

Solar System B

KEY

Part I (Planets)	Part II (Moons)	Part III (Asteroids)	TOTAL
40	35	25	100

Team Number _____

Team Name _____

Type (select one) _____ Varsity

_____ Junior Varsity

Bonus (+1) It came from outside the solar system!

Part I: Planets (40 points)

1. [3 pts] Mercury
 - Venus
 - Mars (must be in order)
2. 3:2 (3:2 resonance)
3. MESSENGER
4. Caloris Basin
5. [2 pts] “Weird Terrain” (no, really...)
 - From shock waves converging again,
 - OR- from ejected material falling back down
6. Planet contracted after its crust already formed
7. It has lots of craters/mare
8. The core is large and/or iron-rich
9. Struck by large object that stripped the mantle,
 - OR- surface was vaporized by forming Sun,
 - OR- light materials pushed away by drag
10. Carbon dioxide (CO₂)
11. Sulfuric acid (H₂SO₄)
12. [T7] Runaway greenhouse effect
13. Ishtar Terra -OR- Aphrodite Terra
14. Small objects are slowed by atmosphere
15. No evidence of plate tectonics or other forms of surface recycling
16. [2 pts] Wind
 - Any water/ice has evaporated
17. Earth
18. a. Olympus Mons
 - b. Tharsis Montes (do not accept Tharsis)
 - c. Tempe Terra
 - d. Valles Marineris
 - e. Utopia Planitia
 - f. Elysium Mons (do not accept Elysium)
 - g. Hellas Planitia (also accept Hellas Crater or just Hellas)
19. Borealis Basin
20. [2 pts] Core = metallic
 - Mantle = silicate
21. Iron (Fe)

22. [2 pts] North = flat lava plains

South = cratered highlands

23. Some minerals can only form in the presence of water

24. [T2] River valleys and/or river deltas

25. [T8] In the polar ice caps

26. Curiosity –OR– Mars Science Laboratory

27. [2 pts] Deposited = water

Eroded = wind

Part II: Moons (35 points)

28. a. Oceanus Procellarum (Ocean of Storms)

b. Copernicus (accept Copernicus Crater)

c. Mare Tranquillitatis (Sea of Tranquility)

d. Tycho (accept Tycho Crater)

29. Tidal locking

30. Aitken Basin

31. Made of dark (basaltic) lava

32. [T1] The Moon has no atmosphere, weather, or geologic activity

33. A large object collided with Earth

34. Chandrayaan-1 –OR– LCROSS/LRO

35. Between the Sun and Earth

36. The Moon will slowly drift away, so it won't cover the entire Sun

37. [T6] Orbits do not always line up exactly

38. [2 pts] Spring = Sun/Moon pull parallel

Neap = Sun/Moon pull perpendicular

39. [2 pts] Capture (from asteroid belt)

Accretion (in current locations)

40. Carbon

41. [2 pts] Phobos

Orbit is faster than 1 Mars day

42. Torn apart into a ring

43. Stickney

44. Tidal forces (causing stretching of the moon)

45. Deimos

46. It barely has any gravity to hold onto material

47. [T10] Volcanoes

48. Sulfur

49. [2 pts] Sulfur dioxide (SO₂)

From volcanic outgassing/plumes

50. Voyager 1 (begrudgingly accept just Voyager)

51. Few craters -OR- young surface -OR- it has actual active volcanoes

52. [T4] Tidal forces from other moons

53. Galilean moons

54. [2 pts] Io = silicate

Other moons = icy

Part III: Asteroids (25 points)

55. Dawn

56. 1/3 (accept 25% to 40%)

57. Liquid water

58. [2 pts] Mars

Jupiter

59. [2 pts] Inner = 2.0 AU (accept 1.8 to 2.2)

Outer = 3.3 AU (accept 3.0 to 4.0)

60. [2 pts] Orbital resonance

Kirkwood gaps

61. Gravitational effects of Jupiter

62. Aten -OR- Apollo

63. Hayabusa (1 or 2) -OR- OSIRIS-REx

64. Trojans

65. Libration

66. Carbon

67. Fraction of light reflected

68. 10 Hygiea (accept just Hygiea)

69. Silicates

70. [T3] 2.8 (accept 2.5 to 3.0)

71. Rheasilva -OR- Veneneia

72. [T5] It is a rocky protoplanet thought to be similar to those that formed terrestrial planets

73. [2 pts] Nickel (Ni)

Iron (Fe)

74. 21 Lutetia (accept just Lutetia)

75. [T9] C (carbonaceous)