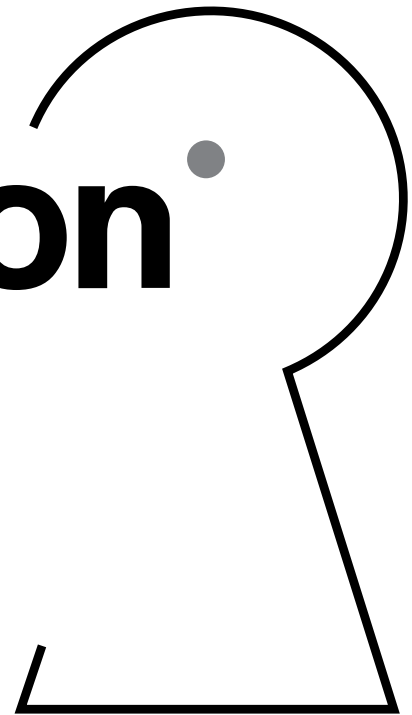
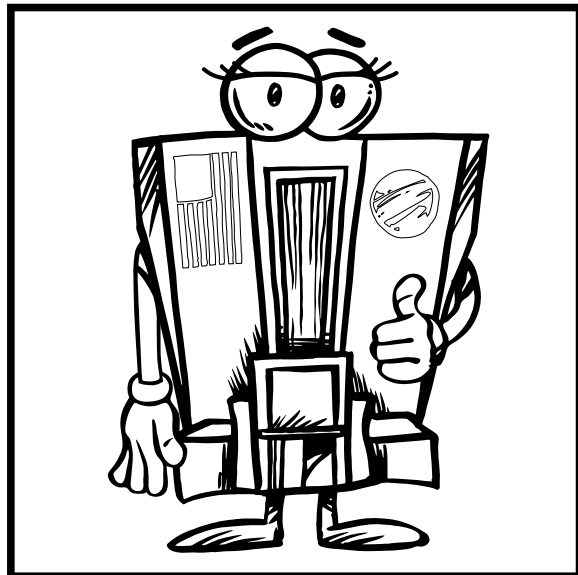
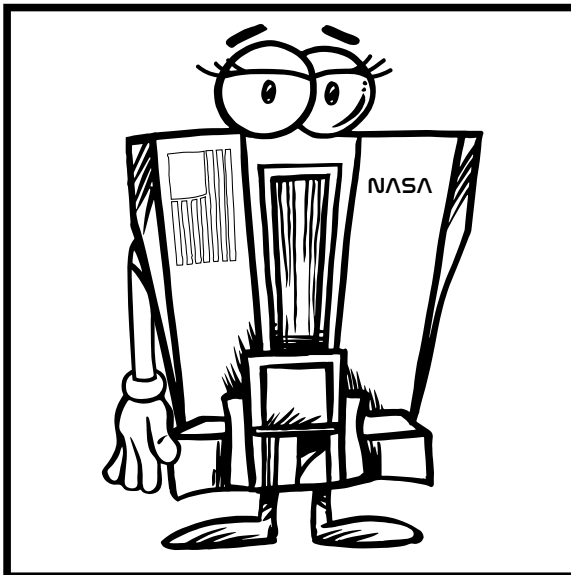
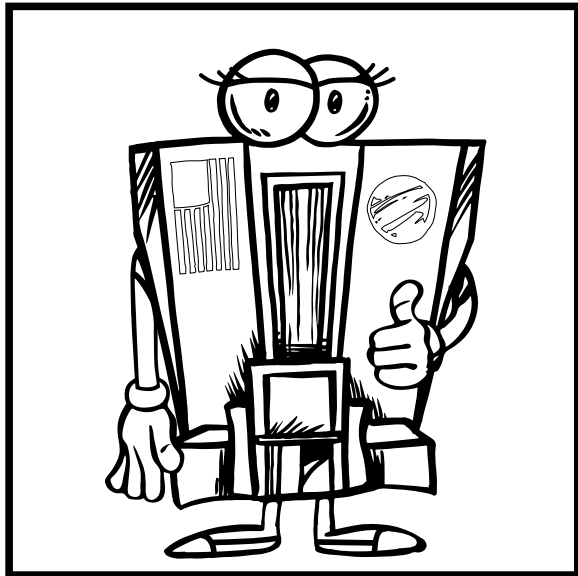
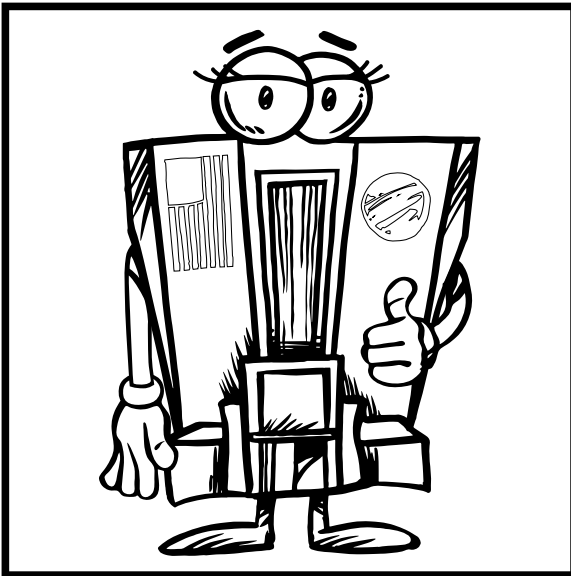


COLORING COMMAND

Exploration Ground Systems



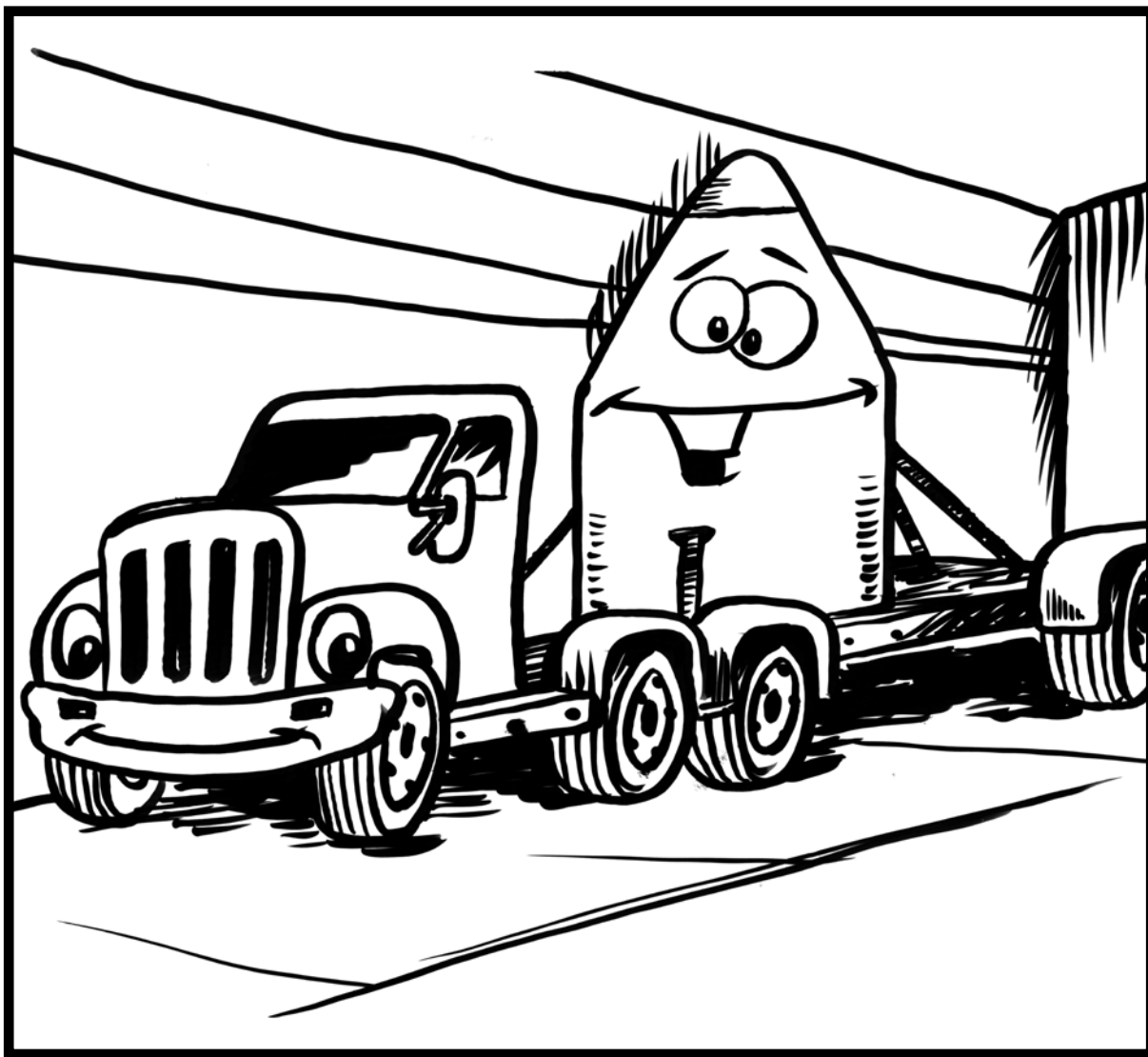
ACTIVITY CENTRAL
**SPOT THE
VAB-ULOUS TWINS**



BE A GOOD JUDGE OF CHARACTER

There are four images of VAB-ulous shown above, but only two are identical. Using your powers of deduction, circle or color the two pictures that share the same appearance.

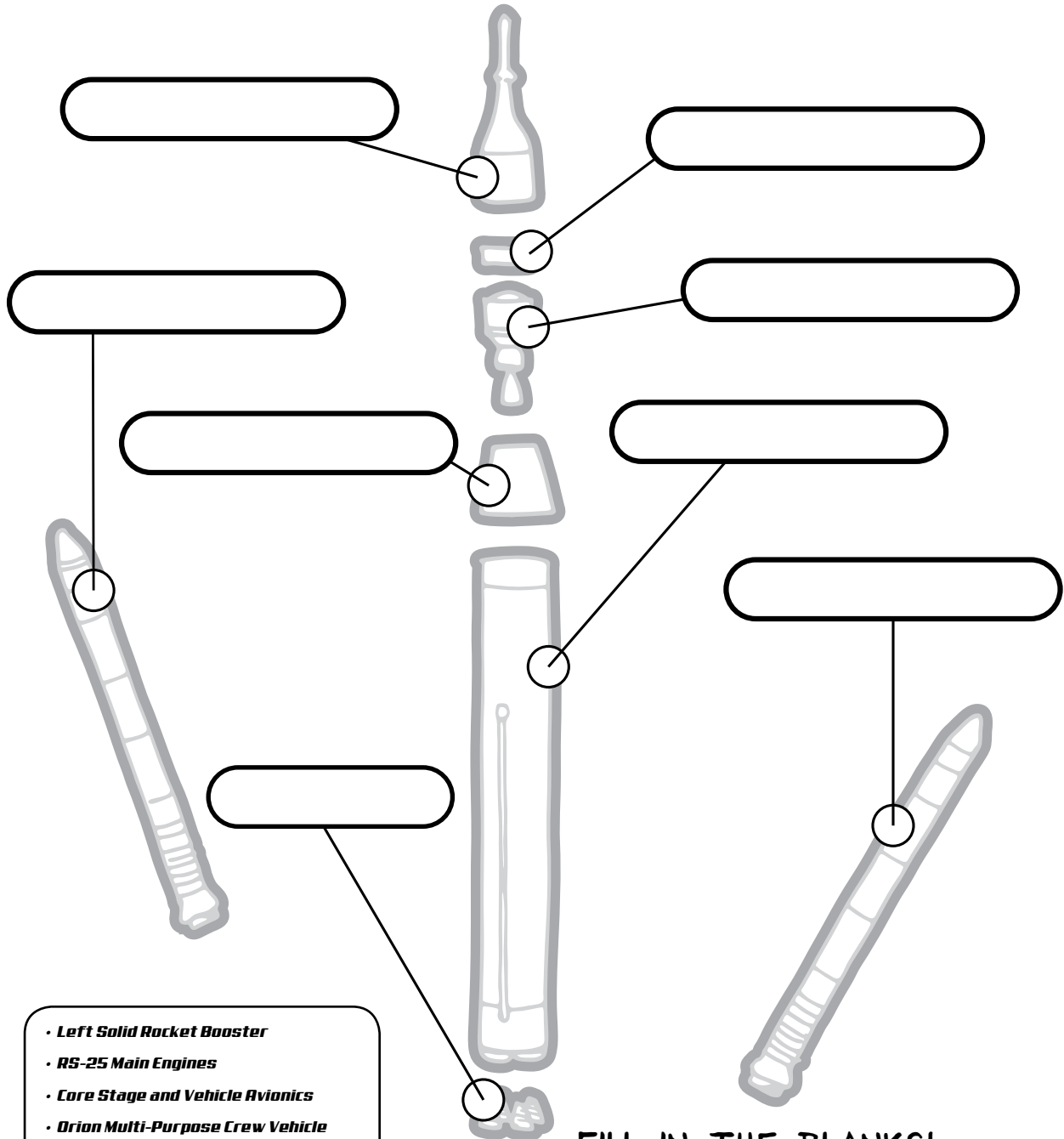
COLORING COMMAND
HAULING & PROCESSING



Rocket parts are shipped from all over the country to the launch site by truck, train, and a type of boat called a barge.

ACTIVITY CENTRAL

PRE LAUNCH LABELS



- **Left Solid Rocket Booster**
- **RS-25 Main Engines**
- **Core Stage and Vehicle Avionics**
- **Orion Multi-Purpose Crew Vehicle**
- **Launch Vehicle Stage Adapter**
- **Orion Stage Adapter**
- **Interim Cryogenic Propulsion Stage**
- **Right Solid Rocket Booster**

FILL IN THE BLANKS!

The list to the left contains the component labels for each part of the rocket shown above. Using your "Thinking Cap," select the names in the list and write them in their appropriate spaces.

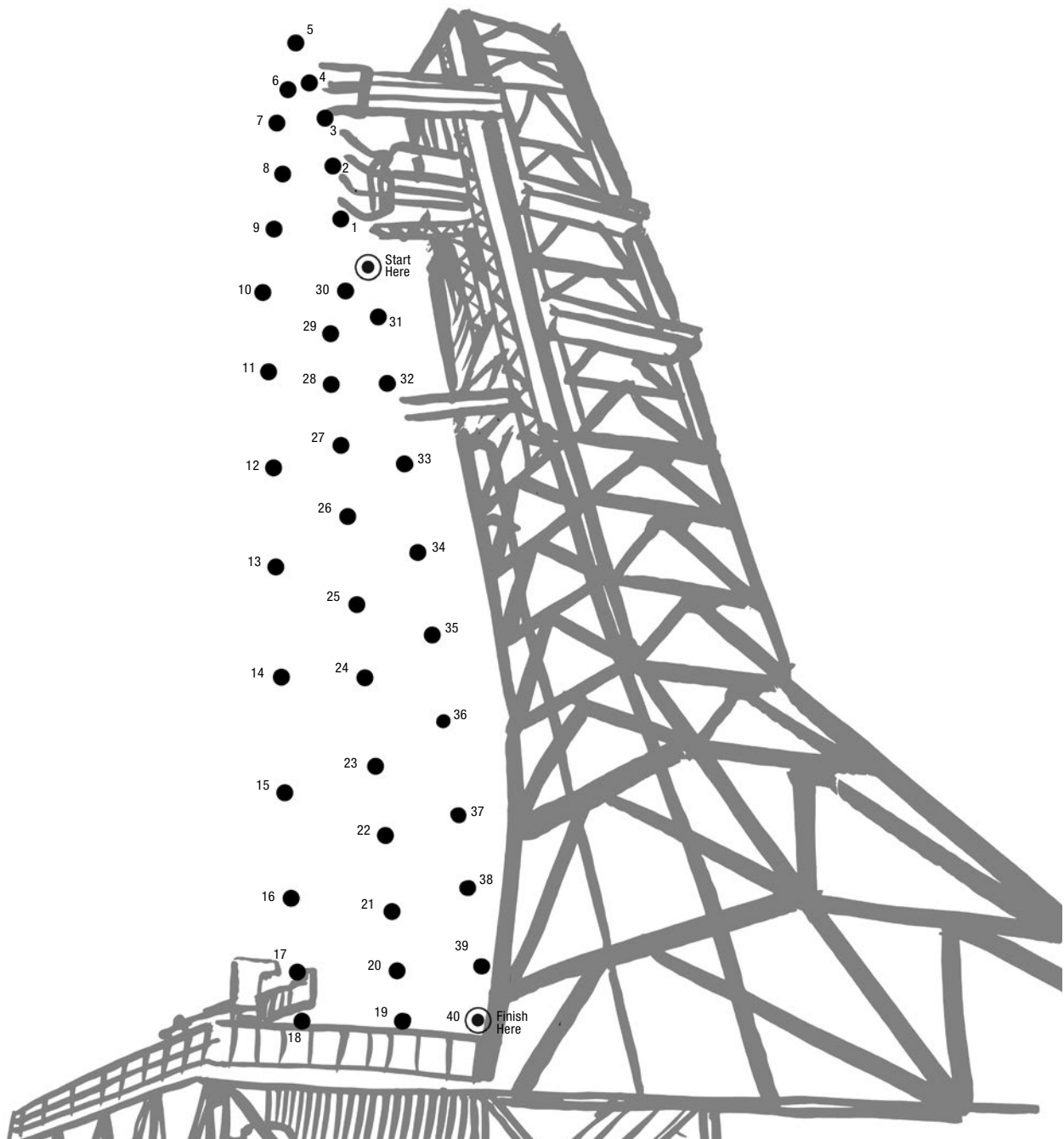
COLORING COMMAND
STACKING COMPONENTS



Large sections of the rocket are assembled in a building that is 52 stories tall. Each section of the rocket is lifted into place by a 325-ton crane. One ton is equal to 2,000 pounds.

ACTIVITY CENTRAL

CONNECT to the TOWER



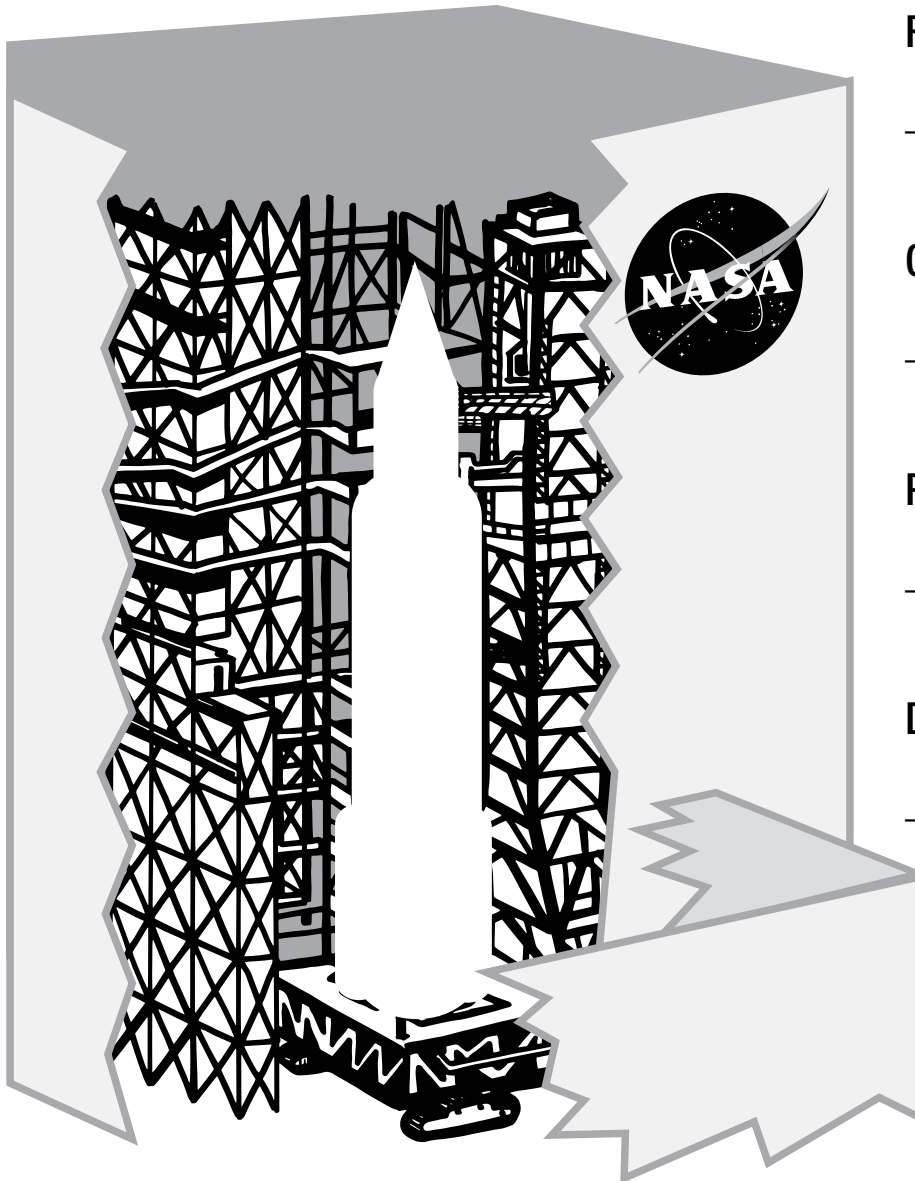
In order to learn what is attached to the mobile launcher, you must first "Connect the Dots." Using a writing tool, begin with #1 and draw lines to each number that follows until you reach #40. When complete you should be able to see what is preparing to lift off.

ESTABLISH A CONNECTION!

COLORING COMMAND

DESIGN YOUR ROCKET

Design and color a picture of your rocket in the white area on the mobile launch platform inside the Vehicle Assembly Building (VAB) below.



Rocket name:

Commander:

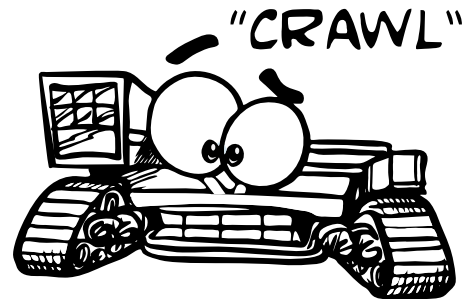
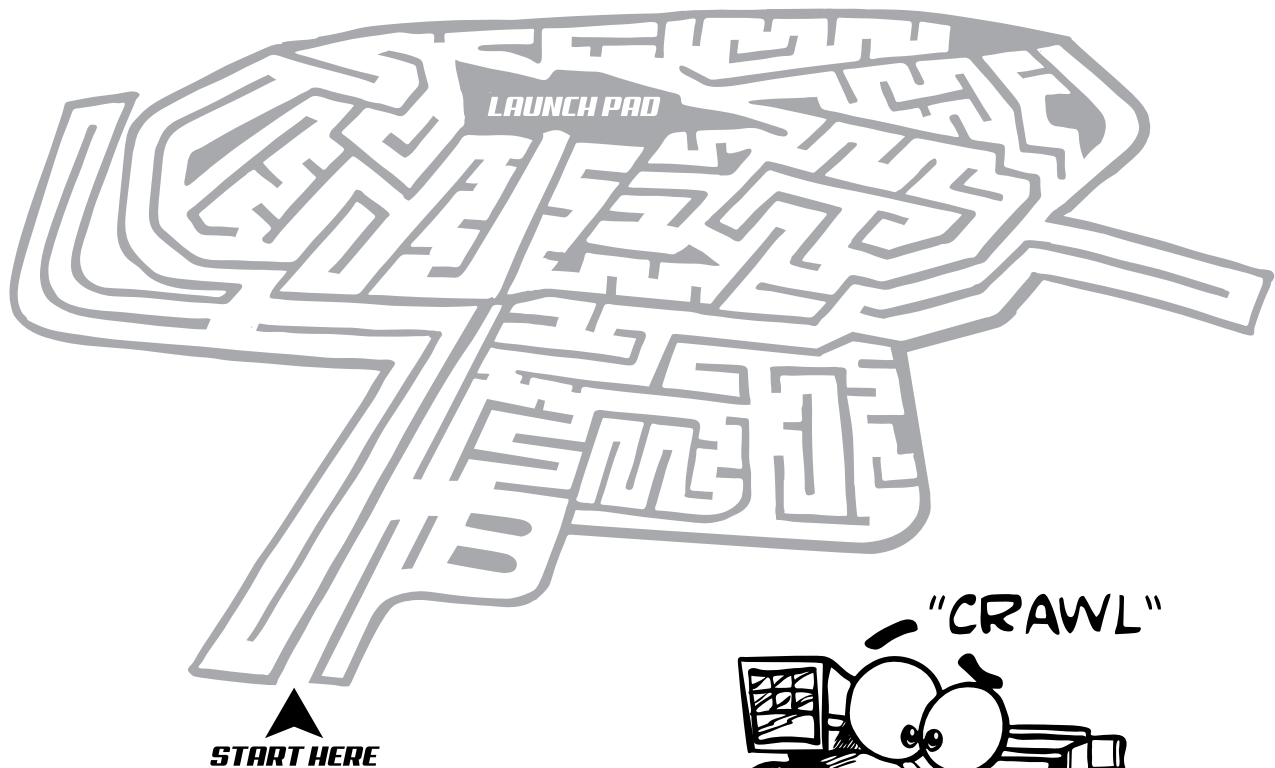
Payload:

Destination:



During the Apollo era, the VAB was designed to house and assemble the Saturn V rocket to carry men to the moon. Also, it was used for the space shuttle. One of the largest buildings in the world, it covers eight acres. In theory, 250 billion ping pong balls would fit inside the VAB. The EGS Program is changing the building to support many different vehicles at the same time. EGS will stack and test launch vehicles and spacecraft before transport to the launch pad.

ACTIVITY CENTRAL **A-MAZE XING**



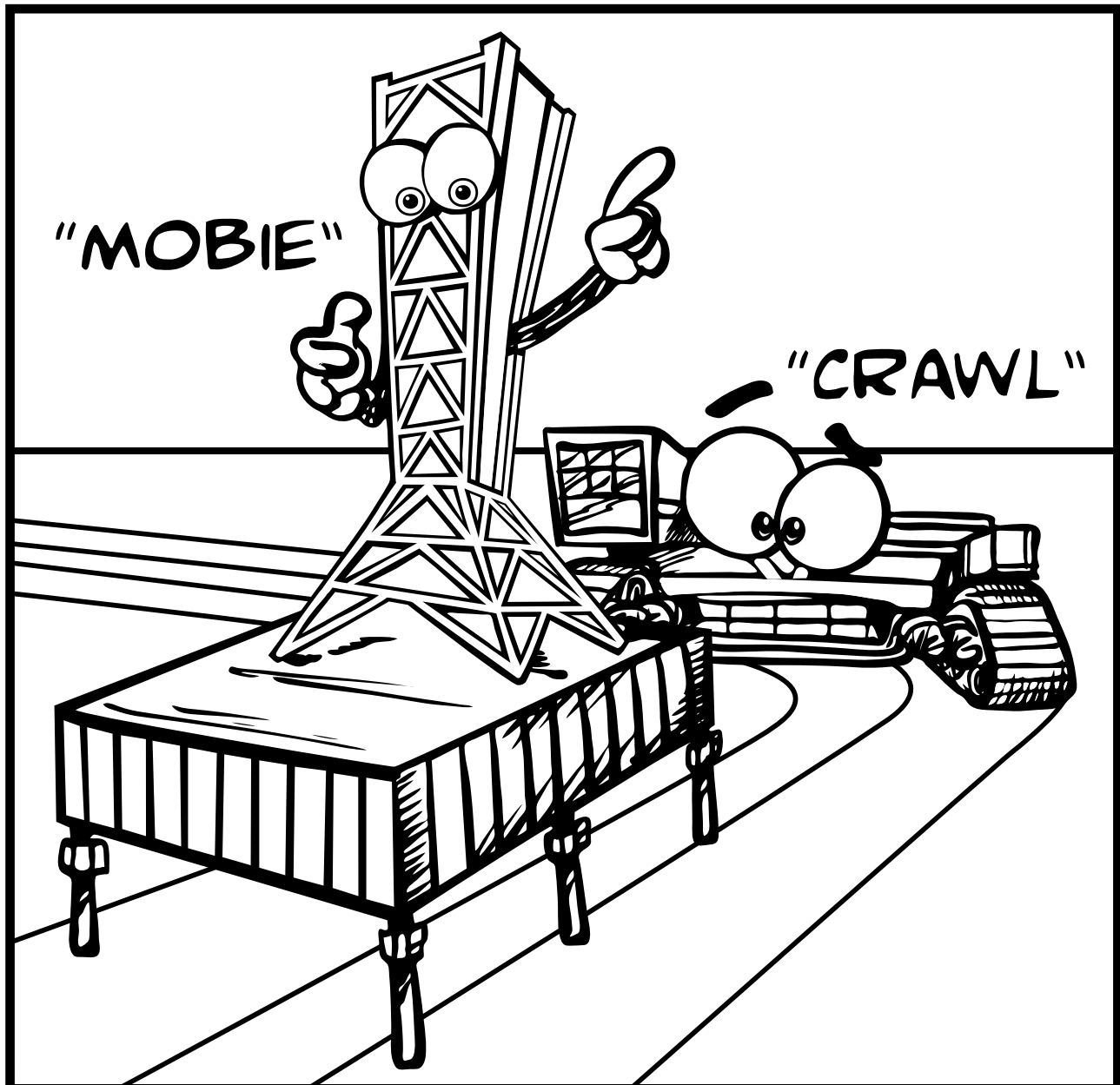
Our EGS pal, Crawl is slowly approaching the launch pad during a practice run but is having trouble finding his way to the center. Using your superior navigation skills and a writing tool, carefully move through the maze and help Crawl reach the launch pad. It is a little tricky, so you may want to lightly draw your lines in until you are sure you have the correct path.

MAKE AN A-MAZING DISCOVERY!



The crawler transporter will be able to lift 18 million pounds at a single time - which is equal to about 700 school buses. That's enough school buses to take 58,000 students to school at one time!

COLORING COMMAND
MOVING to the PAD



Engineers at NASA created a crawlerway to safely take rockets from the Vehicle Assembly Building, or VAB, to the launch pad. The crawlerway is made up of 4 different rock layers, making it 7 feet, 10 inches thick. The crawler is so heavy it would break a normal road!

ACTIVITY CENTRAL

COUNTDOWN CODES

Your next mission, should you accept it, is to secure the coded message indicating our future plans. Using the key below, write the letters that correspond to the numbers in the coded blanks below. The first letter has been done to help you along.

A = 1	H = 8	O = 15	V = 22
B = 2	I = 9	P = 16	W = 23
C = 3	J = 10	Q = 17	X = 24
D = 4	K = 11	R = 18	Y = 25
E = 5	L = 12	S = 19	Z = 26
F = 6	M = 13	T = 20	
G = 7	N = 14	U = 21	

HINT: OUR MISSION GOAL FOR THE FUTURE

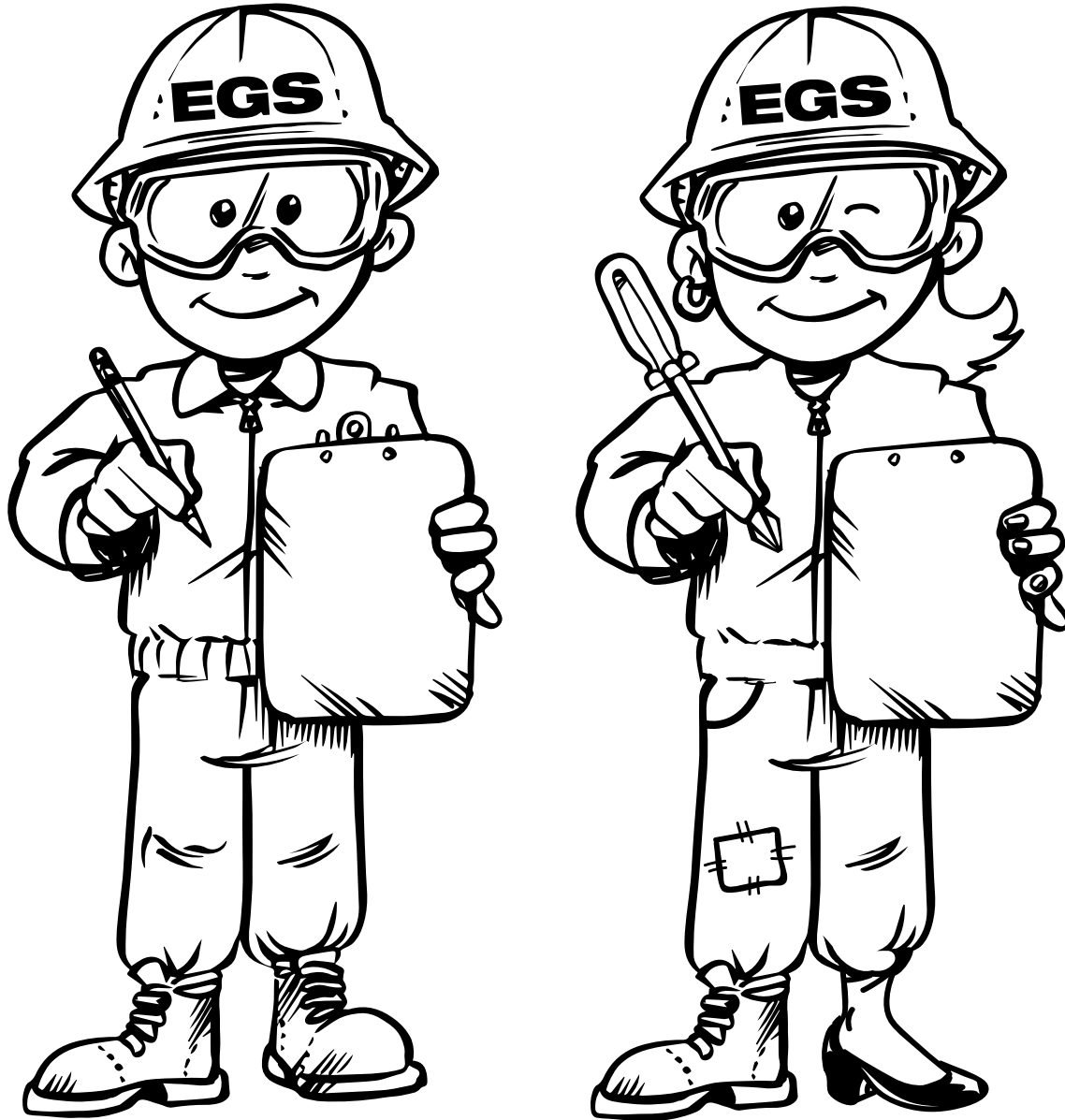
10	15	21	18	14	5	25
J						

20	15		13	1	18	19



For more than 40 years, the Kennedy Space Center firing rooms of the Launch Control Center, or LCC, have been the “brain” for the launches at NASA. The LCC is four stories high and is attached to the Vehicle Assembly Building, or VAB. Exploration Ground Systems is overseeing major upgrades to the LCC so it can support a variety of rocket and spacecraft launches, including NASA’s Space Launch System.

ACTIVITY CENTRAL
SPOT THE DIFFERENCE



Attention to detail is essential in maintaining safety throughout the entire launch and recovery process. Let's see how observant you are. Above you will find twin engineers. They are essentially the same person except that the one on the right has 11 things that are different from the other twin. **Can you find all 11?** Use the spaces below to write down the differences that you identify.



Hello Explorers!

I am the Exploration Ground Systems Launch Director or EGS LD for short. I'm very lucky because I get to work with a team of smart, creative explorers - just like you! Together our team accomplishes great things like testing the ground and flight systems that make sure the powerful SLS rocket and the Orion spacecraft are ready for their mission. Then we successfully launch them on their way into deep space.

As Launch Director, launch day is one of my favorite days. It follows a lot of hard work by the team. When we are sure that 'all systems are go', the countdown clock will count us down to launch or T-0. It's pretty exciting as the final commands are sent to the rocket and the final minutes and seconds roll off the countdown clock. At T-0, the vehicle lifts off the launch pad and is on its way beyond our home planet.

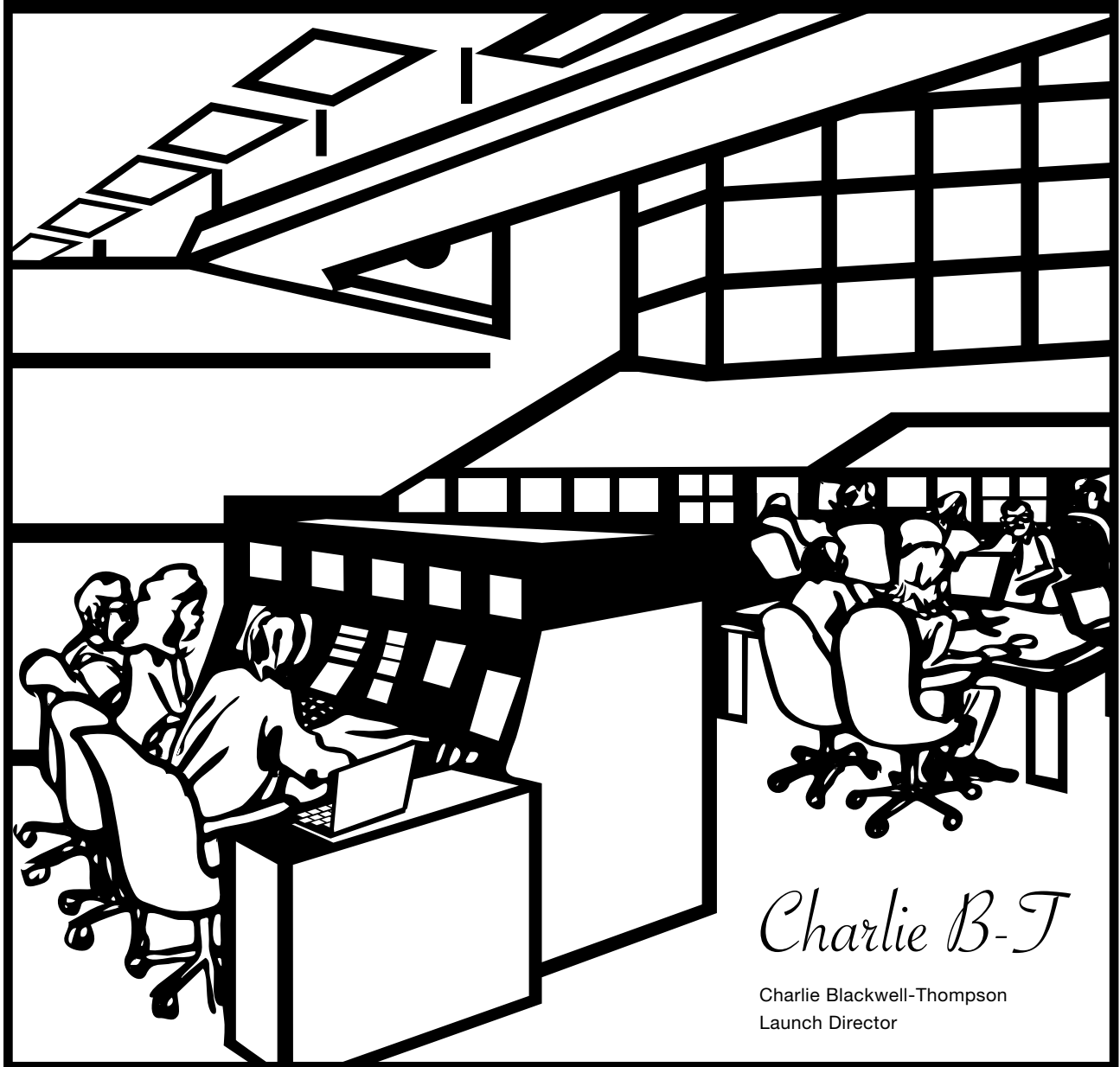
It's a really fun and rewarding job. Maybe one day, you will join us on this exciting journey into deep space. Until then...

Keep Reaching for the Stars!

Charlie B-T

Charlie Blackwell-Thompson
Launch Director
Exploration Ground Systems
Kennedy Space Center

COLORING COMMAND **TEST FIRING**



Charlie B-T

Charlie Blackwell-Thompson
Launch Director

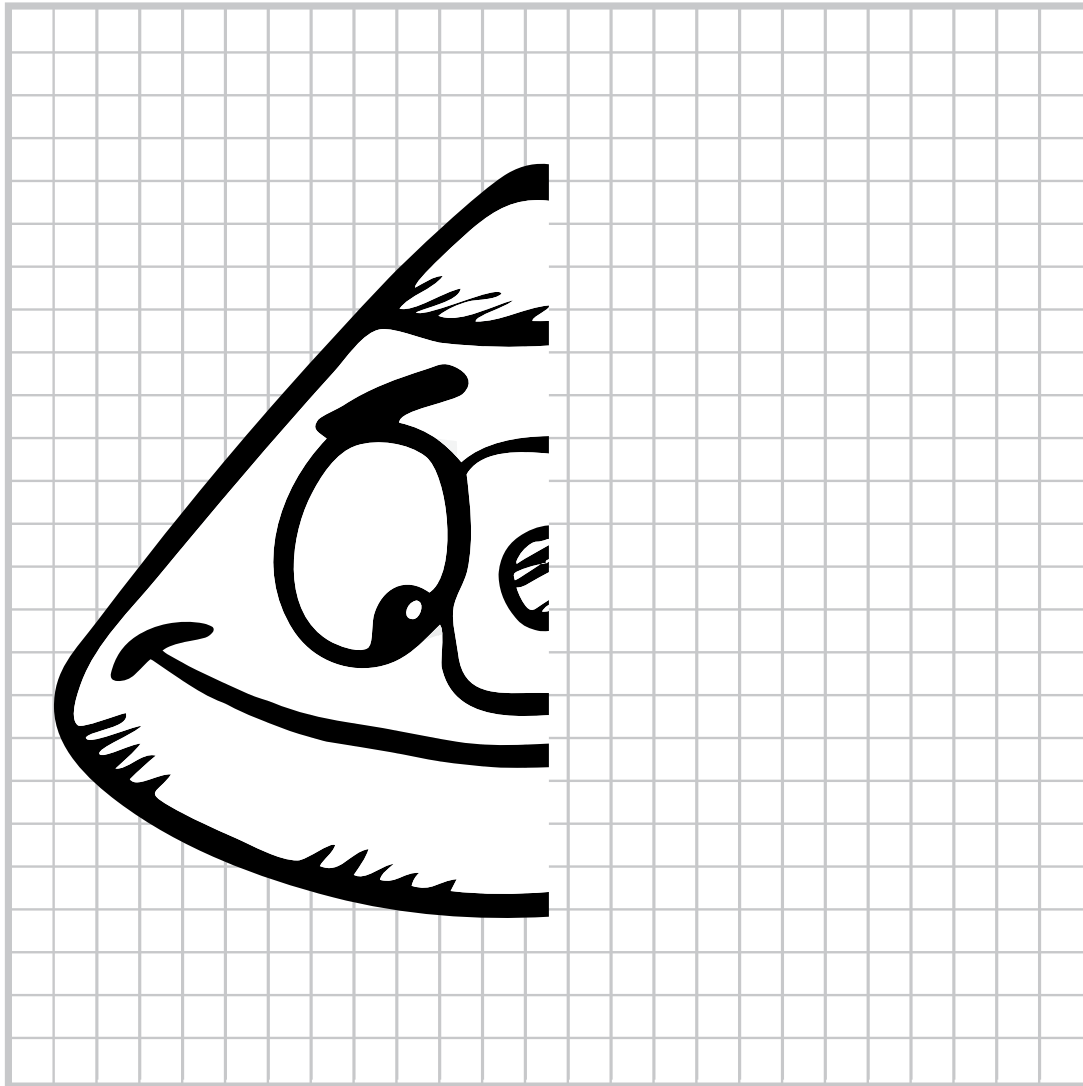


At Kennedy Space Center, EGS engineers use computers to command, control and monitor a spacecraft during launch. These engineers are some of the most talented and qualified men and women from around the world. They come from a wide variety of educational and career backgrounds to become experts in different areas of spacecraft technology and ground systems.



ACTIVITY CENTRAL

DRAW from EXPERIENCE



Spacecraft design is crucial to the success of the mission, crew and support programs. In this activity, you are the engineer responsible for completing the blueprint of our Orion capsule. Using a writing tool, mirror what you see on the left in the grid area to the right.

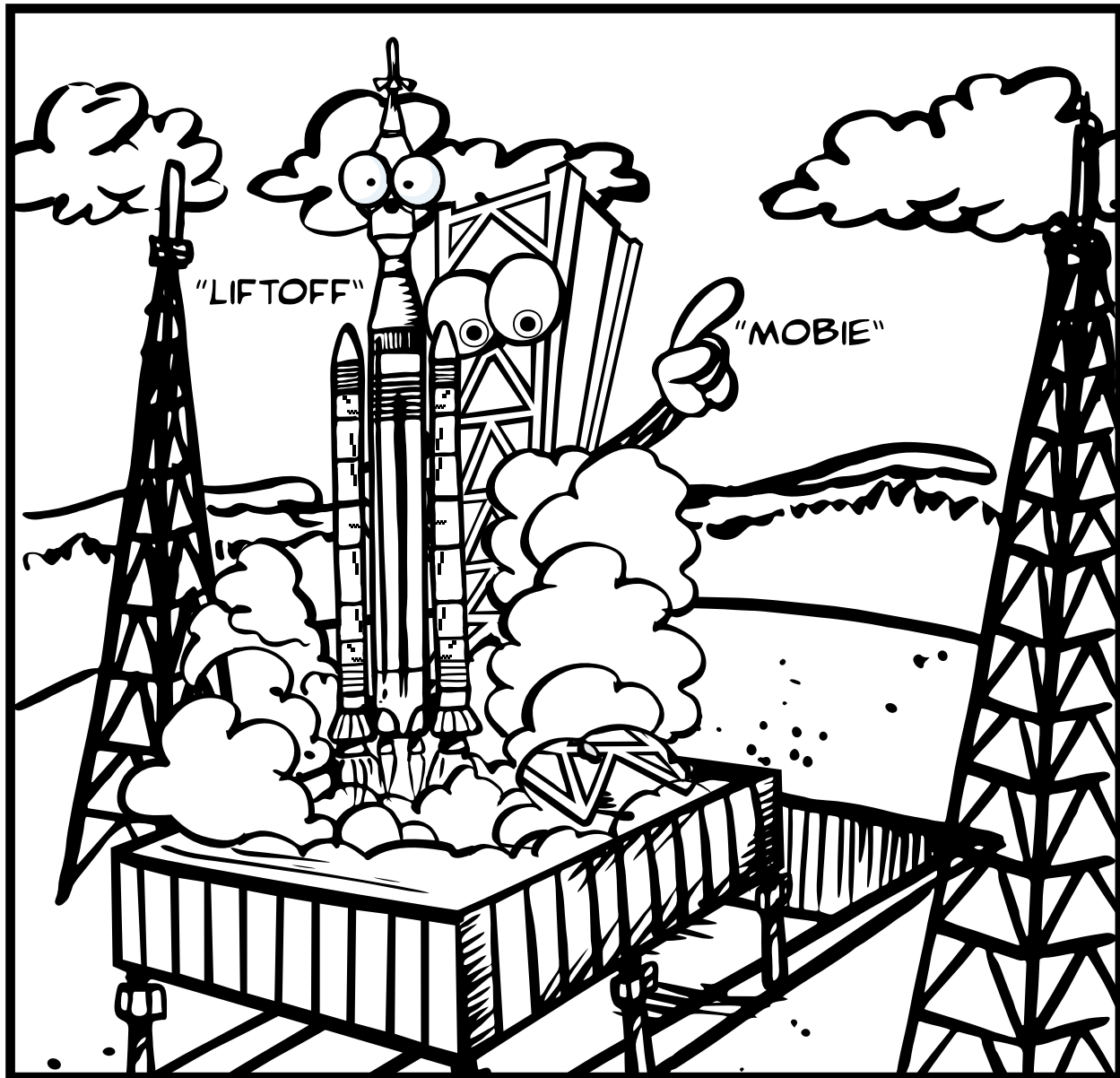
GOOD LUCK!



The Orion spacecraft is built upon everything learned from the past 50 years of NASA's human spaceflight missions, but because it will travel farther into space than any other crewed spacecraft in history, it uses advanced technologies. Lessons learned from the Apollo and shuttle program have been incorporated into Orion's design, making it 10 times safer to fly than the space shuttle.

COLORING COMMAND

LAUNCHING ROCKET



NASA's Exploration Ground Systems, or EGS Program at Kennedy Space Center in Florida is using a "clean pad" philosophy. This means that the launch pad has minimal launch structures, which makes it easier to launch many different rockets. When cleaning up Launch Pad 39B, EGS recycled 4,019 tons of metal and 547 tons of concrete. More than 1.3 million feet of cables, some from the Apollo era, were removed. More than 500,000 pounds of copper wire were recycled from these cables.



ACTIVITY CENTRAL

WORD SEARCH & RECOVERY

Search & Recovery are important tasks performed by the EGS program. Now it's your turn. Frontwards, Backwards, Vertical and Diagonal - the list of words at the bottom are hidden in plain sight in the word search below. Challenge yourself further by recording your time.

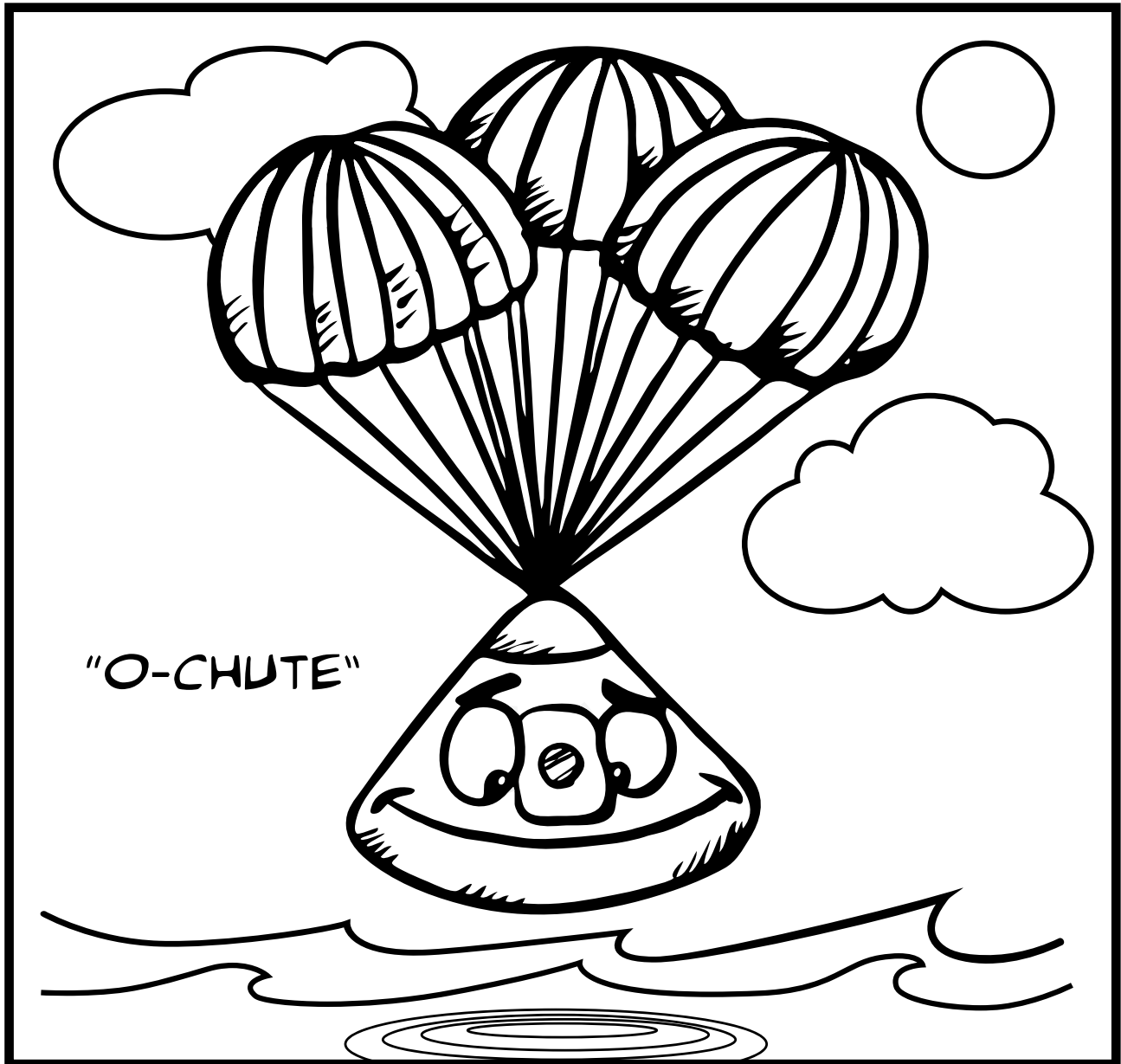
G R O U N D X K D O R I O N P O N R L
 R M O B I L E P R V E D F P A K Q W A
 Z W A H F D M A R T E S T A R H R E U
 C U Q B U I L D I N G H X R U P I A N
 R O I S O X K V D Y I Z I A Q U Y G C
 A T U O G R F W H X S T A C K I M E H
 W Y F N U K T Q I S O Z R H L R Q K E
 L C N G T F S S E C O R P U J E W U R
 E I H V U D R C Y U S O D T B T H X I
 R X F Q I K O W K F R N K E N N E D Y
 A V K T C R E W T C A C R D B E W K R
 X D W T O W E R N M U A O I T C F U P
 W F J Z A F J D M Z G K U M H X N E B
 V Q B X U V F O M N J A W F P O W T A
 R S P A C E C R A F T X I J U L S Q Y
 L Z N G M I B H A U L D L A N Y E U S
 Q T E H D O X E D H Q O F J I R H X S
 C F B U W D S B R X Y K B O O S T E R

GROUND
ORION
MOBILE
TEST
BUILDING
STACK
ABORT
PAD
VEHICLE

HIGH
PARACHUTE
LAUNCHER
PROCESS
CREW
TOWER
KENNEDY
CENTER
CRAWLER

COUNTDOWN
LIFTOFF
COMMAND
HANGAR
SPACECRAFT
COMPLEX
HAUL
BOOSTER
BAY

COLORING COMMAND
CAPSULE RETURN



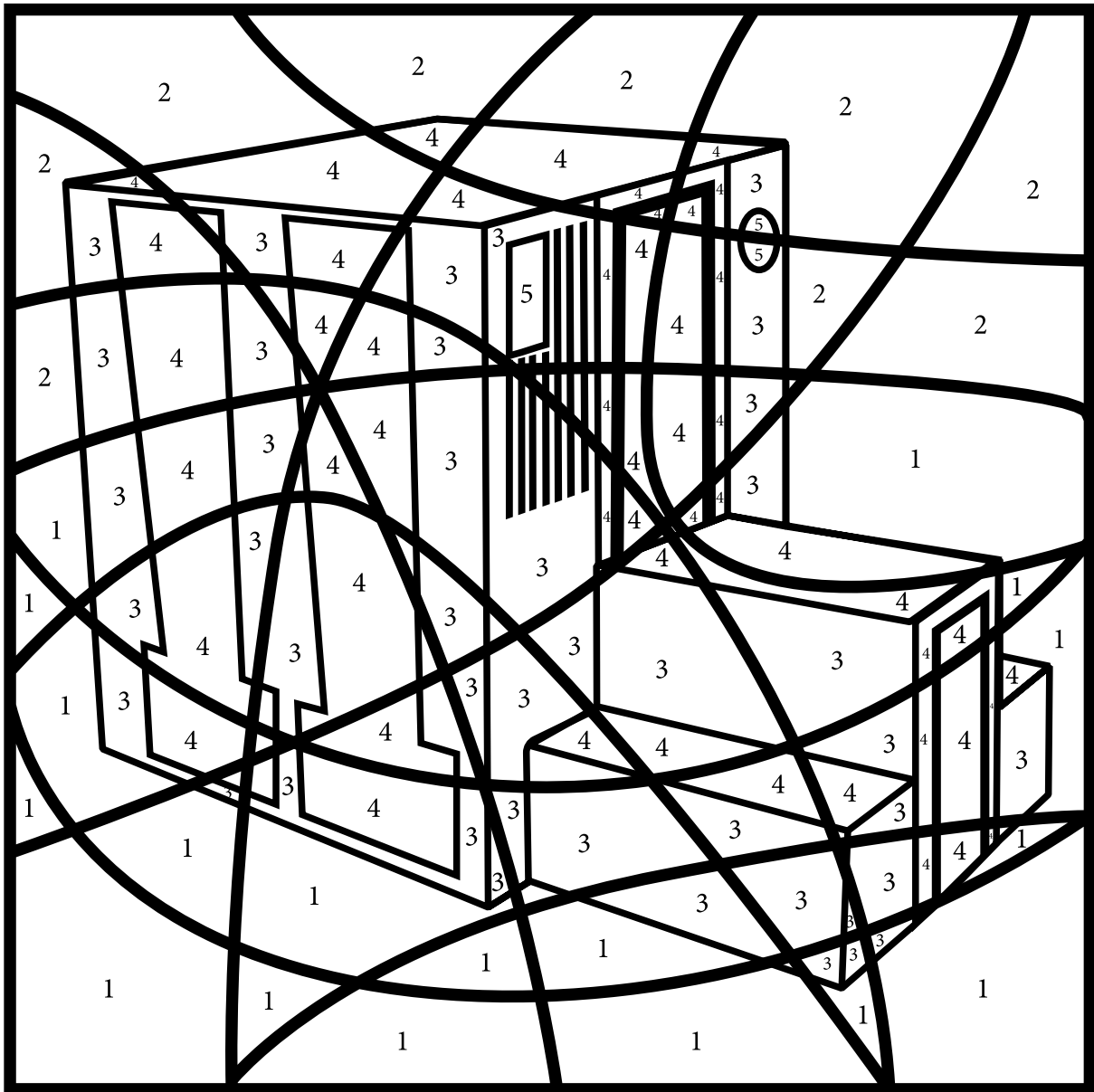
The massive main parachutes used in the final stages of landing slow the crew module to a safe splashdown speed of 25 feet per second (17 mph) at landing. Each main parachute has 80 suspension lines and the three main parachutes combined would cover a football field from 10-yard line to 10-yard line.

ACTIVITY CENTRAL

CHARTING COLOR

Crayons at the ready - You might need to tap into the box of 64 to bring this activity to life. Using the color key at the bottom, color in the corresponding numbered areas in the picture. For example: Use the color GREEN to fill in all areas displaying a #1 while staying within the lines.

BE COLORFUL!



1

Green

2

Sky Blue

3

Light Yellow

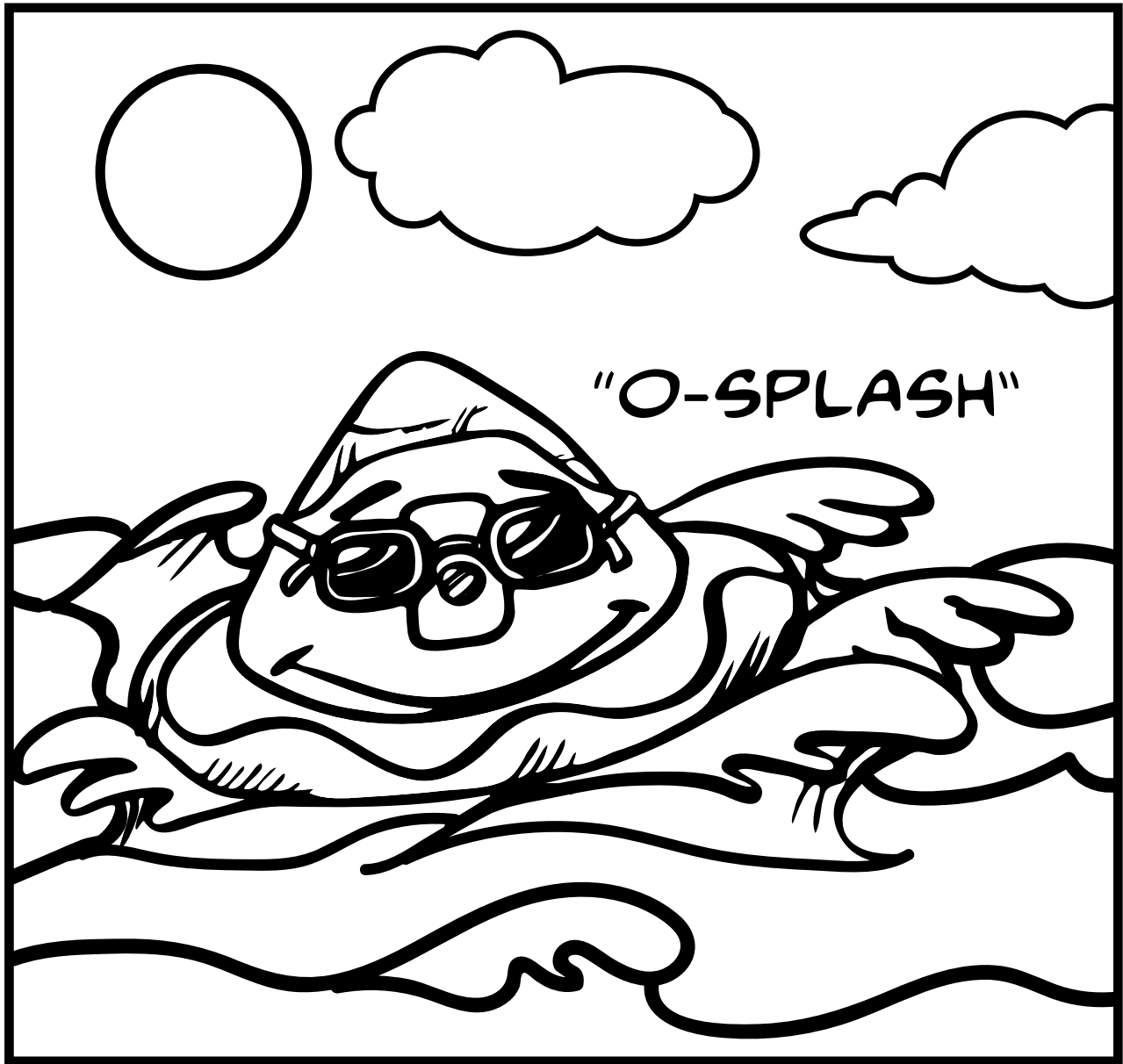
4

Gray

5

Dark Blue

COLORING COMMAND
SPLASHDOWN



Orion's re-entry speed from a Mars mission would be about 27,000 mph – nearly 20 times faster than a supersonic jet can travel (*and more than 35 times faster than most speeding bullets*).



ACTIVITY CENTRAL

RUMBLE in the JUMBLE

As you can see, the list of EGS terms has been jumbled. Use your brain power to rearrange the letters to correctly identify the proper words. Hints are provided to point you in the right direction.

ENJOY!

WLACERR = _ _ _ _ _

HINT: Helps move the mobile launcher and rocket to the pad

HCLUNA = _ _ _ _ _

HINT: What a rocket does at lift off

WRETO = _ _ _ _ _

HINT: This is a structure connected to the rocket at launch

KOTCRE = _ _ _ _ _

HINT: The vessel that carries cargo or astronauts

PLACSEU = _ _ _ _ _

HINT: Another name for the command vehicle the astronauts are strapped into

WAPSLHDOSN = _ _ _ _ _

HINT: This event occurs as the crew compartment parachutes into the ocean

RTTRPAOSN = _ _ _ _ _

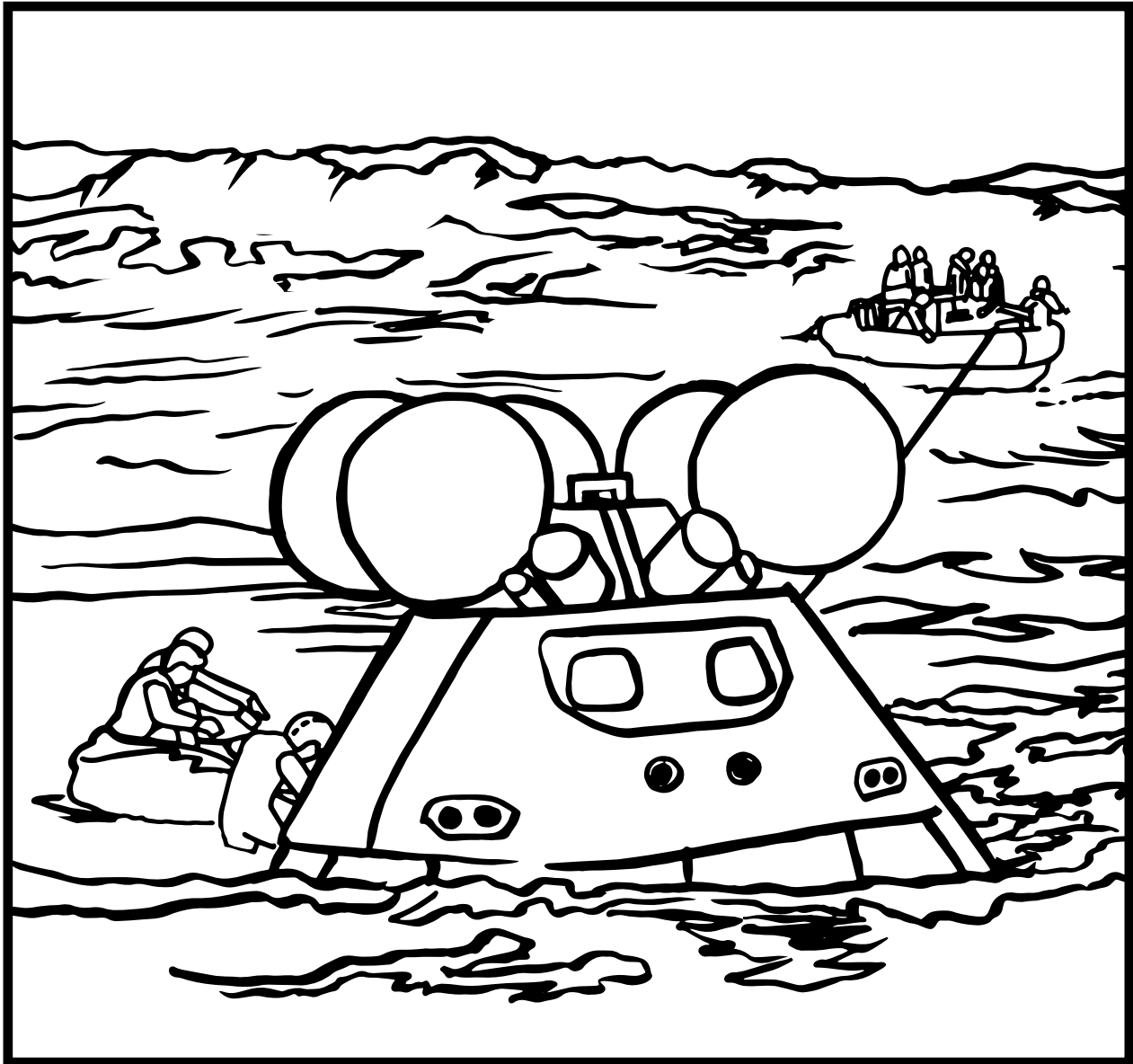
HINT: This is the process used to return the recovered spacecraft to Kennedy Space Center



Orion's launch abort motor generates 500,000 pounds of thrust in a matter of milliseconds to quickly propel the crew module away from danger. From a launch pad abort, Orion's launch abort system accelerates from 0 to 500 mph in two seconds -- nearly six times faster than the average roller coaster!

COLORING COMMAND

CAPTURING the CAPSULE



The recovery team members in the rigid hulled inflatable boats approach NASA's Orion spacecraft following the splashdown in the Pacific Ocean. There, they will attach tending lines to five designated areas on the Orion and tow the vehicle into the ship's well deck. Then, the water will be drained leaving Orion secure and dry.

ACTIVITY CENTRAL

Mission Matchup

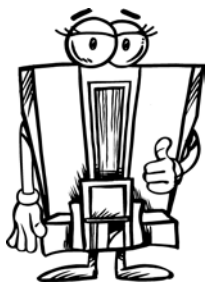
Using your powers of deduction, circle a phrase on the right and draw a line connecting the phrase to the EGS character that it relates to on the left. Continue this process until you have matched all six characters with their phrases.



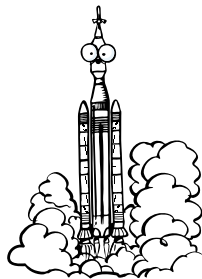
HOLD ON! THAT IS BASICALLY MY JOB - TO PROVIDE SUPPORT TO MY BUDDY LIFTOFF AS HE PREPARES TO LAUNCH.



HOT STUFF. AFTER BRAVING SOME INTENSE HEAT, MY CANOPY SLOWS ME DOWN FOR A GENTLE SPLASH LANDING.



SLOW AND STEADY WINS THE RACE. I TRAVEL ONE MILE PER HOUR WITH MOBIE AND LIFTOFF RIDING ON TOP OF MY PLATFORM.



LOVE TO CHILL OUT IN THE OCEAN WHILE THE RECOVERY TEAMS USE CABLES TO TOW ME BACK TO THE TRANSPORT VESSEL.

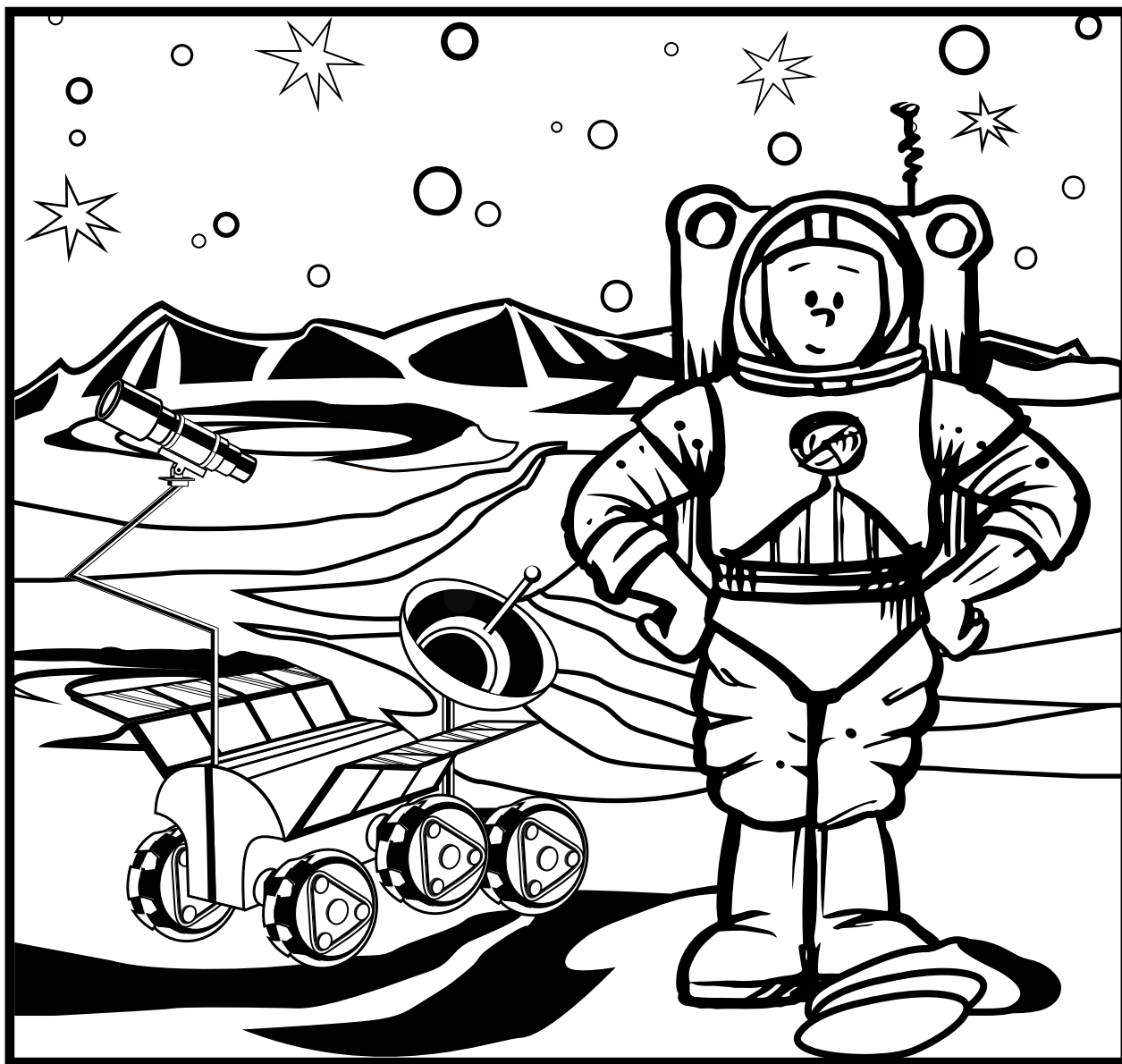


BIGGER IS BETTER. WITH MY MASSIVE SIZE, CRAWL AND MOBIE CAN EASILY DRIVE IN AND PICK UP LIFTOFF FOR A JOURNEY TO THE LAUNCH PAD.



I LIKE TO COUNT BACKWARDS...3,2,1... MY TASK IS TO TRAVEL PAST EARTH'S ORBIT WITH ORION IN TOW TO EXPLORE DEEP SPACE.

COLORING COMMAND
ASTRO-LOGICAL



For decades, the agency and its partners have sent orbiters, landers and rovers, dramatically increasing our knowledge about the Red Planet and paving the way for future human explorers. The Curiosity rover has gathered radiation data to help us protect future astronauts, and the upcoming Mars 2020 rover will study the availability of Martian resources, including oxygen.

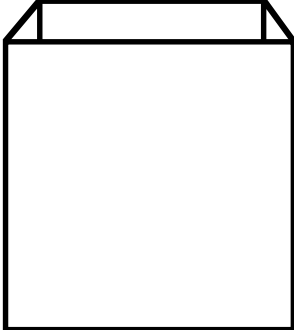
ACTIVITY CENTRAL
LAUNCH LOGIC

1 **PAYLOAD**
BOARD

2 **ROCKET**

THE EARTH

3 **thinking**



4

S
P
L
A
S
H

This activity involves Rebus puzzles and requires your power of deduction. Each puzzle represents a play on words. Study carefully and solve the meaning of each diagram.

For example: |R|E|A|D|I|N|G| = Reading between the lines.

HAVE FUN!



The term "aeronautics" originated in France and was derived from the Greek words for "air" and "to sail."