BIG QUESTIONS ANSWERED

YOUNG ASTRODYNAMICS ENGINEERS' ACTIVITY PACK

Full of fun and exciting activities to accompany this book!

CONTENTS:

OUT-OF-THIS-WORLD WORDS

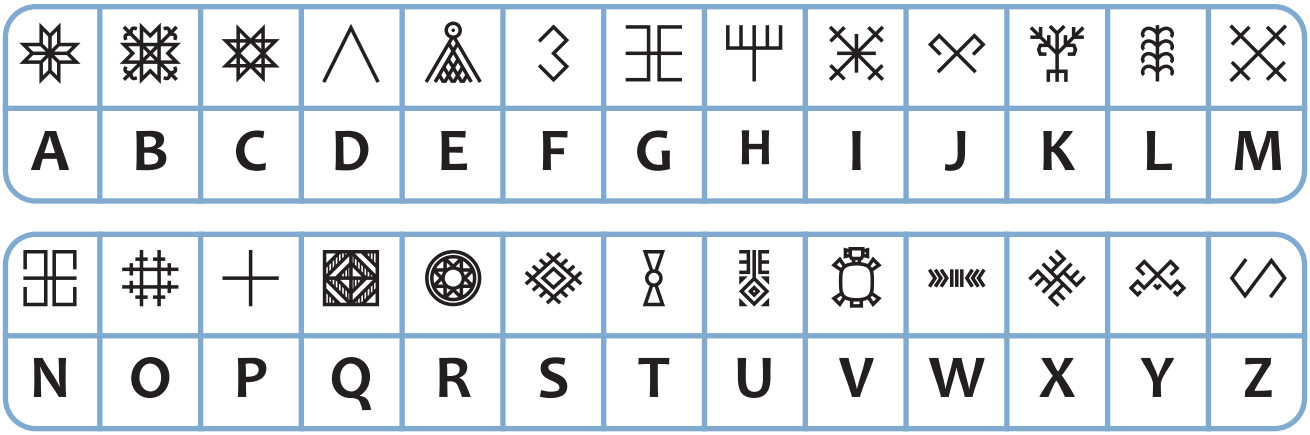
Scientists use all sorts of evidence to learn about outer space! Can you find and circle the words listed below, in the grid. Words can be found in any direction (including diagonals) and can overlap each other.

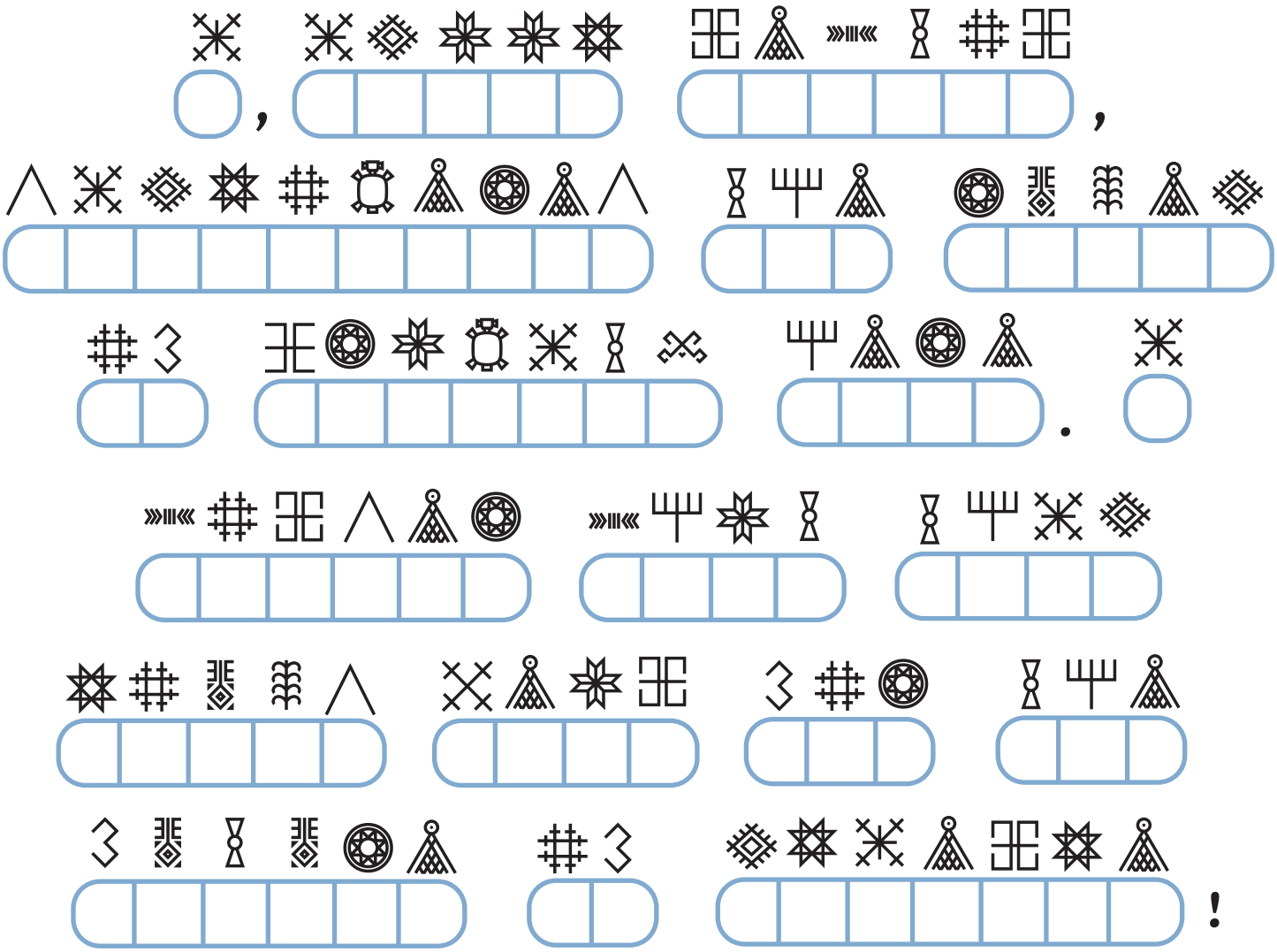
M	O	Y	T	X	B	H	A	N	M	L	S	J	A	C	C	Q	G	V	F
Y	J	M	E	G	Y	D	R	U	Q	K	L	A	U	N	C	H	C	O	P
C	M	R	X	T	D	J	R	O	C	K	P	B	E	S	O	O	I	W	N
H	X	F	W	R	S	G	L	R	D	C	K	X	L	L	Y	K	A	A	F
C	N	E	T	Q	U	Q	J	Z	N	W	S	S	V	G	C	Q	S	E	V
S	O	Z	X	R	G	Z	K	E	H	A	R	R	U	E	P	K	T	K	H
P	F	I	Q	O	R	G	L	E	D	Y	E	A	O	K	E	I	E	K	K
A	K	Y	J	C	L	X	O	T	T	E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

ASTRODYNAMICS
SPACECRAFT
JOURNEY
LAUNCH
SATELLITE
ROCKET
SPUTNIK
ASTEROIDS
OUTER SPACE
GRAVITY

A HIDDEN MESSAGE!

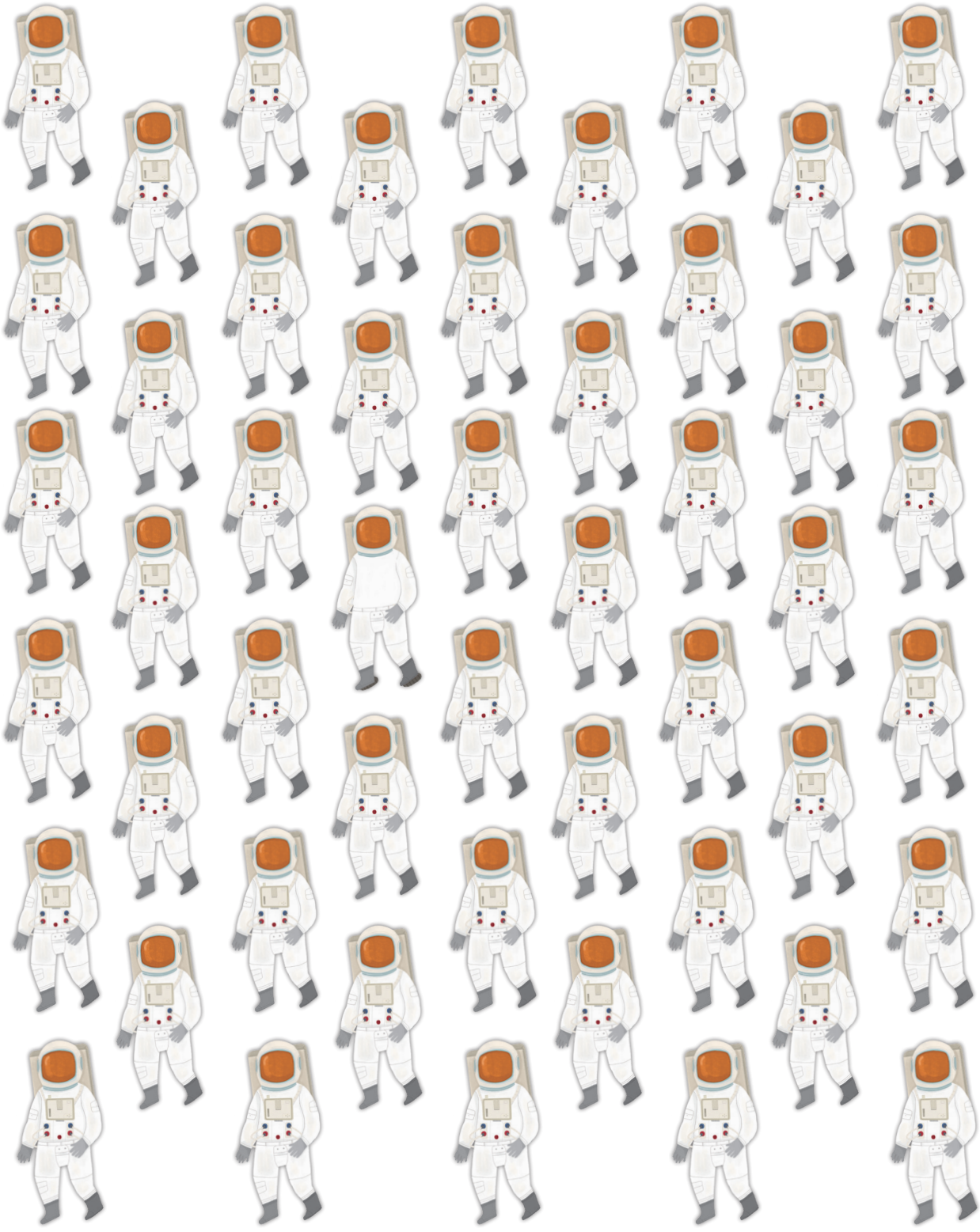
You are on a field trip when you spot something buried beneath an apple tree. It's a piece of parchment with a message on it, unseen for centuries! Can you use the code below to work out what it says?





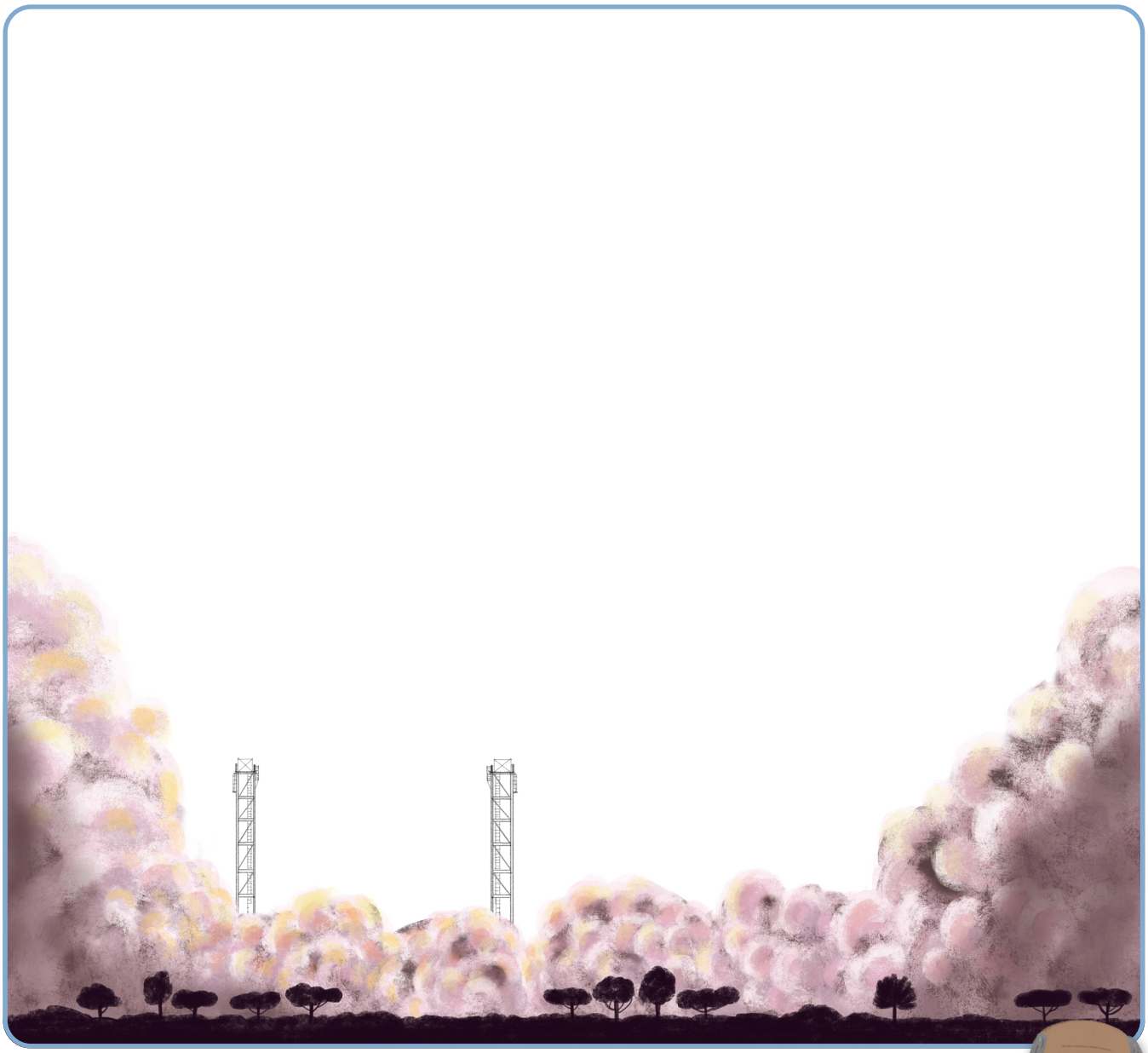
LOOK OUT FOR THE ASTRONAUT

Look at all these astronauts exploring outer space! Can you spot the one that stands out from the rest?



DESIGN YOUR OWN ROCKET LAUNCH

It's rocket launch day! Imagine you are preparing for your journey to outer space as an astronaut – draw the rocket that you'll be taking off in.



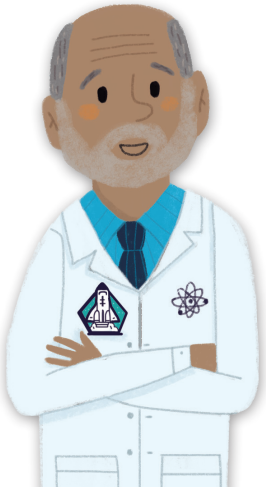
What would you like your rocket to look like? And where in outer space would you like to explore first? Get creative!

ROCKET POWER

Rockets must be moving at extremely fast speeds to leave Earth's atmosphere. Below, is an illustration of the Shenzhou 5 rocket – get creative and complete the drawing of this rocket on its journey to outer space! Finish the picture by coloring it in.

WHOOSHING THROUGH SPACE

Write a diary entry as if you were on a spacecraft, on your way to the International Space Station. How would you feel, what do you think you might see, and what might you get up to for the day?

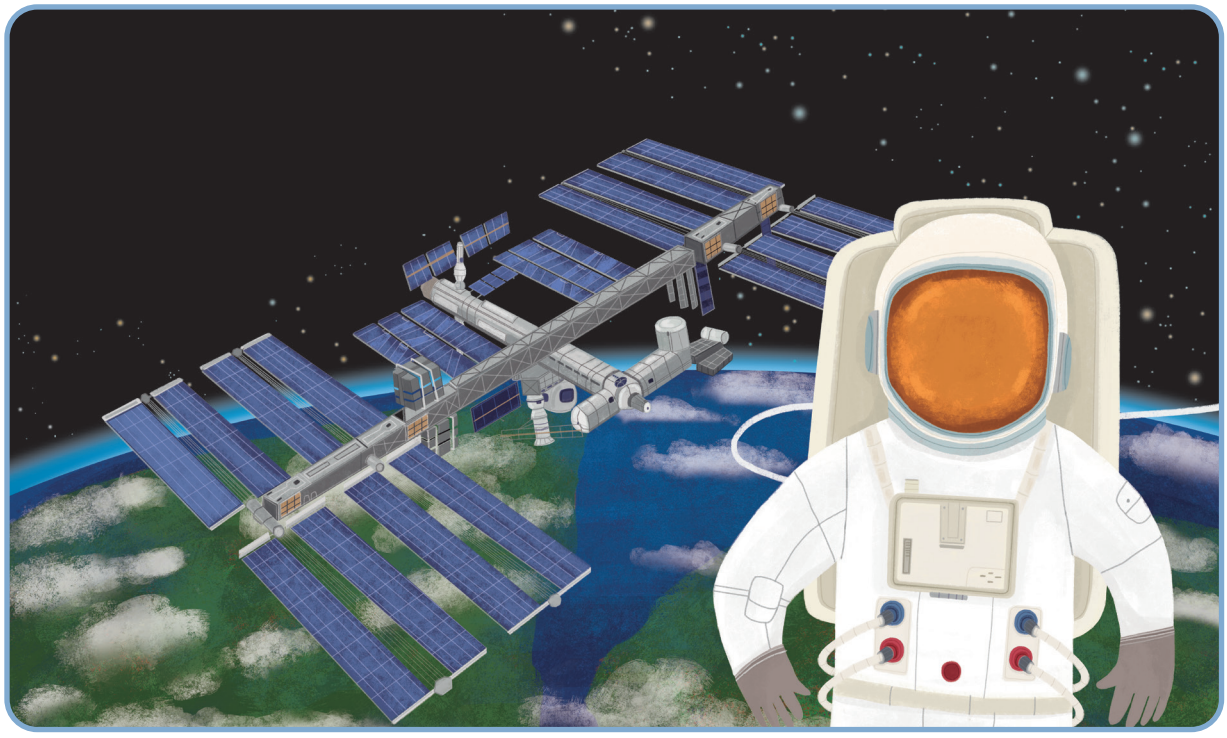


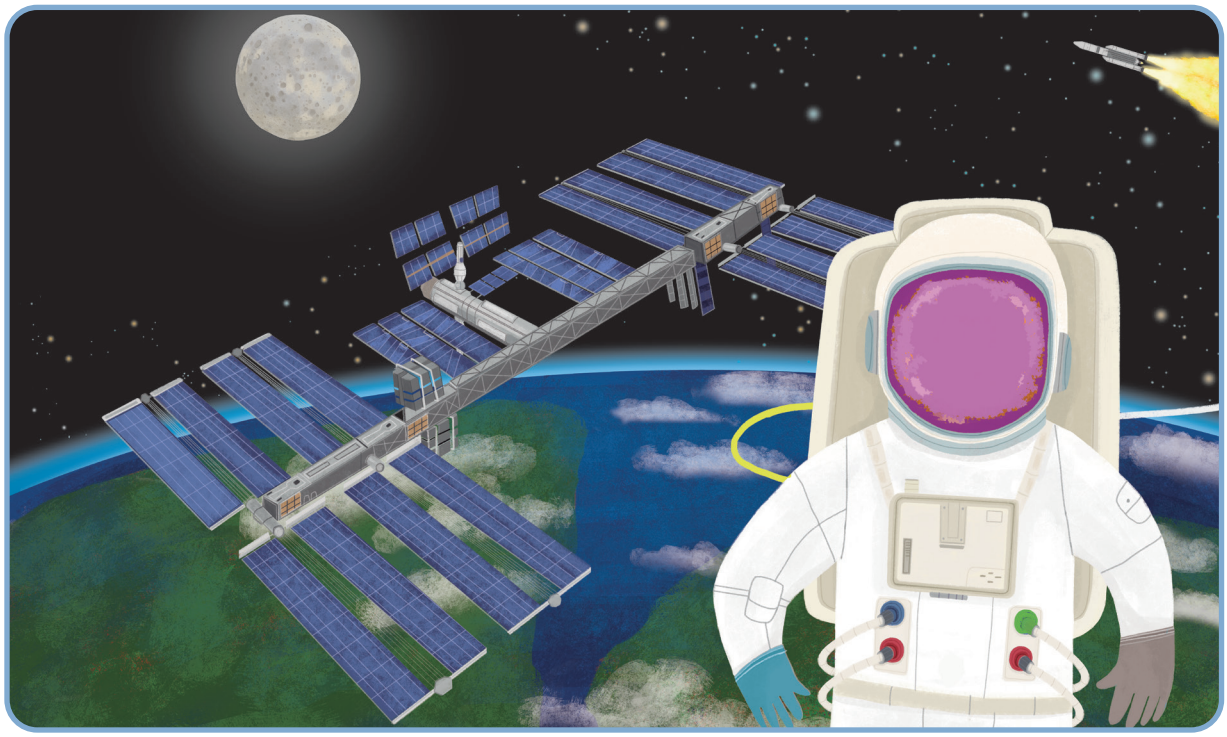
Feeling stuck? Try some of these...

- **Describe what the spacecraft looks like, inside and out.** Think about its color, texture, and size.
- **Describe the places you might travel past on the spacecraft.** What can you see? What was around you at the time?
- **Describe how you would be feeling.** Would you be excited, nervous, or something else?

SPACE STATION SPOTTING

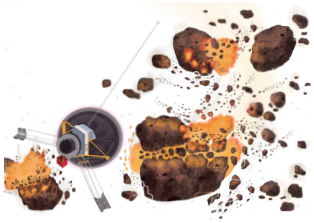
This sneaky astronaut is trying to catch us out! Can you spot the 10 differences between the two scenes? Circle them when you spot them.

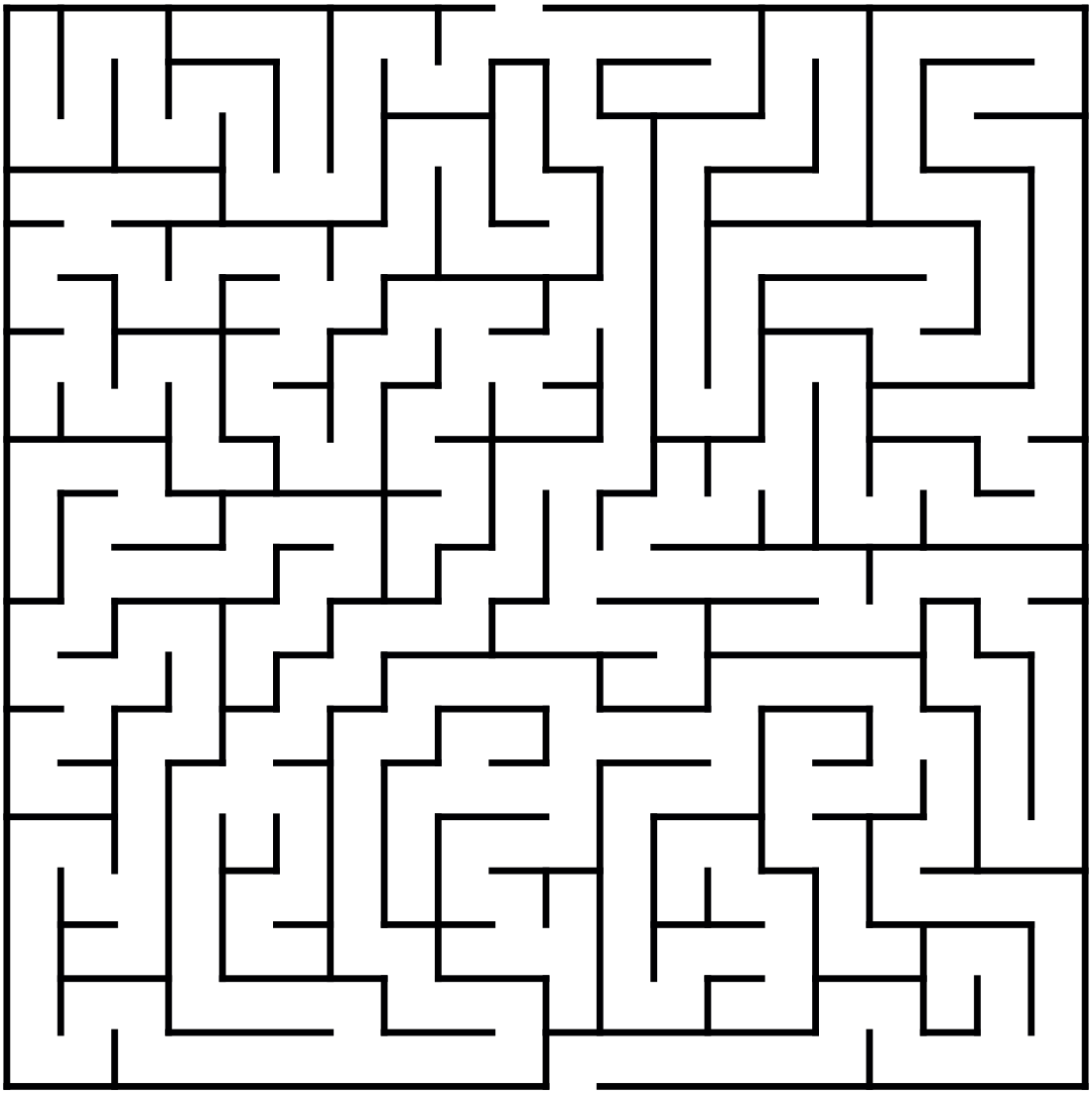


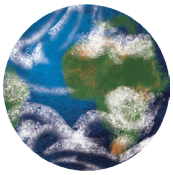


ASTEROID ATTACK!

Oh no! This spacecraft is about to be hit by an incoming asteroid! Can you help the spacecraft return to safety in its orbit around Earth?







PICK A FAVORITE PLANET

Choose a planet from our solar system and see what amazing things you can find out about it! Draw it, color it in, and fill in all of the facts below.

Draw your planet in here!

This planet is called .....

How big is this planet? .....

Does this planet have an atmosphere? .....

This planet is ..... **light-years from Earth.**

This planet orbits a star called .....

Extra cool facts: .....

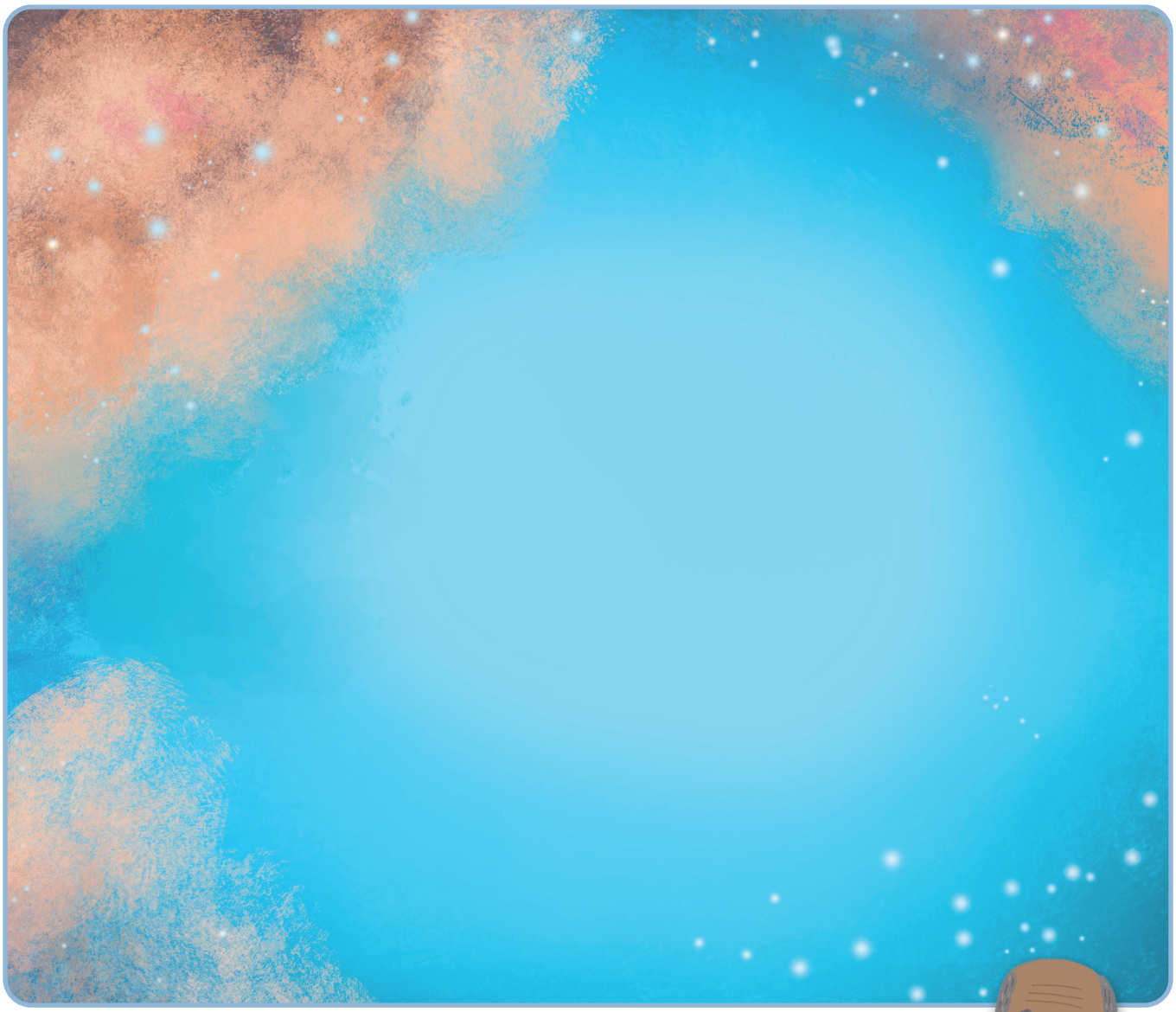
.....

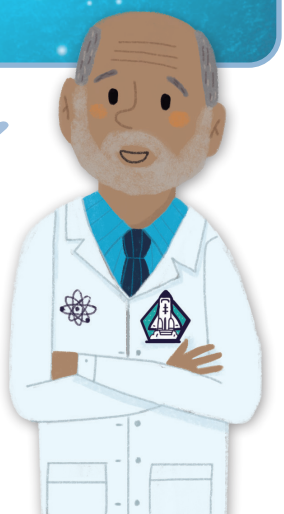
.....

Why not print this sheet off multiple times to create a planet booklet full of lots of different planets!

EXPLORING INTERSTELLAR SPACE

Interstellar space is the big, mysterious area found outside our solar system. Get creative and draw some of the weird and wonderful things you think might be found here.





What do you think might be found in this unexplored area of space? A new planet? Maybe an alien or two!

SPACE JUMBLE

Oh no! A huge space storm has swept in and mixed up a bunch of words! Test your word-solving skills by trying to unscramble the words. They are all related to outer space. There is a list of the correct words below to help you.

ELTLESIAST

NETSALP

ROIDESTSA

SNACISI

TRAEH

OSMON

NRUTAS

EARTH | SATELLITES | SATURN

PLANETS | CASSINI | ASTEROIDS | MOONS

EXTRA ACTIVITY - WORD WITHIN WORDS

You can only use the letters within the word "spacecraft".

1. **Each of these letters can only be used once: S, P, E, R, F, T.**
2. **'Spacecraft' has two letter A's and two letter C's so you can use them twice each.**
3. **You can't use any other letters from the alphabet.**

EXAMPLE: you can make the word RAFT using the letters in SPACECRAFT.

SPACECRAFT

EXPLORING THE COSMOS

Read the questions below and think about your own opinions before filling in your answers.

What do you find most interesting about astrodynamics?

.....

.....

.....

Would you like to travel to outer space in a rocket? Why or why not?

.....

.....

.....

If you were an astrodynamics engineer, what would you most enjoy – working in mission control guiding spacecraft through outer space, or working on spacecraft to make sure they're ready for their journey?

.....

.....

.....

What would be your big question about astrodynamics? What else would you like to find out about this important science?

.....

.....

.....

LOST ON MARS

The spacecraft has gotten lost and is trying to find a safe place to land. Can you help the spacecraft safely reach Mars?

WRITE YOUR OWN ASTRODYNAMICS STORY

Can you write a story of your own about astrodynamics, making sure to include the 3 key words below?

OUTER SPACE **ROCKET** **ASTRODYNAMICS ENGINEER**

MORE FUN ASTRODYNAMICS ACTIVITIES

COLORING SHEETS & MORE!

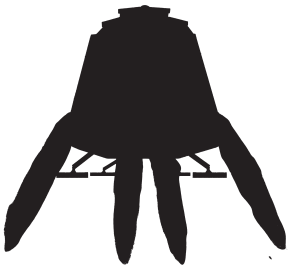
The following activities aren't based on any specific scenes in the book. They can be used on their own or alongside the book as extra activities.

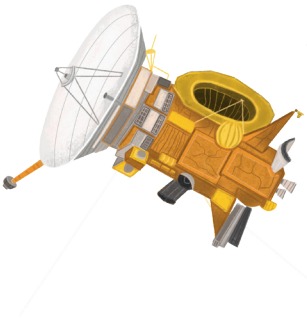
FIND THE SCIENTIST

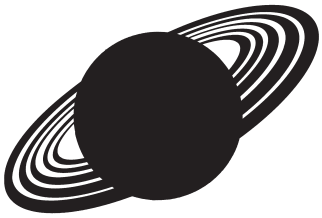
There are lots of different scientists below. Can you find the astrodynamics engineer? Circle them when you find them – there's only one!

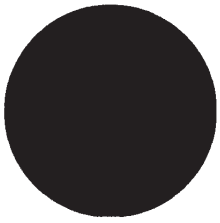
MATCH THE SHAPE

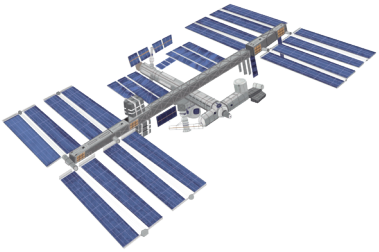
Can you match each shadow to the correct picture? Draw a line to connect them.

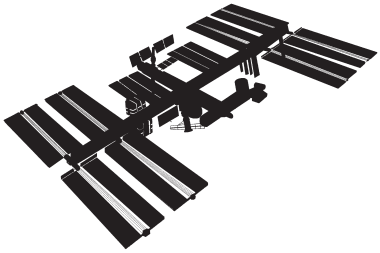


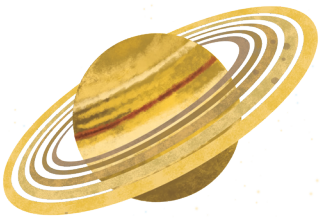








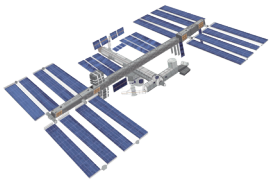


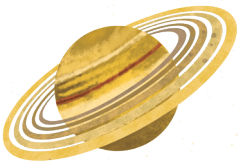


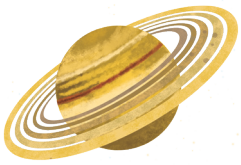
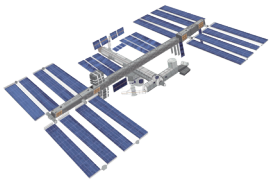
SIMPLE SUMS

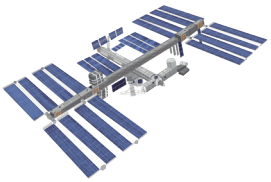
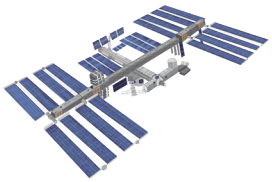
Below are 3 objects which represent different numbers.
Work out the sum based on what each object represents and write your answers in the boxes.

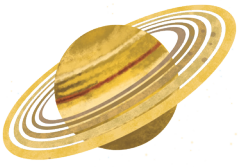
 = 2

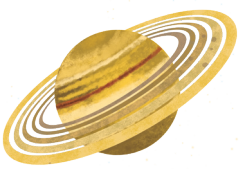
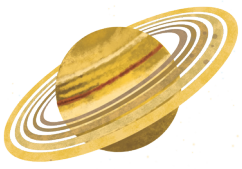
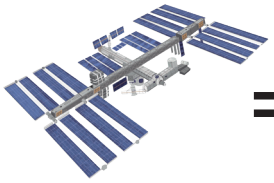
 = 5

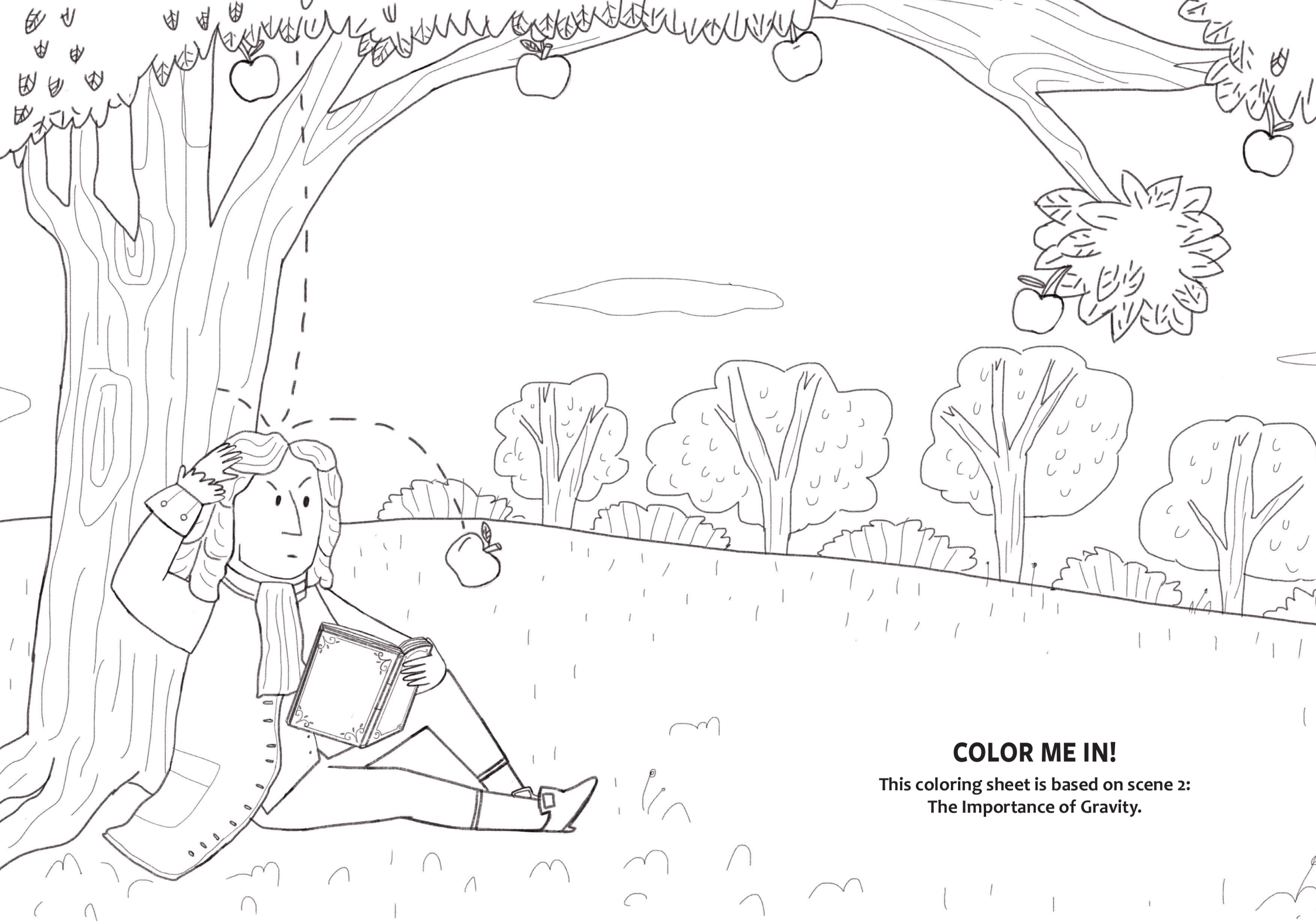
 = 3

 +  −  =

 −  +  =

 +  +  =

 +  −  =

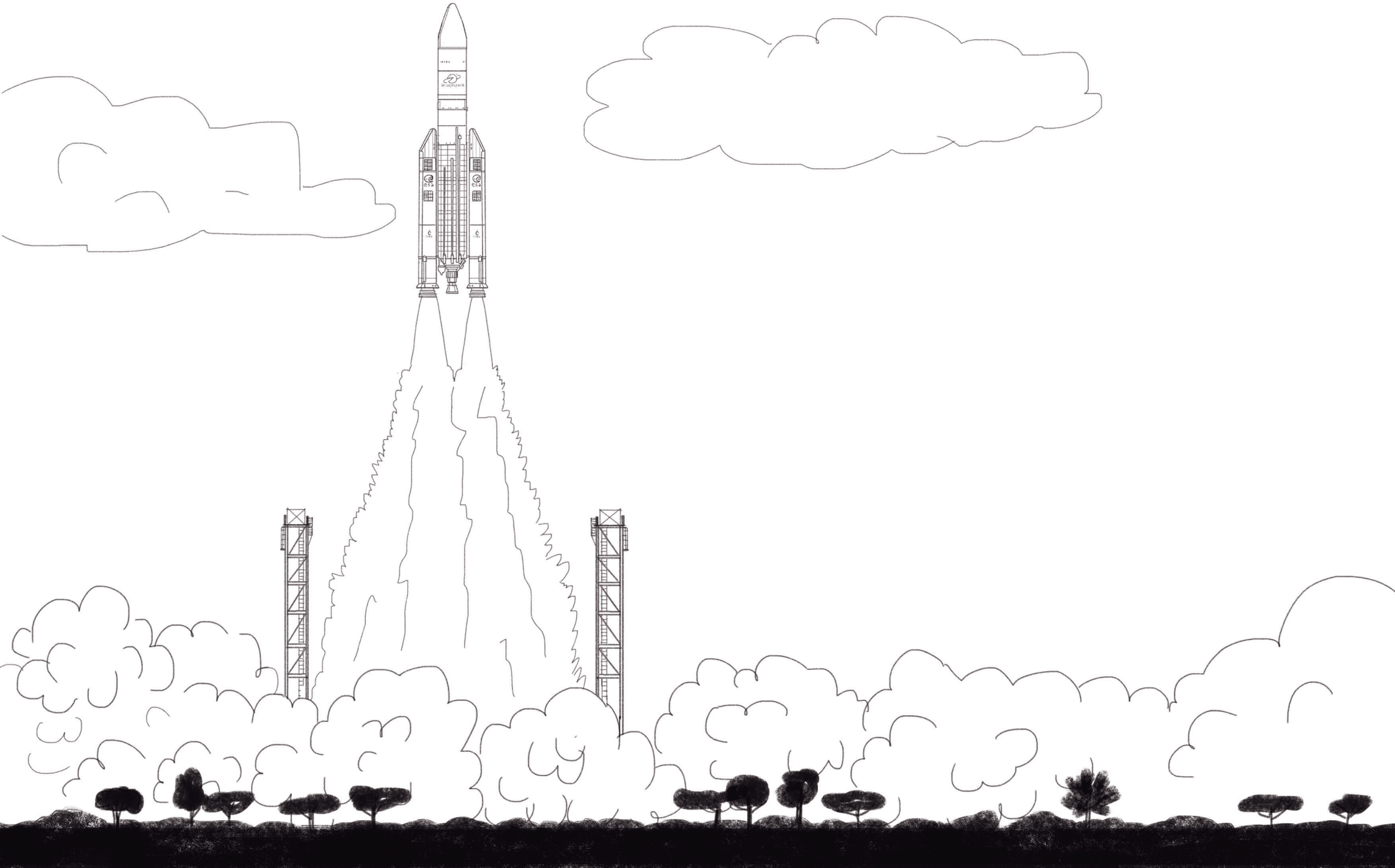


COLOR ME IN!

This coloring sheet is based on scene 2:
The Importance of Gravity.

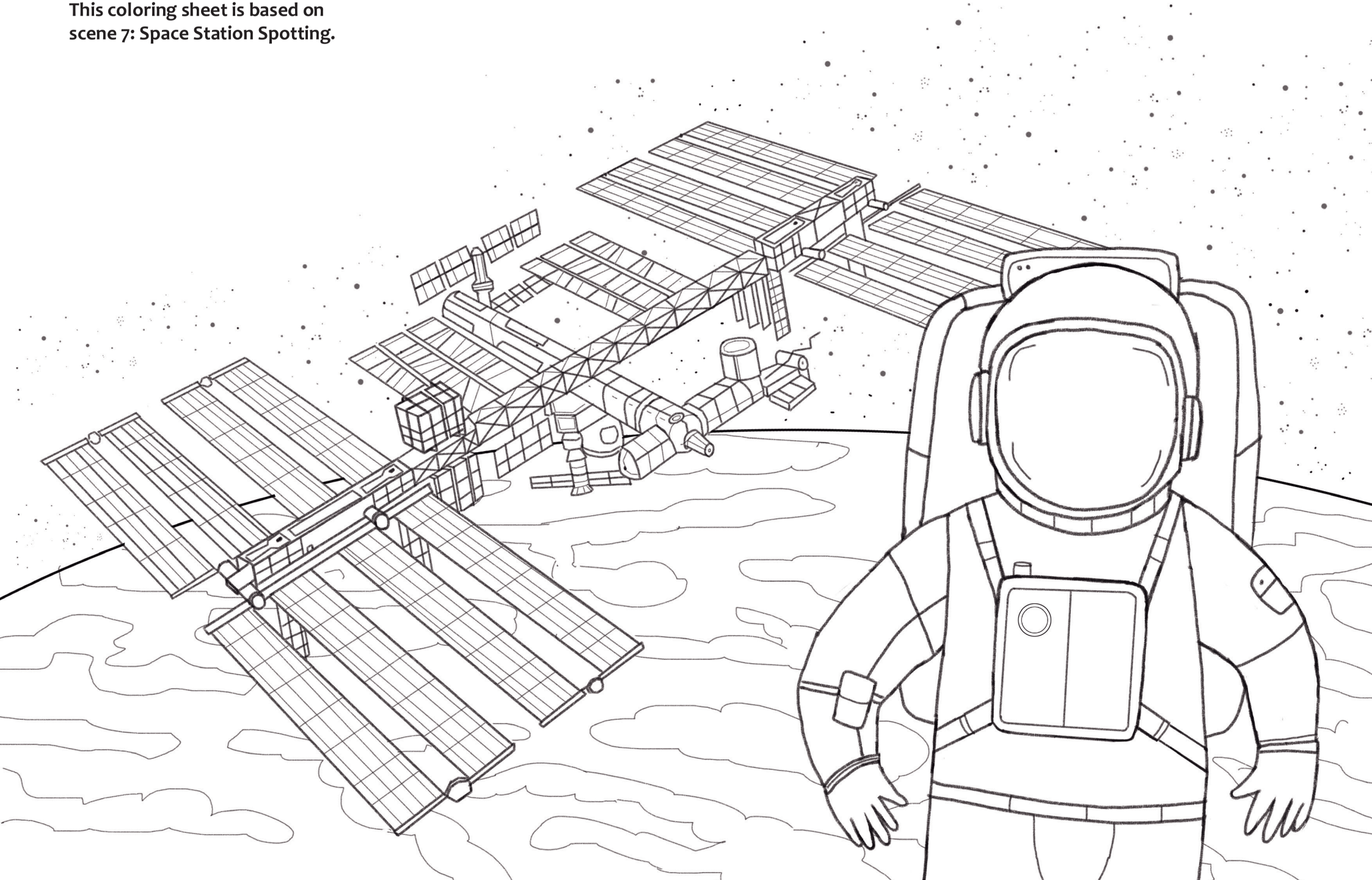
COLOR ME IN!

This coloring sheet is based on scene 4: Launching a Spacecraft.



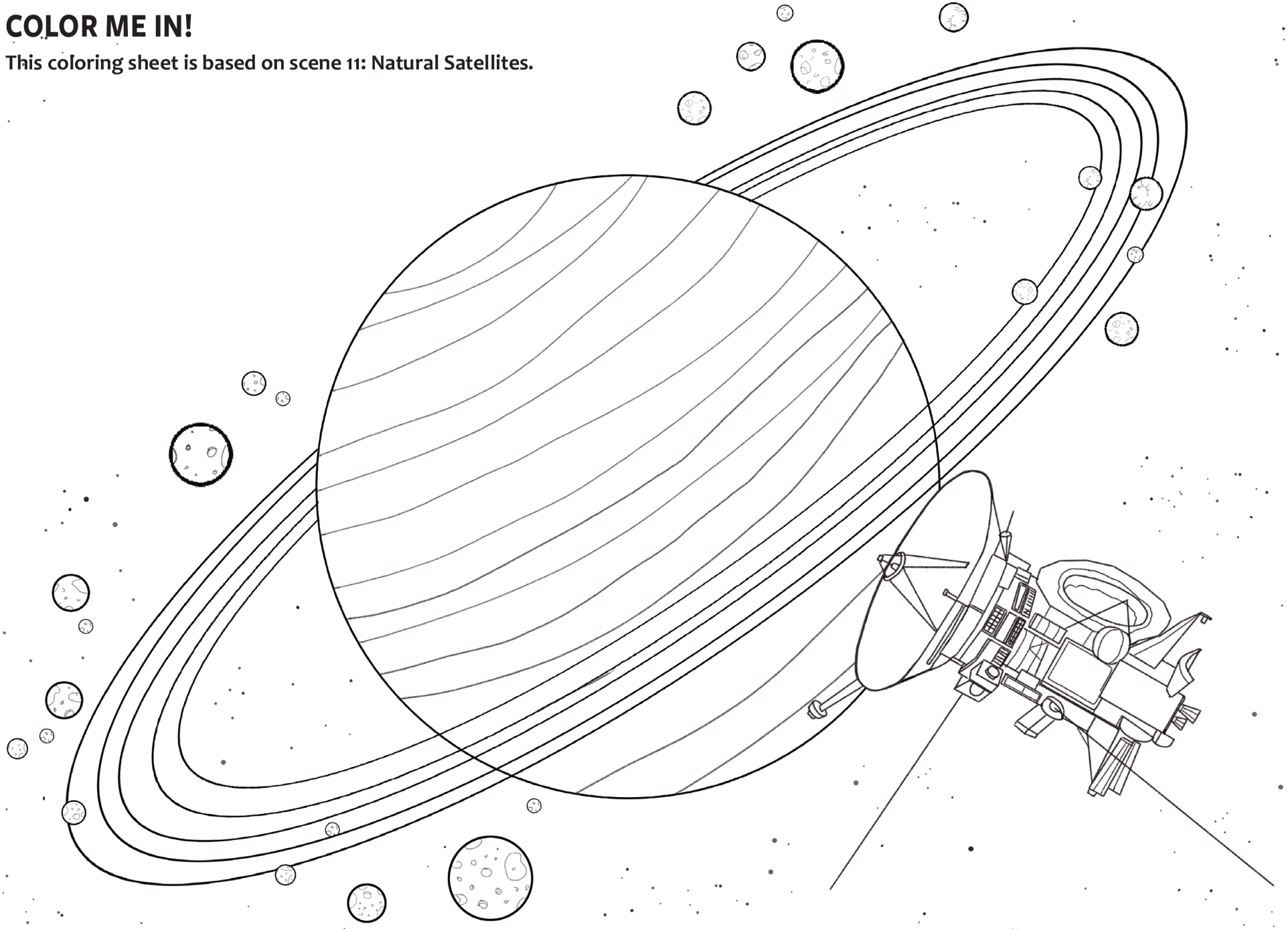
COLOR ME IN!

This coloring sheet is based on scene 7: Space Station Spotting.



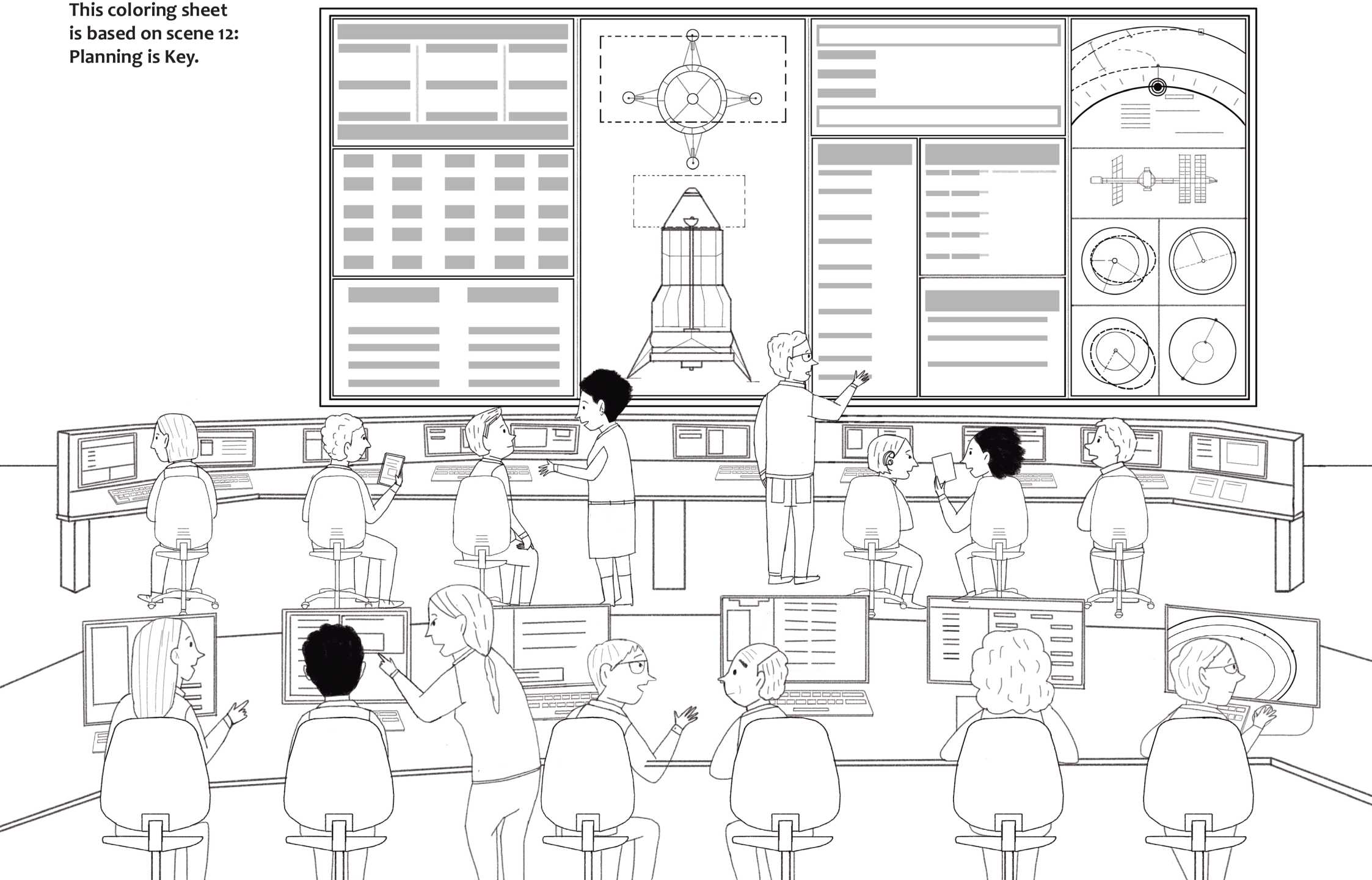
COLOR ME IN!

This coloring sheet is based on scene 11: Natural Satellites.



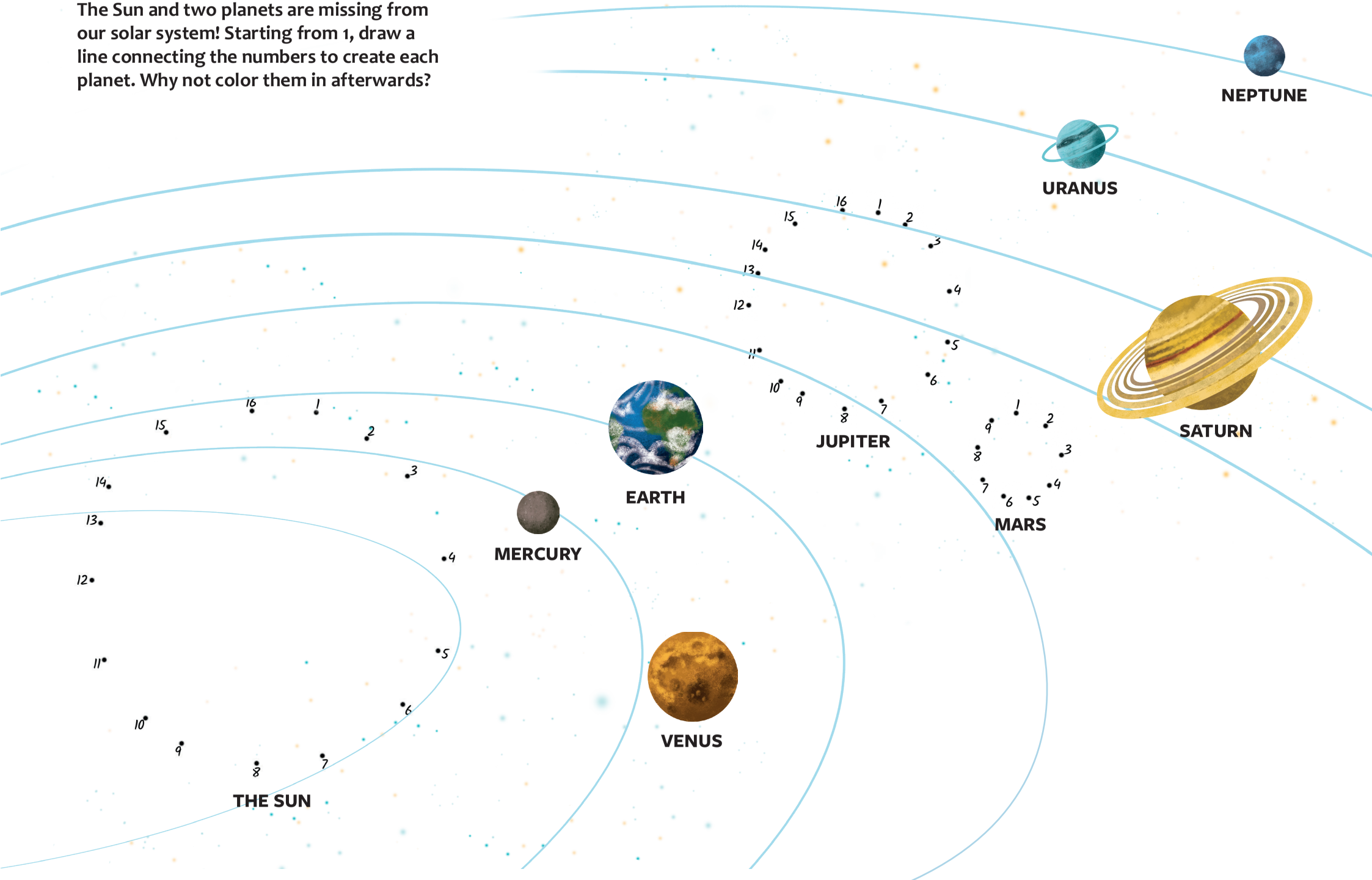
COLOR ME IN!

This coloring sheet is based on scene 12: Planning is Key.



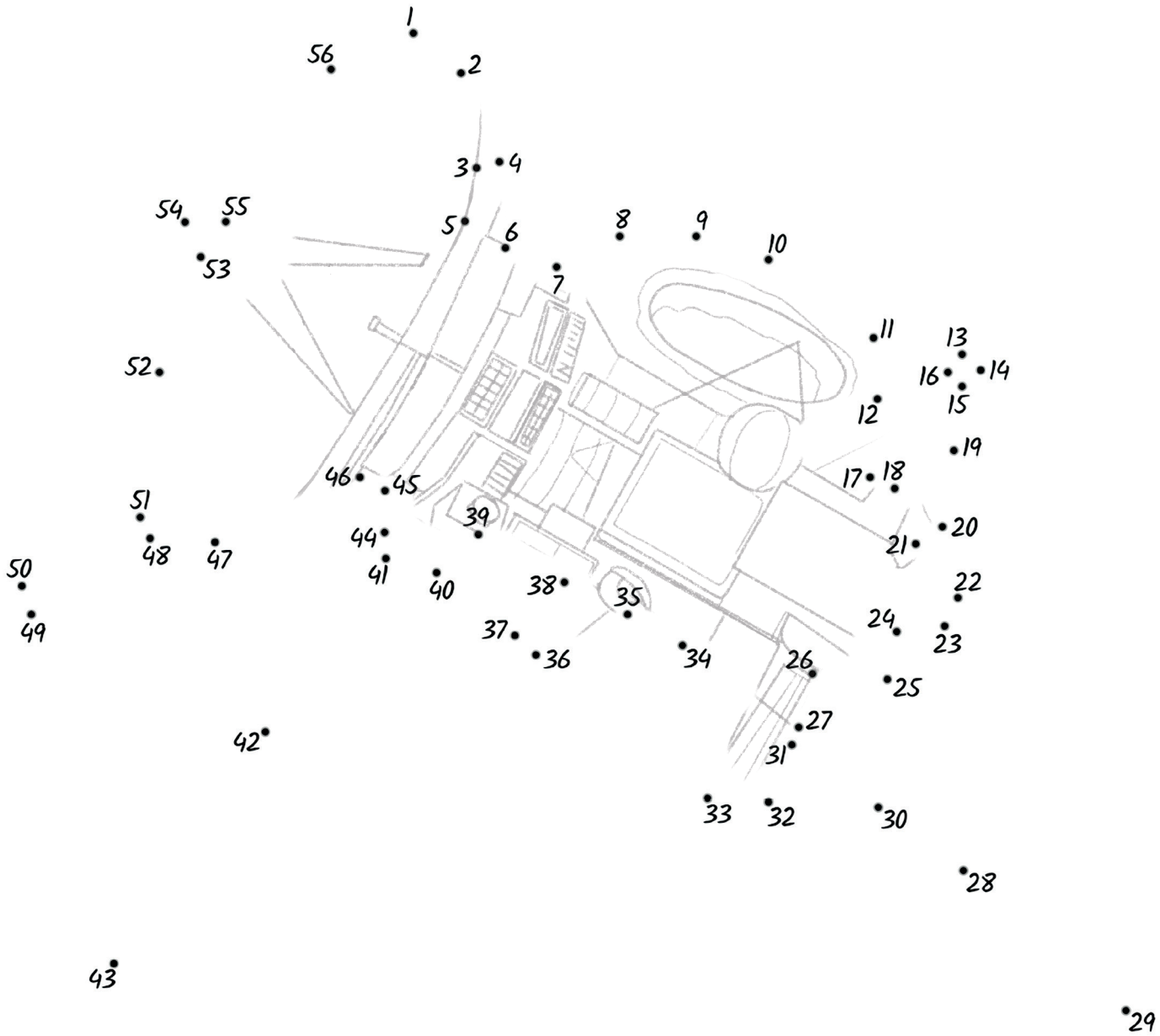
DOT-TO-DOT

The Sun and two planets are missing from our solar system! Starting from 1, draw a line connecting the numbers to create each planet. Why not color them in afterwards?



DOT-TO-DOT

Starting from 1, draw a line connecting the numbers to create a picture. Why not color it in afterwards?



YOUNG ASTRODYNAMICS ENGINEERS' ACTIVITY ANSWERS

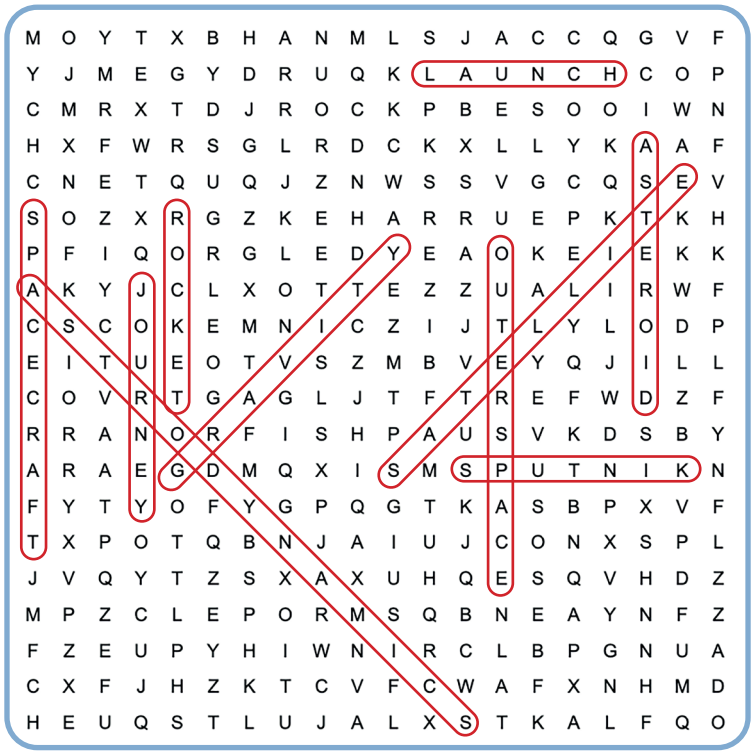
Find the answers to the activities on the following pages.

ACTIVITY ANSWERS

Check your answers against the correct answers below!

OUT-OF-THIS-WORLD WORDS ANSWERS

The answers below are for the "crossword" activity on page 3.



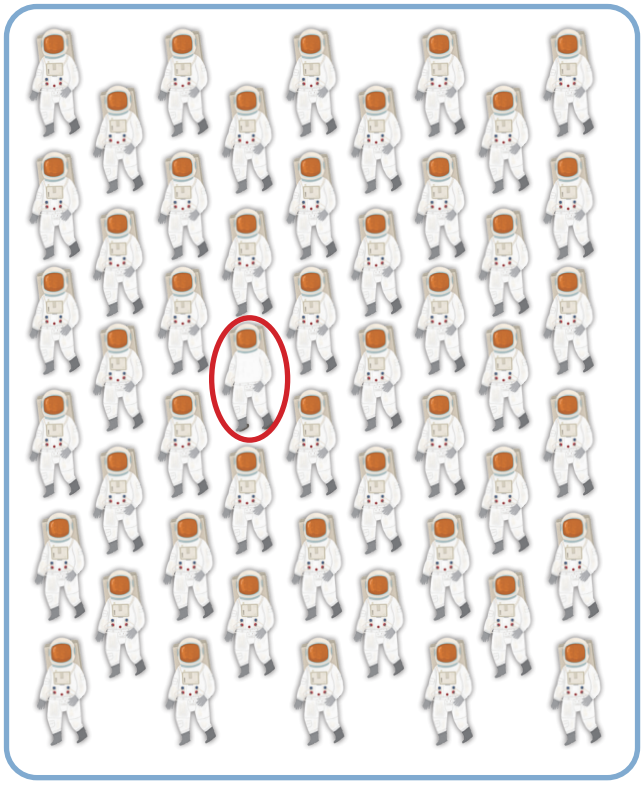
A HIDDEN MESSAGE! ANSWERS

The answers below are for the "decoding challenge" activity on page 4.

I, ISAAC NEWTON,
DISCOVERED THE RULES
OF GRAVITY HERE. I
WONDER WHAT THIS
COULD MEAN FOR THE
FUTURE OF SCIENCE!

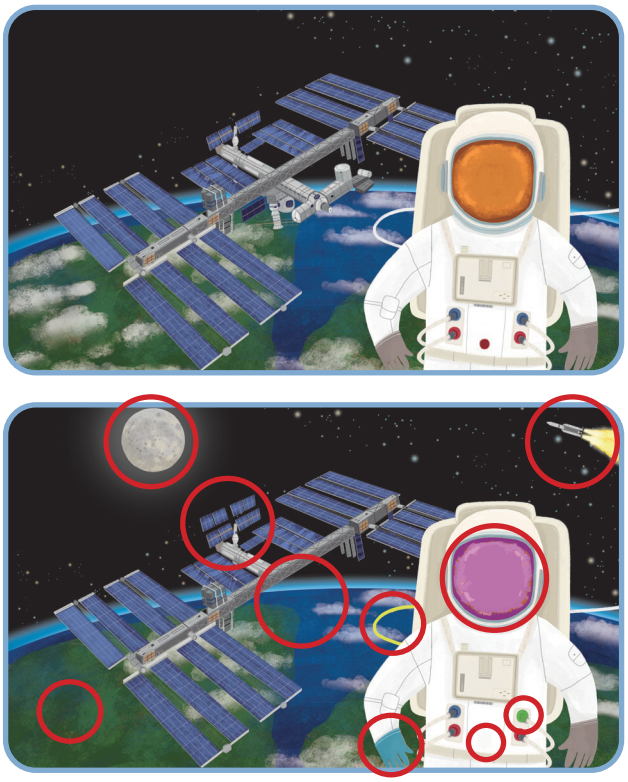
LOOK OUT FOR THE ASTRONAUT ANSWERS

The answers below are for the "odd one out" activity on page 5.



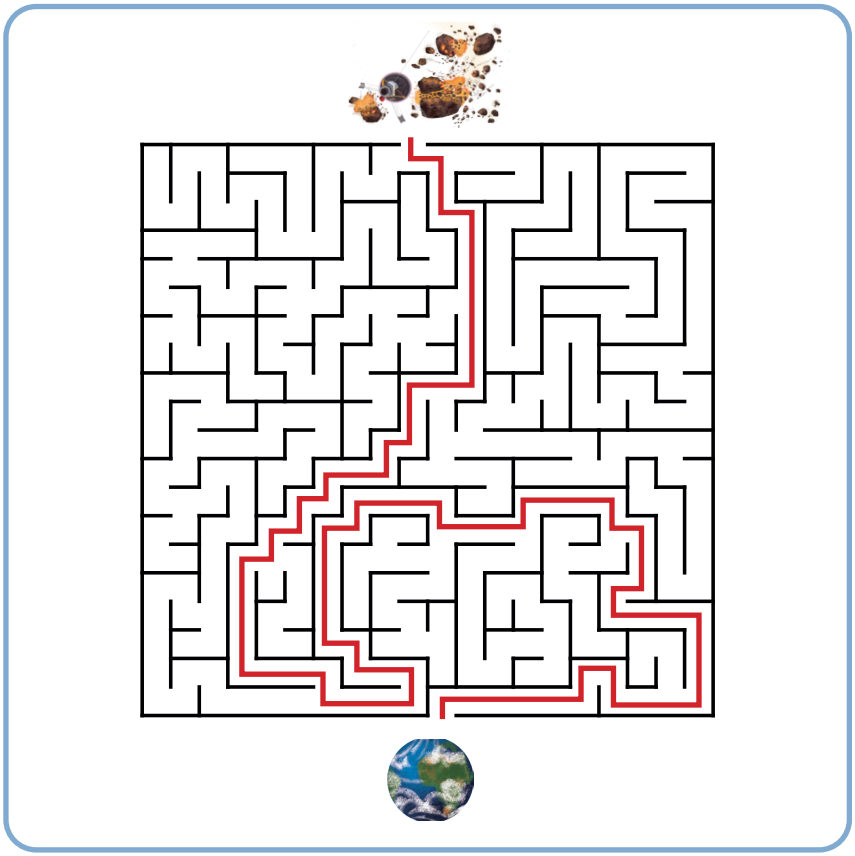
SPACE STATION SPOTTING ANSWERS

The answers below are for the "spot the difference" activity on page 9.



ASTEROID ATTACK! ANSWERS

The answers below are for the "maze" activity on page 10.



SPACE JUMBLE ANSWERS

The answers below are for the "word scramble" activity on page 13.

ELTLESIAST	SATELLITES
NETSALP	PLANETS
ROIDESTSA	ASTEROIDS
SNACISI	CASSINI
TRAEH	EARTH
OSMON	MOONS
NRUTAS	SATURN

LOST ON MARS ANSWERS

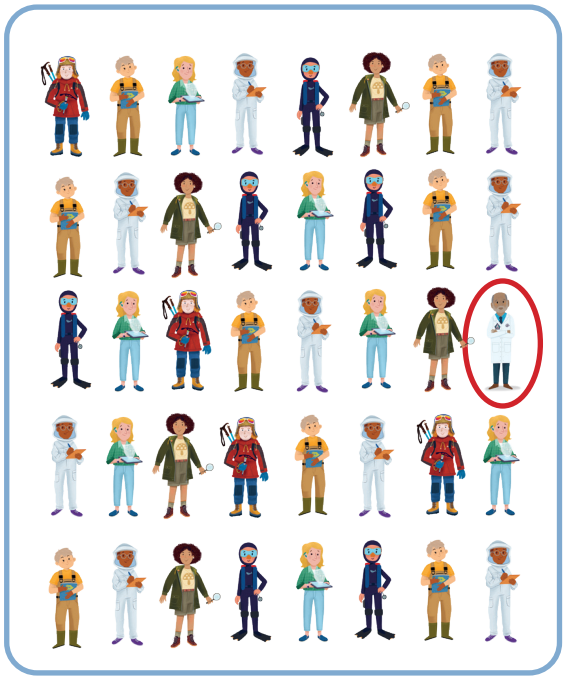
The answers below are for the "line maze" activity on page 15.

EXTRA ACTIVITY ANSWERS

Check your answers against the correct answers below!

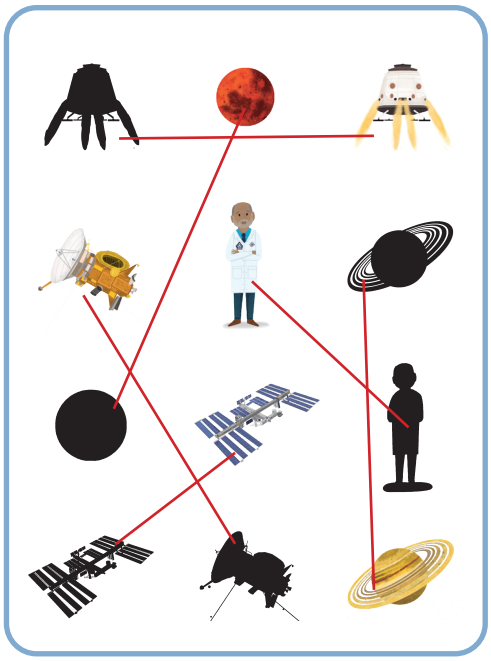
FIND THE SCIENTIST

The answers below are for the activity on page 18.



MATCH THE SHAPE

The answers below are for the activity on page 19.



SIMPLE SUMS

The answers below are for the activity on page 20.