



ACT Science 1, Set 1
Answers & Explanations

1. **C** Rough surface, limited light, neutral pH. These conditions all had more pill bugs at the end of the experiment than the other choices given for each preference.
2. **F** the pill bugs on the acidic and smooth sides at 10 minutes would move to the neutral and rough sides, respectively. The data shows that as time elapsed, the majority of pill bugs moved from the less preferred acidic and smooth sides to the preferred neutral and rough sides. One would expect that trend to continue if the experiment had lasted longer.
3. **A** No, because pill bugs prefer dark areas. The data on light and dark areas suggest this clear preference among pill bugs.
4. **H** Amount of light. This changed from the initial 10 on each side to 6 on one side and 14 on the other after 2 minutes. The number on each side for the pH only changed by 1 and the number remained the same for the texture.
5. **B** The number on each side starts at 10 then changes by 1 before the trend is reversed.
6. **G** Pressure goes down when volume goes up. As the chart shows, there is an inverse relationship between the two—when one goes down, the other goes up.
7. **B** When temperature goes up the pressure increases. The first set of data show this direct relationship.
8. **J** The pressure would stay the same. Temperature and volume are in direct relationship to each other. When one goes up and the other goes up by the same proportional amount, none of the other variables will change.
9. **D** 72.08g. This is the data from the second line from the bottom on the chart.
10. **F** Because the gas's mass is 36.04 grams, temp is 40 K, and volume is 5 L, it's pressure would fall somewhere between the gas with a mass = 36.04, volume = 5, temp = 25, and pressure = 750 and the gas with a mass = 36.04, vol = 5, temp = 55, and pressure = 1650. The only answer choice that falls between 750 and 1650 is 1200.
11. **A** 7. The number of ring-necked pheasants had been decreasing every year by a small amount. The number seen in 1991 was 8.
12. **H** Phasianus colchicus. The number seen went down approximately 4 during the 1970s while the Cyanocitta cristata only went up 2.
13. **B** Bubo virginianus. It has only increased by small fractions every year.
14. **F** 1980-1981. The changes in the other years were almost non-existent. The change from 1980-1981 was the most pronounced.
15. **D** Cyanocitta cristata. There have never been less than ten seen in a year.
16. **H** Stage 9. The average length of the sample measured by the scientist is 10.2 mm. 10.7 is the closest value to 10.2 mm. All of the other stages do not have sizes near 10.2 mm.
17. **D** Pelobates fuscus begins to swim after Rana temporaria. This can be found by comparing the data at stage 7. Rana temporaria swims at 13-16 days while the Pelobates fuscus swims at 32-35 days.
18. **J** Pelobates fuscus. Stage 10 shows the onset of metamorphosis. For Pelobates fuscus, metamorphosis starts at an age of 7 months which means it begins in May. The other two species would start metamorphosis in January or February.



19. **A** Swims to the surface and breaths air. The table shows age in units of hours, days, weeks, months and years. When evaluating the data, it is necessary to convert to the same units to compare rows of the table. Fifteen weeks is approximately 4 months. Looking at the column under “common frog,” 3.8 hours corresponds to 15 weeks.
20. **G** Tadpole. Stage 6 characteristics of a tadpole include “eats algae” and “no teeth.” This implies the ingestion of plant material only. The froglet portion of the table does not make any mention about eating habits. The adult characteristics include the eating of arthropods and insects.
21. **D** Carbon dioxide. The graph shows it quite distinctly.
22. **F** The amount of gas released into the atmosphere has decreased. All of the other gases are being controlled through pollution control.
23. **C** 20%. Going from approximately 315 ppm to 375 is approximately 20%. This data is from the first graph.
24. **F** CFC-12, CFC-11, methane. The graphs of all of these gases show a recent downward trend.
25. **B** August. This is when the second of the two graphs concerning this topic peaks.
26. **H** Autumn. This is the lowest point of the harmonic graph of the level of carbon dioxide.
27. **A** Long Island. The rocky cliffs on the coast of Long Island will accept an increase in sea because they are the least vulnerable to erosion. Also, the cliffs allow the land to be farther away from the level of the water.
28. **J** The energy of the wave takes more material from the shore. The stronger the waves, the more material they will stir up and take back out to the open ocean.
29. **A** Key West. Since this site already has a high amount of shoreline erosion along with a high mean wave height, it is especially vulnerable. A hurricane will only increase both of these measures, affecting the island even more.
30. **G** Harvesting scallops off the ocean floor near the coast of Long Island. Since the actual coast line is mostly rocky cliffs, this work will not affect the actual geography, even though it may impact the biology of the area.
31. **D** Key West. Since its slope is so gradual, it lies the nearest to the level of the ocean and any increase in the ocean/sea level will affect it more.
32. **G** Copper (Cu). The average atomic mass is the number below the element name. Copper has an average atomic mass of 63.55, which rounds to 64.
33. **B** Silicon (Si). As indicated by the information, groups are shown in columns. Gallium (B), aluminum (C), and thallium (D) are all in the same group. Silicon is in another group, so silicon is the correct answer.
34. **F** 222. According to a note on the periodic table, if the atomic mass is in parentheses, it’s the atomic mass of the most stable isotope, rather than the average. Radon has an atomic mass of 222.
35. **B** Argon (Ar) and zinc (Zn). Argon is a non-metal, in the farthest right column, and zinc is a metal in the twelfth column. Titanium and calcium are both metals. Nitrogen and oxygen, as well as radon and xenon, are all non-metals.



36. **F** Fluorine (F). According to the question, the elements with the smallest atomic radius are found in the upper right corner of the periodic table. Fluorine, which is near the top right, is the correct answer.
37. **C** 115. It has to be a number greater than 75, since it still takes an inordinate amount of time at 75 C.
38. **G** Staphylococcus aureus, Escherichia coli, Streptococcus, pyogenes. Only these three have the smallest amount of time at 37 C, while the others do not all have the smallest amount of time at the same temperature.
39. **B** Store at it 50 C. It takes a longer time for it to form at 50 C than it does at 10 C, 25 C or 37 C.
40. **J** 37 C. This is the temperature that Listeria monocytogenes's shortest generation time.