

ASTR 308 SPRING 2010 EXAM 2 REVIEW SHEET

SPACE PIONEERS (be able to identify each individual, the era they lived in, and their major contributions to manned space flight)

- [Konstantin Tsiolkovsky](#)
- [Robert Goddard](#)
- [Wernher Von Braun](#)
- [Hermann Oberth](#)
- [Sergey Korolyov](#)
- [Maxime Faget](#)
- [Robert Gilruth](#)
- [Christopher Kraft](#)
- [Eugene Kranz](#)
- [James E. Webb](#)

COLD WAR POLITICS AND THE SPACE RACE

- What is the Cold War? - When did the Cold War begin? When did it end?
- What event marks the end of the Cold War?
- What was the Space Race? When did it begin? When did it end?
- What events mark the beginning and end of the Space Race?
- What was Project Paperclip?
- Role of German rocket scientists in America
- Sputnik? Explorer I?
- Why did Russians have heavy lift capability to space before the Americans?
- What was the Cuban Missile Crises,? The Strategic Defense Initiative?
- When/Why was NASA created? What was its first goal?

NEWTON'S LAWS AND ROCKET SCIENCE

- What is Newton's First Law of Motion?
- What is constant motion? (consider velocity and acceleration)
- What is Newton's Second Law of Motion?
- What is Newton's Third Law of Motion?
- Rockets obey all three laws under various conditions of flight?
- Upon which law is the principle of the rocket based?
- When thrusting, which two laws govern the rocket's motion?
- Which laws govern the rocket's motion in orbit (when not thrusting)?
- Be able to explain the balance between inertia and the force of gravity for an orbit.

PROJECT MERCURY

- What were three main goals of Project Mercury?
- six flights of Project Mercury
 - 1. Shepard suborbital
 - 2. Grissom suborbital, lost space capsule
 - 3. Glenn orbital flight, 3 orbits supposed to by 7, fireflies, false landing bag deployment light
 - X. Slayton, grounded due to heart fibrillation, was supposed to fly after Glenn
 - 4. Carpenter orbital, ran out of maneuvering fuel, landed down range, big fiasco
 - 5. Shirra, perfect flight, happened during Cuban missile crises
 - 6. Cooper, 36 orbits, performed all functions manually and perfectly

PROJECT GEMINI

- What were three main goals of Project Gemini? (recall NASA website doesn't give one)
- ten flights of Project Gemini
 - Gemini III Grissom & Young, shakedown Gemini spacecraft (named Molly Brown)
 - Gemini IV McDivitt, & White, first EVA by an American
 - Gemini V Cooper & Conrad, mid-range endurance, 5 days in orbit
 - Gemini VI Shirra & Stafford, first rendezvous – with Gemini VI, rocket aborted at take off and Shirra doesn't eject! Shows the right stuff.
 - Gemini VII Borman & Lovell, 2 weeks, 14 days in space, long endurance flight
 - Gemini VIII Armstrong & Scott, first docking space, spacecraft tumbles out of control, Armstrong aborts, Scott doesn't get to do his space walk
 - Gemini IX Stafford & Cernan, EVA working attempt, Cernan almost dies
 - Gemini X Young & Collins, Collins moderately successful EVA
 - Gemini XI Conrad & Gordon, Gordon unsuccessful EVA, gets very tired
 - Gemini XII Lovell & Aldrin, Aldrin completes perfect EVA working in space
- Why did Aldrin's space walk work so well? HINT: How did they change the training?

PROJECT APOLLO

- What was the goal of Project Apollo?
- eleven Apollo flights
 - Apollo 1 Grissom, White, & Chafee, Block I CM, died in fire on the pad.
 - Apollo 7 Shirra, Cunningham, & Eisele, earth orbit shake down of Block II CM, first "mutiny in space", Shirra retires, Cunningham and Eisele fired.
 - Apollo 8 Borman, Lovell, & Anders, first manned flight on Saturn V booster, first manned mission to the moon, ten orbits
 - Apollo 9 McDivitt, Scott, & Schweickart, earth orbit shake down of LM and CM, rendezvous, docking, undocking, firing of descent and ascent stage of LM
 - Apollo 10 Stafford, Young, & Cernan, full dress rehearsal of LOR and partial descent to the moon surface for landing in LM
 - Apollo 11 Armstrong, Aldrin, & Collins, first moon landing (Yay!)
 - Apollo 12 Conrad, Gordon, & Bean, first precision landing on the moon
 - Apollo 13 Lovell, Haise, & Swigert, oxygen take blows up on way to moon
 - Apollo 14 Shepard, Mitchell, & Roosa, use a walking cart to collect rocks, but it fails
 - Apollo 15 Scott, Worden, & Irwin, first flight with Rover
 - Apollo 16 Young, Duke, & Mattingly, first flight to land amongst the moon's mountains
 - Apollo 17 Cernan, Schmidt, & Evans, third flight with Rover, second landing in the mountains, 3 days on the moon, first geologist/scientist on moon, last man on moon
 - Apollo/Soyuz Stafford, Slayton, & Brand; Leonov & Kubasov

What was cause of The Fire?

What was the final straw mutiny about in Apollo 7? Why did Shirra get the last laugh?

What two factors led to NASA deciding to send Apollo 8 to the moon without the LM?

Why was Apollo 8 such a nerve-racking experience? HINT: no LM on the flight

What crazy event happened on Apollo 10 that caused Cernan to swear into his live mic?

What events made the landing of Apollo 11 a bit touch and go? HINT: computer/fuel

What happened (twice) to Apollo 12 during launch into earth orbit?

What fun thing didn't happen on Apollo 12? HINT: special photo

Who was supposed to fly on Apollo 13, but was knocked off the crew 2 days before?

Why? Who replaced him on the flight?

What problems did the Apollo 14 flight have that almost stopped the moon landing?

HINT: there are three involving docking, radars, and the abort switch indicator

What fun thing did Alan Shepard do on the moon? He was the first and only to do it!

What fun science experiment did Dave Scott perform on the moon?

What major discovery that the geologist wanted find did Apollo 15 make?
On Apollo 16, what was the “John and Charlie show”? (in “A Man on the Moon”)
What color soil (unexpected) did Apollo 17 find on the moon?
What was the goal of the Apollo/Soyuz Test Project?

CHRONOLOGY AND SPACE EVENTS (know the events – given in order below)

- Goddard launches first liquid fueled rocket
- V2 Rocket flies in Germany (first real rocket)
- First intercontinental ballistic missile (ICBM)
- First satellite in orbit (what is was it named?) – [space race begins]
- NASA Formed, Project Mercury created
- First American satellite in space (what was it named?)
- First man in space and orbit the earth (1 time; who was he?)
- First American in space (1st suborbital Mercury flight; who was he?)
- Kennedy's Moon Speech
- Second American in space (2nd suborbital Mercury flight; who was he?)
- Second man to orbit the earth (17 times; who was he?)
- Third Man to orbit the Earth (1st orbital Mercury flight; who was he?)
- Cuban Missile Crises
- Project Mercury ends / Project Gemini begins
- First EVA (who was it?)
- First American EVA (Gemini IV; who was he?)
- First real rendezvous of two spacecraft (Gemini VI w/ VII, who commanded VI?)
- First docking of two spacecraft in space (Gemini VIII, who was commander?)
- Successful EVA working ins space (Gemini XII, who did it?)
- Project Gemini end / Project Apollo begins
- Apollo 1 "The Fire"
- Apollo 7 (earth orbit shakedown of CM)
- Apollo 7 (10 orbits around the moon!)
- Apollo 9 (shakedown of LEM in earth orbit)
- Apollo 10 (dress rehearsal at the moon- everything but the landing)
- Apollo 11 (the lunar landing, waking on the moon)
- Apollo 12 (first precision landing on the moon next to Surveyor 3 spacecraft)
- Apollo 13 (the successful failure, no moon landing)
- Apollo 14 (Shepard's moon walk)
- Apollo 15 (First mission with the Rover)
- Apollo 16 (Second mission with the Rover)
- Apollo 17 (with Rover; first scientist on the moon, last manned mission to the moon)
- Apollo /Soyuz mission (Deke Slayton goes into space!) [space race ends]
- End of Project Apollo
- Skylab missions (3 or them)