



# ROCKETRY BASICS WORK SHEET 2019

School Name			
Launch Team Name			
Number Correct		Total Score (Number Correct x 5 Points Each) =	

**After reviewing the educational information provided to your launch team, complete the following worksheet as a group. Each question is worth 5 points.**

**Information needed to complete this worksheet is found in the booklet entitled "Rocketry Basics" and the "Motor Tutorial" on our website. There are also basic history questions that should be researched.**

- What was the name of the first space station?  
 A) Skylab  
 B) Salyut  
 C) International Space Station  
 D) Mir
- To improve rocket accuracy or power, the technique of 'gyroscopic stabilization' was developed by:  
 A) Wan-Her  
 B) Robert Goddard  
 C) Kai-Kang  
 D) Colonel William Congrave
- The nozzle on a rocket motor serves what purpose?  
 A) Reduce the amount of fuel lost at take-off  
 B) To hold the solid – propellant  
 C) To increase the acceleration of the gases that leave the rocket and maximize the thrust
- An unstable rocket will tumble around what 'point'?  
 A) Yaw  
 B) Center of Pressure  
 C) Center of Mass  
 D) Pitch
- Which of his developments did Goddard's interest in rockets reaching higher altitudes become the forerunner of a whole new era in rocket flight?  
 A) Liquid propelled rockets using gasoline and liquid oxygen  
 B) Multi-Stage rocket  
 C) Solid-propellant rocket  
 D) Oxygen tanks
- To shift the center of mass (CM) of a rocket forward, you can do any one of the three following steps: 1) Add weight to the nose, 2) Install lighter fins, and 3) Make the rocket shorter.  
 A) False  
 B) True
- The first United States' satellite made what major scientific discovery?  
 A) Discovery of Pluto  
 B) First successful entry of a satellite into Earth orbit  
 C) Discovery of the Van Allen Radiation Belts
- Which Russian spacecraft was the first to fly past the moon?  
 A) Lunar orbiter  
 B) Explorer 1  
 C) Apollo 11  
 D) Luna 1

- 9 Why should the center of pressure be towards the rocket's tail for the rocket to fly straight?
- A) The payload mass at the upper end will help balance the rocket and then the rocket will fly straight up.
  - B) During flight, 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.
  - C) The payloads always need to be near the top portion of the rocket
  - D) So the mass of the rocket is evenly distributed from bottom to top of the rocket
- 10 Movement in which axis will not affect its flight path during a rocket flight?
- A) Pitch
  - B) Center of Mass
  - C) Roll
  - D) Yaw
- 11 A satellite experiences changes in the gravitational force with distance above a planet. To maintain its orbit around the planet, what must the satellite control?
- A) Velocity
  - B) Forward motion
  - C) Planet's gravity
  - D) Unbalanced gravitational force
- 12 Who was the first American to command the International Space Station?
- A) Alan Shepard
  - B) Neil Armstrong
  - C) William Shepherd
  - D) Chris Hadfield
- 13 A "Gimbaled Nozzle" has what effect on the flight of the rocket?
- A) Rocket has no response to the positioning of the Gimbaled Nozzle
  - B) Spins the rocket to maintain stability.
  - C) Changes the exhaust direction, thus correcting the direction of flight.
- 14 Goddard completed many experiments over he his years, he developed:
- A) Gyroscope system for fight control
  - B) Payload compartment for scientific instruments
  - C) Smoother air travel
  - D) Both A and B
- 15 Which motor has a lower total impulse for an "J" class motor?
- A) 1,280 Newton-seconds
  - B) 700 Newton-seconds
  - C) 640 Newton-seconds
- 16 All rockets that reach outer space are based on which invention?
- A) Jean Froissart Launching rockets through tubes
  - B) Schmidlap's multi-stage vehicle for lifting fireworks to higher altitudes
  - C) Mongol's fire-arrows
  - D) Hero of Alexandria of his invention of the Hero engine
- 17 What Law(s) control the flight path of a rocket when the rocket leaves the Earth and travels into deep space?
- A) Newton's 3<sup>rd</sup> Law
  - B) Newton's 1<sup>st</sup> Law
  - C) Newton's 2<sup>nd</sup> Law
  - D) All of the above
- 18 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) Maximum velocity
  - C) Accelerated velocity
  - D) Escape velocity
- 19 Three separate projects were launched by the United States to gather information about the moon. Which project would take the first moon color photographs?
- A) Surveyor 2
  - B) Lunar Orbiter
  - C) Surveyor
  - D) Apollo 11

20 Who was first human to orbit the Earth?

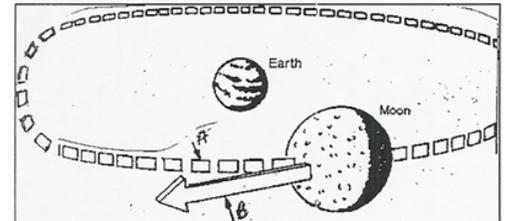
- A) John Glenn
- B) Yuri Gagarin
- C) Neil Armstrong
- D) Yuri Gidzenko

## EXTRA CREDIT QUESTIONS

**These will require additional Internet investigation**

21 Referring to the diagram at the right, an object in space that is near another object is influenced by the gravitational field of that object. Which path in the diagram represents Moon's actual motion when influenced by Earth's gravity?

- A) Path "B"
- B) Neither path.
- C) Path "A"



22 Which American space rover program formally came to an end on February 13, 2019 but recently has returned to full operation on Mars?

- A) Endeavor
- B) InSight
- C) Curiosity
- D) Red Rover



23 "Miles and miles and miles," he announced in satisfaction as he watched the golf ball fly slow-motion over the moon's dusty craters after this hot shot pilot rigged up a six iron and took a one-handed swing at a golf ball. Who was the sportsman?

- A) Alan Shepard
- B) John Glenn
- C) Gus Grissom



24 Which "Hidden Figures" movie subject did NASA change the name of a facility in Fairmont, West Virginia to honor the retired NASA mathematician?

- A) Dorothy Vaughan
- B) Mary Jackson
- C) Katherine Johnson



25 SPACEX's \_\_\_\_\_ became the first American spacecraft to autonomously dock with the International Space Station.

- A) Lizard Master
- B) Crew Dragon
- C) Falcon Heavy
- D) Elon Musk's Tesla

