



## **Fun with Flight Part II**

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\*Page numbers are a continuation from Part I lesson plans

## **Fun with Flight Part II Curriculum Unit Overview**

### **Summary**

This unit is designed for teachers who teach grades three through six. They can use it as pre-visit, visit, or post-visit material. It is designed for teachers to use in their classroom with their students so they can get the maximum amount of learning when they visit the National Aviation Hall of Fame Museum. Allow three to four weeks to complete the entire pre-visit activities prior to field trip (Part I and Part II). Each lesson within the unit is designed to fill a 40-50 minute time period.

### **Big Picture**

In Part I, students received a name badge in the shape of an astronaut. Students inserted their school picture into the face in the helmet and printed their names on the space suit. These will be used when they take their field trip to the museum. Also in Part I, teacher discussed the unit and explained the responsibilities the student must exhibit to complete their pre-flight activities. Teacher also highlighted the opportunities all students have to achieve their dreams and that their picture in the space suit may one day become a reality. Successful completion of the pre-flight and on-site activity will result in the awarding of a Junior Aviator Certificate. This project mirrors the “real world” in the fact that employers require certain projects to be completed with a set standard and will reward employees who meet those standards. Failure to meet the standards in the “real world” would result in disciplinary actions or loss of employment.

### **Preparation for the Unit**

1. Schedule the field trip to the National Aviation Hall of Fame.
2. Choose the activities that will be completed in class.
3. Obtain appropriate materials for the activities and make needed copies.
4. Reserve space outside of classroom for those activities that require more space.

### **Overview**

On the following page is a summary of the unit including brief summaries of each authentic learning task (ALT). This table provides an overview of the tasks in the unit sections and shows how the activities in the different teaching areas relate to each other.

**(Unit's Title)**  
**Curriculum Unit Summary**

World War II	Jet Age	Into Space
<p><b>Air Resistance-Parachutes</b> Students will use cause and effect skills to test the relationship between surface area of a parachute and air resistance. Results will be graphed and compared to determine optimal surface area of a parachute.</p>	<p><b>Aircraft Carrier</b> Web based research is introduced as students lead themselves through a website outlining the importance of aircraft carriers to the Jet Age.</p>	<p><b>Working in Space</b> Students will learn how the gear astronauts must wear in space can pose difficulties when working in space. This lesson specifically focuses on small motor skills and how challenging they are in space.</p>
<p><b>African American Enshrinees</b> In this lesson, students will understand the significance of enshrinee's actions on the Civil Rights Movement.</p>	<p><b>Weather Wise</b> Students will learn the basic elements of a weather map and understand the importance of accurate weather prediction to flight.</p>	<p><b>When I Grow Up. . .</b> This career-oriented lesson is driven by students researching various jobs in all industries. Students will also self-examine their strengths and weaknesses to determine and begin matching jobs to their strengths.</p>
<p><b>Henry Ford and the Assembly Line</b> Students will study basic economics as it applies to production in the automobile industry and learn how these techniques have been applied to the aviation industry.</p>	<p><b>Plane to Fly There/Radio Chatter</b> In this lesson, students are introduced to the "language" of the International Phonetic Alphabet. Using this knowledge, students will analyze dialogue to determine a particular flight plan.</p>	<p><b>Moon Survival</b> In this lesson, students will cooperatively work in a small group to "survive" a space emergency. Students must analyze information, problem solve, and work together to come to a common solution.</p>

**Transfer Activity**

After students complete the ALTs, they will be prepared to be an active participant at the National Aviation Hall of Fame. For those students who mastered the principles in the pre-visit activities, the museum will allow them to apply and enrich their knowledge. For those students who were unclear on the underlying principles of the activities, the museum will allow an opportunity to relearn as well as apply those skills. While there, students will

complete a flight log recording their participation in all displays. They will also complete a scavenger hunt of facts relating to the enshrinees.

## **Section One: (Title)**

### **ALT One: World War II**

**See attached lessons plans which detail the:**

**Summary**

**Competencies**

**Time**

**Materials**

**Instructions**

**Evaluation/Assessment of Student's Competency**

**Closure**

## **ALT Two: Jet Age**

**See attached lessons plans which detail the:**

**Summary**

**Competencies**

**Time**

**Materials**

**Instructions**

**Evaluation/Assessment of Student's Competency**

**Closure**

## **ALT Three: Into Space**

**See attached lessons plans which detail the:**

**Summary**

**Competencies**

**Time**

**Materials**

**Instructions**

**Evaluation/Assessment of Student's Competency**

**Closure**

## **Transfer Activity**

After students complete the ALTs, they will be prepared to be an active participant at the National Aviation Hall of Fame. For those students who mastered the principles in the pre-visit activities, the museum will allow them to apply and enrich their knowledge. For those students who were unclear on the underlying principles of the activities, the museum will allow an opportunity to relearn as well as apply those skills. While there, students will complete a flight log recording their participation in all displays. They will also complete a scavenger hunt of facts relating to the enshrines.

## **Lesson 10**

### **Air Resistance- Parachutes**

Description: In groups of two or three, students will construct, predict and test several sizes of parachutes to see which has the greater air resistance.

#### Objectives:

1. The student will test the relationship between surface area and time a parachute will stay in the air.
2. The student will be able to compare the size of the surface area and the amount of air resistance to the effects of gravity.
3. The students will record the results in a data table and then graph them in their Preflight Notebook.

#### MATERIALS:

trash bags (one per group)  
circle patterns  
newsprint  
string or thread  
washers  
paper clips  
copies of student pages for each group  
stop watch or timer  
compass  
Preflight Notebook

#### PROCEDURE:

1. Each group will construct and test three different sizes of parachutes.
2. To make a circle pattern, use a compass to draw patterns with diameters of 6", 10" and 14".
3. Students will follow the instructions on the student page.
4. After the flight tests, students can compare the results for all groups.
5. Students can make a data table and then graph the results in their Preflight Notebook.

EVALUATION: The students predicted, tested and compared the results to understand that the larger the object, the greater its air resistance. Their responses on their worksheets indicate understanding.

EXTENSION: Have the students make parachutes using different materials. Compare the type of materials to see which makes the best parachute. They can also use a variety of weights and objects. Some students could research the use of parachutes during World War II.

## PARACHUTE ACTIVITY

You will be making three sizes of parachutes. Before you start, predict which size parachute you think will stay up longest.

6" diameter \_\_\_\_\_ 10" diameter \_\_\_\_\_ 14" diameter \_\_\_\_\_

1. Begin making the parachute canopies by cutting three different sizes of circles from the plastic sheet. (see procedure)
2. Cut a hole about the size of a quarter in the center of each parachute.
3. Cut six 12" pieces of string for each parachute.
4. Poke six holes (or use a punch) evenly spaced around the circle. Tie one end of each string to each hole.
5. Bend a paper clip into a hook. Tie the loose ends of the strings to the paper clip, and then hook the clip onto a washer.
6. Toss each size of parachute up, starting with the 6" diameter first. Time each size to see how long each stays up. Repeat several times. Record the times for each on the data table. Then answer the questions.

## PARACHUTE FLIGHT LOG

SIZE	1 <sup>st</sup> TRIAL	2 <sup>nd</sup> TRIAL	3 <sup>rd</sup> TRIAL	4 <sup>th</sup> TRIAL
6" DIAMETER				
10" DIAMETER				
14" DIAMETER				

1. Which parachute stayed up longest? \_\_\_\_\_ How long? \_\_\_\_\_
2. Why do you think it stayed up the longest?
3. How could you make a parachute that would stay longer?
4. In your preflight notebook, write a short paragraph that tells about this activity. Use the words "air resistance" and tell which parachute floated the longest and why.
5. In your preflight notebook, make a bar graph comparing the length of time the three parachutes stayed up. Be sure to give your graph a title and label the axes.

## Lesson 11

### African American Enshrinees/World War II

Description: The students will read information on Benjamin Davis Jr. and Daniel “Chappy” James Jr. These two gentlemen were pioneers in the fields of aviation and civil rights. Students will note the time frame in which these gentlemen lived and relate their life experiences to the Civil Rights movement in the United States. Students will learn how life experiences influenced and enabled these young men to become successful.

#### Objectives:

1. The students will use technology to obtain information on Benjamin Davis Jr. and Daniel “Chappy” James Jr.
2. The students will understand the significance of the enshrinees’ actions on U.S. History as it relates to the Civil Rights Movement.
3. The students will understand how personal experiences (both good and bad) shape and influence life.

MATERIALS: NAHF website: [www.nationalaviation.org](http://www.nationalaviation.org)  
Pre-Flight Notebook

#### PROCEDURE:

1. In small groups (numbered determined by the teacher) students will use the NAHF website (see above).
2. Groups then present their information to the class and teacher leads discussion focusing on objectives above. Teacher highlights the following quote made by Chappy James which displays his fierce determination and patriotism: “I am not a second-class citizen and no man here is unless he thinks like one, reasons like one or performs like one. This is my country and I believe in her, and I believe in her flag, and I’ll defend her, and I’ll fight for her and serve her. If she has any ills, I’ll stand by her and hold her hand until in God’s given time, through her wisdom and her consideration for the welfare of the entire nation, things are made right again.”  
(Quote taken from biography found on website.)
3. OPTIONAL: Teacher then selects two students to role play Chappy and Benjamin. Teacher interviews them focusing on how they felt as an African-American in the military and how those experiences affected their lives.
4. Each student will then create a journal entry from the point of view of either Chappy or Benjamin. Once a final copy is created, it is glued into the Pre-Flight Notebook.

#### EVALUATION:

Teacher grades using rubric scoring: See Ohio guidelines.

#### EXTENSION:

Research other enshrines and present their point of view.

## Lesson 12

### Henry Ford and the Assembly Line

Description: Henry Ford enabled the common man to purchase an automobile through the use of an assembly line. Later, he applied the idea of mass production to the aviation industry. In this activity, some students will form teams and work in an assembly line to assemble a car. Other students will work individually to also assemble a car. Fate cards (good and bad) will be used to imitate real life situations throughout the simulation. After a 30 minute time period, production is stopped and students can compare the number of automobiles produced. Through the use of assembly lines, airplanes were also able to be mass-produced thus cutting down on cost and making the airplane a more practical form national defense.

#### MATERIALS:

Play dough – different colors to represent automobile parts such as:

Red: chassis

Green: tires

Yellow: license plates

Blue: bumpers

Fate cards: see attached

Direction cards: see attached

Pre-Flight Notebook

#### Objectives:

4. Students will recognize that change occurs in history.
5. Students will identify cause and effect relationships.
6. Students will identify and assess the possibilities of group decision-making cooperative activities and personal involvement in the community.
7. Students will demonstrate knowledge of and ability to think about the relationship among events.
8. Students will identify the factors that influence producer's decisions to supply goods or services.
9. Students will identify the factors that explain the general relationship between supply, demand and price in competitive market.

#### PROCEDURE:

1. Teacher splits class into teams and individuals depending on class size. The following products must be made out of the different colors:  
Red team: chassis  
Blue team: bumpers  
Green team: tires  
Yellow team: license plates
2. The assembly team needs at least 2 people per team. They then can form an assembly line and produce a complete automobile. Their pay is determined by how many completed automobiles are produced. One person serves as the quality control person who is responsible for determining if the standards for the completed unit have been met.
3. The individuals are also given the different colors of play dough and given the same instruction sheet. Individuals serve as their own quality control person.
4. At a fifteen-minute break, each team or individual is given a fate card. They use these in the second half of the simulation.
5. After 30 minutes, time is called and teacher leads a discussion about the number of completed automobiles and the advantages/disadvantages of working on the assembly line.
6. Teacher is the Chief Operating Officer who determines whether the finished product is allowed "on the lot" or must go back to the plant.

**EVALUATION:** Discuss results with the students. Have students write about their experience in their Pre-Flight Notebook. Include both the positives and negatives about the activity.

**EXTENSION:** Students should apply their knowledge of assembly lines with respect to the efficiency and effectiveness of mass production. In a short paragraph, explain what effects the changes in production of aircraft had on the nation with regards to the military and civilian sectors.

## FATE CARDS

Copy and cut apart.

**YOUR CHILD IS ILL AND YOU MUST LEAVE TO PICK HIM UP. YOU MUST LEAVE THE WORK AREA.**

**TAKE a 5-MINUTE BREAK FROM YOUR STATION.**

**YOUR BOSS WANTS A NEW DESIGN. REDESIGN YOUR PART FOR THE REST OF YOUR SHIFT.**

**POWER OUTAGE – ENTIRE LINE DOWN FOR 5 MINUTES. (NO WORK FOR INDIVIDUALS EITHER.)**

**IF YOU ARE ON A TEAM, YOU MUST STOP PRODUCTION AND HAVE A TEAM MEETING ABOUT THE YEAR END PICNIC.**

**YOU ARE ILL AND HAVE TO TAKE YOUR MEDICINE. GO GET A DRINK OF WATER AND COME BACK.**

**YOU PRODUCED A “LEMON”. TAKE AWAY 1 COMPLETED AUTOMOBILE FROM YOUR FINAL COUNT.**

**STRIKE! IF YOU’RE A TEAM YOUR PLANT IS SHUT DOWN. TAKE 5 MINUTES OFF.**

**YOU HAVE A PHONE CALL. TAKE 5 MINUTES OFF.**

## STUDENT DIRECTIONS: TEAM CARD

YOUR JOB IS TO PRODUCE A COMPLETED  
AUTOMOBILE USING THE FOLLOWING PLAY  
DOUGH AND INSTRUCTIONS.

RED TEAM: PRODUCE A CHASIS (THE BODY OF  
THE AUTOMOBILE)

BLUE TEAM: BUMPERS

GREEN TEAM: TIRES

YELLOW TEAM: LICENSE PLATES

ONE PERSON: QUALITY CONTROL – CHECKS  
COMPLETED UNIT

**STUDENT DIRECTIONS: INDIVIDUAL CARD**

**YOUR JOB IS TO PRODUCE A COMPLETED  
AUTOMOBILE USING EACH OF THE FOUR COLORS  
OF PLAY DOUGH:**

**RED: CHASIS (BODY OF CAR)**

**GREEN: TIRES**

**BLUE: BUMPERS**

**YELLOW: LICENSE PLATE**

**YOU ARE YOUR OWN QUALITY CONTROL.**

## Lesson 13

### Aircraft Carrier

Description: The uses of aircraft carriers were vital to both the offensive and defensive strategies during World War II. The aircraft carriers allowed for air power to be utilized in areas that were previously only accessible by water.

Objectives:

1. Students will use technology to access information about the “City of Steel”.
2. Students will understand the importance of aircraft carriers during World War
3. Students will understand the risks involved in take-off and landing an airplane or a bomber from an aircraft carrier.

MATERIALS:

Preflight notebook

Computer with website: <http://www.discovery.com/stories/technology/carrier/carrier.html>

Student worksheet

PROCEDURE:

1. Bookmark the site, <http://www.discovery.com/stories/technology/carrier/carrier.html> for the students.
2. Have students work in small groups or pairs to answer the guided questions on the student page.
3. Lead a discussion to verify the information on the data sheets is correct.
4. Have students glue the completed sheet in their Preflight Notebook.

EVALUATION:

Teacher can assess student understanding from discussion.

EXTENSION:

Students can listen to the carrier stories and navigate the website to explore the aircraft carrier.

Students can read about James Doolittle on the NAHF website:

<http://www.nationalaviation.org/inductee.html>

Students can log on to <http://www.planemath.com/activities/pmactivities4.html> and select Runways and Takeoffs to determine the amount of runway needed for takeoff.

**Student Page**

Name \_\_\_\_\_

Date \_\_\_\_\_

\*log onto the site, <http://www.discovery.com/stories/technology/carrier/carrier.html>

1. Read the paragraph on the home page of “City of Steel”

How long does it take to build an aircraft carrier?

2. Click on “Great Carrier Moments.”

What year was carrier aviation born?

3. Click on Carrier moment #2

What made the HMS Argus the first “through deck” aircraft carrier?

4. Click on Carrier Moment #3.

What mistake cost Japan “dearly”?

5. Click on Carrier Moment #4.

How many aviators made it back alive?

6. Click on Carrier Moment #5.

What was the turning point of the Pacific Naval War?

7. Click on Carrier Moment #6.

How many Japanese Carriers were sunk?

8. Click on Carrier Moment #7.

What event caused President Johnson to change his mind about building aircraft carriers?

9. Click on Carrier Moment #8

Why do you suppose Alan Shepherd said it was one of his best landings?

10. Click on Carrier Moment #9 and 10.

How do we use the carriers today?

**Teacher Page**

1. How long does it take to build an aircraft carrier?

**8 years**

2. What year was carrier aviation born?

**1911**

3. What made the HMS Argus the first “through deck” aircraft carrier?

**The deck was free of obstructions.**

4. What mistake cost Japan “dearly”

**The Japanese Fleet turned back without trying to find the U. S. Carriers.**

5. How many aviators made it back alive?

**71 aviators**

6. What was the turning point of the Pacific Naval War?

**Japanese Carrier missed the Battle of Midway**

7. How many Japanese Carriers were sunk?

**4**

8. What event caused President Johnson to change his mind about building aircraft carrier?

**Korean War started**

Why do you suppose Alan Shepherd said it was one of his best landings?

**Answers will vary**

How do we use the carriers today?

**Cruise missiles and jets with laser-guided “smart” bombs.**

## Lesson 15

### Plan to Fly There

#### Description

It would be very difficult to build a house without a plan. A builder depends on the plan to provide information about the design and size of a house under construction. Plans can also be used to describe an action or sequence of events such as planning for a celebration.

The pilot of an airplane depends on a *flight plan* to provide information to help ensure a successful flight to a destination. The plan may contain the following information:

1. Aircraft number (identification)
2. When the flight will leave (departure time)
3. Where the plane will takeoff from (departure time)
4. How it will get there?
5. Where it will land?
6. How long it will take to fly there (estimated time en route)
7. When the flight will land (estimated time of arrival)
8. Color of the airplane
9. The pilot's name

Abbreviations and codes are used on flight plans to save space and reduce the number of words. For example, the code for San Francisco International Airport in California would appear on the flight plan as SFO.

The pilot plans the route by connecting a series of points on an *aeronautical chart*. These points are abbreviated, and are listed on the flight plan to describe the route of flight.

Pilots use a radio or telephone to communicate or “file” flight plan information with a Flight Service Station.

Once the airplane is airborne, Air Traffic Control (ATC) controllers use the information of flight plans to help track airplanes, and to maintain a safe distance between airplanes.

Talking on a radio or telephone can sometimes change the sound of words and letters. For example the letter B sounds like the letter P and the letter C sounds like the letter D. Most of the information on flight plan is abbreviated or coded using letters and numbers. To help eliminate mistakes caused by a change in the sound of a letter, pilots use the *International Phonetic Alphabet*.

The International Phonetic Alphabet assign word sounds to every letter in the alphabet. Instead of saying the letter A, pilots say the word Alpha. The code SFO would be state Sierra Foxtrot Oscar.

#### Objectives:

- Students will understand radio chatter and comprehend its meaning.
- Students will determine their own flight plan based on the radio chatter given.
- Students will determine a quantity by using a map scale.
- Students will identify the components of a flight plan.
- Students will create a simple flight plan.

#### MATERIALS:

- Preflight Notebook
- Student activity pages
- Optional (overheads of all activity pages)

## PROCEDURE:

1. Teacher initiates discussion on radio chatter. During discussion, teacher introduces the International Phonetic Alphabet and explains why it used. (See background)
2. Teacher introduces the term ETD (estimated time of departure), and explains its meaning. (ETA is used in the activity-students should be able to apply what they've learned about ETD to figure out what ETA means. (ETA means estimated time of arrival).
3. Teacher passes out the radio chatter student page, aero-chart, International Phonetic Alphabet, official pilot's flight plans and student activity page.
4. Students are directed to read the radio chatter student page, use the aero-chart and International Phonetic Alphabet to complete the student activity page 1.
5. After a ten minute work time, teacher will go over with class completed student activity page 1.
6. Students complete Pilot's Flight Plan (top one) for the flight relating to the radio chatter.
7. Students then can complete their own flight plan using a different destination and departure using the Aero-chart. Have students complete student activity page 2 and Pilot's Flight Plan (bottom one).
8. Have students glue activity pages into Preflight Notebook.

## EVALUATION:

Students can apply what they learned on student activity page 1 when they create student activity page 2.

## EXTENSION:

1. Have students plan a flight route using chart they create.
2. Invite a pilot to the classroom and talk about flight plans
3. Have the students spell his or her name using the phonetic alphabet.
4. Have students create a flight plan from their house to the school.
5. Log onto <http://webevents.broadcast.com/simufly/index.html> and you can hear radio chatter from Dallas /Fort Worth.
6. Log onto <http://www.planemath.com/activities/pmactivities4.html> and select Pie in the Sky for a lesson on radio chatter as it relates to weather.
7. Log onto <http://www.planemath.com/activities/pmactivities4.html> and select Flight Path to give students an opportunity to determine the shortest flight path between two cities.
8. Log onto <http://www.planemath.com/activities/pmactivities4.html> and select Time Flies for a lesson on military time.
9. Log onto <http://www.planemath.com/activities/pmactivities4.html> and select Fill 'Er Up for a lesson on mileage and fuel costs.

# Student Activity/ Page 1

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**Directions**

1. Look at the Radio-Chatter Student Page and use it to determine your flight plan.
2. Use the Aero-Chart to answer some of the questions below.
3. Fill in the blank spaces on the form to determine your plan.

**Aircraft Identification**

1. What is your identification number?  
\_\_\_\_\_

**Departure Time**

2. What time did you leave?  
\_\_\_\_\_

**Departure Airport**

3. From what airport did you leave?  
\_\_\_\_\_

**Route of Flight**

4. How did you get there?  
\_\_\_\_\_

**Destination of Trip**

5. Where will you land?  
\_\_\_\_\_

**Estimated Time En Route**

6. How many hours will it take you to get there?  
\_\_\_\_\_

**Arrival Time**

7. What time will you land?  
\_\_\_\_\_

**Aircraft Color\***

8. What color is your plane?  
\_\_\_\_\_

**Name of Pilot\***

9. What is your name?  
\_\_\_\_\_

## Lesson 16

### Working in Space

Description: While working in space, astronauts must wear cumbersome gear. On their hands, they wear bulky gloves which inhibit their ability to manipulate small objects. Astronauts must practice manipulate materials prior to their flight.

#### Objectives:

1. Students will learn the obstacles presented when working in space.
2. Students will attempt to manipulate a small object while wearing bulky gloves in order to simulate the challenges that face the astronauts.

#### MATERIALS:

Bulky gloves (ski gloves)  
Two bags of Hershey kisses  
Brown paper bag (used as trash can)  
Pre-Flight Notebook  
Instruction sheet overhead

#### PROCEDURE:

1. Teacher divides class into two equal teams. If the class has an odd number, one student will go twice for his/her team.
2. Instructions for activity are placed on overhead and teacher reviews instructions with the class. (see instruction sheet)
3. Teacher starts activity and monitors while students complete the tasks.
4. The first team finished is considered the “winner”; however, the other team should be given time to finish activity.
5. Teacher leads discussion on the difficulties encountered as the students attempted to complete the task.
6. In the Pre-Flight Notebook, students write a journal entry describing their experience.

#### EVALUATION:

Students share journal entries with class and apply what they learned to infer the specific tasks an astronaut may encounter that would pose difficulties for him/her.

#### EXTENSION:

Have students go to the website : <http://www-pao.ksc.nasa.gov/kscpao/captions/2000/dec/00pp1924.htm>

Here they can find pictures of different people wearing gloves for space work. Students can use these pictures as writing prompts and develop a piece of writing about the use of the gloves.

## WORKING IN SPACE

### INSTRUCTION SHEET

1. The first person in line receives a pair of gloves, a bag of Hershey kisses, and a brown paper bag.
2. When the teacher says go, the first person puts on the gloves, takes out one Hershey kiss, unwraps it and puts it in his/her mouth.
3. With the gloves still on, the student places his/her trash in the brown paper bag.
4. With the gloves still on, the student passes the brown paper bag and bag of candy to the next person in line.
5. Lastly, the student takes off the gloves and passes those to the next student in line.
6. Each person in line repeats steps 2 through 5 until all team members have finished.

## Lesson 17

### When I Grow Up . . .

Description: Choosing a career path is one of the most important decisions that a young person has to make. How do I find a job that's best for me? Will the job I do make enough money for me to do all the things that I want to do? Join in these job searches and find out if the world of NASA is the place for you. And no, you don't have to be rocket scientist.

Objectives:

1. Students will use technology to research a variety of jobs.
2. Students will self-examine them selves and determine the specific skills they possess.
3. Using the information they have obtained, students will design their perfect profession as it relates to NASA

MATERIALS:

(none)

PROCEDURE:

#### Job Search #1: What do people at NASA do?

The first thing you have to do is to find out what types of jobs people at NASA do. Of course, the first ones that come to mind are rocket scientists, engineers, and astronauts. But did you know that NASA could not exist without lawyers, technicians, maintenance crews, bus drivers, secretaries, accountants, computer specialists, and even cafeteria workers? There's even a special crew in Florida that has to make sure there are no alligators on the runway before the shuttle can land.

Listed below is a link to NASA Spacelink's web page about Careers. After reading through the job lists on the different web sites, choose 2 or 3 that are of interest to you. Record those in your Pre-Flight Notebook with the following information:

- Job title (the name of the job, for example – test pilot)
- Job description – list several things that you would have to do if you had this job
- Education or training needed for this job
- Why do you think you would like this job?

<http://spacelink.nasa.gov/Instructional.Materials/Curriculum.Support/Careers/>

#### Job Search #2: Real People

Reading job descriptions can be confusing if you do not understand some of the technical terms that are used. Journals and biographies are excellent tools for learning about on-the-job skills for different professions. Visit the sites listed below. Read through the journals and biographical information. Choose one that sounds interesting and write a brief description of what this person does at work. Include the job title and why you chose this particular job.

Space Team Outline

<http://quest.nasa.gov/space/team/index.html>

Aerospace Team Online

<http://quest.nasa.gov/aero/team/>

Women of NASA

<http://quest.nasa.gov/women/WON.html>

Solar System Online

<http://quest.nasa.gov/sso/team/index.html>

Profiles from Microgravity

<http://microgravity.msfc.nasa.gov/WOMEN/index.html>

### Job Search #3: NASA's Leaders

Do you want to be head of your own company someday? Listed below are several people in leadership positions at NASA, either now or in the past. Choose a person and study the information on the web pages. What characteristics make this person a leader?

Dr. Werhner Von Braun – First Director of NASA Marshall Space Flight Center

<http://astro-2.msfc.nasa.gov/Academy/History/vonBraun/vonBraun.html>

<http://history.nasa.gov/sputnik/braun.html>

Donna Shirley – Mars Exploration Program Manager

<http://mars.jpl.nasa.gov/msp98/news/news21.html>

Daniel S. Goldin – NASA Administrator

[http://www.nasa.gov/bios/dan\\_goldin.html](http://www.nasa.gov/bios/dan_goldin.html)

Eileen Collins – Shuttle Commander

<http://quest.nasa.gov/women/bios/ec.html>

Donald J. Campbell – Director NASA Glenn Research Center

<http://www.grc.nasa.gov/WWW/PAO/html/djcbio.htm>

### Extra Stuff

Rate your skills as a good employee. How many of the following describe you?

- works well with others – a team player
- completes tasks on time
- self-motivated to start and complete a task
- good communication skills – speaking, writing, listening
- basic computer skills – typing, word-processing, record keeping
- good at written language skills – good speller, writes clear sentences
- willing to learn new things
- honest
- arrives on time

Design the Perfect Profession

If you could design your perfect job, what would it be? Think about these things and create your dream occupation.

- What would you do every day?
- Where would you live?
- What hours would you work?
- What education or training would you need?
- How much money would you make?
- Would you be the boss or the employee?
- Would you like to travel?
- Which of the following fit your skills:
  - \_\_\_ technical
  - \_\_\_ creative
  - \_\_\_ problem solver
  - \_\_\_ outdoors
  - \_\_\_ indoors
  - \_\_\_ work with a group
  - \_\_\_ work alone
  - \_\_\_ work for a large company
  - \_\_\_ work for a small company
  - \_\_\_ work for yourself\
  - \_\_\_ military
  - \_\_\_ artistic
  - \_\_\_ structured
  - \_\_\_ leader
  - \_\_\_ follower
  - \_\_\_ work with your hands
  - \_\_\_ think of new ideas

Additional NASA Resources for this Lesson

NASA Spacelink Directory: Careers

<http://spacelink.nasa.gov/Instructional.Materials/Curriculum.Support/Careers/>

NASA CORE: Audiovisual materials (click on “Search Catalog” and enter the key word Careers)

<http://core.nasa.gov>

Astro-Venture: Visit the career guidance center

<http://astroventure.arc.nasa.gov>

NASA Quest: Career information and chats with NASA specialists

<http://quest.nasa.gov/activities/chats/index.html>

**EVALUATION:** Have students share notebooks and discuss job qualifications. If time allows, have students share information with the class.

**EXTENSION:**

Log onto <http://kids.msfc.nasa.gov/Pioneers/> and have students explore the different careers. They can then write a job description for that profession.

## Lesson 18

### Moon Survival

#### Description

Students will work in teams and decide which items they need for survival. After they have agreed on an order, the teacher can share NASA's reasons for their ranking.

#### Objectives:

Students will work in groups of four  
Students will use problem-solving strategies  
Students will rate items by their importance

#### MATERIALS:

Pre-Flight notebook  
Student pages  
Overhead of student pages for each group  
Overhead markers  
NASA copy on overhead

#### PROCEDURE:

1. Teacher divides students into groups of four.
2. Each student is assigned a role: Commander, Ground control, mission specialist, and environmental engineer. (See task cards)
3. Teacher determines time limit and writes the beginning time on the board.
4. Teacher hands out Moon Survival Sheets and overhead for each group
5. After a determined amount of time, teacher regroups class and has groups share results.
6. Pass out evaluation rubrics and have students fill out on self and team member's performance.

#### EVALUATION:

Teacher observation and rubric scores

#### EXTENSION:

Log onto <http://mars.jpl.nasa.gov/classroom/teachers.html> and go to Activity 11 Interplanet Activity Guide. Here students form a team to make a travel brochure to Mars.

## Crew Description

(Can be cut apart)

### Commander:

Your job is to lead your crew in solving the problem. Your job is to report the results to the class at the appropriate time.

### Ground Control:

You are on the ground communicating with the space crew. You are the only person on the crew who can communicate with the teacher and ask questions. You can only talk to the commander and the teacher. You are the one who gets the materials from the teacher.

### Mission Specialist:

Your job is to make sure every crewmember is participating. You need to keep the crew focused and watch the time. Time limit: \_\_\_\_\_

### Environmental Engineer:

Your job is to record the information on the data sheet and then on the overhead. You can make notes on the data sheet as necessary.

## Moon Survival

Instructions: Your crew was originally scheduled to rendezvous with a mother ship on the lighted surface of the moon. Due to mechanical difficulties, however, your ship was forced to land at a spot some 200 miles from the rendezvous point. During re-entry and landing, much of the equipment aboard was damaged and, since survival depends on reaching the mother ship, the most critical items available must be chosen for the 200-mile trip. Below are listed the 15 items left intact and undamaged after landing. Your task is to rank order them in terms of their importance for the crew in allowing them to reach the rendezvous point. Place the number 1 by the most important item, the number 2 by the second most important, and so on through number 15, the least important.

- \_\_\_ Box of matches
- \_\_\_ Food concentrate
- \_\_\_ 50 feet of nylon rope
- \_\_\_ Parachute silk
- \_\_\_ Portable heating unit
- \_\_\_ Two .45 caliber pistols
- \_\_\_ One case dehydrated Pet milk
- \_\_\_ Two 100-pound tanks of oxygen
- \_\_\_ Map of the moon's surface
- \_\_\_ Life raft
- \_\_\_ Magnetic compass
- \_\_\_ 5 gallons of water
- \_\_\_ Signal flares
- \_\_\_ First aid kit containing injection needle
- \_\_\_ Solar-powered FM receiver-transmitter

## Moon Survival Reporting Sheet

- \_\_\_\_\_ Box of matches
- \_\_\_\_\_ Food concentrate
- \_\_\_\_\_ 50 feet of nylon rope
- \_\_\_\_\_ Parachute silk
- \_\_\_\_\_ Portable heating unit
- \_\_\_\_\_ Two .45 caliber pistols
- \_\_\_\_\_ One case dehydrated Pet milk
- \_\_\_\_\_ Two 100-pound tanks of oxygen
- \_\_\_\_\_ Map of the moon's surface
- \_\_\_\_\_ Life raft
- \_\_\_\_\_ Magnetic compass
- \_\_\_\_\_ 5 gallons of water
- \_\_\_\_\_ Signal flares
- \_\_\_\_\_ First aid kit containing injection  
needle
- \_\_\_\_\_ Solar-powered FM receiver-  
transmitter

**NASA's rankings**

- 15 Box of matches
- 4 Food concentrate
- 6 50 feet of nylon rope
- 8 parachutes silk
- 13 portable heating units
- 11 two .45 caliber pistols
- 12 one case dehydrated Pet milk
- 1 two 100-pound tanks of oxygen
- 3 map of the moon's surface
- 9 life raft
- 14 magnetic compass
- 2 5 gallons of water
- 10 signal flares
- 7 first aid kit containing  
injection needle
- 5 solar-powered  
FM receiver-transmitter

**NASA's Reasons**

- No oxygen to sustain the flame
- Good food source, efficient
- Useful in scaling cliffs, tying together the injured
- Will provide protection from sun's rays
- Useless on dark side, not needed on lighted side
- Possible means of propulsion
- Bulky duplication of food concentrate
- Most pressing need
- Primary means of navigation
- CO<sub>2</sub> bottle in raft may be used for propulsion
- Magnetic field not polarized, worthless
- Replacement for high water loss on light side
- Distress signal when mother ship is sighted
- For injecting vitamins  
-special use in suit
- Talk to mother ship, FM needs short range and line of sight