. This value occurs in the month of November. The answer is H.
19. From the table, look at the row of data for a latitude of 40 N. The values for total radiation start at 8.8 and then increase to 24.0 in July; then the values decrease to 7.7 in December. Option D is the best graph of this relationship. The answer is D.
20. Scan the column of data for the month of March. The values range from 0.1 to 1.7. A value of 21.3 could occur at two different places: between 10 N and 0 or between 0 and 10 S. The answer is H.
21. For the month of July, as distance from the Equator increases, the total amount of radiation increases in the Northern Hemisphere (from 19.1 to 23.8) and decreases in the Southern Hemisphere (from 19.1 to 0). The answer is D.

Passage 5

22. Scientist 2 argues that genetically engineered corn may have harmful side effects that have not been studied. Thus, any new evidence that suggests that genetically engineered corn is safe would weaken Scientist 2's argument. Option J is the best answer; if cross pollination has no negative consequences, then Scientist 1 could argue that it's appropriate to continue with large scale commercialization of corn, a position that Scientist 2 opposes. The answer is J.
23. Scientist 1 argues that genetically engineered corn has numerous advantages. Thus, any negative consequences of this type of corn would weaken this argument. Option D is the best choice; if the new proteins produced by Bt have minor allergens, then the corn may cause allergies in humans. The answer is D.
24. Scientist 2 talks about green lacewings, which are predators of the corn borer. Scientist 2 argues that green lacewings are nontarget organisms which the genetically engineered corn is unintentionally harming. New research that indicates that Bt corn reduces the population of green lacewings would support Scientist 2's argument that the new corn is having harmful effects on nontarget organisms. The answer is J.
25. Scientist 1 explains this process: "Researchers have inserted into corn a gene from the bacterium…" and "The gene makes a protein lethal to certain caterpillars." The answer is B.
26. Scientist 1 would support this statement, given the statement in the first sentence of his argument: "Genetic engineering will allow farmers to grow large supplies of corn more economically than before." Why? "Genetic engineering endows plants with certain abilities." The answer is H.
27. This question is asking us to determine a point of disagreement between the two Scientists. Both scientists acknowledge that Bt corn produces pesticides and both scientists note that Bt corn will affect various organisms. There is no evidence for the two scientist's opinion on option D. Scientist 1, however, believes that new research studies will show the effectiveness of Bt corn; Scientist 2 is not so optimistic. They would probably disagree about the truthfulness of option B. The answer is B.
28. This question is asking us to determine a point of agreement between the two Scientists. Scientist 2 disagrees with options G, H, and J. Both Scientists, however, would agree with the statement in option F: "New research studies will strengthen their arguments." Scientist 1 believes that new research will support the argument for beneficial uses of Bt corn; Scientist 2 notes that new research might cast doubt on the effectiveness of this type of corn. The answer is F.

29. Use Table 1. The doctors in the Aspirin Group took aspirin regularly, while the doctors in the Placebo Group did not take aspirin. From the table, only 5% of the Aspirin Group had heart attacks compared to 10% of the Placebo Group. So taking Aspirin did reduce the percent of heart attacks. The answer is B.

30. Use Table 2. The percentage of thromboxane after five hours is 5 for Aspirin, 15 for Ibuprofen, and so forth. Option F presents the best graphical representation of this data. The answer is F.

31. Use Table 2. After five days, the percent is already 100 for Celebrex. Naprosyn has a value of 97 after five days; it's likely that its value will also increase to 100 percent after seven days. Will the percent for Aspirin increase to 100% after seven days? Probably not. The percentage only increased from 5 to 35 after five days; it's not likely to increase to 100% after only two more days, given the information in Table 2. The answer is C.

32. Use Table 2. Subtract the percentage of thromboxane after five hours from the percentage after five days for each drug. The values are as follows: Aspirin, 30; Ibuprofen, 80; Naprosyn, 75; and Celebrex, 0. Option J presents the best graphical representation of this data. The answer is J.

33. Use Table 1. Regularly taking aspirin reduces the percentage of heart attacks. The percentage of strokes, however, is not reduced by taking aspirin. Option D is the best choice. The answer is D.

34. This question is difficult. The doctors in the Aspirin Group were taking an aspirin tablet every other day. From Table 2, the percentage of thromboxane after taking Aspirin varies from 5% after five hours to 35% after five days. If the doctors were taking Aspirin every other day, the biggest time lapse before an Aspirin would be two days. It's reasonable to assume that the percentage of thromboxane is somewhere between 5 and 35%. Option F, 10% to 20%, has the only values that are in this range. The answer is F.

Passage 7

35. Use Table 1. Compare the percentages for each Waste Category listed in the options. The biggest difference is for Plastic: 69.3% for Program 2 versus 35.2% for Program 1. The answer is C.

36. Only certain categories of waste are recycled: paper, yard waste, plastic, and glass. Together these four categories total about 60% of the composition of MSW. Thus, approximately 40% of MSW (the other categories) are not recycled. This statement is supported by the results of Experiment 1 and the best explanation is given in option F. The answer is F.

37. Use Table 2. Scan the columns of data for Arsenic at sites L1 and L2. The values for L1 are higher than those at L2 for all Waste Categories. Thus, this statement is not supported and the best explanation is given in option A. The answer is A.

38. Use Table 2. Scan the row of data for Paper. At L1, the value for Arsenic is .1; Lead, 4; Mercury, .3 and Zinc, 22. Option G presents the best graphical representation of this data. The answer is G.

39. Use Table 2. For Lead the values at L2 are higher than at L1 for all Waste Categories; for Mercury, the same pattern holds, as it does for Zinc. The answer is D.

40. Use Table 2. Calculate the absolute difference between lead and zinc at L2 for each Waste Category. The values are as follows: Paper (Lead 19, Zinc 30; difference is 11); Yard Waste (Lead 137, Zinc 321; difference is 184); Other Organics (Lead 408, Zinc 202; difference is 206); and Metal (Lead 350, Zinc 229; difference is 121). The answer is H.