

OVERVIEW

SAILOR OF THE STARS

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Many students are curious about space and how you really get there. More and more students want to be involved in the space program and many will be, if not directly then indirectly, by having careers in NASA and related industries.

Astronaut is a Greek word meaning “sailor of the stars.” SAILOR OF THE STARS is a simulation that exposes your students to the life of an astronaut. Your students will tackle a variety of assignments as they apply for a position in the space program, go through astronaut candidate training, train with their crew, build a simple rocket and participate in a launch, work and live in space, work together with their crew to land, and debrief. Be ready for your students to be engaged, excited, and challenged as they work in this simulation.

SAILOR OF THE STARS consists of eight distinct phases. Each phase is labeled by a letter of The Phonetic Alphabet used by all Aeronautics, Military, and Space agencies.

Phase 1: ALPHA—Wanted a Few Good...Astronauts provides many opportunities for developing Language Arts skills. Students read a classified ad which describes the four space shuttle positions currently available through NASA. Students write a business letter requesting an application and complete the application. In student pairs, they conduct an interview and are interviewed for their respective position. Following the interview, students are selected as astronaut candidates. Students create a business card and name badge to use in their new position. *Optional activities:* students write to a real astronaut; students create a pop up of a real astronaut and hold a press conference to introduce their selected astronaut.

Phase 2: BRAVO—Training the Astronaut provides the astronaut candidate training framework within which students explore curriculum in the areas of science and technology, language arts, social studies, and math. Students read about the science and technology related to the space program and complete a comparison between vehicles on earth and in space. Students complete research and write a mini-brief on a NASA Field Center. Students read about the history of space exploration and complete a space history puzzle. Students complete a math activity solving a variety of space-related problems. *Optional activities:* students give oral reports on their research/mini-briefs; students write a song teaching others about the space shuttle; students locate the various NASA field centers on the United States map; students write a mini-brief on space history; students write a letter informing an organization that their space canister will not be boarded on the shuttle; students complete additional mathematical calculations; students plot a meaningful course through their school and/or campus; students participate in career day, listening to professionals give presentations about their career choices.



SPACE EXPLORATION THROUGH THE AGES (1)

SAILOR OF THE STARS

- 1500 B.C.E. **Babylonians** recognize 18-year cycle for **lunar eclipses**
- 540 B.C.E. Babylonians divide the heavens into twelve **constellations** (the **zodiac**) to enable their priests to make predictions
- 350 B.C.E. Aristotle establishes an Earth-centered **universe**
- 270 B.C.E. Aristarchus of Samos proposes a Sun-centered **universe**
- 140 B.C.E. Ptolemy explains the motion of the heavens in an Earth-centered **universe**
- C.E. 813 Arabs start a school of **astronomy** in Baghdad
- 850 Arabs perfect **astrolabe**
- 1150 Chinese develop first rockets
- 1543 Copernicus explains planetary motion in Sun-centered **universe**
- 1580 Brahe begins observations of the planets
- 1609 Kepler publishes *Astronomia Nova* which contains his first two laws
- 1610 Galileo reports his **telescopic** observations
- 1655 Huygens discovers Titan and two years later the rings around Saturn
- 1675 Charles II founds the Greenwich **Observatory** in England
- 1687 Newton publishes *Principia*
- 1802 Herschel discovers Uranus and **binary stars**
- 1865 Author Jules Verne publishes *From the Earth to the Moon*
- 1895 Russian Konstantin Tsiolkovsky begins to write about space flight
- 1898 Author H. G. Wells publishes *War of the Worlds*
- 1903 Wright Brothers make first-ever powered flight at Kitty Hawk, NC
- 1915 NACA (National Advisory Committee for Aeronautics) is created
- 1926 Robert Goddard launches first successful liquid-fuel rocket
- 1929 Edwin Hubble suggests the universe is expanding at an ever-increasing rate; develops velocity-distance relationship known as *Hubble's Law*
- 1931 Amateur astronomer, Clyde Tombaugh discovers Pluto
- 1942 First successful flight of the German V-2 rocket
- 1945 Werner Von Braun's rocket team defects to the U.S. army and later comes to work with the U.S. Space Program
- 1947 Chuck Yeager in the Bell X-1 breaks the sound barrier
- 1957 USSR launches Sputnik I, the first **satellite**, starting a space race between the Soviet Union and the United States
- 1958 President Eisenhower creates NASA (National Aeronautics and Space Administration)
- 1959 NASA selects the first seven Mercury astronauts (Shepard, Glenn, Grissom, Slayton, Schirra, Cooper, Carpenter)
- 1960 U.S. Echo 1, first experimental communication satellite is launched
- 1961 Yuri A. Gagarin, a cosmonaut from the Soviet Union, becomes first human to orbit the Earth

PROBLEMS, PROBLEMS, PROBLEMS (2)



SAILOR OF THE STARS

3. There are approximately 400 billion stars in our Milky Way Galaxy. That is a very big number. To fully understand how big, let's do some calculations. Let's pretend that one star were only as wide as your pinky finger, or 1 cm. And let's also pretend we could line up 400 billion stars of this size in a row. How long do you think the line would be? One mile? 10 miles? 100 miles? More?

Fill in the chart below. Keep track of your zeros as the numbers get bigger.

Number of stars	Distance	Describe something of the same size or distance
1	1 cm	width of the pinky finger
100	100 cm or 1 M	a little less than the distance between your hands with your arms stretched out
100,000	1000 M = 1KM or .66 miles	distance from your house to _____
1,000,000	6.6 miles	distance from _____ to _____
1,000,000,000 one billion	$6.6 \times 1000 = \underline{\hspace{2cm}}$ miles	distance from _____ to _____
400 billion	$400 \times 6600 = \underline{\hspace{2cm}}$ miles	If the distance around the earth at the equator is 25,000 miles, about how many times could you wrap the Earth with your line of stars? _____ Picture your line of stars the size of your pinky extending into space. How far does it reach? (The distance to the moon is 238,857 miles.) _____

Just imagine! Astronomers have discovered millions of galaxies and are finding more each day. Many of these galaxies have even more stars than our Milky Way!!

4. The shuttle can carry approximately 59,600 pounds of payload (work to be completed). Numerous high schools, universities, and other institutions have requested to have their experiments carried aboard the shuttle. Already, the payload weighs 48,750 pounds.

a. What is the remaining payload capacity? _____

- b. Your goal is to try to fill the shuttle as close to capacity as possible and to take as many canisters as possible. Which of the following experimental payload canisters can **not** be taken aboard the shuttle? Circle those you cannot take.

University X's canister weighs 2000 lbs
 Institution P's canister weighs 1575 lbs
 High School G's canister weighs 481 lbs
 University D's canister weighs 2965 lbs

High School A's canister weighs 157 lbs
 University L's canister weighs 3600 lbs
 Institution T's canister weighs 4300 lbs
 High School M's canister weighs 295 lbs



SHUTTLE FOOD AND BEVERAGE LIST (1)

SAILOR OF THE STARS

Directions Look over this extensive list of foods and determine which foods you would like to eat while aboard the shuttle. Plan out a seven day menu, using your 7 DAY MEAL PLAN sheet.

FOODS ABBREVIATIONS

(FF) — Fresh Food **(IM)** — Intermediate Moisture **(I)** — Irradiated **(NF)** — Natural Form
(R) — Rehydratable **(T)** — Thermostabilized

BEEF

Beef w/BBQ Sauce (T)
Beef, Dried (IM)
Beef Patty (R)
Beef Steak (I)
Beef Stroganoff w/Noodles (R)

BREAD (FF)

BREAKFAST ROLL (FF)

BROWNIES (NF)

CANDY

Coated Chocolates (NF)
Coated Peanuts (NF)
Gum (NF)
Life Savers (NF)

CEREAL

Bran Chex (R)
Cornflakes (R)
Granola (R)
Granola w/Blueberries (R)
Granola w/Raisins (R)
Grits w/Butter (R)
Oatmeal w/Brown Sugar (R)
Oatmeal w/Raisins (R)
Rice Krispies (R)

CHEDDAR CHEESE

SPREAD (T)

CHICKEN

Chicken, Grilled (T)
Chicken Salad Spread (T)
Chicken, Sweet 'n Sour (R)
Chicken, Teriyaki (R)

COOKIES

Butter (NF)
Shortbread (NF)

CRACKERS, BUTTER (NF)

EGGS

Scrambled (R)
Mexican Scrambled (R)
Seasoned Scrambled (R)

FRANKFURTERS (T)

FRUIT

Apple, Granny Smith (FF)
Apple, Red Delicious (FF)
Applesauce (T)
Apricots, Dried (IM)
Banana (FF)
Cocktail (T)
Orange (FF)
Peach Ambrosia (R)
Peaches, Diced (T)
Peaches, Dried (IM)
Pears, Diced (T)
Pears, Dried (IM)
Pineapple (T)
Strawberries (R)
Trail Mix (IM)

GRANOLA BAR (NF)

HAM (T)

HAM SALAD SPREAD (T)

JELLY

Apple (T)
Grape (T)

MACARONI & CHEESE

(R)

NOODLES AND

CHICKEN (R)

NUTS

Almonds (NF)
Cashews (NF)
Macadamia (NF)
Peanuts (NF)
Trail Mix (IM)

PEANUT BUTTER (T)

POTATOES AU GRATIN (R)

PUDDINGS

Banana (T)
Butterscotch (T)
Chocolate (T)
Tapioca (T)
Vanilla (T)

RICE

Rice w/Butter (T)
Rice and Chicken (R)
Rice Pilaf (R)

SALMON (T)

SAUSAGE PATTIE (R)

SHRIMP COCKTAIL (R)

SOUPS

Chicken Consommé (B)
Mushroom (R)
Rice & Chicken (R)

SPAGHETTI W/MEAT SAUCE (R)

TORTILLAS (FF)

TUNA

Tuna (T)
Tuna Salad Spread (T)

TURKEY

Turkey Salad Spread (T)
Turkey, Smoked (I)
Turkey Tetrazzini (R)

VEGETABLES

Asparagus (R)
Broccoli au Gratin (R)
Carrot Sticks (FF)
Cauliflower w/Cheese (R)
Celery Sticks (FF)
Green Beans & Broccoli (R)
Green Beans/Mushrooms (R)
Italian (R)
Spinach, Creamed (R)
Tomatoes & Eggplant (T)

CONDIMENTS

Catsup (T)
Mayonnaise (T)
Mustard (T)
Pepper (Liquid)
Salt (Liquid)
Tabasco Sauce (T)
Taco Sauce (T)