**Space Primer: The 2011-2012 Space Topic**



The 2011-2012 National Forensic High School policy debate resolution is, “Resolved: The United States federal government should substantially increase its exploration and/or development of space beyond the Earth’s mesosphere.” This packet will help you and your teammates become more familiar with the topic before this summer’s research.

# FIRST, the Space Exploration Timeline:

Nota Bene: Review all the directions before beginning the project.

In class, you will watch the following videos (All of these videos are online for you to re-watch except for the last one):

 1 - History.com - First space flight video (Running Time: 3:55):
 <http://www.history.com/topics/space/videos#space-jfks-new-frontier>

 2 - History.com - The Space Race video (Running Time: 2:58):
 <http://www.history.com/videos/the-space-race#the-space-race>

 3 - YouTube - History of NASA (Running Time: 6:59):
 <http://www.youtube.com/watch?v=gOYDzCOmWIs&feature=related>

 4- IMAX Space Station (Running Time: 47:00)

While watching these videos take notes on major events in U.S. Space history. You will need this information later to complete your timelines in class.

After watching the videos, read the two attached articles in this packet: (1) A Brief History of Space Exploration and (2) History of Manned Space Exploration.

Once this preliminary work is completed, please complete the attached timeline. Write in major events in the history of Space exploration in chronological order on the timeline. You must include at least 9 major events and must include correct dates for these events in chronological order to get full credit.

This timeline will due at the end of the class period and is worth 25 points so please work diligently.

# SECOND, the Declaration of the Space Event Topic:

Choose your three favorite space exploration events based on your readings and the videos. In the space provided below, write in your three favorite events, numbering them 1 through 3 (#1 being your favorite choice and #3 being your least favorite choice). You must have appropriate titles, images, and details for each of these events to get full credit. I will use this list to assign you one event for your 2-minute in class presentation.

This assignment is due next class and is worth 10 points.

# LASTLY, the 2-minute Presentation of Space Topic:

Once you have been assigned your space topic, prepare a 2-minute presentation for the class. The presentation must have the following:

 (1) 1 Visual Aid to show the class; this can be an image you can bring up on the

 Smart Board.

 (2) Explanation of the Event with sufficient background describing the 5 W’s:

 Who? What? When? Where? Why?

 (3) Description of how you think this event may become important to understanding a debate argument next year. This section may be highly speculative, but should be informed by your understanding of debate strategy and mechanics like affirmative structure, disadvantages, counterplans, kritiks, etc.

You will need to submit the rubric in this packet for evaluation before giving your presentation in class.

Ms. Tallungan will assign you a presentation date. This assignment is worth 25 points.

# OVERALL, Deadlines/Graded Work:

Space Exploration Timeline - End of class (25 points)

Declaration of Space Event Topic - Next Class (10 Points)

2-Minute Presentation - Class Next Week (25 Points); See Rubric for details

A Brief History: Space Exploration

As often happens in science, the earliest practical work on rocket engines designed for spaceflight occurred simultaneously during the early 20th century in three countries by three key scientists: in Russia, by Konstantin Tsiolkovski; in the United States, by Robert Goddard; and in Germany, by Hermann Oberth. In the 1930s and 1940s Nazi Germany saw the possibilities of using long-distance rockets as weapons. Late in World War II, London was attacked by 200-mile-range “V-2” missiles, which arched 60 miles high over the English Channel from Germany at more than 3,500 miles per hour.

After World War II, the United States and the Soviet Union created their own missile programs. On October 4, 1957, the Soviets launched the first artificial satellite, Sputnik 1, into space. Four years later on April 12, 1961, Russian Lt. Yuri Gagarin became the first human to orbit Earth in Vostok 1. His flight lasted 108 minutes, and Gagarin reached an altitude of 327 kilometers (about 202 miles).

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| man-on-moon |

The first U.S. satellite, Explorer 1, went into orbit on January 31, 1958. In 1961 Alan Shepard became the first American to fly into space. On February 20, 1962, John Glenn’s historic flight made him the first American to orbit Earth.

“Landing a man on the moon and returning him safely to Earth within a decade” was a national goal set by President John F. Kennedy in 1961. On July 20, 1969, Astronaut Neil Armstrong took “a giant step for mankind” as he stepped onto the moon. Six Apollo missions were made to explore the moon between 1969 and 1972.

During the 1960s unmanned spacecraft photographed and probed the moon before astronauts ever landed. By the early 1970s orbiting communications and navigation satellites were in everyday use, and the Mariner spacecraft was orbiting and mapping the surface of Mars. By the end of the decade, the Voyager spacecraft had sent back detailed images of Jupiter and Saturn, their rings, and their moons.

Skylab, America’s first space station, was a human-spaceflight highlight of the 1970s, as was the Apollo Soyuz Test Project, the world’s first internationally crewed (American and Russian) space mission.

In the 1980s satellite communications expanded to carry television programs, and people were able to pick up the satellite signals on their home dish antennas. Satellites discovered an ozone hole over Antarctica, pinpointed forest fires, and gave us photographs of the nuclear power-plant disaster at Chernobyl in 1986. Astronomical satellites found new stars and gave us a new view of the center of our galaxy.

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| shuttle |

In April 1981 the launch of the space shuttle Columbia ushered in a period of reliance on the reusable shuttle for most civilian and military space missions. Twenty-four successful shuttle launches fulfilled many scientific and military requirements until January 1986, when the shuttle Challenger exploded after launch, killing its crew of seven.

The Challenger tragedy led to a reevaluation of America’s space program. The new goal was to make certain a suitable launch system was available when satellites were scheduled to fly. Today this is accomplished by having more than one launch method and launch facility available and by designing satellite systems to be compatible with more than one launch system.

The Gulf War proved the value of satellites in modern conflicts. During this war allied forces were able to use their control of the “high ground” of space to achieve a decisive advantage. Satellites were used to provide information on enemy troop formations and movements, early warning of enemy missile attacks, and precise navigation in the featureless desert terrain. The advantages of satellites allowed the coalition forces to quickly bring the war to a conclusion, saving many lives.

Space systems will continue to become more and more integral to homeland defense, weather surveillance, communication, navigation, imaging, and remote sensing for chemicals, fires and other disasters.

The International Space Station is now in orbit and permanently crewed. With many different partners contributing to its design and construction, this high-flying laboratory has become a symbol of cooperation in space exploration, with former competitors now working together.

And while the space shuttle will likely continue to carry out important space missions, particularly supporting the International Space Station, the Columbia disaster in 2003 signaled the need to step up the development of its replacement. Future space launch systems will be designed to reduce costs and improve dependability, safety, and reliability. In the meantime most U.S. military and scientific satellites will be launched into orbit by a family of expendable launch vehicles designed for a variety of missions. Other nations have their own launch systems, and there is strong competition in the commercial launch market to develop the next generation of launch systems.

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| space-station |

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World of Earth Science | History of Manned Space Exploration

The history of manned [space](http://www.enotes.com/earth-science/space) exploration is essentially the history of the United States and Soviet/Russian space programs. Although the European Space Agency and China are expected to begin manned exploration of space in the early twenty-first century—manned exploration of space in the twentieth century resulted initially from a hotly contested "space race" that was, perhaps, the most visible of Cold War competitions between the Soviet and American superpowers. Initially driven by national pride and a quest for perceived strategic military advantage, over the last two decades, the exploration of space has become a more scientifically oriented and cooperative enterprise, especially in the ongoing [joint](http://www.enotes.com/wests-law-encyclopedia/joint) construction of the International Space Station (ISS).

The official Soviet Space Program (SSP) began in May 1946, as it was then that the government made the decision to set up an industrial branch for missile "armamentation" in the Union of Soviet Socialist Republics (USSR).

The decision to create a space program, however, was not made overnight. Since the early 1930s in the USSR, small groups of enthusiasts attempted to create rockets. These groups were made up of engineers who afterwards would play leading roles in the Soviet Space Program; among them was Soviet aeronautical engineer Sergei Pavlovich Korolev (1906–1966). A victim of Soviet purges during the late 1930s, Korolev survived a term in Stalin's Gulag system to become the "Chief Designer" of the Soviet Space Program. Although during his lifetime Korolov's identity was never publicly revealed to western sources, Korolev became the eventual leader of most of the SSP projects.

The success of missile building in Nazi Germany, including the creation of the V-2 rocket, influenced the beginning of rocket system development in the USSR. Immediately after the end of the World War II, a group of Soviet engineers traveled to Germany, where they carefully studied captured German documents and equipment intended for missile creation. The group even worked in Germany for a time before returning to the USSR. By 1948, the P-1 missile was already developed (the analogue of V-2) and was officially accepted as the main armament in the Soviet army. In 1950, an improved version of this missile was created, and in 1951, the new P-2 missile was first created. By 1956, the army accepted the new missile, which could carry a nuclear charge and reach its target from a distance of about 932 mi (1,500 km).

The future United States space program also received an important boost from German scientists who either fled to the United States before the war, or who intentionally fled the advancing Soviet armies to surrender to United States and British forces. Notable among these scientists was [Wernher von Braun](http://www.enotes.com/salem-history/wernher-von-braun) (1912–1977). Greatly advancing the work of early American rocket designer [Robert H. Goddard](http://www.enotes.com/salem-history/robert-h-goddard) (1882–1945), and others, von Braun would become one of the chief architects of the American Space Program and go on to design the Saturn V rocket that ultimately achieved the escape velocities needed to propel America's Apollo program astronauts to the [Moon](http://www.enotes.com/earth-science/moon).

In 1957, the two-stepped intercontinental ballistic missile P-7 was created in the USSR. Using this rocket, the world's first Earth-orbiting [satellite](http://www.enotes.com/earth-science/satellite), *Sputnik,* was launched on September 4, 1957 from the Baikonur cosmodrome (now in Kazakhstan). *Sputnik* weighed 187 lb (83.6 kg) and completed an elliptical orbit around the earth every 98 minutes. *Sputnik* was designed to return data about the composition and density of Earth's upper atmosphere. *Sputnik* transmitted via radio signals for approximately three weeks.

Also in the 1950s, the largest and most famous Soviet space vehicle-launching site, Baikonur, was built. This launching site is located in the Kazakhstan steppe, and the most important launches of Soviet/Russian spacecraft, in particular all spacecraft with men and women (cosmonauts) aboard, were launched from the Baikonur launch complex. Following the collapse of the USSR, the Baikonur launching site was located in an independent Kazakhstan, but Russia continues to rent and use the site for its space program.

The experimental research component of space study began under Korolev's supervision as early as 1949. Gradually, geophysics and meteorological rockets began to be launched, measurements of different geophysical field parameters at different heights were executed, and later, launching of rockets with animals on board were executed. Also in the 1950s, in parallel with military missile projects, work began on sending man into space. The result was the launch on April 12, 1961, of the spacecraft *Vostok* with the first cosmonaut, Yuri Gagarin. Aboard *Vostok,* Gagarin spent about one hour in space and completed one circuit around the earth. Shortly afterward, on August 6, 1961, the second cosmonaut, German Titov, flew to space on board the spacecraft *Vostok 2,* spending approximately one day orbiting the earth (Titov died in Moscow in 2000).

The launch of the first *Sputnik* and Gagarin's flight were triumphs of the Soviet Space Program, and the start of the unofficial space race with the Americans.

The effect on America of the spectacular early success of the Soviet Union in space exploration can rarely be overstated. Despite the design-based successes of Soviet-made MiG jet aircraft used against American forces during the Korean War, since 1947, when Charles E. "Chuck" Yeager (1923–) became the first man to break the sound barrier, America assumed it held a vast technological superiority over the Soviet Union in aeronautics and other science and engineering fields. Americans regarded the Soviet Union as nation with a struggling economy and often politically repressed scientific research programs (e.g., the debilitating effects of Lysenkoism—a Stalin-supported pseudoscientific interpretation of genetics that suppressed early Russian advances in genetics and contributed widespread Soviet agricultural shortages).

The Soviet launch of *Sputnik* and subsequently of launching the first man into orbit inflicted a deep wound to America's pride and assumed technological superiority. Near hysteria swept the American government as it feared—at a time of increasing nuclear tensions—that the demonstrated Soviet capabilities in peaceful space exploration would easily be translated into a destabilizing advantage in nuclear weapons delivery capability. Decimating the manpower and budgets of its successful high altitude aeronautics programs, the United States military and, after its founding in 1958, the National Aeronautics and Space Administration (NASA) accelerated rocket development programs. Moreover, the Soviet successes in space so rocked the American psyche that major reforms were undertaken in the educational system to close an apparent gap in scientific and engineering expertise. Education of scientists became a strategic national priority.

Although Soviet secrecy made direct comparisons difficult, the early record of the American space programs was notable for its very public failures. Rockets continually destroyed themselves in spectacular launch explosions. America's first attempted response to *Sputnik,* the Vanguard TV3 on December 6, 1957 ended in a launch failure. During 1958, four out of five intended American Pioneer probe missions (intended for lunar flybys) ended in launch failures.

Consistently behind the Soviet Union, the Americans finally successfully launched *Explorer 1* on February 1, 1958. Weeks after Gagarin's orbital flight, on May 5, 1961, the United States launched its first astronaut, Alan B. Shepard Jr. into a sub-orbital flight from Cape Canaveral. It was not until February 20, 1962, that astronaut John Glenn became the first American to orbit the earth. Shepard's flight so captivated and buoyed Americans, that then U.S. President John F. Kennedy issued a challenge that America would dedicate the resources needed to land a man on the Moon and return him safely before the end of the 1960s.

Before America could complete its one-man Mercury program—a series of 20 unmanned and six manned flights designed principally to test elements of rocketry and whether humans could survive and work in space—the Soviet Union increased its number of "firsts" in space exploration. One of the lone bright spots for the American space program was the success of the *Mariner 2* interplanetary probe. Launched in December 1962, *Mariner* passed within approximately 21,000 mi (33,800 km) of Venus and was able to transmit back to Earth the first useful data from an interplanetary probe.

On July 14–16, 1963, two spacecraft, *Vostok 5* and *Vostok 6,* were launched with cosmonaut V. Bykovskii on board one, and with the first woman cosmonaut [Valentina Tereshkova](http://www.enotes.com/salem-history/valentina-tereshkova) on board the second. On March 18, 1965, cosmonaut Aleksei Leonov was the first to go out in open space (spacewalk) from onboard the three-man *Voskhod* spacecraft.

On June 3, 1965, American astronaut Edward H. White II became the first American to "walk in space" (i.e., perform an Extra Vehicular Activity or EVA). White's tethered EVA was part of a methodical two-man Gemini program, designed to test equipment and refine skills in maneuver and rendezvous that would be required on subsequent three-man Apollo lunar missions. Although the Soviets maintained an impressive lead in space "firsts," it was during the Gemini program—consisting of 2 unmanned and 10 manned missions—that America gained the technological ability to move into the ambitious Apollo missions.

In contrast, despite being shrouded in secrecy, by the mid-1960s, the first failures of the Soviet Space Program were apparent. First launches of Soviet N-1 rockets (the rocket intended to take Soviet cosmonauts to the Moon) were not successful, and during tests, the rocket did not reach past an altitude of 70,000 ft (21,335 m). While the "Moon race" between the United States and the USSR continued, the Soviets spent vast amounts of money (equivalent to over 600 million U.S. 1969 dollars), but when it became obvious that the USSR would not win the race—i.e., it would not be able to be the first country which would land a man on the Moon—the Moon project stagnated and the remaining N-1 rockets were dismantled.

A devastating fire during a prelaunch test on January 27, 1967, killed three *Apollo 1* astronauts and put NASA's quest to put a man on the moon by the end of the decade in jeopardy. The Soviet space program also encountered fatalities. During the first test of the *Soyuz* spacecraft in April 1967, cosmonaut V. M. Komarov was killed in a crash resulting from entangled parachute shroud lines. Another *Soyuz* accident occurred in June 1971, when a pressure leak during reentry killed all three *Soyuz* cosmonauts.

After a series of unmanned test flights, Americans returned to space on October 11, 1968, with the launch of *Apollo 7.* The success of the mission, and the stellar performance of the redesigned Apollo spacecraft put NASA on the fast track to a lunar mission. In December 1968, *Apollo 8* astronauts Frank Borman, James A. Lovell Jr., and William A. Anders became the first manned spacecraft to leave Earth orbit when they traveled to the Moon and completed 10 orbits before returning to Earth. In March 1969, the flight of *Apollo 9* remained in Earth orbit to successfully test the Lunar Excursion Module (LEM)—the first true spacecraft never designed to enter Earth's atmosphere. The 2-stage LEM was designed to carry astronauts from lunar orbit to the lunar surface and the upper stage was designed to return them to the Apollo command module that would remain in lunar orbit. In May, 1969, the flight of *Apollo 10* tested the LEM in the lunar gravitational field, as astronauts undocked the LEM from the Apollo command module and flew within approximately 50,000 ft (15,420 m) of the lunar surface.

On July 16, 1969, the launch of *Apollo 11* propelled astronauts Neil A. Armstrong (Commander), Edwin E. "Buzz" Aldrin, Jr. (Lunar Module Pilot), and Michael Collins (Command Module Pilot) toward the Moon. On July 20, 1969, Armstrong became the first man to set foot on another world. Armstrong and Aldrin left behind an American flag and a plaque that read: "Here Men From Planet Earth First Set Foot Upon the Moon. July 1969 A.D. We Came In Peace For All Mankind."

Having won the "space race," the American public's interest in lunar exploration quickly waned. Other than a renewed concern for the astronauts about the ill-fated *Apollo 13* mission, public interest and the political will to continue to shoulder the financial burdens of lunar exploration brought the Apollo program to a halt after the flight of *Apollo 17* in December, 1972.

Interestingly, it was only on the last flight of Apollo that a trained professional scientist—geologist astronaut Jack Schmitt—was able to conduct observations and conduct experiments on the lunar surface. *Apollo 17's* emphasis on lunar [geology](http://www.enotes.com/earth-science/geology) and science heralded a new age of space exploration.

Also frustrating and unsuccessful for the Soviets was the Soviet [space shuttle](http://www.enotes.com/earth-science/space-shuttle) project, begun in 1974. In the middle of the 1980s, an experimental version of the shuttle was created, the *Buran*, but the spacecraft executed only one flight in the automatic mode (without a pilot on board) on November 15, 1988. After the collapse of the USSR, work on this project was cut because of lack of funding.

One of the most successful projects of the Soviet Space Program, however, was the creation and work of the *Mir* orbital space station. Based on extensive experience with earlier *Salyut* space stations, *Mir* became the premier Earth orbiting laboratory. The base module of *Mir*, which weighed 36 tons (32.7 metric tons), was launched on February 20, 1986. In 1987, the *Kvant* module was linked up with the station; in 1990, the *Kristall* module was also linked up with the station, and in 1990, special equipment for docking of American shuttles in the station was placed aboard *Mir*.

For several years, *Soyuz TM* spacecraft with cosmonauts on board were regularly sent to *Mir,* changing crews after periods of about 5–6 months. After launch, the spacecraft docked with the *Mir* station after traveling in space for about two days. During several missions, the crews of the spacecraft and the station conducted joint exercises, and afterwards, the old crew "passed watch" to the new one. Several days after the spacecraft's arrival at the station, it returned to the earth with the crew who had finished the last watch.

Many scientific research projects were carried out on board *Mir*; 73 persons from nine countries visited the station and it was calculated that the total time spent onboard by all the cosmonauts was about 40 years. During 1988, cosmonauts Musa Manrov and Vladimir Titov set records for what was then the longest period of time in space for humans (366 days). Subsequently, the longest flight record was extended to 438 days by cosmonaut Vladimir Polyakov. The duration of *Mir's* active status was much longer then expected. After ten years of utilization, different mechanical drawbacks occurred more frequently, and eventually the decision was made to end the project. The Soviet/Russian space station *Mir* was taken out of orbit and re-entered Earth's atmosphere in 2001; its fragments sank in the Pacific Ocean.

Following the Apollo lunar program, the United States completed a more modest Skylab program. In a welcome deescalation of Cold War tensions in 1975, the U.S. and Soviet Space programs cooperated in a joint *Apollo-Soyuz* rendezvous and docking mission. The mission was designed to pave the way for future cooperation in spaceflight.

NASA development of the Space Transportation System (STS)—the Space Shuttle—has made space more accessible to a wider variety of scientists and experts. The space shuttle has become the American workhorse for orbital delivery of wide range of satellites and repair of science instruments (e.g., the Hubble Space Telescope). America's first shuttle, *Columbia*, was launched in April, 1981.

In January 1986, a disastrous explosion 73 seconds after liftoff destroyed the space shuttle *Challenger*. The explosion was due to a faulty "O" ring—a ring sealing joints in the segmented solid [rock](http://www.enotes.com/earth-science/rock) boosters—that was made less flexible by the cold [weather](http://www.enotes.com/uxl-science-encyclopedia/weather) conditions prevailing during the launch sequence. A ring failure allowed hot gasses to escape the right solid rocket booster and then to burn through to the main auxiliary fuel tank used at liftoff. The explosion claimed the life of the seven-member crew—including America's first teacher in space, astronaut Christa McAuliffe—and halted manned U.S. space flight for more than two years. In general, after the collapse of the USSR, the Russian space program was reduced and only recently began a revival. In spite of many different difficulties, Russia participated in the project of creating and utilizing the International Space Station. The first module (*Zarya*) of the ISS was created in Russia and launched on November 20, 1998, from Baikonur.

On December 4, 1998, the United States shuttle *Endeavor* was launched, carrying the ISS module *Unity*. American and Russian astronauts joined the two modules in open space. This event marked the beginning of the International Space Program (ISP), the official opening of which occurred on December 10, 1998. Construction of and research aboard the ISS continues.

Material Reprinted from <http://www.enotes.com/earth-science/history-manned-space-exploration/print>

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Timeline

**Due: At End of Class**

Directions: Write in major events in the history of Space exploration in chronological order on the timeline. You must include at least 9 major events and must include correct dates for these events in chronological order to get full credit. (25 Points)



Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Declaration of Space Presentation Topic

**Due: Next Class**

Directions: Choose your three favorite space exploration events based on your readings and the videos. In the space provided below, write in your three favorite events, numbering them 1 through 3 (#1 being your favorite choice and #3 being your least favorite choice). You must have appropriate titles, images, and details for each of these events to get full credit. I will use this list to assign you one event for your 2-minute in class presentation. (10 Points) 

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Presentation Rubric

**Due: Assigned Presentation Date**

Topic:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| **DELIVERY** | **2** | **3** | **4** | **5** | **POINTS** |
| 1. Explanation of Event | Speaker presents little necessary information accurately and in a thoughtful manner | Speaker presents some necessary information accurately and in a thoughtful manner | Speaker presents most necessary information accurately and in a thoughtful manner | Speaker presents all necessary information accurately and in a thoughtful manner |  |
| 2. Visual Aid | Speaker presents an irrelevant visual aid that is easy for the whole class to see | Speaker presents a somewhat relevant visual aid that is easy for the whole class to see | Speaker presents a mostly relevant visual aid that is easy for the whole class to see  | Speaker presents a visual aid that is relevant and easy for whole class to see  |  |
| 3. Connection to Topic | Speaker demonstrated little thought and strategic sense when discussing connection to topic  | Speaker had a somewhat thoughtful and strategic potential connection to the topic | Speaker had a mostly thoughtful and strategic potential connection to the topic | Speaker had a thoughtful and strategic potential connection to the topic  |  |
| 4. Eye Contact | Speaker does not speak loudly at all during the speech | Speaker speaks loudly during part of the speech. | Speaker speaks loudly during most of the speech | Speaker speaks loudly so entire audience can hear the entire speech  |  |
| 5. Enthusiasm | Speaker was rarely enthusiastic to present speech | Speaker was somewhat enthusiastic to present speech | Speaker was mostly enthusiastic to present speech.  | Speaker was very enthusiastic and energetic to present speech |  |