Space Exploration Merit Badge Requirements
U.S.S. Hornet (CV-12) Museum
Apollo 11 / Apollo 12 Recovery Ship

WORKSHEET

Name: _____

History of Space Exploration

1. Name at least 2 everyday applications/devices that are made possible though space exploration:

   a._____ b._____

2. Name 2 NASA technology spin-offs found in everyday life:

   a._____ b._____

3. Who developed the first true rockets?

   a. Greeks

   b. Chinese

   c. Germans

   d. British

4. What did the first rockets use for propellant?

   a. gasoline

   b. liquid hydrogen and liquid oxygen

   c. gunpowder

   d. alcohol

5. Which of the following figures is known as the “Father of Modern Astronautics”?

   a. Dr. Robert Goddard

   b. Yuri Gagarin

   c. Albert Einstein

   d. Konstantin Tsiolkovsky

6. Dr. Robert Goddard successfully launched the first:

   a. guided rocket

   b. liquid-fuel rocket

   c. J.A.T.O. equipped aircraft

7. Dr. Goddard launched this first rocket with a payload. What did the payload consist of? (Circle all that apply)

    a. guidance system

    b. M&Ms

    c. barometer

    d. camera

    e. test equipment

8. Hermann Oberth was well known for his association with and support of:

    a. German Rocket Society (VfR)

    b. NASA

    c. U.S. Air Force

9. The German Rocket Society developed the conical nozzle.

    a. True

    b. False

10. Dr. Wernher Von Braun helped develop which of the following?

    a. International Space Station

    b. V-2 Rocket

    c. Space Shuttle Atlantis

    d. Atlas Rocket

The Physics of Rocketry and Space Travel

11. "Every object persists in its state of rest or uniform motion in a straight line unless it is compelled to change that state by forces impressed on it" describes which of the following?

    a. Newton's 1st Law

    b. Newton's 2nd Law

    c. Newton's 3rd Law

    d. Boyle's Law

    e. Bernoulli's Principle

12. Is weight the product of mass and gravity?

    a. Yes

    b. No

13. "For every action there is an equal and opposite reaction" describes Newton's _____ Law.

14. What 2 elements are required for combustion in a rocket engine?

    a._____ b_____

15. In liquid rockets, the oxidizer and fuel are stored separately.

    a. True

    b. False

16. In solid rocket engines, the fuel and oxidizer are mixed together.
    a. True
    b. False
17. A rocket's thrust can be increased – influenced – by changing the overall shape of the exhaust nozzle.
    a. True
    b. False
18. Which of the following laws/principles are responsible for producing thrust in a rocket?
    a. Newton's 1st Law
    b. Newton's 2nd Law
    c. Newton's 3rd Law
    d. Bernoulli's Principle
    e. all of the above

Model Rocket Components

19. The launch lug serves to:
    a. stabilize the rocket throughout the launch phase
    b. stabilize the rocket during flight
    c. ignite the rocket engine
    d. increase thrust when launched
20. The shock cord serves to:
    a. deploy the parachute
    b. hold the rocket engine in place
    c. keep the nose cone fastened to the body tube
    d. keep the parachute fastened to the nose cone
21. Model rockets often employ liquid rocket engines.
    a. True
    b. False
22. The parachute ejection charge is ignited by the:
    a. propellant
    b. igniter
    c. delay charge

Orbital Mechanics

23. When the Space Shuttle is in orbit, is it freefalling?
    a. Yes
    b. No.
24. While in orbit, are astronauts under the influence of gravity?
    a. Yes.
    b. No

25. Are the orbits of all satellites perfect circles?

    a. Yes

    b. No

26. If a satellite is in geosynchronous orbit, it stays over one point on the planet and does not move relative to that point.

    a. True

    b. False

Cold War Space Race

27. Which of the Mercury capsules was first into space?

    a. Friendship 7

    b. Freedom 7

    c. Liberty Bell 7

    d. Gemini I

28. What type of rocket was that mission powered by?

    a. Redstone (liquid rocket)

    b. Redstone (solid rocket)

    c. Atlas (liquid rocket)

    d. Atlas (solid rocket)

29. Who was the first American into Space?

    a. Alan Shepard

    b. John Glenn

    c. Chuck Yeager

    d. Neil Armstrong

America's Moon Rocket

30. The first man to set foot on the Moon was:

    a. Jim Lovell

    b. Gordon Cooper

    c. Buzz Aldrin

    d. Neil Armstrong

31. The mission was titled:

    a. Apollo 8

    b. Apollo 11

    c. Apollo 13

    d. Gemini XI

32. The rocket that got them to the Moon was the _____

33. The rocket consisted of ____stages.

34. The vehicle that transported the astronauts from the Command Module to the surface of the Moon and back was called the:

    a. Moon Rover

    b. Lunar Module

    c. Lunar Shuttle

35. Which U.S. Navy aircraft carrier picked up the Apollo capsule and its crew after splashdown?

    a. U.S.S. Hornet CV-8

    b. U.S.S. Hornet CVS-12

    c. U.S.S. Nimitz CVN-68

    d. U.S.S. Ticonderoga CG-47

NASA Rockets, Operations, and Missions

36. Satellites take pictures by assigning each pixel within the camera's field of view a specific number, and then transmit those numbers back to Earth in the appropriate order where the picture is then reconstructed.

    a. True

    b. False

37. Name at least one of the Mars Explorations Rovers: _____

38. The Rovers primary mission is to:

    a. study the Martian surface (rock and soil samples)

    b. search for traces of water (possible life)

    c. Both

39. Name one of the tools used by the rovers: _____

40. Is the Space Shuttle playing a role in the construction of the International Space Station?

    a. Yes

    b. No

41. The Space Shuttle employs:

    a. solid rockets

    b. liquid rockets

    c. Both

42. The Shuttle's solid rocket boosters are reusable.

    a. True

    b. False

43. Can the Shuttle deploy satellites?

    a. Yes

    b. No

44. The Space Shuttles surface is made of ceramic tiles for heat protection.

    a. True

    b. False

45. Who are the two main partners in constructing the International Space Station?

a. United States and United Kingdom

b. Russia and Japan

c. United States and Russia

d. Japan and Australia

46. What is the primary mission of the International Space Station?

a. humanitarian

b. scientific

c. military

d. commercial

47. Does the International Space Station also improve international relations?

a. Yes

b. No

Future Lunar and Martian Habitats

48. Name 2 possible sources of energy for a Lunar or Martian base.

a._____ b._____

49. Name 2 major factors of life support that must be considered for the base.

a._____ b._____

Careers in Space Exploration

50. Provide the missing information:

Astronaut, Pilot – required education:

Astronaut, Mission Specialist – required education:

NASA Scientist/Engineer – required education:

Merit Badge Endorsement

Scout Applicant Name: _____Program Date: _____

Troop #_____ Location: _____

Merit Badge Endorsement: I certify that I have personally reviewed the Applicant's completion of the requirements for the Boy Scouts of America, Space Exploration Merit Badge and have found the applicant has satisfactorily completed the requirements for this merit badge.

Print Councilor Name: _____

Councilor Signature: _____ Date: _____