



Rocketry Basics Worksheet

This is Rocket Science



School Name: _____

Launch Team Name: _____

Number Correct _____ X 5 = _____ Total Score



After reviewing the educational information provided to your launch team, complete the following worksheet as a group. Each question is worth five points.

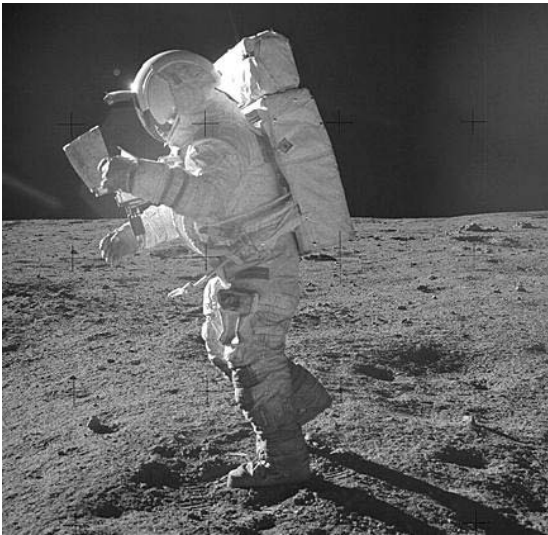
Information needed to complete this worksheet is found in the booklet entitled "Rocketry Basics" and the "Motor Tutorial" on the website.

- 1) _____ **Which invention is basic to all rockets that reach outer space?**
 - A) Jean Froissart launching rockets through tubes
 - B) Hero of Alexandria of his invention of the Hero engine
 - C) Schmidlap's multi-stage vehicle for lifting fireworks to higher altitudes
 - D) Mongol's fire-arrows
- 2) _____ **The technique of 'spin stabilization', to improve rocket accuracy or power was developed by**
 - A) William Gravesande
 - B) Colonel William Congrave
 - C) Wan-Her
 - D) William Hale
 - E) Kai-Kang
- 3) _____ **Goddard was interested in rockets reaching higher altitudes. Which of his developments became the forerunner of a whole new era in rocket flight?**
 - A) Solid-propellant rocket
 - B) Oxygen tanks
 - C) Multi-stage rocket
 - D) Liquid propelled rockets using gasoline and liquid oxygen
- 4) _____ **What was Sputnik 1st major accomplishment?**
 - A) Medium and long range intercontinental ballistic missile
 - B) First successful entry of a satellite into space
 - C) Launched a few months after the United States launched its first satellite
- 5) _____ **Which Russian spacecraft was the first to fly past the moon?**
 - A) Lunar orbiter
 - B) Explorer 1
 - C) Apollo 11
 - D) Lunar 1
- 6) _____ **The U.S. had 3 separate projects to gather information about the moon. What was the name of the project that would take color photographs of the moon?**
 - A) Apollo 11
 - B) Lunar Orbiter
 - C) Surveyor
 - D) Ranger

- 7) _____ **What was the name of the first American to orbit the Earth in a small capsule?**
- A) John Glenn
 - B) Goddard
 - C) Neil Armstrong
 - D) Dale A. Gardner
- 8) _____ **What is the name of the first space station?**
- A) Apollo 11
 - B) Saturn Booster
 - C) Skylab
 - D) Apollo 13
- 9) _____ **The gravitational force on a satellite changes with the height it is above a planet. What must the satellite control to maintain its circular orbit around the planet?**
- A) Forward motion
 - B) Unbalanced gravitational force
 - C) Planet's gravity
 - D) Velocity
- 10) _____ **In order for a rocket to leave Earth's gravitational pull and travel out into deep space it must reach its:**
- A) Terminal velocity
 - B) Accelerated Velocity
 - C) Maximum velocity
 - D) Escape Velocity
- 11) _____ **When the rocket leaves the Earth and travels into deep space, its flight path is controlled by what Law(s)?**
- A) Newton's 1st Law
 - B) Newton's 2nd Law
 - C) Newton's 3rd Law
 - D) All of the above
- 12) _____ **In a rocket, what is the purpose of the nozzle?**
- A) To hold the solid – propellant
 - B) To increase the acceleration of the gases that leave the rocket and maximize the thrust
 - C) Reduce the amount of fuel lost at take-off
- 13) _____ **Around what 'point' will an unstable rocket tumble?**
- A) Yaw
 - B) Center of Pressure
 - C) Pitch
 - D) Roll
 - E) Center of Mass

- 14) _____ **During a rocket flight, movement in which axis will not affect its flight path?**
- A) Yaw
 - B) Center of Pressure
 - C) Pitch
 - D) Roll
 - E) Center of Mass
- 15) _____ **What does a 'Gimbaled Nozzle' do when a rocket takes off?**
- A) Changes the exhaust direction
 - B) Rocket responds by changing course
 - C) Rocket has no response to the positioning of the Gimbaled Nozzle
- 16) _____ **Why should the center of pressure be towards the rocket's tail for the rocket to fly straight?**
- A) The payloads always need to be near the top portion of the rocket
 - B) So the mass of the rocket is evenly distributed from bottom to top of the rocket
 - C) As the rocket flies, airflow over the larger surface area at the tail will impact a greater force on the tail than the head keeping the nose cone pointed up
 - D) The payload mass at the upper end will help balance the rocket and then the rocket will fly straight up.
- 17) _____ **Who was the first American to ride up to space?**
- A) John Glenn
 - B) John W. Young
 - C) Alan Shepard
 - D) Neil Armstrong
- 18) _____ **Over the many years of Goddard's experiments, he developed –**
- A) Gyroscope system for flight control
 - B) Payload compartment for scientific instruments
 - C) Smoother air travel
 - D) Both A and B
- 19) _____ **To shift the center of mass (CM) of a rocket forward, one needs to add weight to the nose, install lighter fins, and make the rocket shorter.**
- A) True
 - B) False
- 20) _____ **Which motor has a lower total impulse for an "I" class motor?**
- A) 900 Newton-seconds
 - B) 640 Newton-seconds
 - C) 480 Newton-seconds

EXTRA CREDIT QUESTIONS -- These will require additional internet investigation.

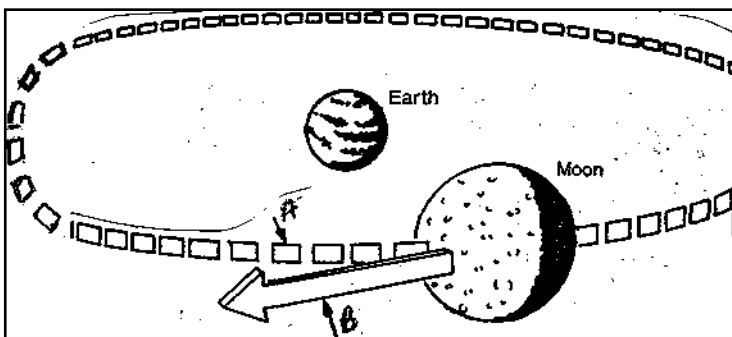


21. _____ This hot shot pilot rigged up a six iron and took a one-handed swing at a golf ball on the moon. "Miles and miles an miles," he announced in satisfaction, watching the ball fly slow-motion over the moon's dusty craters. Who was the sportsman?

- A. John Glenn
- B. Alan Shepard
- C. Deke Slayton

22. _____ Three days before liftoff, this astronaut turned on his car radio and caught a news story in which NASA announced that he had been pulled from his first spaceflight because he had been exposed to German measles. Who was the grounded flier?

- A. A Charlie Duck
- B. B John "Jack" Swigert
- C. C Ken Mattingly



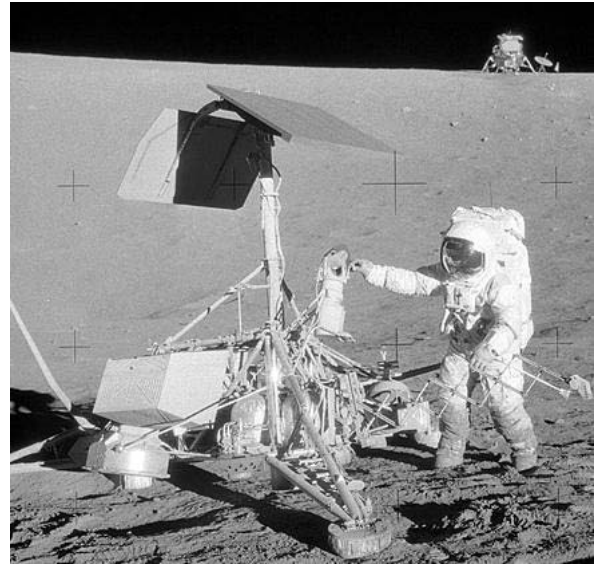
23. _____ Refer to diagram at left. An object in space that is near another object is influenced by the gravitational field of that object. Which path in the diagram below represents Moon's actual motion when influenced by Earth's gravity?

- A. Path "A"
- B. Path "B"

Explain your answer in terms of the 'forces' and 'velocity', & 'motions' of the earth and moon.

24. _____ In addition to carrying out the first major science experiments of the Apollo moon program, these astronauts encountered an object from another world – Earth. Who was on the Surveyor 3 salvage crew?

- A. John Young and Charles Duke
- B. Charles “Pete” Conrad and Alan Bean
- C. David Scott and James Irwin



25. _____ Two astronauts on the lunar surface were loading up their moon buggy with tools and equipment when a hammer in the commander’s spacesuit brushed against the fender, ripping half of it off. “Oh, you won’t believe it,” he radioed to Mission Control. “There goes a fender.” Whose driving record gets the points?

- A. Eugene Cernan
- B. John Young
- C. Charles “Pete” Conrad