

Answers:

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

Solutions:

- (A):** Compare any two experiments where the weight and the metal temperature are the same for the two different metals, for example, Experiments 1 and 6.
- (G):** Experiments 2 and 3 have only one variable (temperature) changing.
- (D):** The question asked for increase, not final temperature. Use Experiments 1, 2, and 3 to establish relationship. The increase is the difference between the expected final temperature of the water (25 degrees) and the initial water temperature of 20 degrees Centigrade.
- (H):** The only variable different between this experiment and Experiment 4 is the amount of water.
- (C):** The change in water temperature depended on whether A or B was used.
- (H):** The family tree traces three generations: children 1 to 11, their parents, and their parent's parents.
- (D):** Child 10 is an example.
- (G):** No data given to support F. H is not true because disease X can be transmitted to females as well as males. J is wrong because there is no information to indicate that disease X is hemophilia. From the data, more than half the children born to a diseased male were diseased.
- (B):** Example -- parents of the father of children 1 to 4.
- (G):** Parents of children 3 and 11 show both possibilities.
- (D):** Any error in the thermometer will be unimportant because it will not affect the comparison of the experiments.
- (G):** The beam is the sun; the thermometer is just a measuring device.
- (D):** The distance between the orbit and the focus changes as you move along an ellipse.
- (J):** Too many variables have been changed to allow a comparison.
- (A):** Simplest because only one variable is changed in all experiments.

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16. **(G):** Since only Experiment 2 is used, no comparisons are made. Only the existence of effect can be noted.
17. **(C):** To see what effect is due to the acid, we have to subtract out the effect of the water by itself, so water would be the control.
18. **(F):** She assumes that she scraped off rust and nothing but rust. Choice G is incorrect because the weight of the rust either multiplied or divided by the weight of the scraped bar does not equal a constant.
19. **(A):** The scraped bar weighed less as the strength of the acid increased. If what is scraped off is rust only, then there was more rust formed as the strength of the acid increased.
20. **(F):** Since iron rusts at the surface, the more surface, the faster the rusting process.
21. **(C):** Error can come from both not removing all the rust and from removing unruined iron.
22. **(H):** From the choices offered, the only two experiments that vary in nature of material only are Experiments 3 and 6.
23. **(B):** Use Experiments 1 and 5 and add the increases.
(2 degrees + 3.1 degrees = 5.1 degrees) (100 degrees + 5.1 degrees = 105.1 degrees)
24. **(H):** This reduces the concentration of Y. (conc. = amt./vol.)
25. **(B):** These experiments give information only about soluble solids.
26. **(F):** All the others affect the nature of materials used or the quantities used. If you change the instruments used to measure your values (choices H and J), there is a danger that the values you will read will be different, because the instruments are not calibrated in respect to each other.
27. **(A):** Scientist 2 claims a common origin for the planets, so they should have a common inventory of elements.
28. **(F):** It would be strange if nine randomly gathered planets had the same composition.
29. **(D):** He describes a method for smoothing them out after capture.
30. **(H):** This follows from the idea that they all formed out of the same dust cloud.
31. **(A):** This would approximate "natural conditions."
32. **(H):** The difference between Experiments 1 and 3 is the small fish, so they are the variable being studied.
33. **(D):** When the snails were there, the water was clear. When the snails were not there, the water became dirty.
34. **(H):** Algae are not known for being carnivorous.
35. **(A):** Algae continued to grow under each of the conditions described.
36. **(F):** F is stronger than G. J is good for Scientist 1.
37. **(C):** This attacks a basic assumption of Scientist 2 about energy.
38. **(G):** If heat is a substance, then an object should be heavier if it has more heat in it.

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39. **(B):** If heat is a fluid, then it is a vapor in the gas phase. Barometric pressure depends on the weight of the gas present, and therefore the pressure should increase when there is more heat in the air, and decrease when the air is cooler.
40. **(G):** It can be shown that ash doesn't burn because the molecules that compose ash do not react with oxygen. It can also be shown that the same types of molecules as those in ash produced by different means (not burning) will not burn. Choices F and J follow Scientist 1's idea and choice H is irrelevant.