FOR YOUTH DEVELOPMENT®
FOR HEALTHY LIVING
FOR SOCIAL RESPONSIBILITY

HOME ACTIVITY KIT

Hands-on Learning at Home

HOME ACTIVITY KIT

CONTENTS

Home Activity Kit Theme

OUR FUTURE

Activities Appropriate for

Ages 5-12

EARTH, MOON AND MARS BALLOONS

Objective: By the end of the session, students will:

- Learn about the sizes of the earth, the moon, and mars
- Explore the sizes and distances of each
- Demonstrate their rotation patterns

Time Needed: 60 – 90 minutes

Items Needed: Blue balloon (Earth), red balloon (Mars), white balloon (Moon), Cloth measuring tape (or meter stick and string), calculators, and access to the internet to display.

Instructions:

- Students need to understand that a "model" is a simulation that helps display a complex system. "Relative Distance" is how far objects are from each other. "Relative Size" is how large objects are compared to each other. "Scale" is a standard of measurement for comparing objects with correct perspective.
- Utilizing the "EarthMoonMars.pdf" have students do the first page making a prediction.
- Discuss models and scale.
- Hand out balloons.
- Blue balloons (Earth) should be 63 centimeters in circumference (around). Demonstrate how to measure this or use string and a yard stick.
- Students can use page 2 of "EarthMoonMars.pdf" in the Balloon Prediction section.
- After filling all the balloons, next students will find their distance from each other. (The Earth is twice as big as Mars, and 4x's the size of the moon) Roughly 31 cm for Mars and 16 cm for the moon.
- The moon from the Earth would be .6meters away (600 cm)
- Mars would have to be 3/4th of a mile away (3 laps around a track) ...or pick a location near the school about that distance
- It would take 2-3 days to reach the moon from Earth and 6-11 months to reach Mars. (depending on where they are in orbit in relation to each other)
- Have students fill out the reflection sheet of the "EarthMoonMars.pdf"

Voice/Choice/Leadership:

- Students could choose another celestial distance to study (sun or Saturn)
- Students can lead the discussion of calculating distances and sizes (with guidance)

Resource:

https://marsed.asu.edu/sites/default/files/stem_resources/Earth_Moon_Mars_Balloons_5th_Grade_Lesson_8_2013.pdf

(A) Student Handout. Earth, Earth's Moon, Mars Comparisons

NAME: _____

1. In the box below, draw your thoughts (predictions) of how large the Earth, Earth's Moon, and Mars are.

2. Why you think this is correct?

3. How large the Earth, Earth's Moon, and Mars?

On behalf of NASA's Mars Exploration Program, this lesson was prepared by the Mars Public Engagement Program and Arizona State University's Mars Education Program, under contract to NASA's Jet Propulsion Laboratory, a division of the California Institute of Technology. These materials may be distributed freely for non-commercial purposes. Copyright 2012; 2010; 2000.

(B) Student Worksheet. Relative Size and Distance Sheet

NAME: _____

1. In the box below, draw your thoughts (predictions) of how far the Earth, Earth's Moon, and Mars are away from each other.

2. Why you think this is correct?

3. How far away are the Earth, Earth's Moon, and Mars?

On behalf of NASA's Mars Exploration Program, this lesson was prepared by the Mars Public Engagement Program and Arizona State University's Mars Education Program, under contract to NASA's Jet Propulsion Laboratory, a division of the California Institute of Technology. These materials may be distributed freely for non-commercial purposes. Copyright 2012; 2010; 2000.

(C) Student Worksheet. Student Reflection

NAME: _____

1. What surprised you about Earth, Earth's Moon and Mars?

2. Why can't we show the real distances and sizes of Earth, Earth's Moon, and Mars?

3. This is called a scale model. How do you think scientists use scale models? (Hint: how did you use it?)

4. What do you know now that you did not before about the Earth, Earth's Moon and Mars?

On behalf of NASA's Mars Exploration Program, this lesson was prepared by the Mars Public Engagement Program and Arizona State University's Mars Education Program, under contract to NASA's Jet Propulsion Laboratory, a division of the California Institute of Technology. These materials may be distributed freely for non-commercial purposes. Copyright 2012; 2010; 2000.

NASA ADVENTURES

Objective: By the end of the session, students will:

- Learn the basics of NASA and space travel
- Practice different small motor skills
- Utilize their artistic ability while learning about NASA
- Develop an enthusiasm for space exploration

Time Needed: 20-30 minutes

Items Needed: Art supplies and "nasaadventures.pdf"

Instructions:

- Students can work on the packet of activities over several settings
- Student will gain an enthusiasm for the space industry

Voice/Choice/Leadership:

- Students can lead the discussion of reflection of what excites them about NASA
- Students can design a play that mimics the comic book strip given in the packet
- Students can create their own coloring page or comic strip

Resource:
https://aero.larc.nasa.gov/files/2012/10/education_coloring_english.pdf

National Aeronautics and
Space Administration
Langley Research Center

Educational Product	
Students	Grades K-5

EP-2003-12-07-LaRC

ADVENTURES in aeronautics

COLORING BOOK!

HEY KIDS!

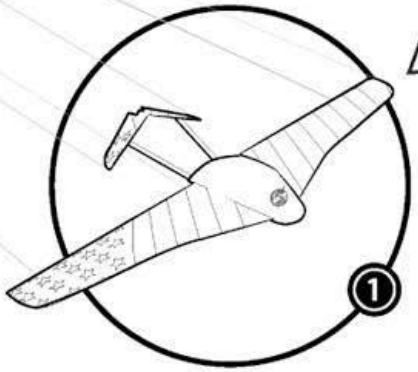
GET YOUR **CRAYONS** AND TAKE A TRIP WITH F.A. PLANE AND FRIENDS!
LEARN ABOUT THE FIRST "**A**" IN NASA, "**AERONAUTICS!**"

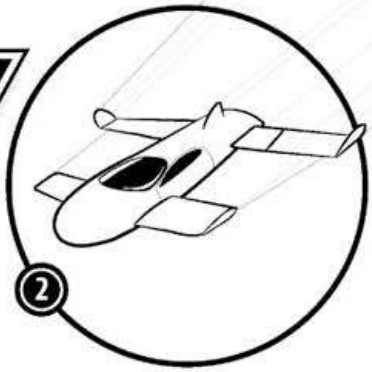
AERONAUTICS

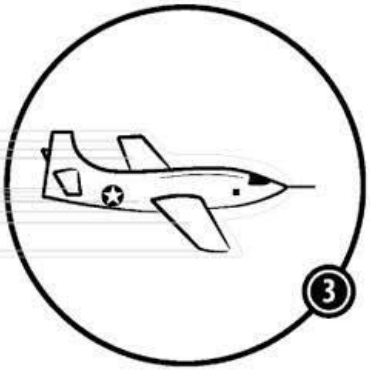
The science of flight that deals with all types of aircraft.

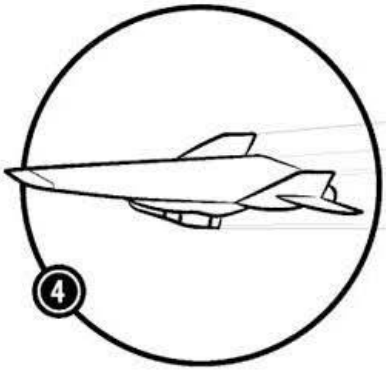
This storybook about NASA Aeronautics is dedicated to all the future aviation professionals–the youngsters that are in school today. We hope this story will inspire them to learn more about the many aspects of flight and the many types of careers associated with the U.S. aviation industry.

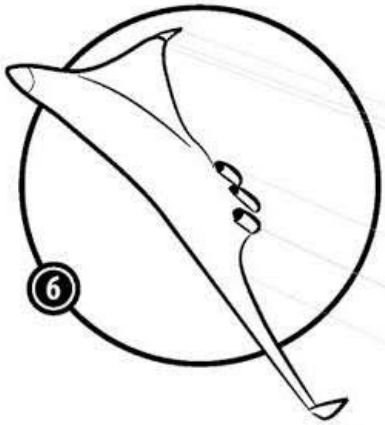
MATCH GAME!











These images are taken from pages in this storybook. When you have finished reading the book, come back to test your knowledge of these types of aircraft. Match the image of the aircraft with its name in the storybook. The names of the planes are listed below, choose the number of the image that fits its name!

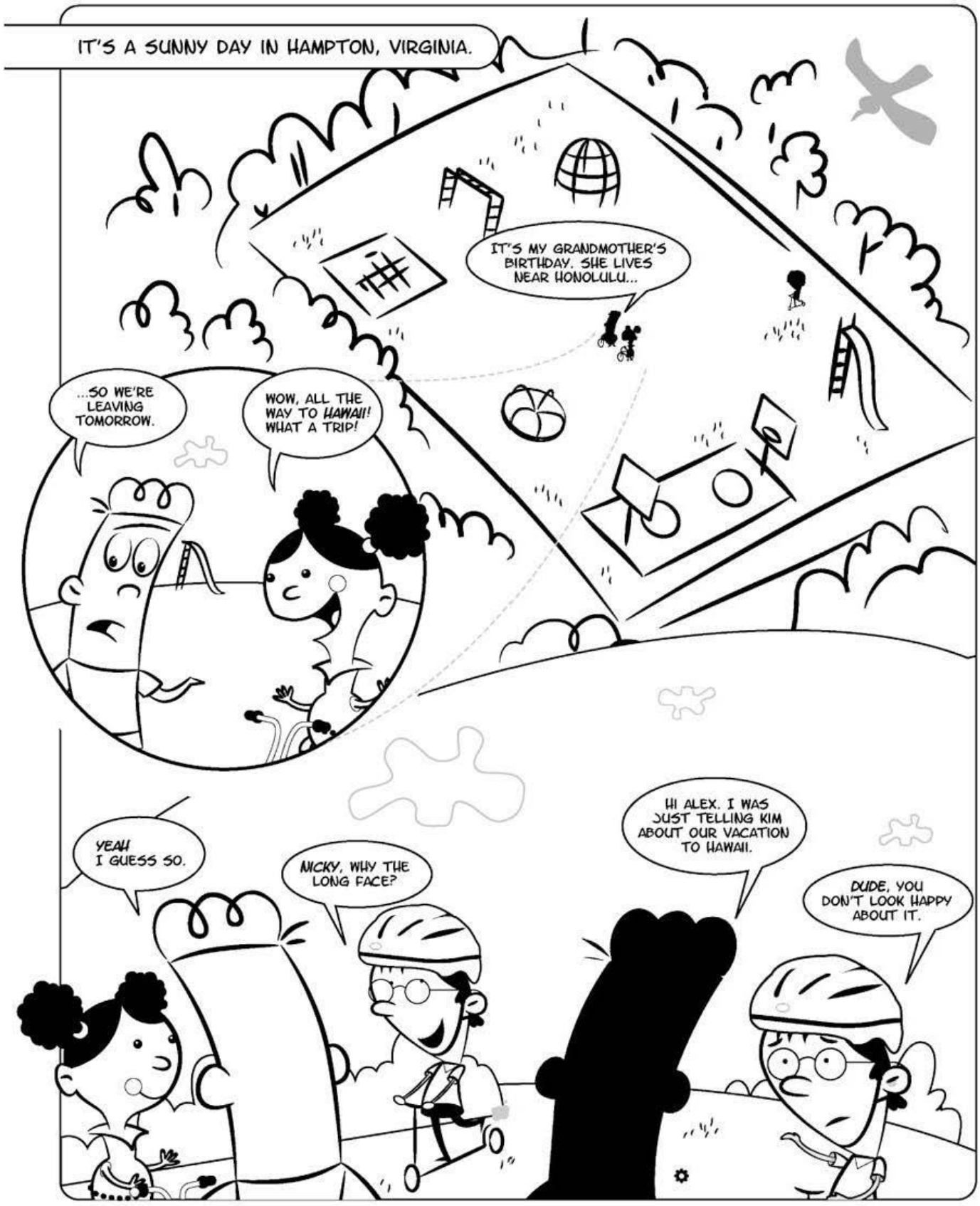
- ○ A **Personal Air Vehicle**
- ○ B **Joint Strike Fighter**
- ○ C **Hypersonic X-43 Plane**
- ○ D **Blended Wing Body**
- ○ E **X-1 Supersonic Plane**
- ○ F **Mars Plane**

Acknowledgements

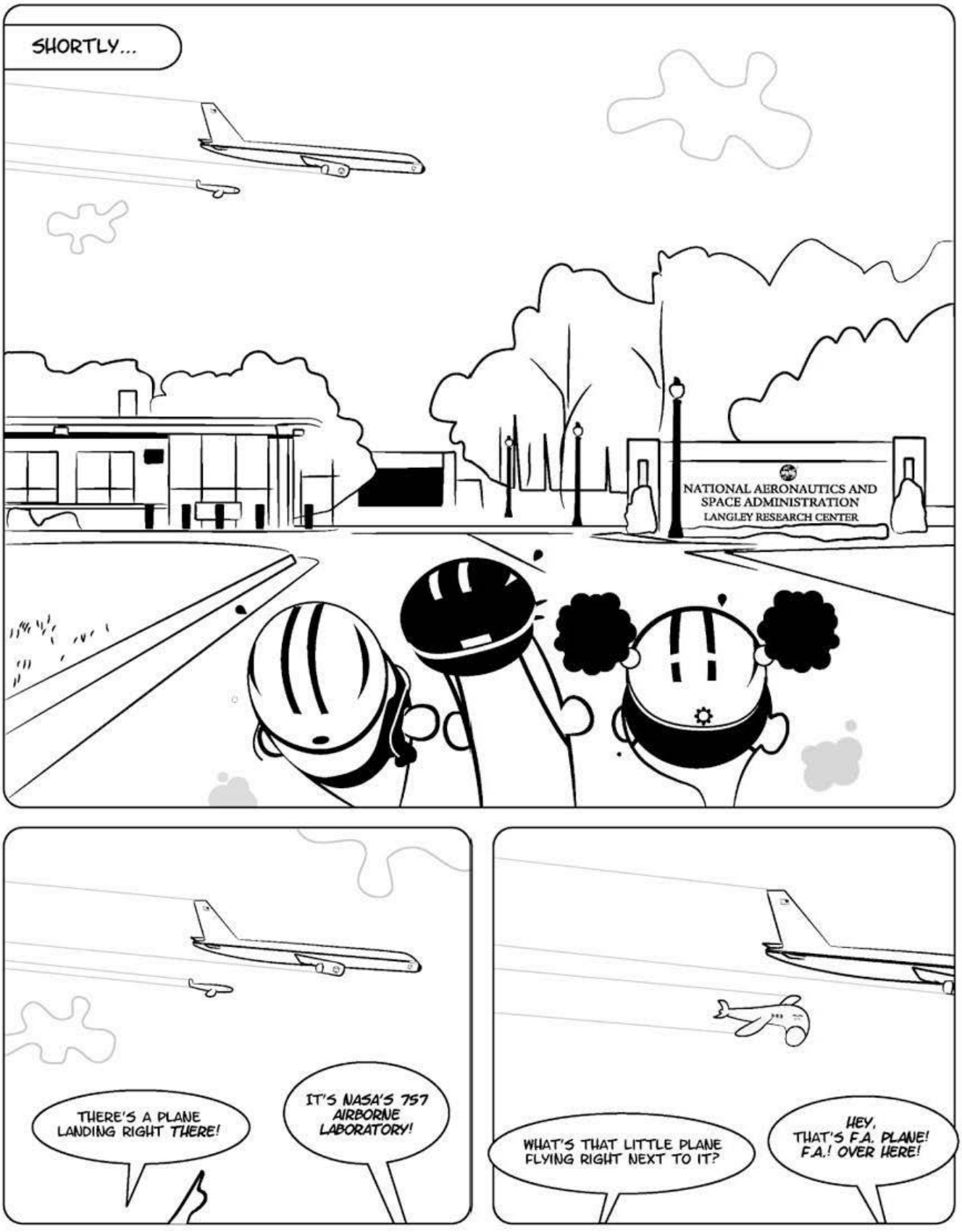
Original Idea & text for a museum storybook exhibit — **Natalie S. Friend**, Planners Collaborative Inc.

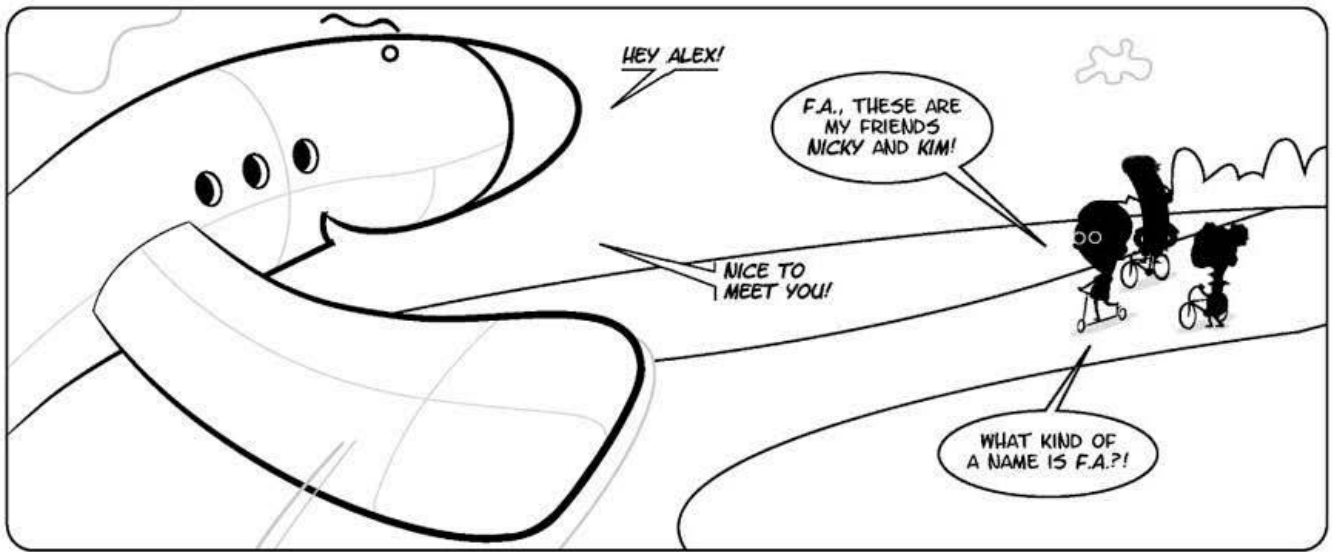
Illustrations & layout — **Wade A. Mickley**, NCI Information Systems

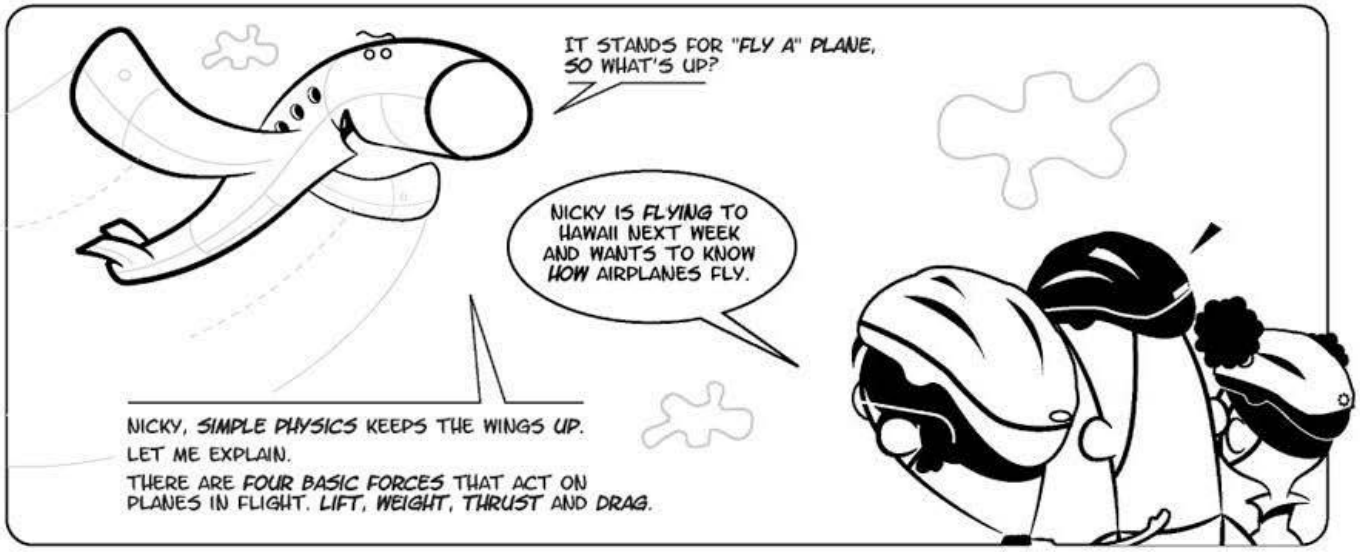
Answer key: A-2, B-5, C-4, D-6, E-3, F-1

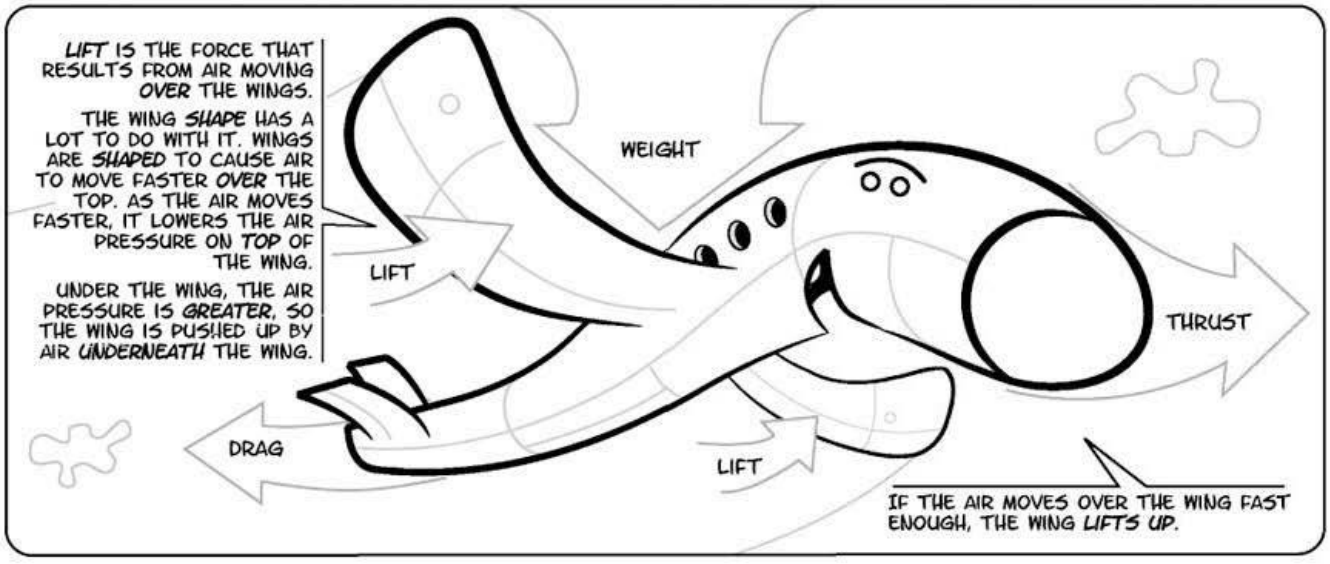

IT'S A SUNNY DAY IN HAMPTON, VIRGINIA.
IT'S MY GRANDMOTHER'S BIRTHDAY. SHE LIVES NEAR HONOLULU...
...SO WE'RE LEAVING TOMORROW.
WOW, ALL THE WAY TO HAWAII! WHAT A TRIP!
YEAH I GUESS SO.
NICKY, WHY THE LONG FACE?
HI ALEX. I WAS JUST TELLING KIM ABOUT OUR VACATION TO HAWAII.
DUDE, YOU DON'T LOOK HAPPY ABOUT IT.

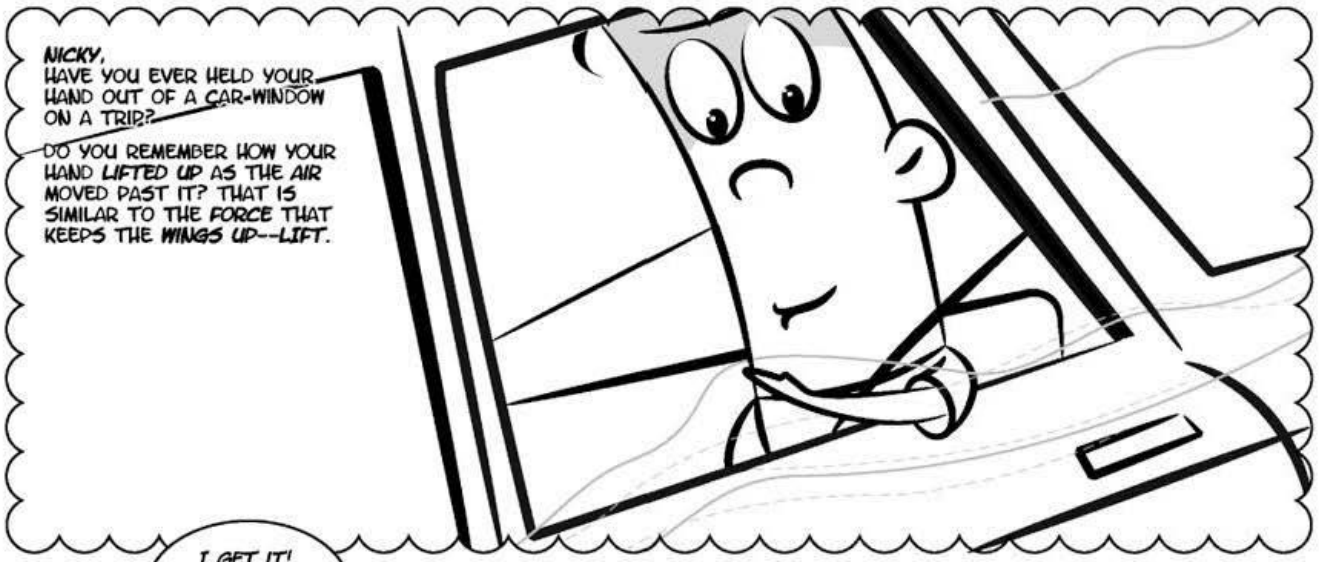

WELL, WE HAVE TO FLY. AND I'VE NEVER BEEN IN A PLANE BEFORE.
ARE YOU AFRAID TO FLY?
NO, NOT REALLY. I JUST WONDER: WHAT KEEPS THE PLANES UP?
THE WINGS DO!
YEAH, BUT WHAT KEEPS THE WINGS UP?
WELL, THE UH... THE WINGS STAY, UM...
SEE, YOU DON'T KNOW EITHER!
BUT I KNOW WHERE WE CAN FIND OUT! NASA LANGLEY RESEARCH CENTER! C'MON!

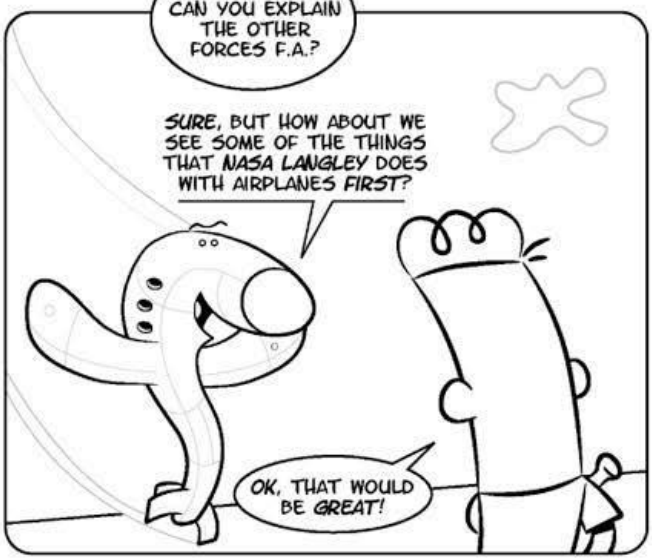

SHORTLY...
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
THERE'S A PLANE LANDING RIGHT THERE!
IT'S NASA'S 757 AIRBORNE LABORATORY!
WHAT'S THAT LITTLE PLANE FLYING RIGHT NEXT TO IT?
HEY, THAT'S F.A. PLANE! F.A.! OVER HERE!

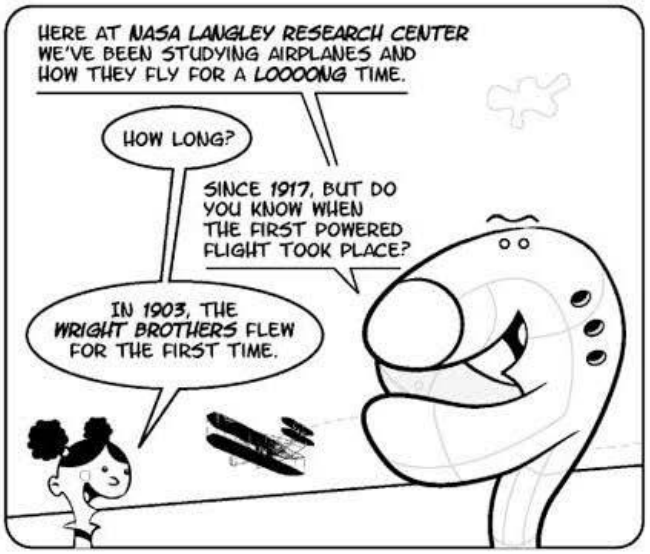

HEY ALEX!
F.A., THESE ARE MY FRIENDS NICKY AND KIM!
NICE TO MEET YOU!
WHAT KIND OF A NAME IS F.A.?!

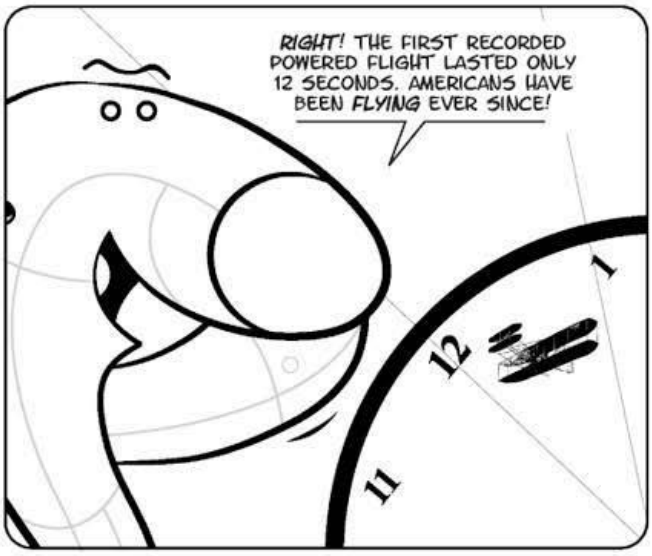

IT STANDS FOR "FLY A" PLANE, SO WHAT'S UP?
NICKY IS FLYING TO HAWAII NEXT WEEK AND WANTS TO KNOW HOW AIRPLANES FLY.
NICKY, SIMPLE PHYSICS KEEPS THE WINGS UP.
LET ME EXPLAIN.
THERE ARE FOUR BASIC FORCES THAT ACT ON PLANES IN FLIGHT. LIFT, WEIGHT, THRUST AND DRAG.

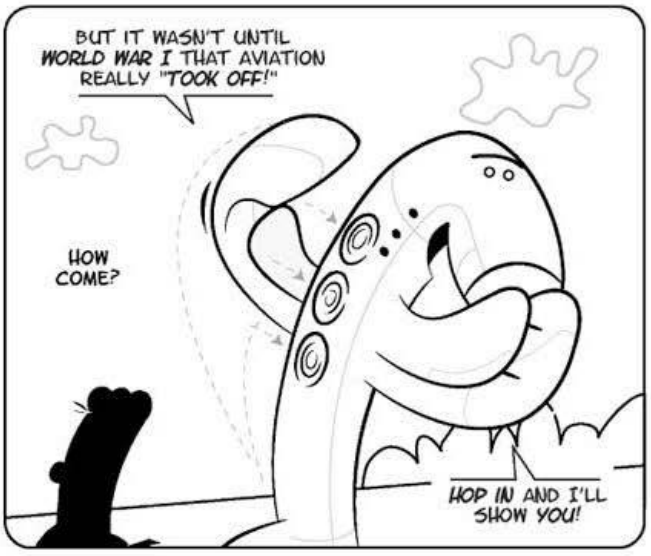

LIFT IS THE FORCE THAT RESULTS FROM AIR MOVING OVER THE WINGS.
THE WING SHAPE HAS A LOT TO DO WITH IT. WINGS ARE SHAPED TO CAUSE AIR TO MOVE FASTER OVER THE TOP. AS THE AIR MOVES FASTER, IT LOWERS THE AIR PRESSURE ON TOP OF THE WING.
UNDER THE WING, THE AIR PRESSURE IS GREATER, SO THE WING IS PUSHED UP BY AIR UNDERNEATH THE WING.
WEIGHT
LIFT
THRUST
DRAG
LIFT
IF THE AIR MOVES OVER THE WING FAST ENOUGH, THE WING LIFTS UP.

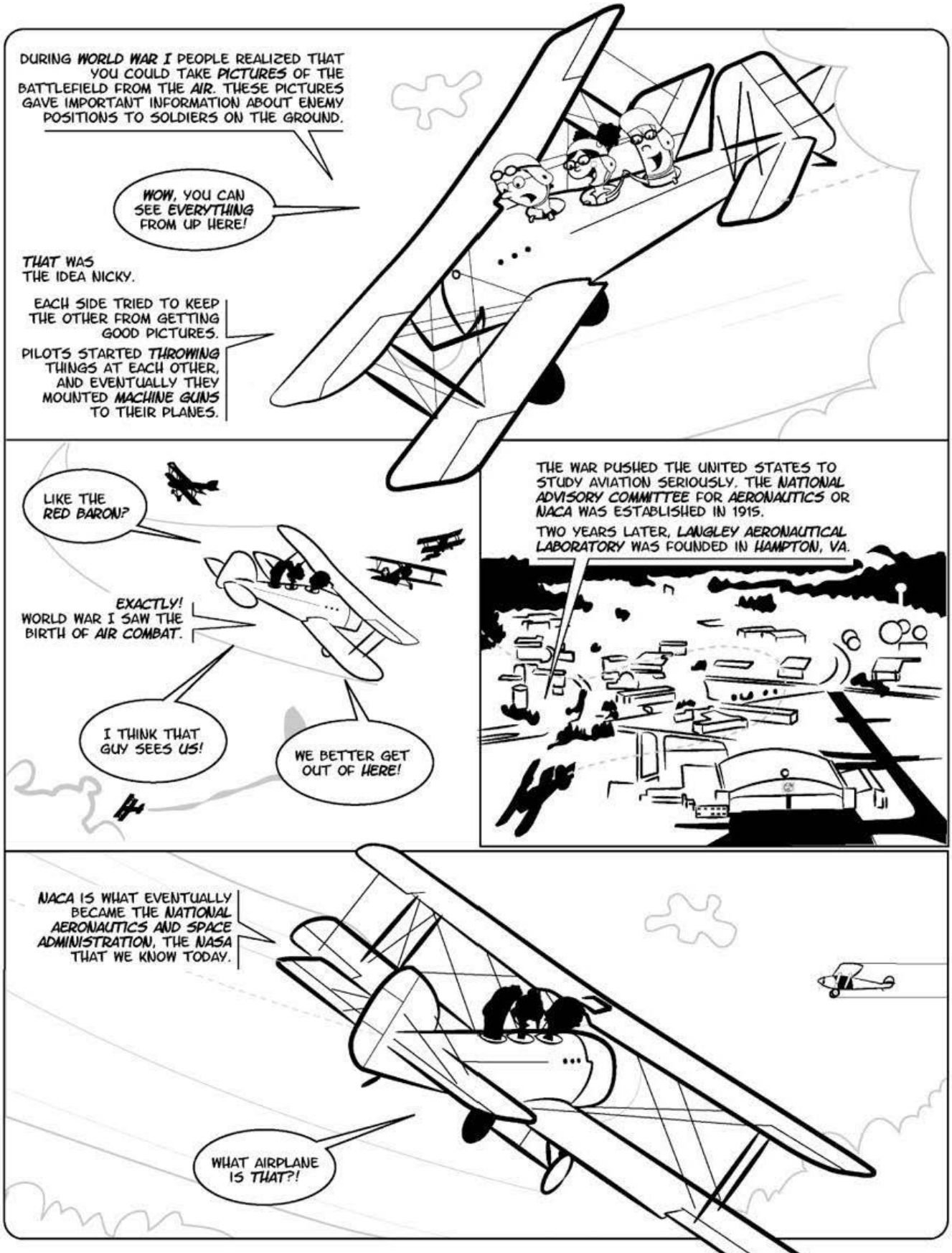

NICKY, HAVE YOU EVER HELD YOUR HAND OUT OF A CAR-WINDOW ON A TRIP?
DO YOU REMEMBER HOW YOUR HAND LIFTED UP AS THE AIR MOVED PAST IT? THAT IS SIMILAR TO THE FORCE THAT KEEPS THE WINGS UP--LIFT.

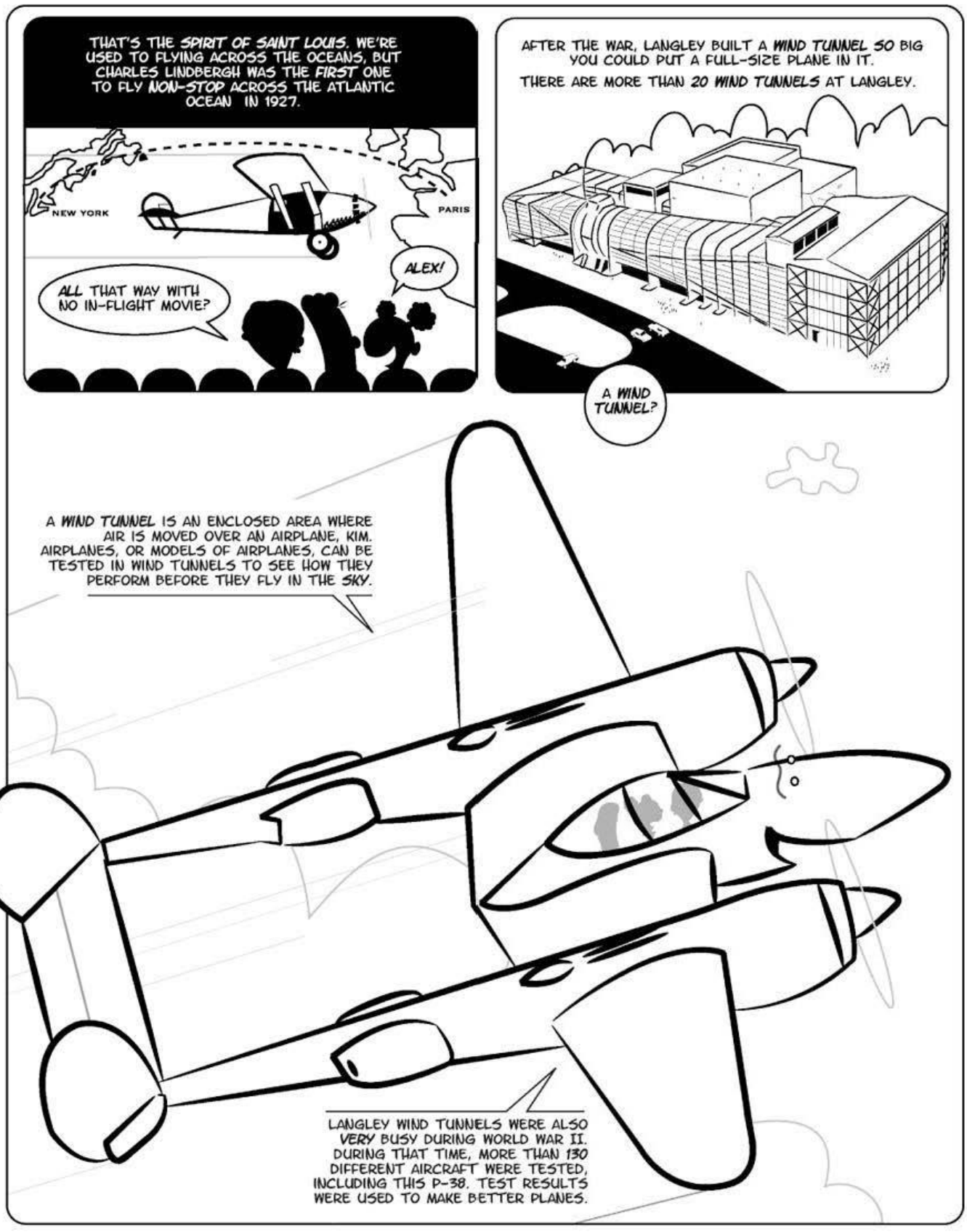

I GET IT! CAN YOU EXPLAIN THE OTHER FORCES F.A.?
SURE, BUT HOW ABOUT WE SEE SOME OF THE THINGS THAT NASA LANGLEY DOES WITH AIRPLANES FIRST?
OK, THAT WOULD BE GREAT!

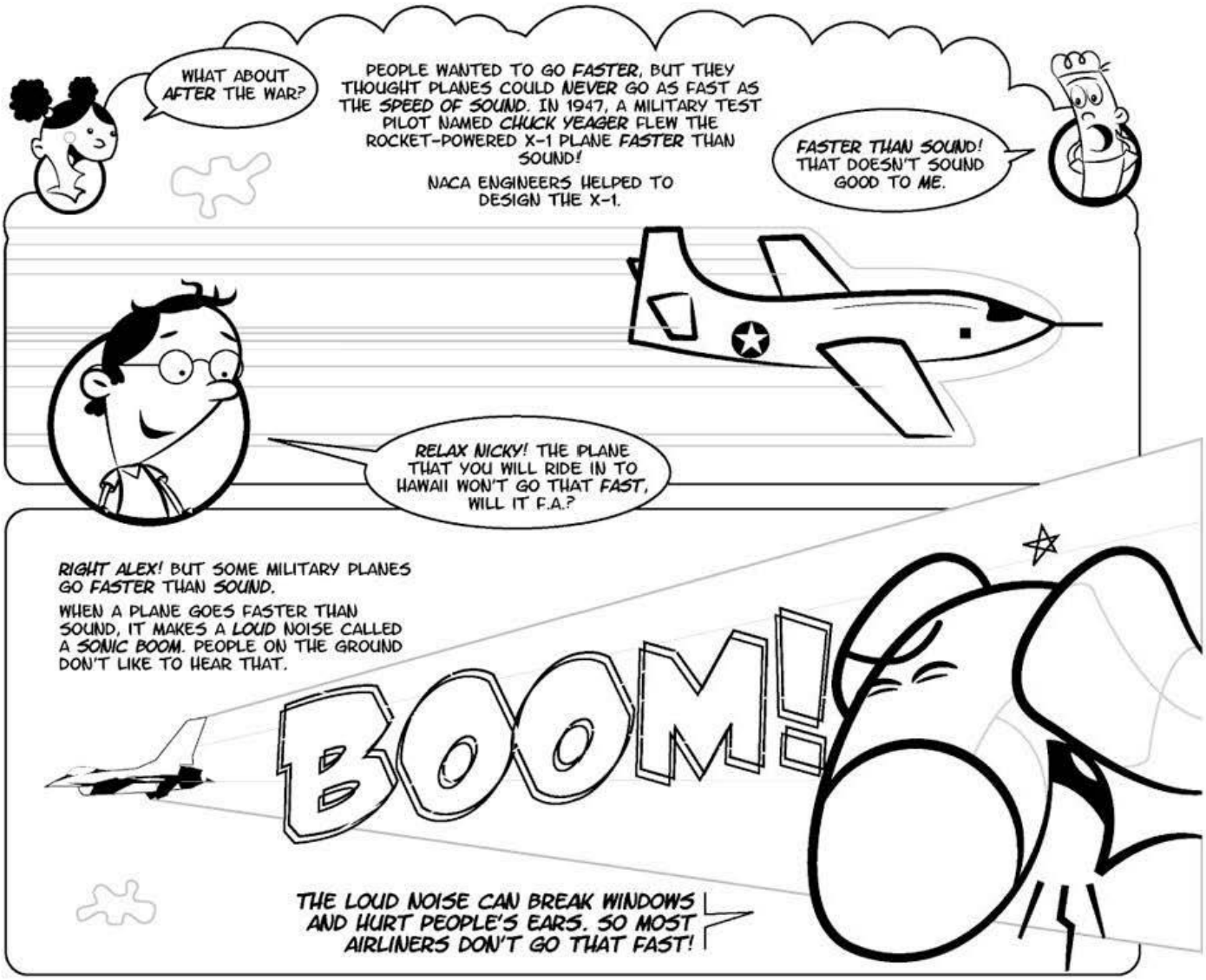

HERE AT NASA LANGLEY RESEARCH CENTER WE'VE BEEN STUDYING AIRPLANES AND HOW THEY FLY FOR A LOOOONG TIME.
HOW LONG?
SINCE 1917, BUT DO YOU KNOW WHEN THE FIRST POWERED FLIGHT TOOK PLACE?
IN 1903, THE WRIGHT BROTHERS FLEW FOR THE FIRST TIME.

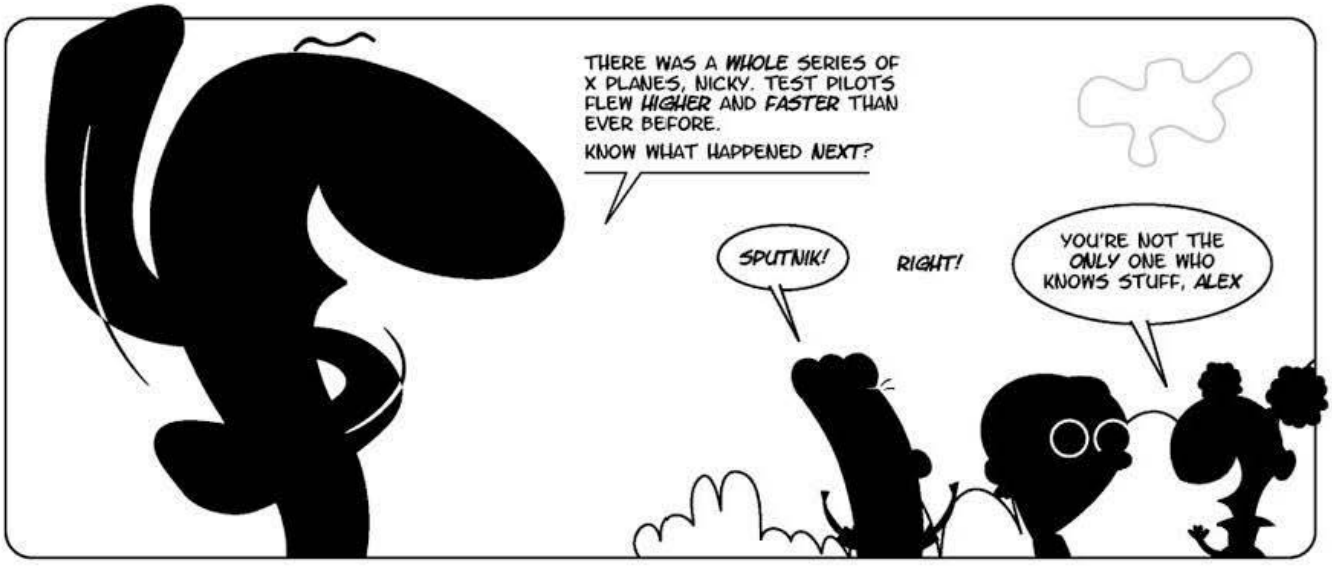

RIGHT! THE FIRST RECORDED POWERED FLIGHT LASTED ONLY 12 SECONDS. AMERICANS HAVE BEEN FLYING EVER SINCE!
12
1
11

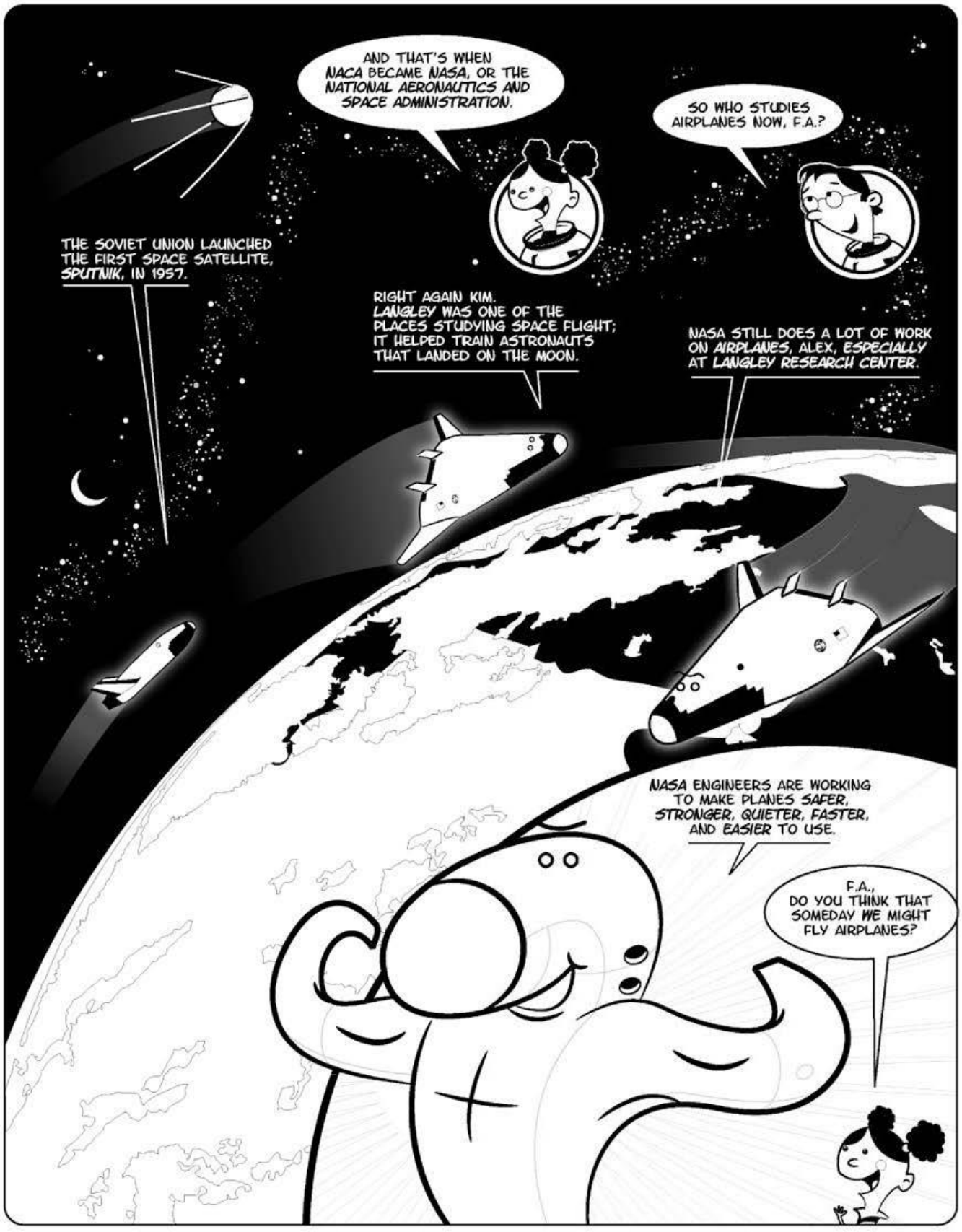

BUT IT WASN'T UNTIL WORLD WAR I THAT AVIATION REALLY "TOOK OFF!"
HOW COME?
HOP IN AND I'LL SHOW YOU!

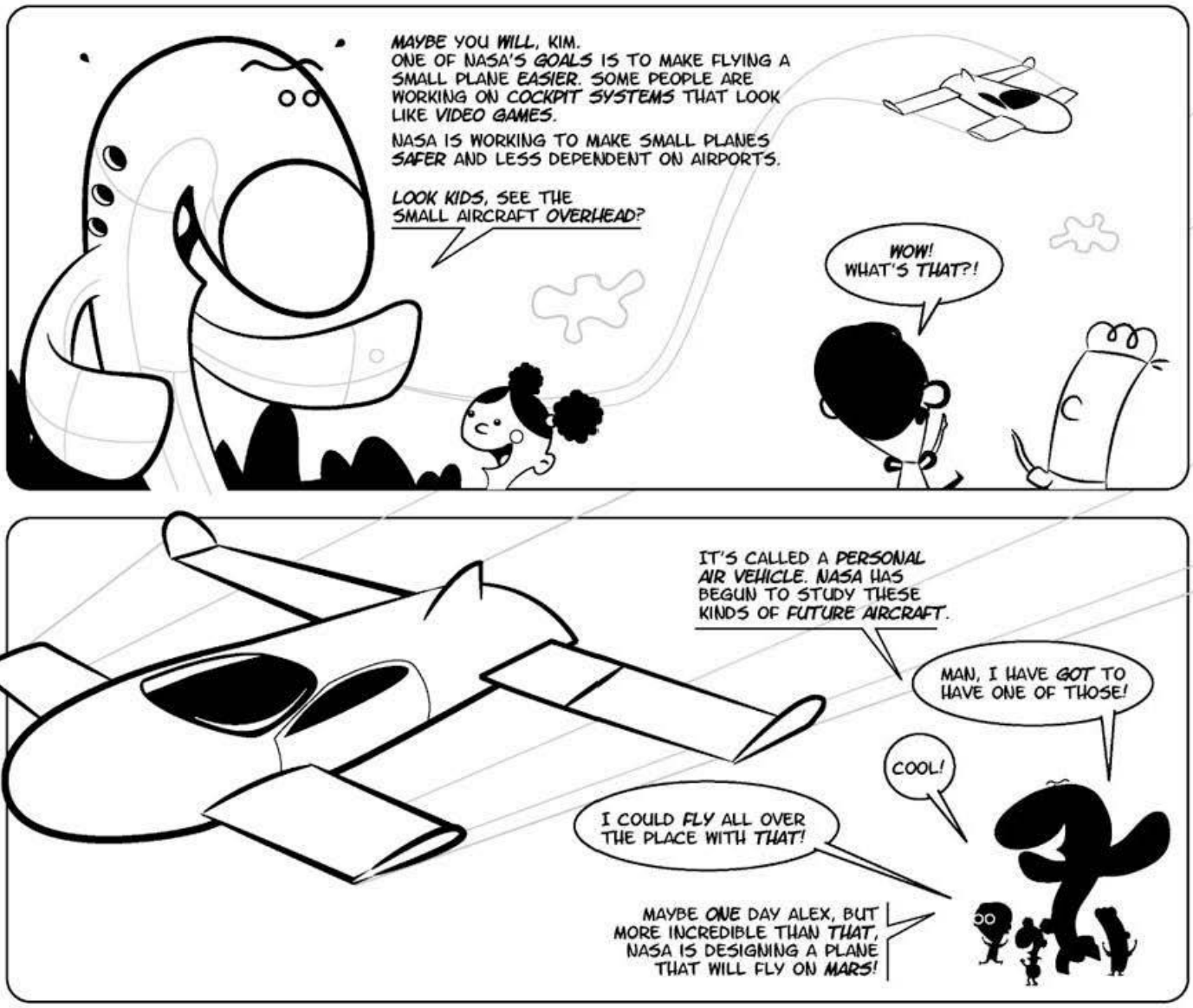

DURING WORLD WAR I PEOPLE REALIZED THAT YOU COULD TAKE PICTURES OF THE BATTLEFIELD FROM THE AIR. THESE PICTURES GAVE IMPORTANT INFORMATION ABOUT ENEMY POSITIONS TO SOLDIERS ON THE GROUND.
WOW, YOU CAN SEE EVERYTHING FROM UP HERE!
THAT WAS THE IDEA NICKY.
EACH SIDE TRIED TO KEEP THE OTHER FROM GETTING GOOD PICTURES.
PILOTS STARTED THROWING THINGS AT EACH OTHER, AND EVENTUALLY THEY MOUNTED MACHINE GUNS TO THEIR PLANES.
LIKE THE RED BARON?
EXACTLY! WORLD WAR I SAW THE BIRTH OF AIR COMBAT.
I THINK THAT GUY SEES US!
WE BETTER GET OUT OF HERE!
THE WAR PUSHED THE UNITED STATES TO STUDY AVIATION SERIOUSLY. THE NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS OR NACA WAS ESTABLISHED IN 1915.
TWO YEARS LATER, LANGLEY AERONAUTICAL LABORATORY WAS FOUNDED IN HAMPTON, VA.
NACA IS WHAT EVENTUALLY BECAME THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, THE NASA THAT WE KNOW TODAY.
WHAT AIRPLANE IS THAT?!

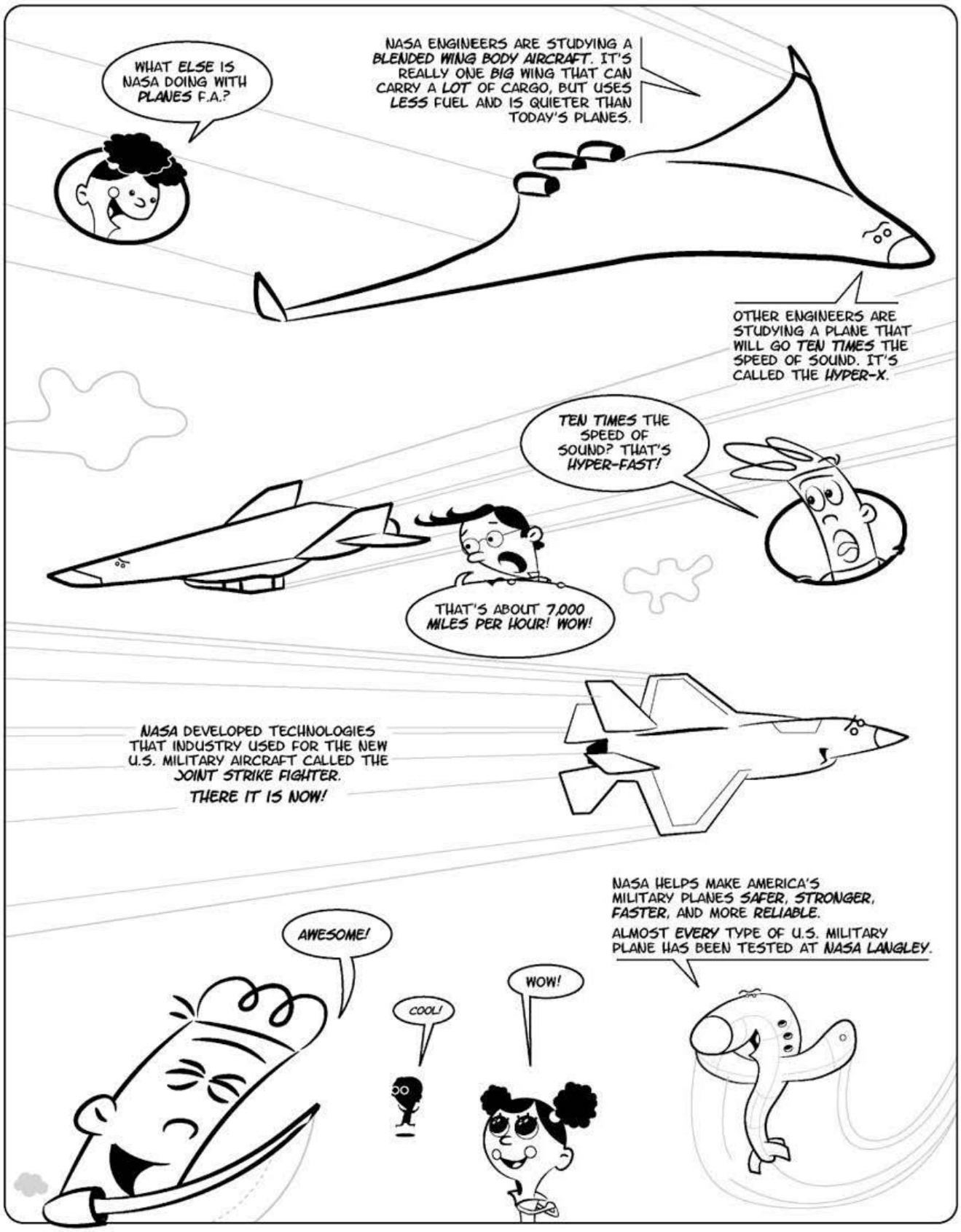

THAT'S THE SPIRIT OF SAINT LOUIS. WE'RE USED TO FLYING ACROSS THE OCEANS, BUT CHARLES LINDBERGH WAS THE FIRST ONE TO FLY NON-STOP ACROSS THE ATLANTIC OCEAN IN 1927.
NEW YORK
PARIS
ALL THAT WAY WITH NO IN-FLIGHT MOVIE?
ALEX!
AFTER THE WAR, LANGLEY BUILT A WIND TUNNEL SO BIG YOU COULD PUT A FULL-SIZE PLANE IN IT.
THERE ARE MORE THAN 20 WIND TUNNELS AT LANGLEY.
A WIND TUNNEL?
A WIND TUNNEL IS AN ENCLOSED AREA WHERE AIR IS MOVED OVER AN AIRPLANE, KIM. AIRPLANES, OR MODELS OF AIRPLANES, CAN BE TESTED IN WIND TUNNELS TO SEE HOW THEY PERFORM BEFORE THEY FLY IN THE SKY.
LANGLEY WIND TUNNELS WERE ALSO VERY BUSY DURING WORLD WAR II. DURING THAT TIME, MORE THAN 130 DIFFERENT AIRCRAFT WERE TESTED, INCLUDING THIS P-38. TEST RESULTS WERE USED TO MAKE BETTER PLANES.

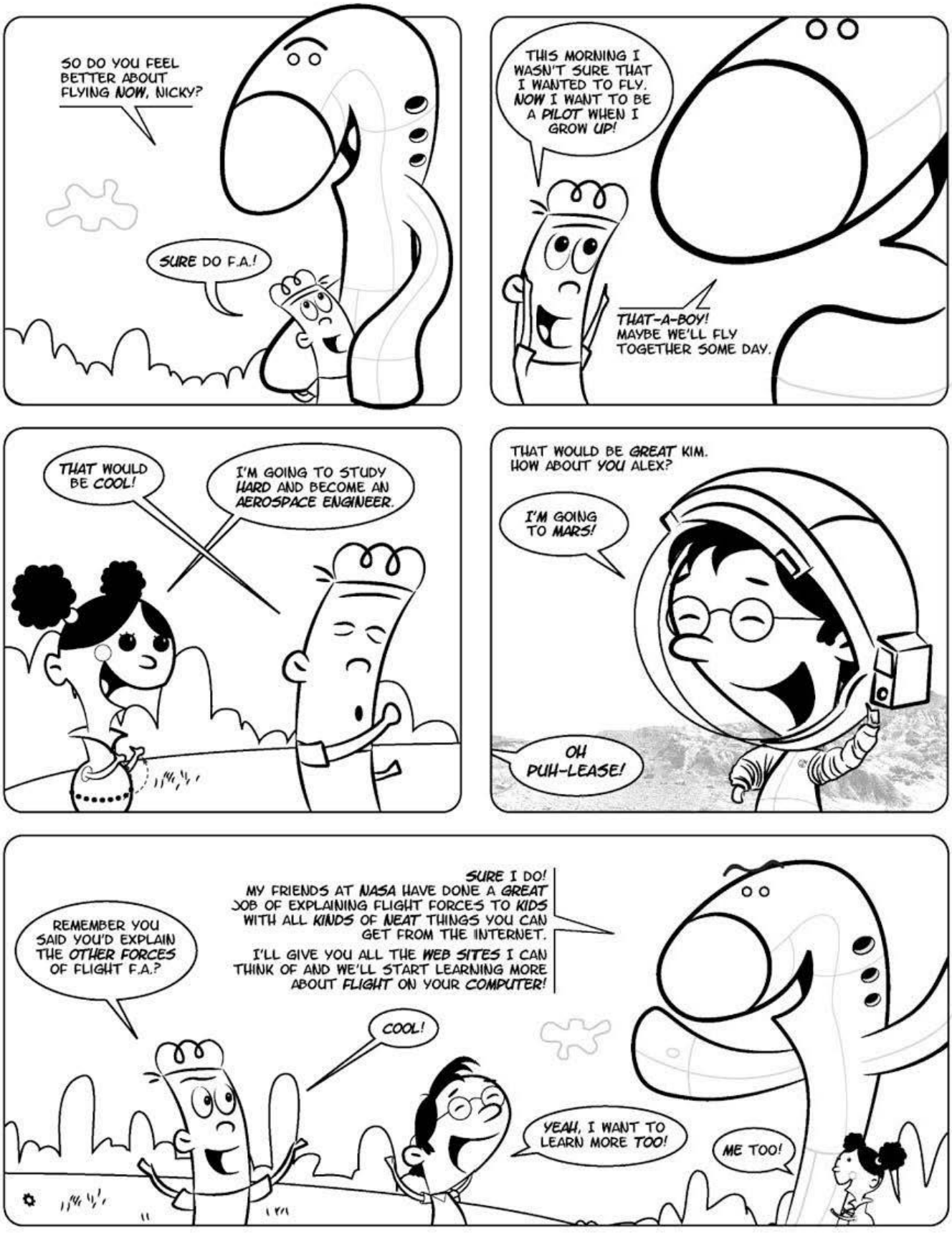

WHAT ABOUT AFTER THE WAR?
PEOPLE WANTED TO GO FASTER, BUT THEY THOUGHT PLANES COULD NEVER GO AS FAST AS THE SPEED OF SOUND. IN 1947, A MILITARY TEST PILOT NAMED CHUCK YEAGER FLEW THE ROCKET-POWERED X-1 PLANE FASTER THAN SOUND!
NACA ENGINEERS HELPED TO DESIGN THE X-1.
FASTER THAN SOUND! THAT DOESN'T SOUND GOOD TO ME.
RELAX NICKY! THE PLANE THAT YOU WILL RIDE IN TO HAWAII WON'T GO THAT FAST, WILL IT F.A.?
RIGHT ALEX! BUT SOME MILITARY PLANES GO FASTER THAN SOUND.
WHEN A PLANE GOES FASTER THAN SOUND, IT MAKES A LOUD NOISE CALLED A SONIC BOOM. PEOPLE ON THE GROUND DON'T LIKE TO HEAR THAT.
BOOM!
THE LOUD NOISE CAN BREAK WINDOWS AND HURT PEOPLE'S EARS. SO MOST AIRLINERS DON'T GO THAT FAST!


THERE WAS A WHOLE SERIES OF X PLANES, NICKY. TEST PILOTS FLEW HIGHER AND FASTER THAN EVER BEFORE.
KNOW WHAT HAPPENED NEXT?
SPUTNIK!
RIGHT!
YOU'RE NOT THE ONLY ONE WHO KNOWS STUFF, ALEX


THE SOVIET UNION LAUNCHED THE FIRST SPACE SATELLITE, SPUTNIK, IN 1957.
AND THAT'S WHEN NACA BECAME NASA, OR THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.
RIGHT AGAIN KIM. LANGLEY WAS ONE OF THE PLACES STUDYING SPACE FLIGHT; IT HELPED TRAIN ASTRONAUTS THAT LANDED ON THE MOON.
SO WHO STUDIES AIRPLANES NOW, F.A.?
NASA STILL DOES A LOT OF WORK ON AIRPLANES, ALEX, ESPECIALLY AT LANGLEY RESEARCH CENTER.
NASA ENGINEERS ARE WORKING TO MAKE PLANES SAFER, STRONGER, QUIETER, FASTER, AND EASIER TO USE.
F.A., DO YOU THINK THAT SOMEDAY WE MIGHT FLY AIRPLANES?


MAYBE YOU WILL, KIM.
ONE OF NASA'S GOALS IS TO MAKE FLYING A SMALL PLANE EASIER. SOME PEOPLE ARE WORKING ON COCKPIT SYSTEMS THAT LOOK LIKE VIDEO GAMES.
NASA IS WORKING TO MAKE SMALL PLANES SAFER AND LESS DEPENDENT ON AIRPORTS.
LOOK KIDS, SEE THE SMALL AIRCRAFT OVERHEAD?
WOW! WHAT'S THAT?!
IT'S CALLED A PERSONAL AIR VEHICLE. NASA HAS BEGUN TO STUDY THESE KINDS OF FUTURE AIRCRAFT.
MAN, I HAVE GOT TO HAVE ONE OF THOSE!
COOL!
I COULD FLY ALL OVER THE PLACE WITH THAT!
MAYBE ONE DAY ALEX, BUT MORE INCREDIBLE THAN THAT, NASA IS DESIGNING A PLANE THAT WILL FLY ON MARS!
YOU'RE JOKING, RIGHT?
NOPE.
NASA IS DESIGNING A PLANE THAT CAN BE PACKED INTO A SPACESHIP, SENT TO MARS, AND FLY THROUGH THE THIN ATMOSPHERE ON THE RED PLANET.
AMAZING!
I NEVER REALIZED THERE WAS SO MUCH GOING ON AT NASA.


WHAT ELSE IS NASA DOING WITH PLANES F.A.?
NASA ENGINEERS ARE STUDYING A BLENDED WING BODY AIRCRAFT. IT'S REALLY ONE BIG WING THAT CAN CARRY A LOT OF CARGO, BUT USES LESS FUEL AND IS QUIETER THAN TODAY'S PLANES.
OTHER ENGINEERS ARE STUDYING A PLANE THAT WILL GO TEN TIMES THE SPEED OF SOUND. IT'S CALLED THE HYPER-X.
TEN TIMES THE SPEED OF SOUND? THAT'S HYPER-FAST!
THAT'S ABOUT 7,000 MILES PER HOUR! WOW!
NASA DEVELOPED TECHNOLOGIES THAT INDUSTRY USED FOR THE NEW U.S. MILITARY AIRCRAFT CALLED THE JOINT STRIKE FIGHTER.
THERE IT IS NOW!
NASA HELPS MAKE AMERICA'S MILITARY PLANES SAFER, STRONGER, FASTER, AND MORE RELIABLE.
ALMOST EVERY TYPE OF U.S. MILITARY PLANE HAS BEEN TESTED AT NASA LANGLEY.
AWESOME!
COOL!
WOW!


SO DO YOU FEEL BETTER ABOUT FLYING NOW, NICKY?
SURE DO F.A.!
THIS MORNING I WASN'T SURE THAT I WANTED TO FLY. NOW I WANT TO BE A PILOT WHEN I GROW UP!
THAT-A-BOY! MAYBE WE'LL FLY TOGETHER SOME DAY.
THAT WOULD BE COOL!
I'M GOING TO STUDY HARD AND BECOME AN AEROSPACE ENGINEER.
THAT WOULD BE GREAT KIM. HOW ABOUT YOU ALEX?
I'M GOING TO MARS!
OH PUH-LEASE!
REMEMBER YOU SAID YOU'D EXPLAIN THE OTHER FORCES OF FLIGHT F.A.?
SURE I DO! MY FRIENDS AT NASA HAVE DONE A GREAT JOB OF EXPLAINING FLIGHT FORCES TO KIDS WITH ALL KINDS OF NEAT THINGS YOU CAN GET FROM THE INTERNET.
I'LL GIVE YOU ALL THE WEB SITES I CAN THINK OF AND WE'LL START LEARNING MORE ABOUT FLIGHT ON YOUR COMPUTER!
COOL!
YEAH, I WANT TO LEARN MORE TOO!
ME TOO!

NASA has many web sites that can help you to learn more about flight. Some are listed below and others can be found by doing a search on the web for the topic that interests you most!

Resources for Students and Educators of Grades K -12

Aerospace Technology Education Programs
http://www.aero-space.nasa.gov/edu/2aero.html

Aerospace Education Services Program (AESP)
http://www.okstate.edu/aesp/AESP.html

NASA Explorer Schools
http://www.nsta.org/explorerschools

NASA Student Involvement Program (NSIP)
http://www.nsip.net

NASA Explores
http://NASAexplores.com

NASA Educator Resource Network
http://spacelink.nasa.gov/ercn/

NASA Revolutionary Vehicles Student Competition
http://avst.larc.nasa.gov/competition.html

Other web sites that may interest all age groups

The NASA Home Page Address
http://www.nasa.gov

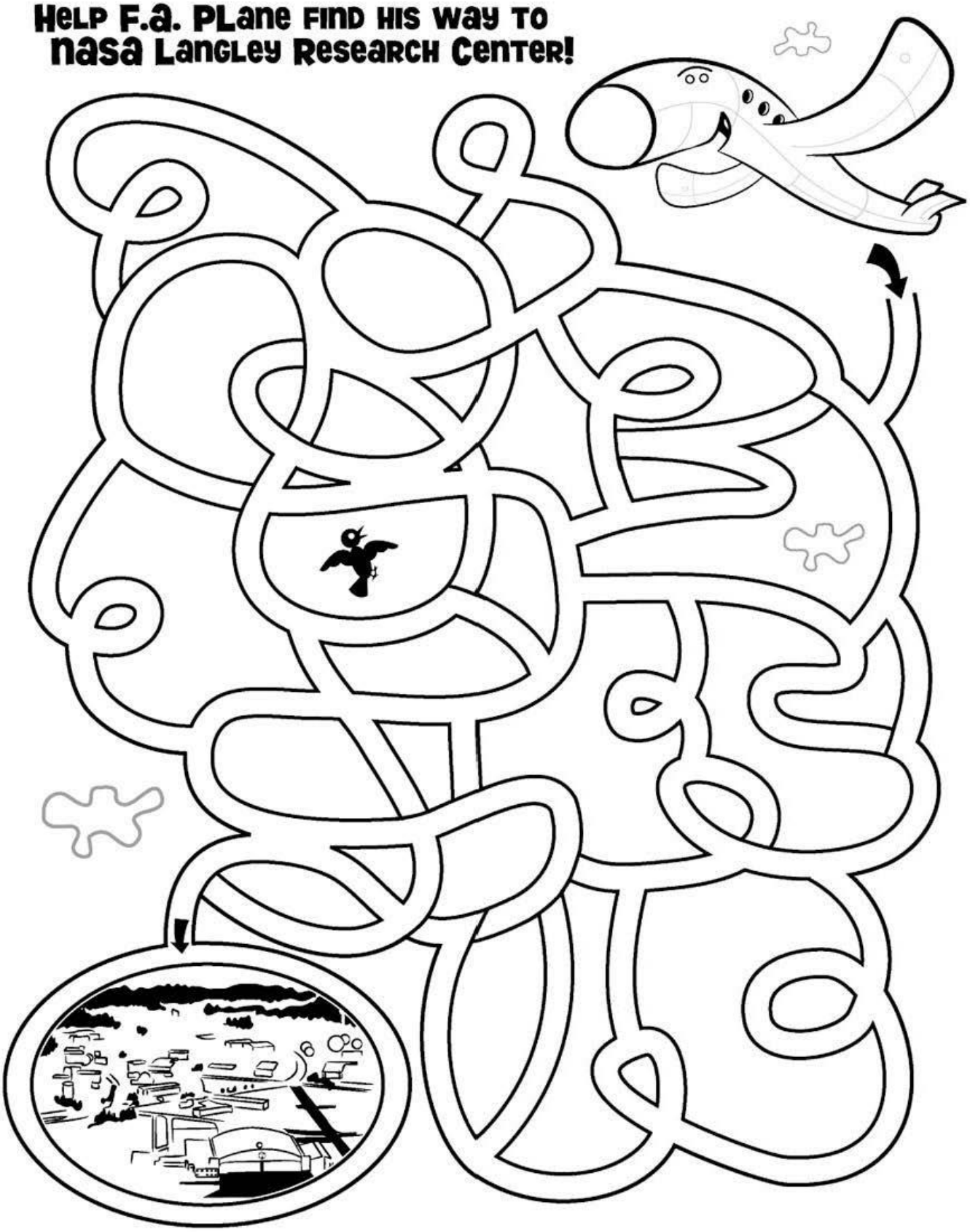
NASA's Education Home Page
http://education.nasa.gov

NASA Langley Research Center
http://www.larc.nasa.gov

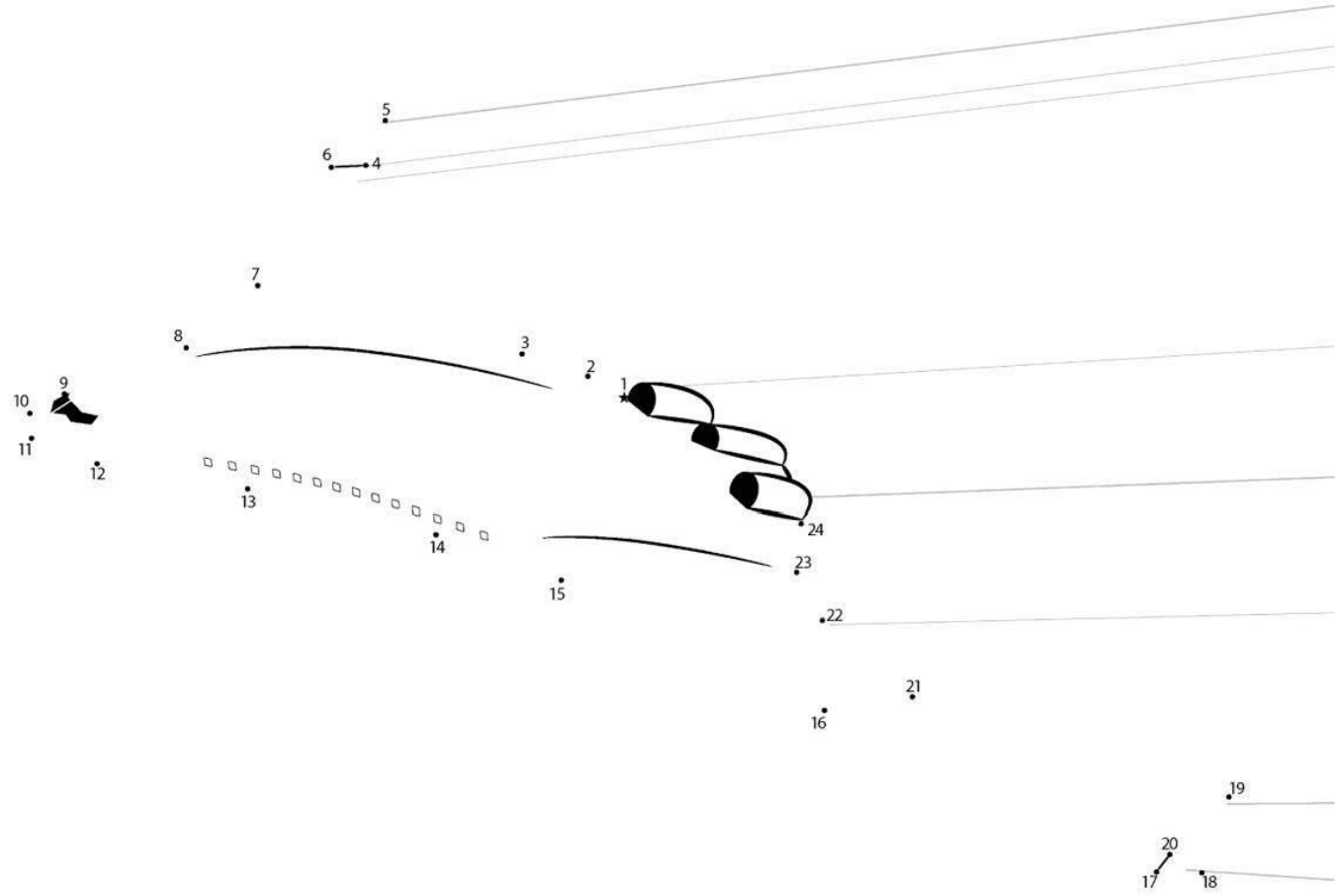
HEY KIDS! TURN THE PAGE FOR COLORING AND GAMES!

F.A. PLANE AND FRIENDS!

Help F.a. Plane find his way to nasa Langley Research Center!



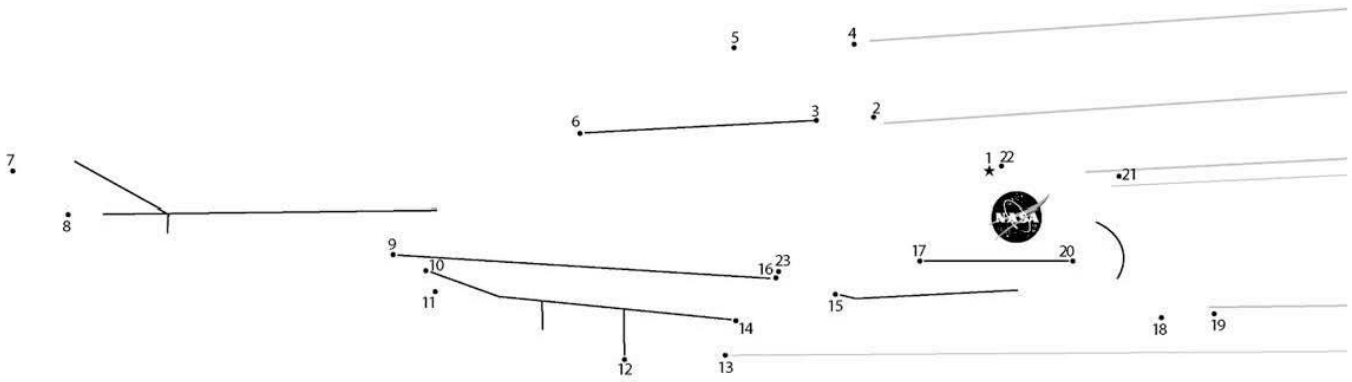

ALEX!



THE BLENDED-WING BODY AIRCRAFT

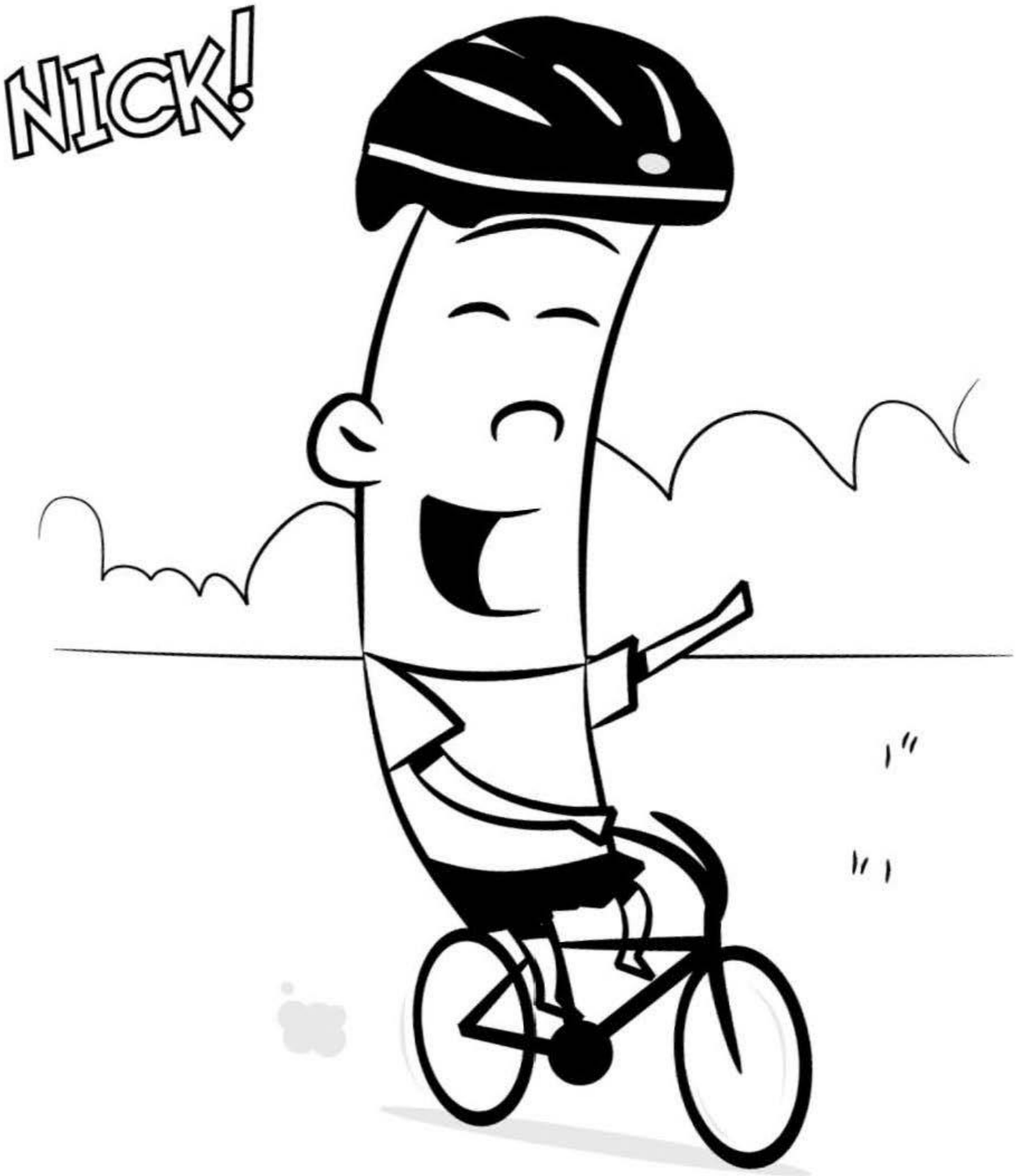
Follow the numbers to Connect the Dots!


KIM!



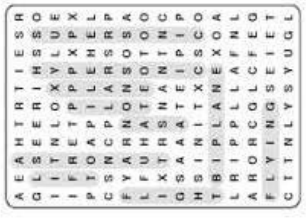
THE HYPER-X PLANE

Follow the numbers to Connect the Dots!


NICK!


WORD SEARCH!
Find the words below that have been hidden in the grid on the right!
FLYING
SUPERSONIC
FLIGHT
NASA
PILOT
HYPERSONIC
BIPLANE
LIFT
ASTRONAUT
XPLANE
A E A H T R T I E S R
G L S E E R I H S S O
I I T N L O X Y L U E
I F R E T P P P X P X
P T O A P I L E H E L
C S N C P L A R S R P
F Y A R N O N S O S A
L F U H A T E O T O O
I X T R S N A N T N C
G S A A A T E I P I P
H S I N I T X C S C O
T B I P L A N E X O A
L R I P P L L A F N L
A R O R C G L C F E G
F L Y I N G S E I E T
C T T N L Y S Y U G L

KEY:



STUDYING VOLUME

Objective: By the end of the session, students will:

- Learn about volume in general
- Explore how volume changes bases upon the shape of the container
- Work on prediction in their scientific reasoning

Time Needed: 20-30 minutes

Items Needed: Large container for collecting spills, rice, and various glass and/or plastic containers

Instructions:

- Making predictions and testing them is an important process skill for youth.
- Creating a space for students to make estimates about what container will hold the most to the least is a great simple start.
- Students can test their hypothesis by adding rice to the containers to see which holds the most.
- Students should keep their predictions written on the board or a piece of chart paper to show the predictions vs the actual
- Discuss the uniqueness about volume and why the eye can be deceiving.

Voice/Choice/Leadership:

- Students could choose to find another way to research volume
- Students can have a voice about what other aspects of math to explore in the coming weeks

Resources:
http://littlebinsforlittlehands.com/volume-science-experiment-stem-activity/

MAKING ASTRONAUTS SAFE

Objective: By the end of the session, students will:

- Learn about Astronauts and their space suits
- Demonstrate their understanding and research in a variety of ways

Time Needed: 20 minutes

Items Needed: Show video clip of space travel or walking on the moon and review Space Suit details.

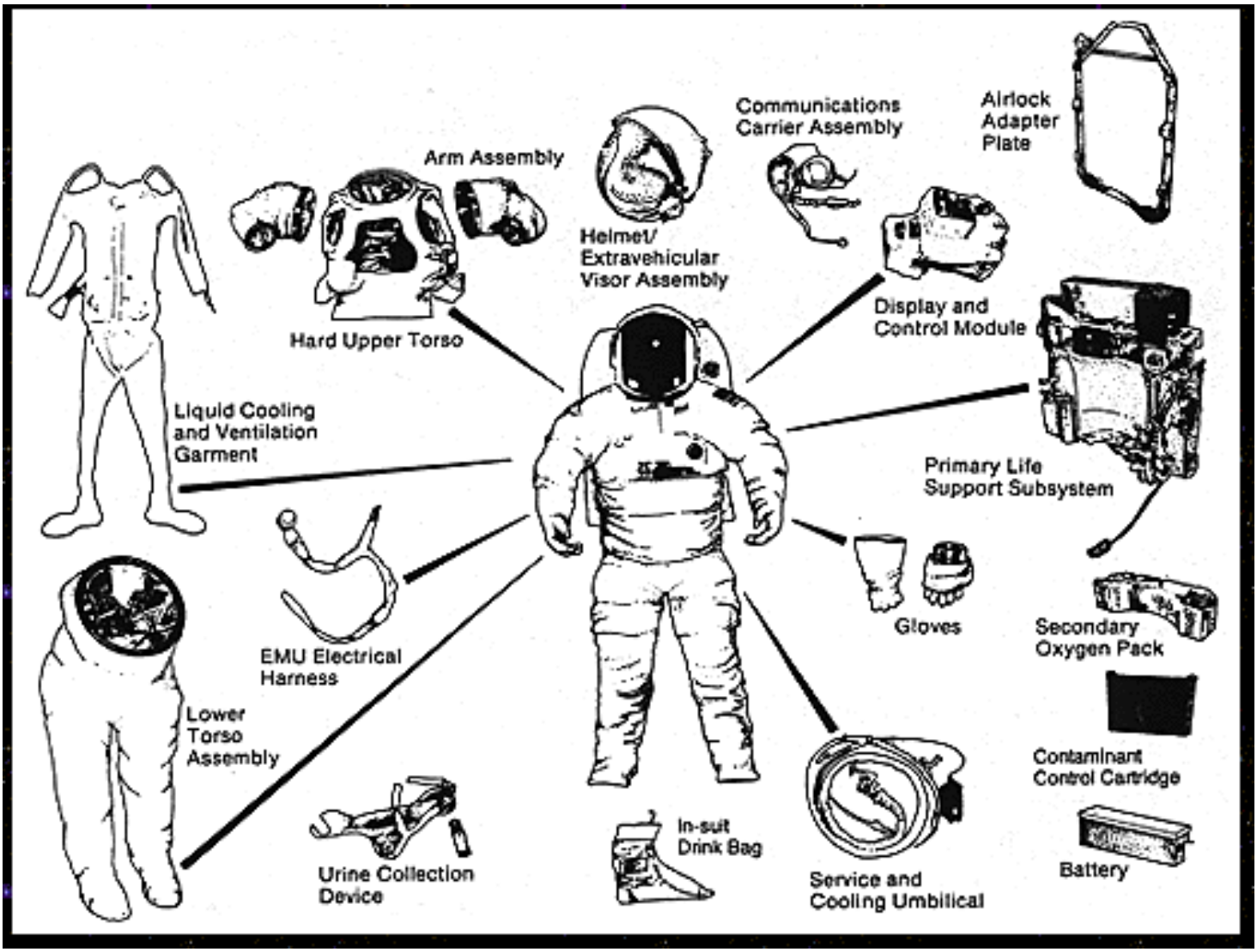
Instructions:

- This is a simple project to help begin the process of studying space.
- Understanding the space suit teaches what forces of nature astronauts are trying to combat.
- Stop often to discuss why and how certain elements were invented on the suit.
- Utilize the internet for more information on the suits specifically and show scenes of astronauts utilizing the suits as a lesson starter.

Voice/Choice/Leadership:

- Students could choose to find another way to research the suit and its components
- Parent/guardian could make a quiz game about the material

Resources: www.nasa.gov



Source: https://starchild.gsfc.nasa.gov/docs/StarChild/space_level2/spacesuit.html

SPACE CAREERS SHOWCASE

Objective: By the end of the session, students will:

- Learn about future possibilities
- Learn about current and future careers in the space industry
- Expand their thinking of their own future potential

Time Needed: 30-45 minutes

Items Needed: Website to be shown to all students, art paper, and art supplies

Instructions:

- Read through the list of careers for someone in space. What options are there for those that love space? What are the skills they would need?
- What other jobs might be needed for the space exploration industry?
- Have students draw pictures of themselves working in the space industry
- Have students display their work in a gallery
- Discuss with the students after which ones they liked or had not previously thought about.

Voice/Choice/Leadership:

- Students could choose to find another way to research the future
- Students can choose which elements of the future to represent in their picture
- Students can have a voice about how that will be displayed and communicated

Resource: https://successatschool.org/advicedetails/262/Jobs-in-space-that-are-out-of-this-world

CLEAN WATER

Objective: By the end of the session, students will:

- Learn about how important water is to our body's health
- Learn some processes for filtering water
- Become aware of the need for more clean water in our community and the world

Time Needed: 15-20 minutes

Items Needed: 2 Fruits for example (one fresh and one dried) and a way to display an internet video to the student

Instructions:

- Show the group a fresh fruit and then a "dried up" version of that fruit. (i.e. grape and raisin or plum and prune or banana and dried banana)
- Discuss the differences that they see or note.
- Make sure to work in the term "hydration" * Watch the clip found at https://www.youtube.com/watch?v=goKCOAijWTo
- Discuss the signs of a body not getting enough water.
- Discuss the need for clean water and where they may be people or groups that do not get the water that there body needs.

Voice/Choice/Leadership:

- Students can choose the fruit for the lesson
- Students can do prior research on the health benefits of drinking water
- Students can chart/track their water intake

Resource: https://www.healthyactivekids.com.au

KICK THE CAN!

Objective: By the end of the session, students will:

- Engage in outdoor play and physical activity
- Play a game that encourages fairness, trust, and social responsibility
- Enjoy physical play to engage in a healthy heart and body

Time Needed: 20 minutes

Items Needed: Empty soda can filled with rocks/pebbles and ample outdoor space.

Instructions:

- Fill a coffee can with pebbles and put it on the ground next to the player you have chosen to be "It."
- The student who is "It" closes her eyes and counts to 100, while everyone else spreads out over a wide area to hide.
- When "It" finishes counting, she leaves the can and goes to look for the other players.
- When she spots another player, she must tag him before he can run back and kick the can.
- If he manages to kick the can, he is safe.

Voice/Choice/Leadership:

- Students can choose to work with a different version of tag or form of physical activity
- Students could choose obstacles/rules for the activity to make it more challenging.
- Students could lead in a discussion of the reflection of the activity (How did your body feel after? Was it fun? Is it easier or harder to "work out" when you are having fun playing?)

Resource: Scholastica Activities & Printables

TRAIN LIKE AN ASTRONAUT OBSTACLE

Objective: By the end of the session, students will:

- Learn about what it takes to become an astronaut
- Aspire vocationally to dream bigger than their current situations
- Utilize and develop more appreciation for their literacy skills
- Utilize game play to have increased physical activity

Time Needed: 30 minutes

Items Needed: AstronautObstacle.pdf, cones and open space

Instructions:

- Use the handout to help kids better understand the activity.
- Help facilitate students in their understanding that their activity and practice have great impact on their muscles, brain, and heart.
- Utilize vocabulary terms from the mission like "agility," "coordination," and "speed."

Voice/Choice/Leadership:

- Students could create a game or obstacle course of their own to work on agility
- Leaders could write to NASA to have a guest speaker discuss the importance of physical activity for future astronauts.
- Leaders could document the activity and training in written, picture, or video form.

Resource: Mission Handout: Agility Astro Course

MISSION X: MISSION HANDOUT

YOUR MISSION: Agility Astro-Course

You will complete an agility course as quickly and as accurately as possible to improve agility, coordination and speed. After you have completed the Astro-Course and recorded your times, you will comment on your agility during this physical experience on your Mission Journal.

Agility requires quickness, strength, and good balance and coordination. Walking up and down stairs, hiking outdoors and playing tag are some daily activities that require agility.

Mission Question: How can you perform a physical activity that will improve your agility, coordination, and speed?

MISSION ASSIGNMENT: Agility Training

Follow the directions listed below to complete the Agility Astro-Course. A warm-up/stretching and cool-down period is always recommended.

- ◯ Lie face-down on the ground at the starting point.
- ◯ When time starts, jump to your feet and run the course to the finish following these criteria.
  - Complete the course as quickly as possible.
  - Do not touch or knock over any cones.
  - Touching or knocking over a cone is a 2 second penalty added to your completed time for each cone infraction.
- ◯ Record your final time on your Mission Journal.
- ◯ Record any penalties that occurred on your Mission Journal.
- ◯ Rest at least one minute.
- ◯ Return to the line, repeat the Astro-Course at least three times, following the same directions as the first time. Continue to practice improving your movements, accuracy and time.

- ◯ Record observations about this activity before and after this physical experience in your Mission Journal.

Follow these instructions to train like an astronaut.

Improving agility makes it easier for you to move around objects quickly and safely. By improving your movements and time on the Agility Astro-Course, you may find it is easier to change directions while moving or running and keep your balance instead of falling over or bumping into other people or objects.

It's a Space Fact:

Astronauts practice strength and agility through training exercises designed by NASA Astronaut Strength, Conditioning & Rehabilitation Specialists (ASCR). These fitness specialists conduct an annual fitness test, design individual exercise programs, and provide one-on-one pre-flight and post-flight conditioning activities for the astronauts. The agility we use every day on Earth is different from the agility used in space. Being in space over a period of time can affect astronaut's agility. This is observed once the astronauts return to Earth. Due to the astronauts living in microgravity environment and not using their muscles as they do on Earth, their muscles weaken. After they return from a long duration mission, astronauts work with ASCRs to restore and maintain agility as before their spaceflight mission.

Fitness Acceleration

- Using the same set up as the Agility Astro-Course, move the cones to make the agility course larger. One may also add more cones to increase the agility factor. One may also reduce the area of the Agility Astro-Course by using less cones. Is this course more difficult to complete?
- Immediately before engaging in the Agility Astro-Course, do jumping jacks for 30 seconds. Compare this time to the times for the first three trials. Did your time increase or decrease? Explain.
- Change the environment in which the Agility Astro-Course is performed (i.e. inside to outside).
- Decrease the rest time between trials.

Think Safety!

Researchers and ASCRs working with the astronauts must make sure they have a safe environment in which to practice so the astronauts are not injured.

- A warm-up and cool-down period is always recommended.
- Avoid obstacles, hazards, and uneven surfaces.
- Wear appropriate clothes and shoes that allow you to move freely and comfortably.
- Drink plenty of water before, during, and after physical activities.

Agility:
The ability to quickly and easily move your body.

Coordination:
Using your muscles together to move your body.

Mission Explorations:

- Stand on one leg. Wave your arms and other leg about and still try to keep your balance.
- Participate in a field sport such as soccer or a racket sport such as tennis.
- Take part in a relay race with other pairs of students.
  - Stand beside your partner.
  - Using a scarf or bandana, tie you and your partner's legs that are nearest to each other together at the ankle.
  - Race a measured distant to the finish line.
- Participate in sack races.
  - Step into a sack made of burlap, pulling it over your feet and up around your waist.
  - Hold the sack in place, and race against other students by hopping to the finish line.

Status Check: Have you updated your Mission Journal?

CLEAN WATER PROJECT

Ages 5-12

Objective: By the end of the session, students will:

- Learn some processes for filtering water
- Become aware of the need for more clean water in our community and the world

Items Needed: Way to display the internet

Instructions:

- Show students the video found at: https://thewaterproject.org/thewaterchallenge
- Discuss what the video tells us about water around the world
- Discuss how students can make a difference in their daily routines

Voice/Choice/Leadership:

- Students can choose to share what they learn with family members

Resource: https://thewaterproject.org/