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Te Waka Ātea o Kalani

Kalani's Spaceship

Resource Sheet

Student Name: _____

Class Name: _____

Date Completed: _____

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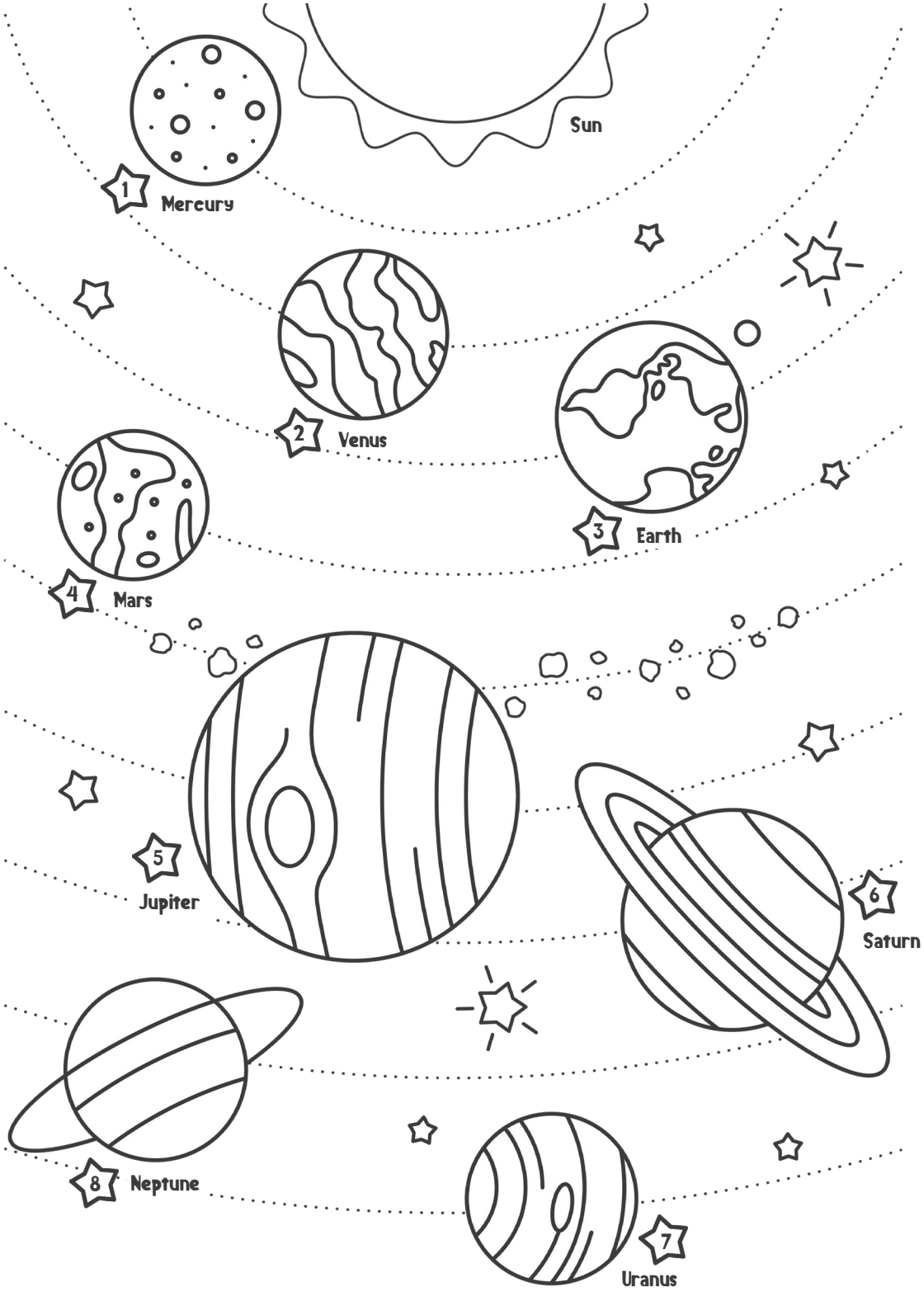
Welcome to Mercury!

1. Howmany planets can you see?

8

2. Lets show Kalani how he will travel through our solar system.
Find all of the numbers and join them up from 1 to 8. Now colour in the solar system!



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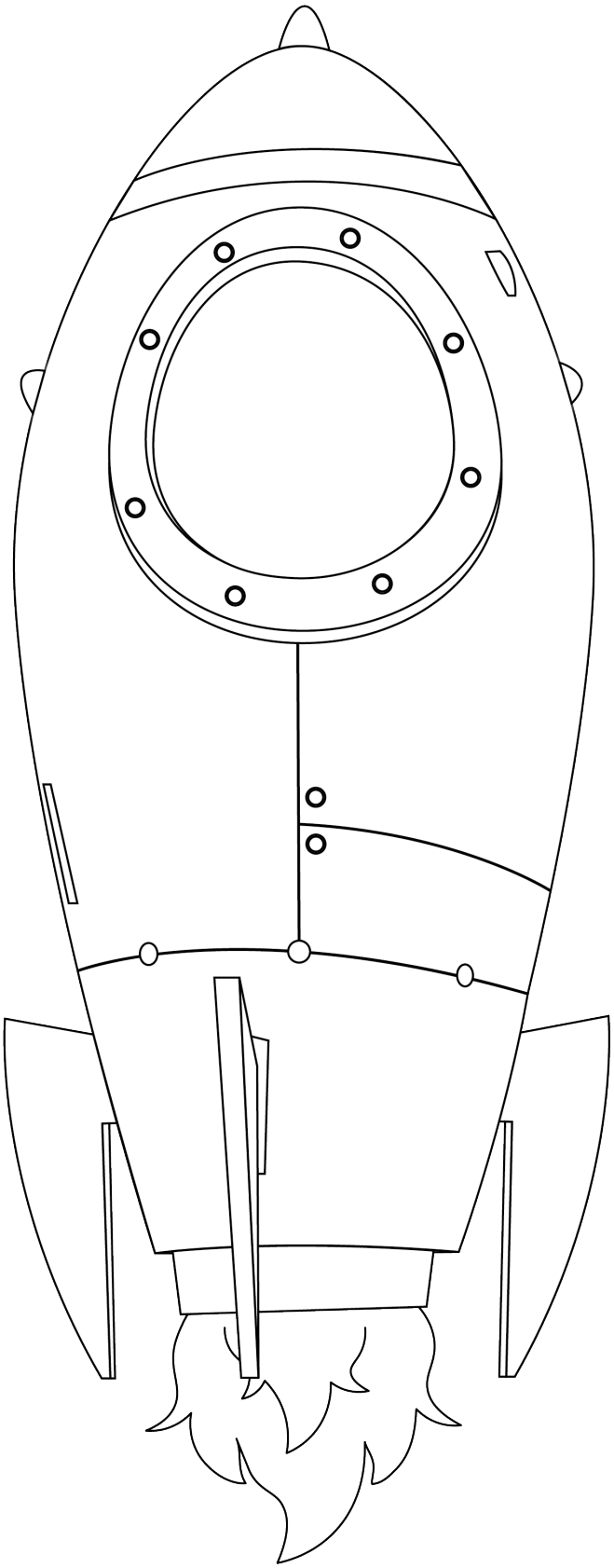
Teacher & Student Activity

Make 11 copies of the rocket.

- **On each rocket, write one numeral from 10 to 1.**
- **On one rocket, write the word, liftoff. Color.**
- **Laminate rockets for future use.**
- **Choose a location in the classroom to place the rockets in a countdown sequence.**



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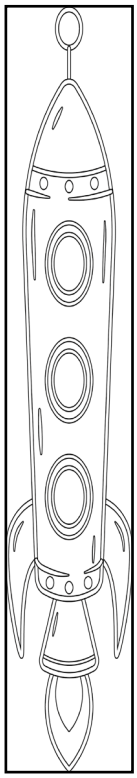
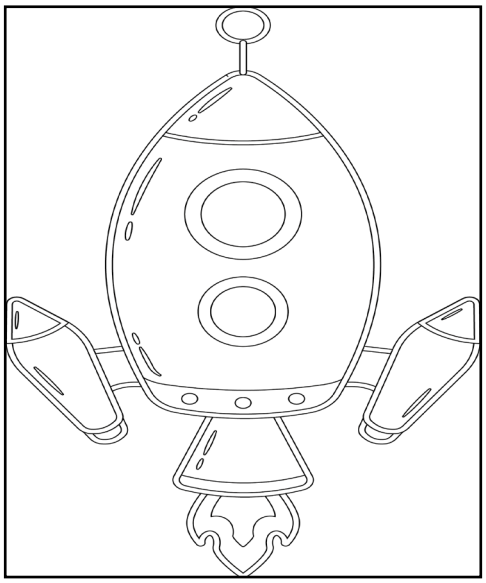
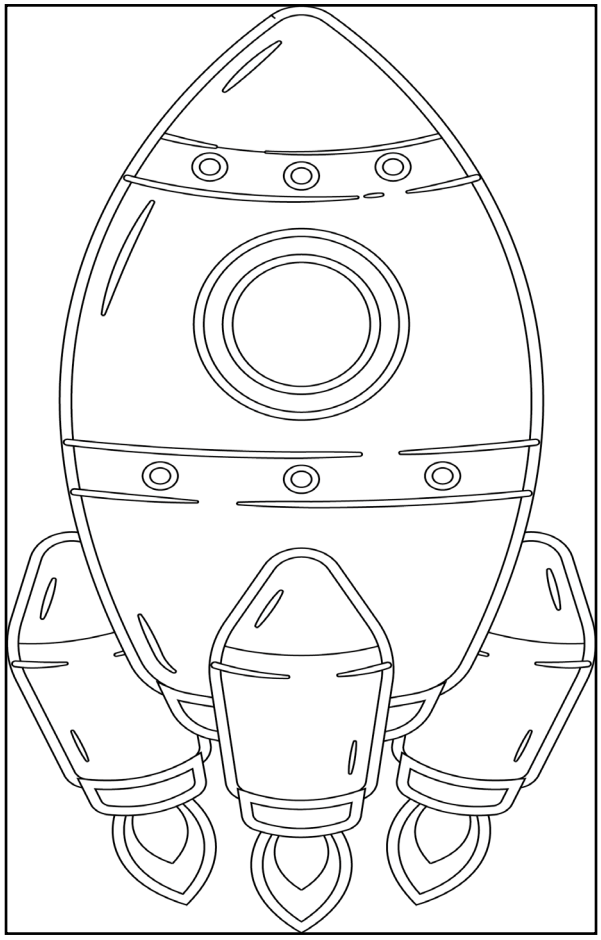
Student Activity

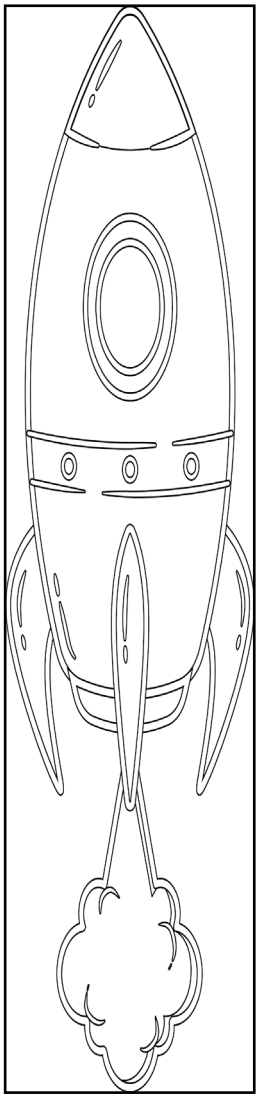
Colour in, cut out and order the rockets by size (use the box outline as a guide).

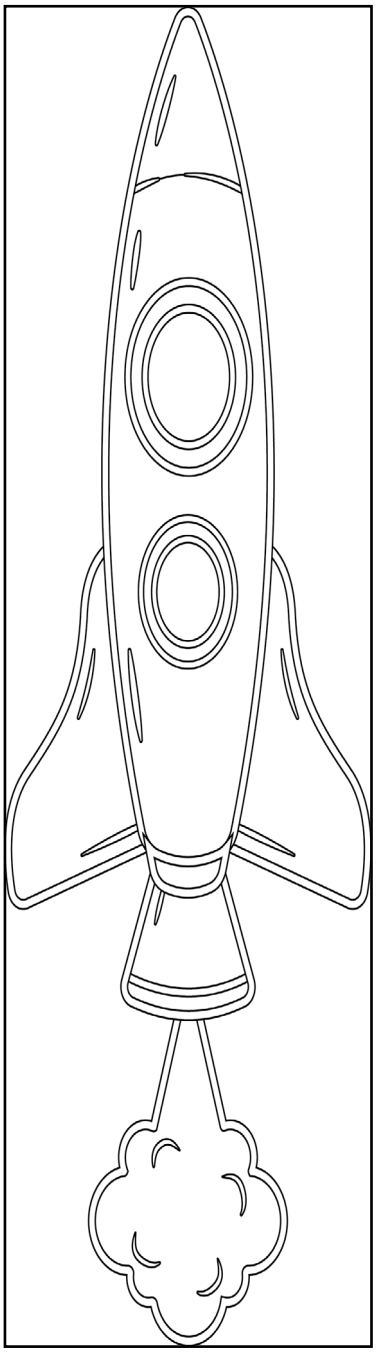
- **Shortest to tallest**
- **Widest to thinnest**











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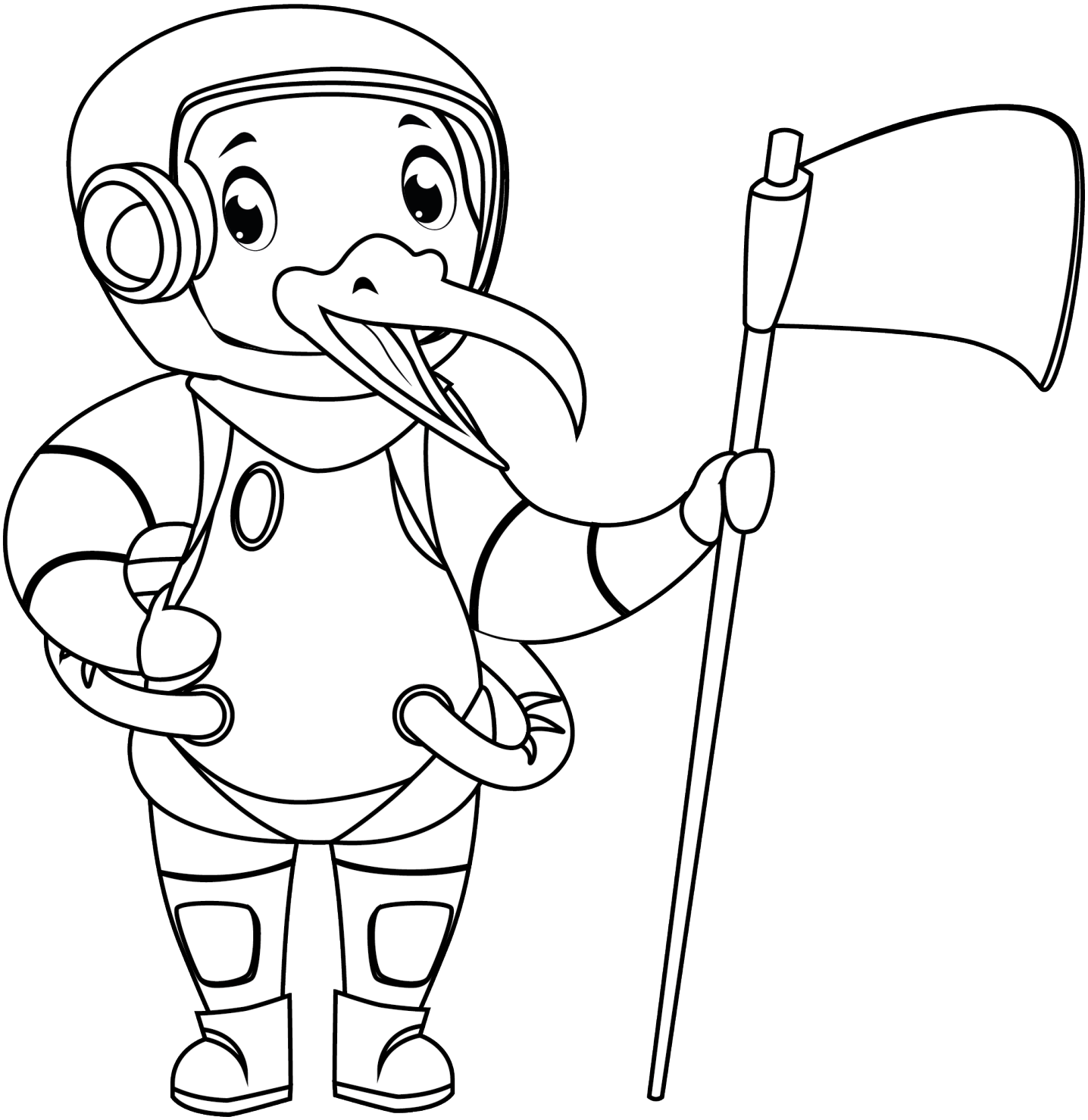
Questions:

1. How old are you? (in years)

2. How many months are there until your next birthday?

Student Activity:

Colour in Kalani and design your own flag!



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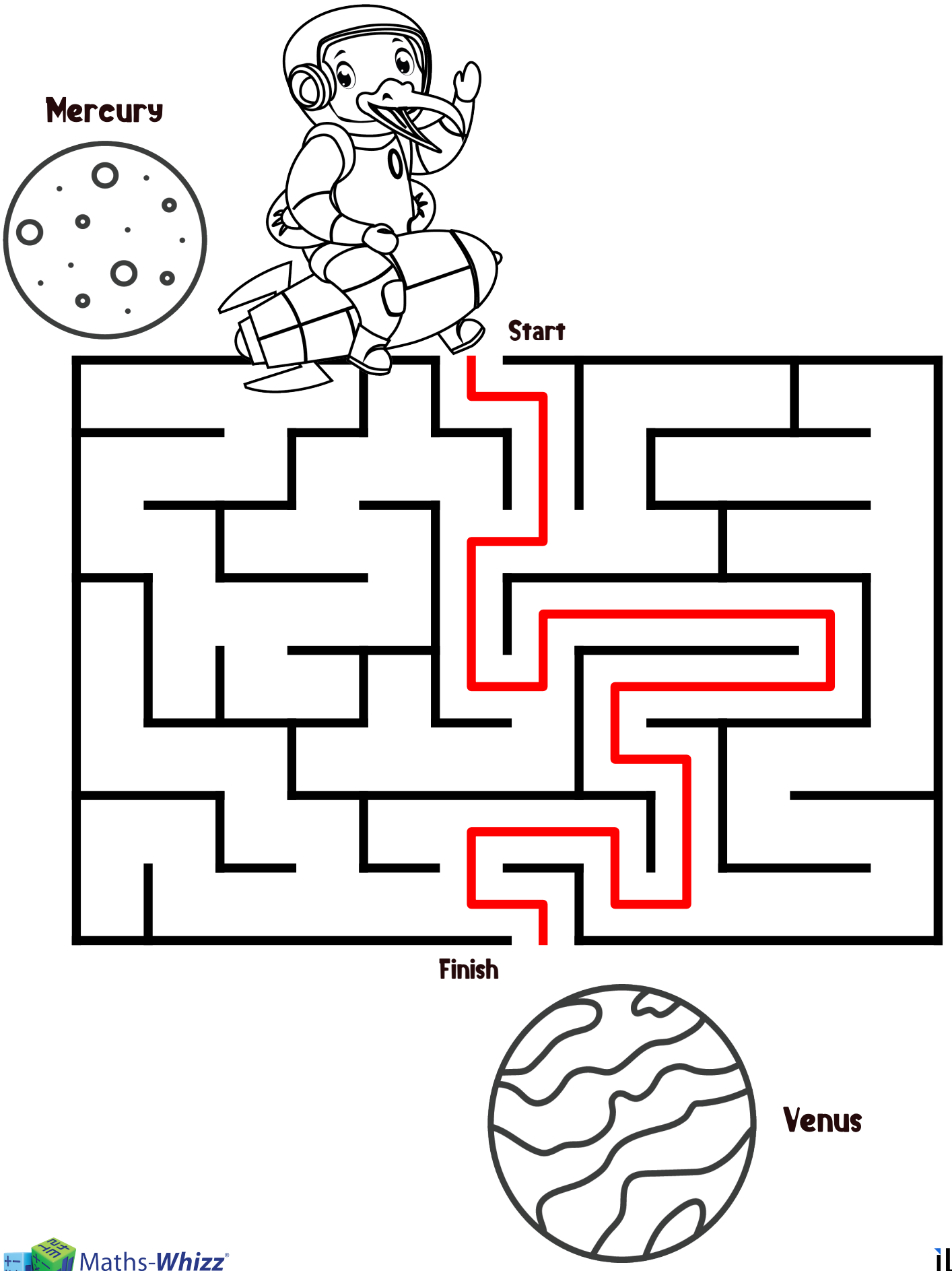
Student Activity

Help Kalani make his way through the maze to get from Mercury to Venus.



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Welcome to Venus!

Questions:

1. Howmany moons can you see?

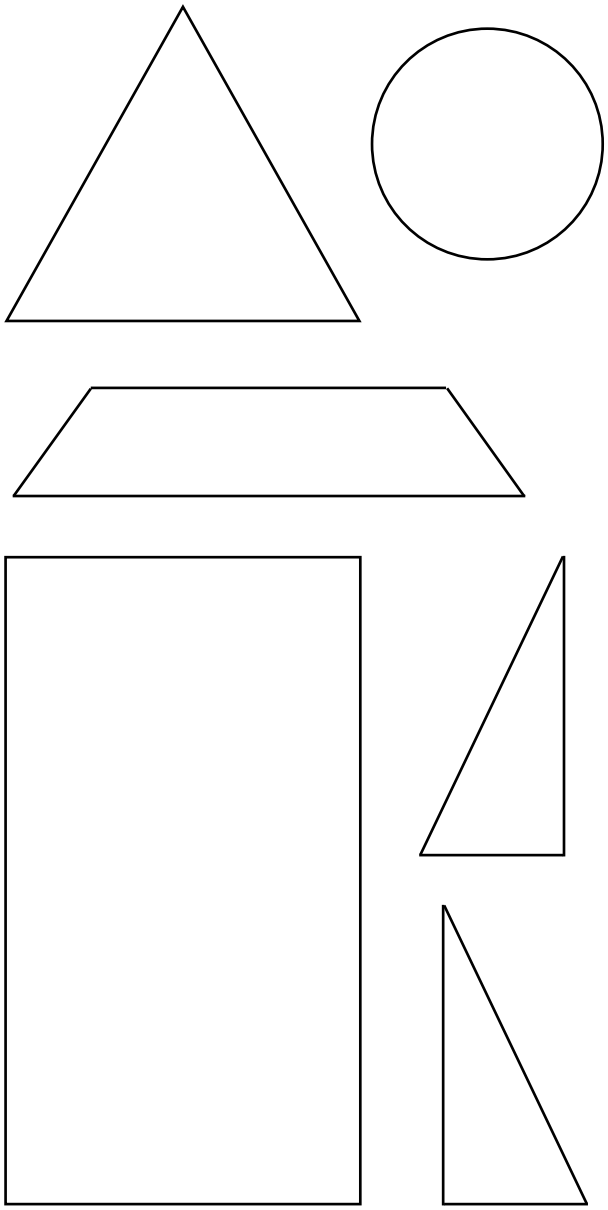
12

2. How old are you in years?

3. How old are you in months?

Student Activity

Can you draw a waka ātea (spaceship) using these shapes:



Draw here:

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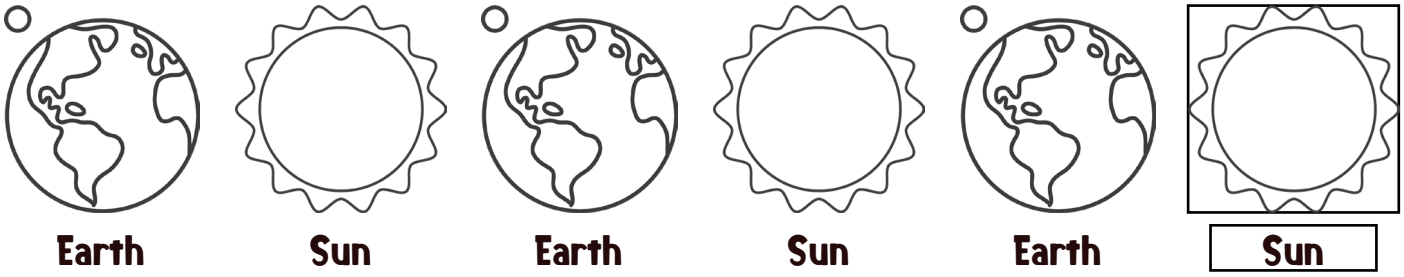
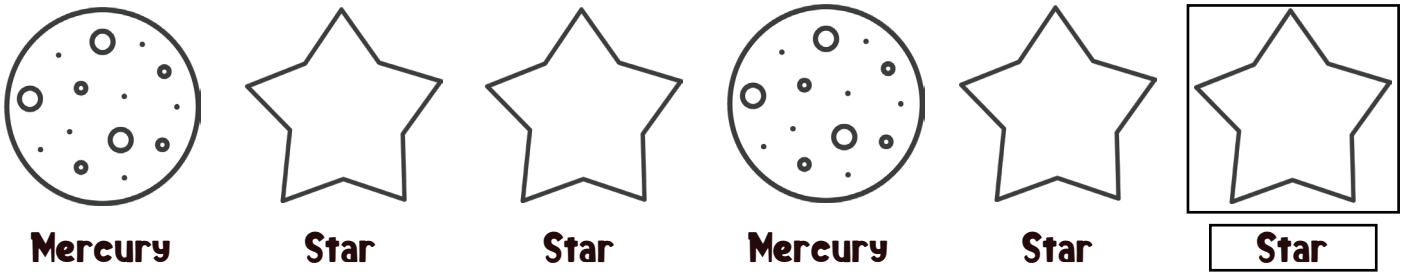
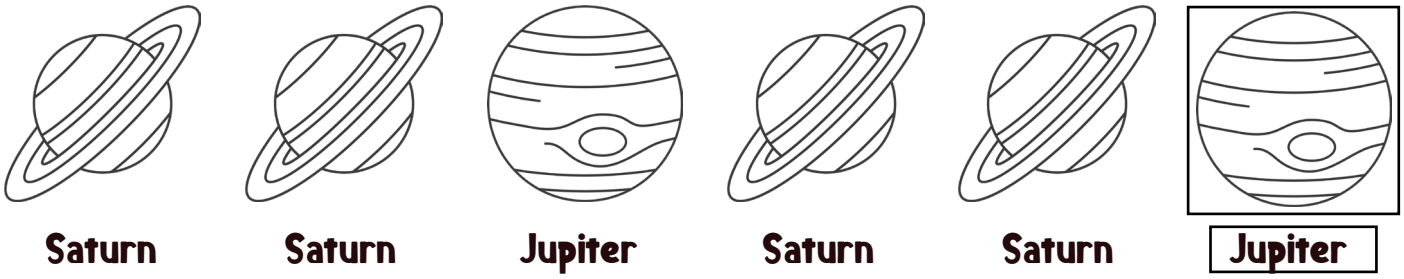
Student Activity

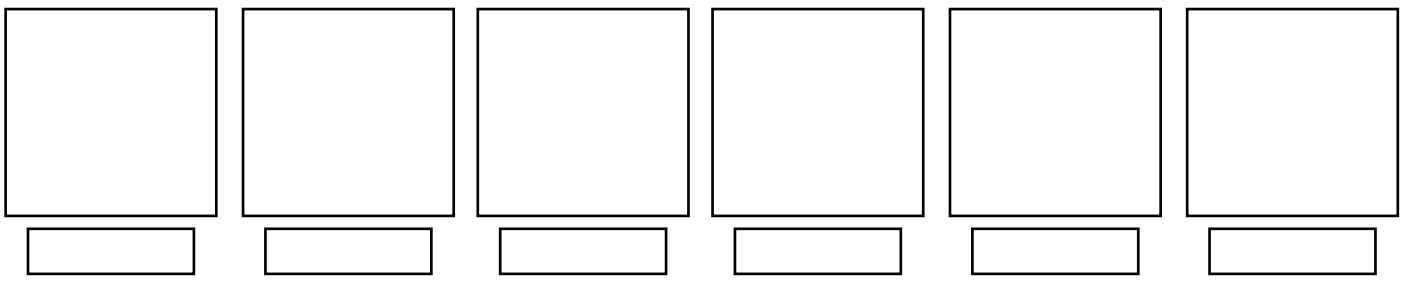
What comes next?







Make your own repeating pattern using objects found in our solar system.



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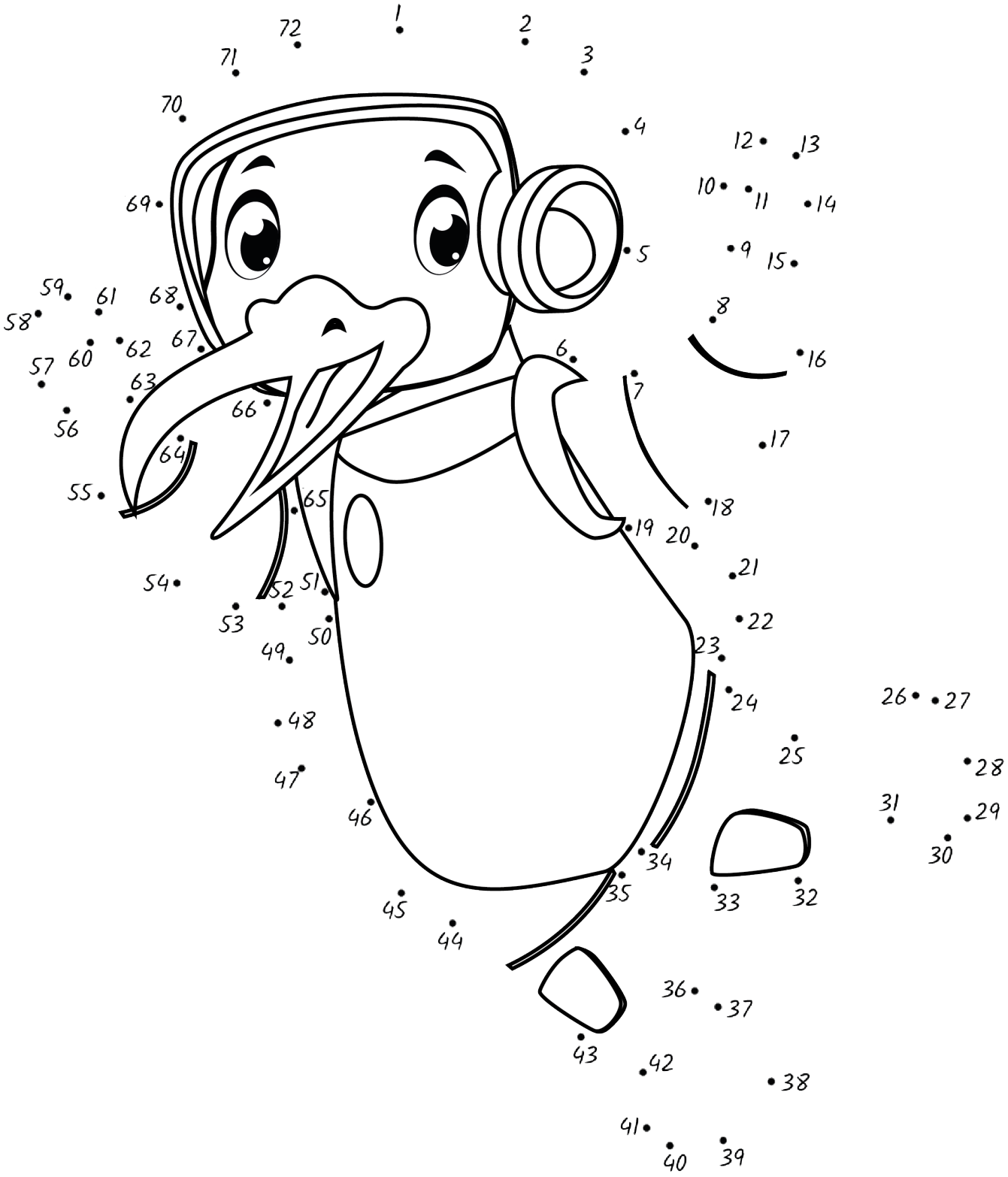
Student Activity

Join the dots to make Kalani the Kiwi 's Astronaut Suit



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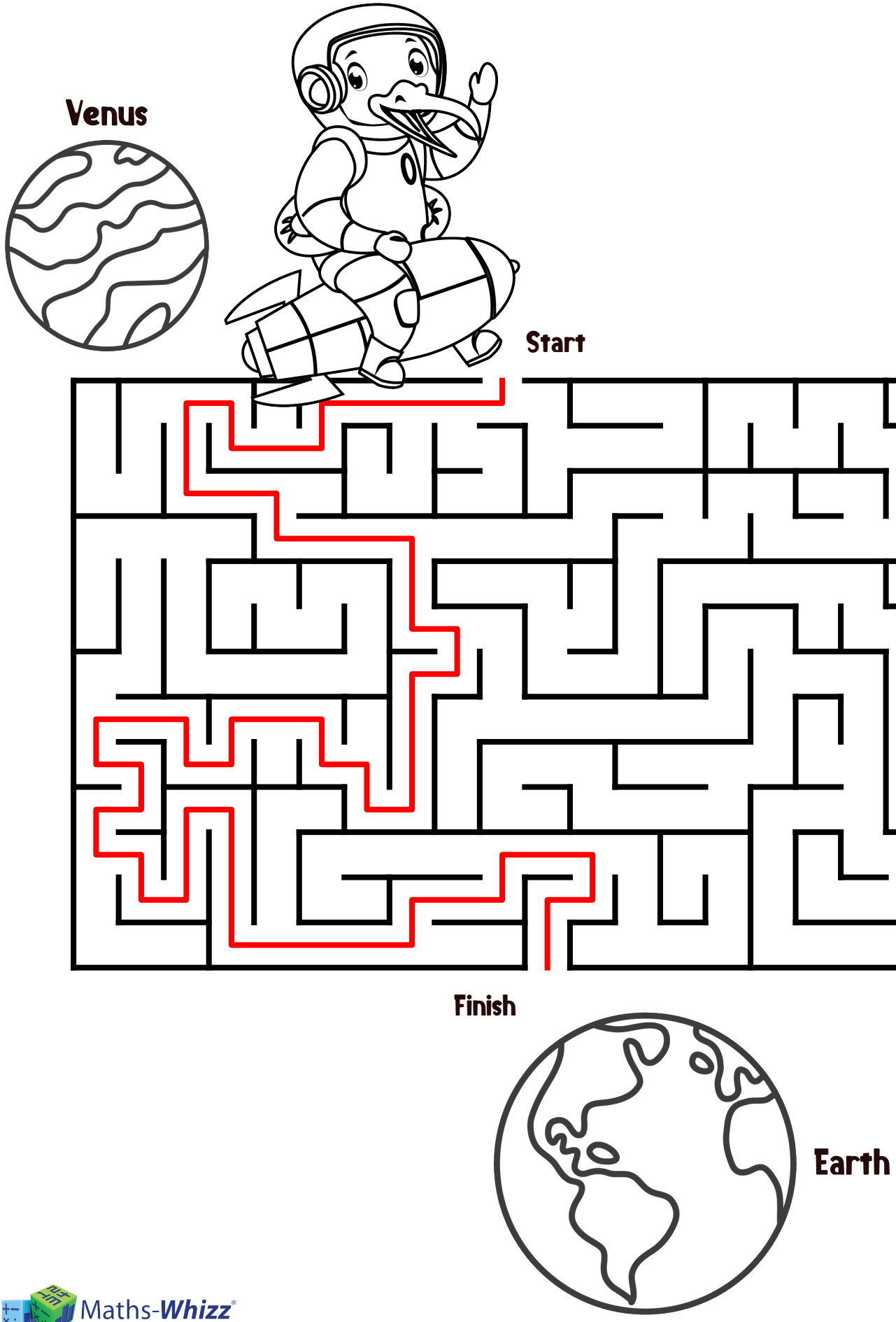
Student Activity

Help Kalani make his way through the maze to get from Venus to Earth.



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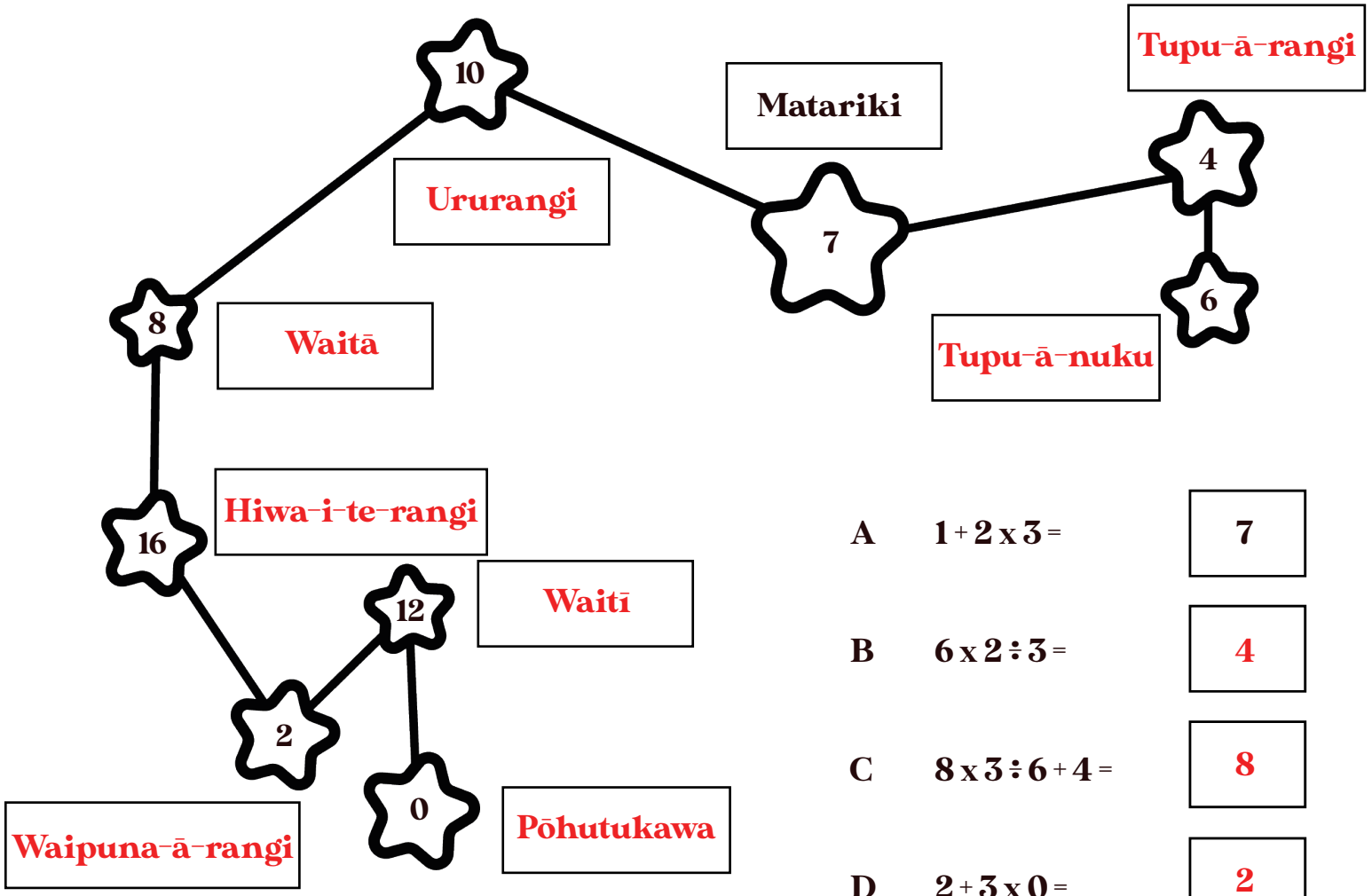
Welcome to Earth!

Student Activity

Here are the Matariki Stars. Solve these equations to find out which name goes with which star.



A	Matariki	H	Pōhutukawa
B	Tupu-ā-rangi	I	Waitī
C	Waitā		
D	Waipuna-ā-rangi		
E	Tupu-ā-nuku		
F	Ururangi		
G	Hiwa-i-te-rangi		

A	$1 + 2 \times 3 =$	7
B	$6 \times 2 \div 3 =$	4
C	$8 \times 3 \div 6 + 4 =$	8
D	$2 + 3 \times 0 =$	2
E	$10 \times 2 - 14 =$	6
F	$(2 + 3) \times 2 =$	10
G	$1 + 3 + 5 + 7 =$	16
H	$1 \times 3 \times 5 \times 7 \times 0 =$	0
I	$6 \times 4 \div 2 =$	12

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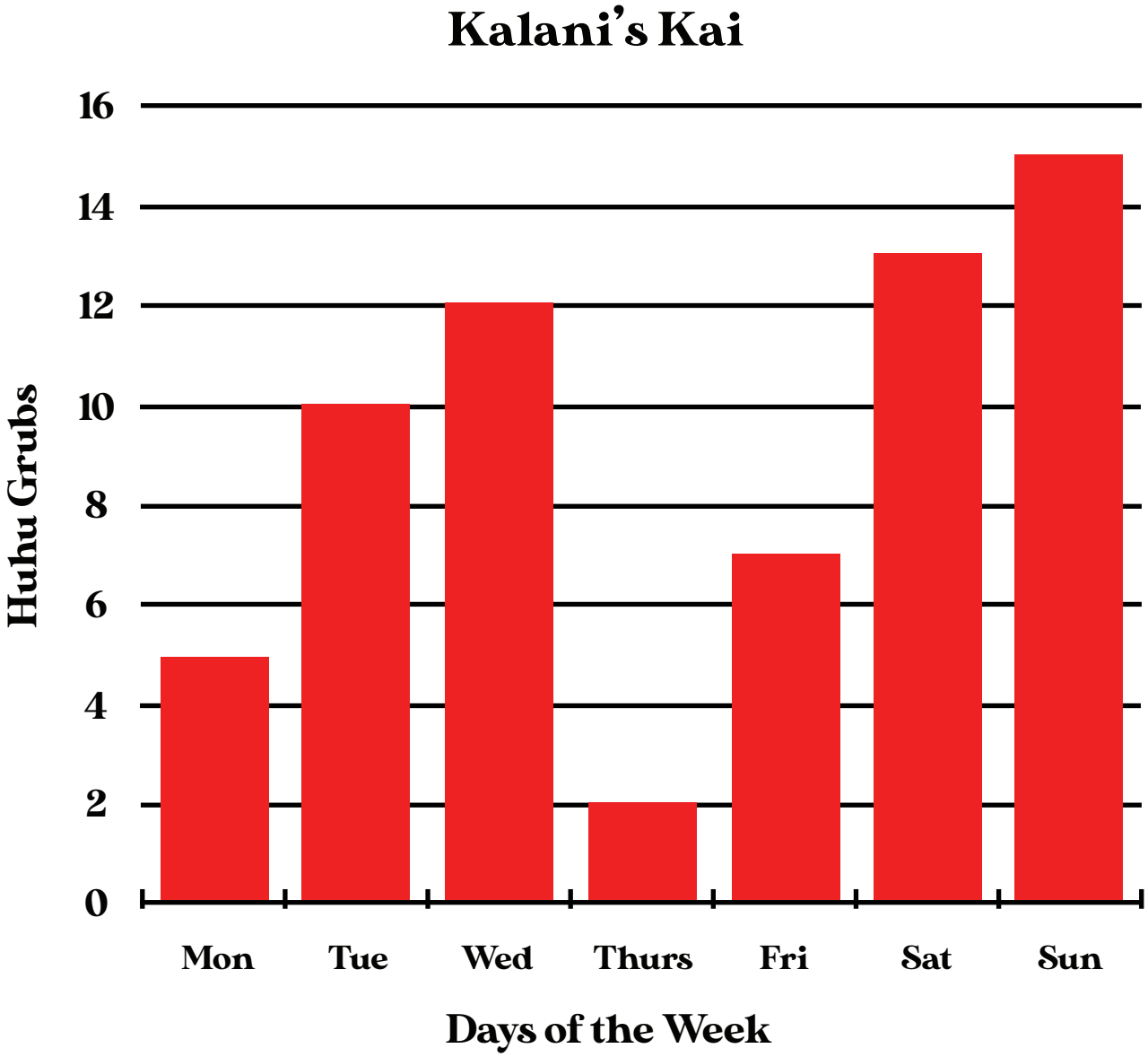
Questions:

Kalani is hungry after his journey and goes into the bush to get some kai.

On Monday he found 5 huhu grubs
On Tuesday he found 10 huhu grubs
On Wednesday he found 12 huhu grubs
On Thursday he found 2 huhu grubs
On Friday he found 7 huhu grubs
On Saturday he found 13 huhu grubs
On Sunday he found 15 huhu grubs

1. Complete the bar graph showing how many huhu grubs Kalani got each day.



2. What day did Kalani get the most Huhu grubs?

Sunday

3. How many Huhu Grubs did Kalani get altogether in one week?

64

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Student Activity

Look at the house and draw the reflection of the shape in the mirror line. See how many dots away the shape is from the mirror line. Use the dots to guide you. Make sure the distance is the same from the mirror line.

1. How many dots do you draw through to create the house?

15

2. What are the names of the two shapes used to build this house?

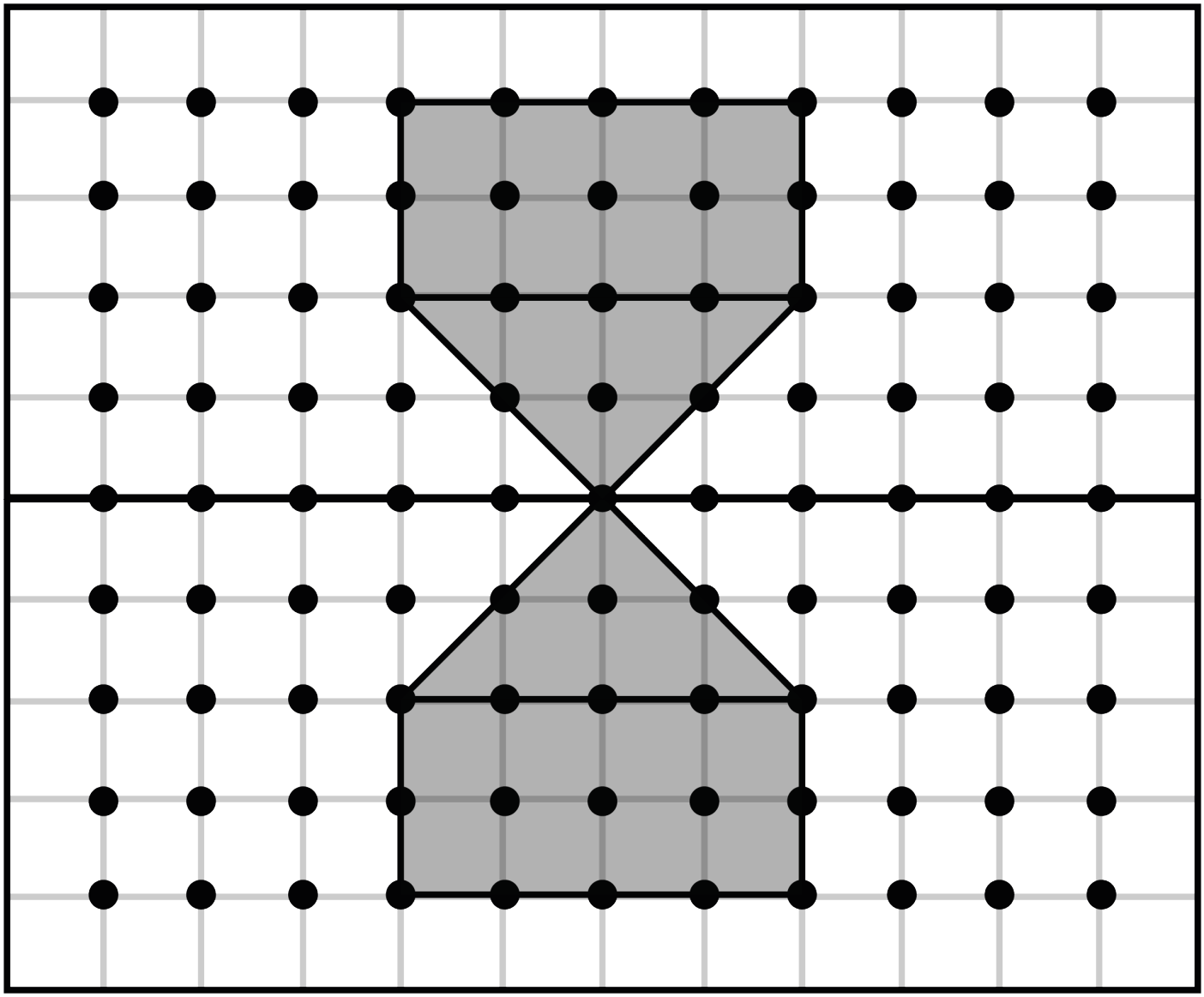
Rectangle & Triangle

3. How many dots wide is the house?

5

4. How many dots tall is the house?

5



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Questions:

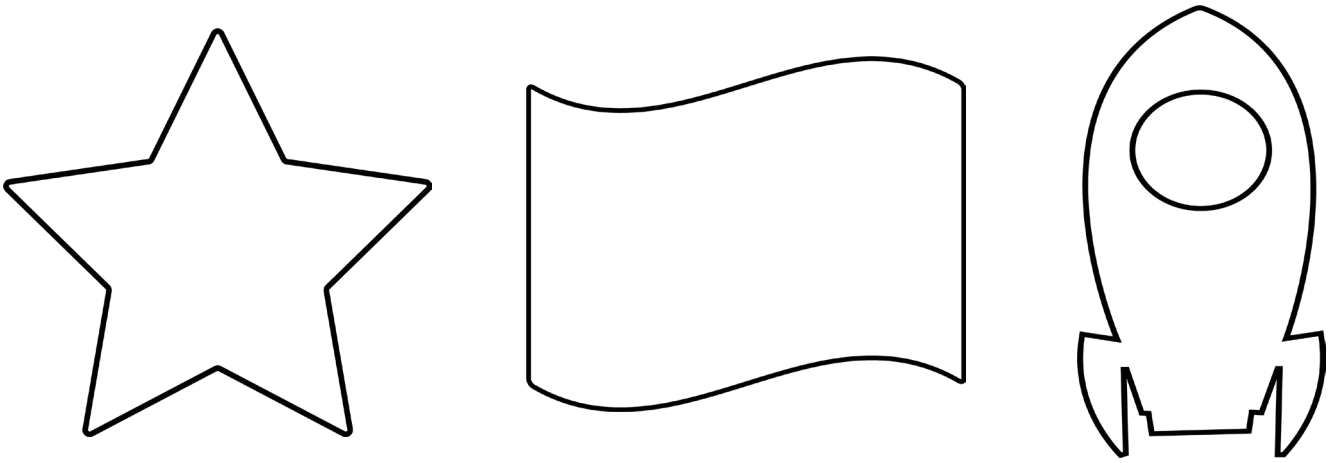
Rotational Symmetry (Refer to the digital version)

1. How many ways can the flag fit back in it's spot?

2

2. How many ways can the spaceship fit back in it's spot?

1



Questions:

1. If there are 4 spots on each ladybird, how many spots are there in total on 6 ladybirds?

24

2. 32 lunches were brought to Kalani's class but there were only 27 students at school. How many lunches were left over?

5

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Questions:

Kalani has a feijoa tree and is selling them at the market.

- **Feijoas sell for $12 per kg.**
- **Kalani picked 10 kg of feijoas for the market**
- **Each bag contained 20 feijoas and weighed 2kg.**

1. How many bags of feijoas did Kalani take to the market?

5

2. How much did each feijoa weigh?

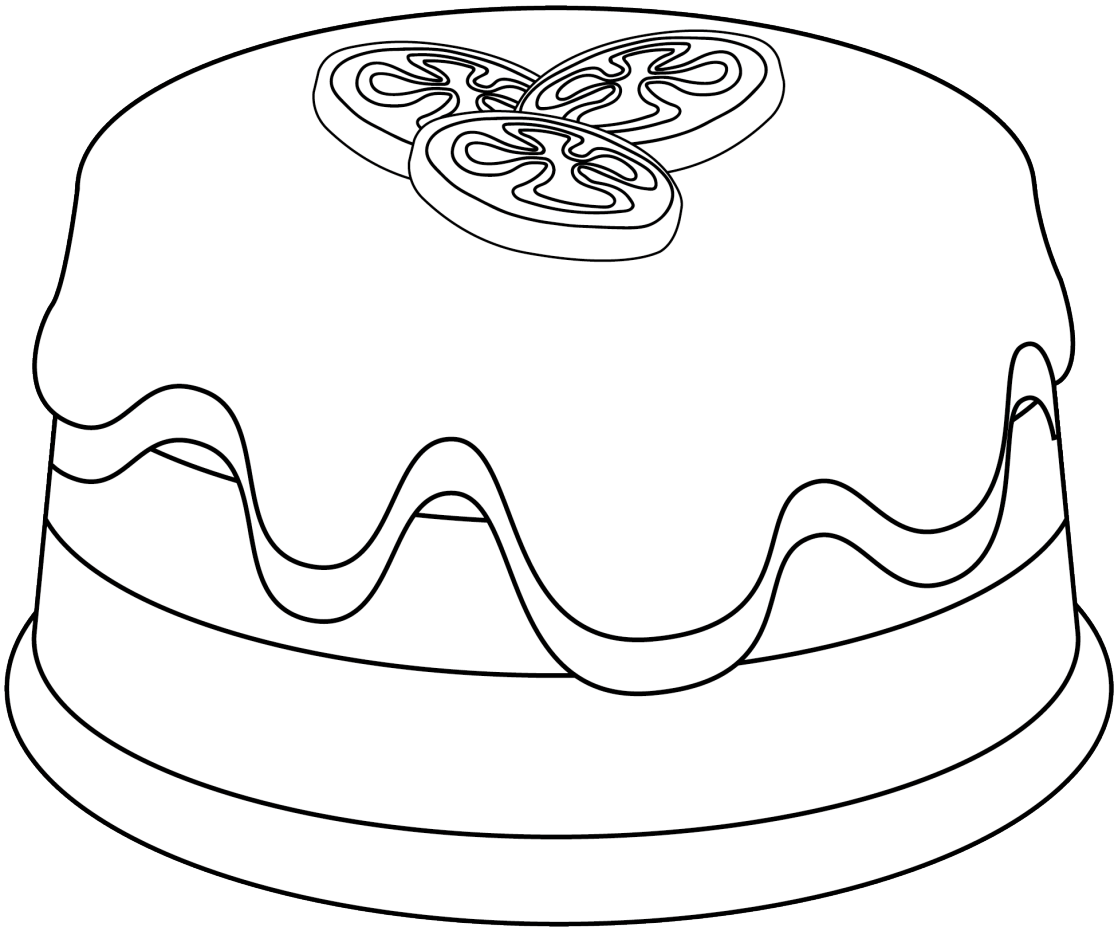
100g

3. Kalani sold 4 kg of feijoas. How much did he make?

$48

Kalani had so many feijoas he decided to make a cake to take to Mars (look at the recipe on the digital version)

Colour in the feijoa cake and finish decorating it!



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Questions:

What is the total weight in grams if Kalani adds the flour, baking powder, baking soda, salt and cinnamon together?

259.5g

If 1 egg is 30 ml, how many mls are there if you add the milk and eggs together?

180ml

If he doubled the recipe:
How many grams of butter would he need?

150g

How much sugar would he need?

300g

How much milk would he need?

240ml

How much cinnamon would he need?

5g

If Kalani cut it into 12 pieces and ate 6 of them what fraction of the cake would be left?

1/2

If Kalani cut it into 12 pieces and ate 2 of them what fraction of the cake would be left?

10/12 or 5/6

If Kalani ate 3/4 of the cake, how many pieces would he have eaten?

9

If Kalani ate 1/6 of the cake, how many pieces would he have eaten?

2

Questions:

1. How old are you in years?

2. How old are you in months?

3. How old are you in weeks?

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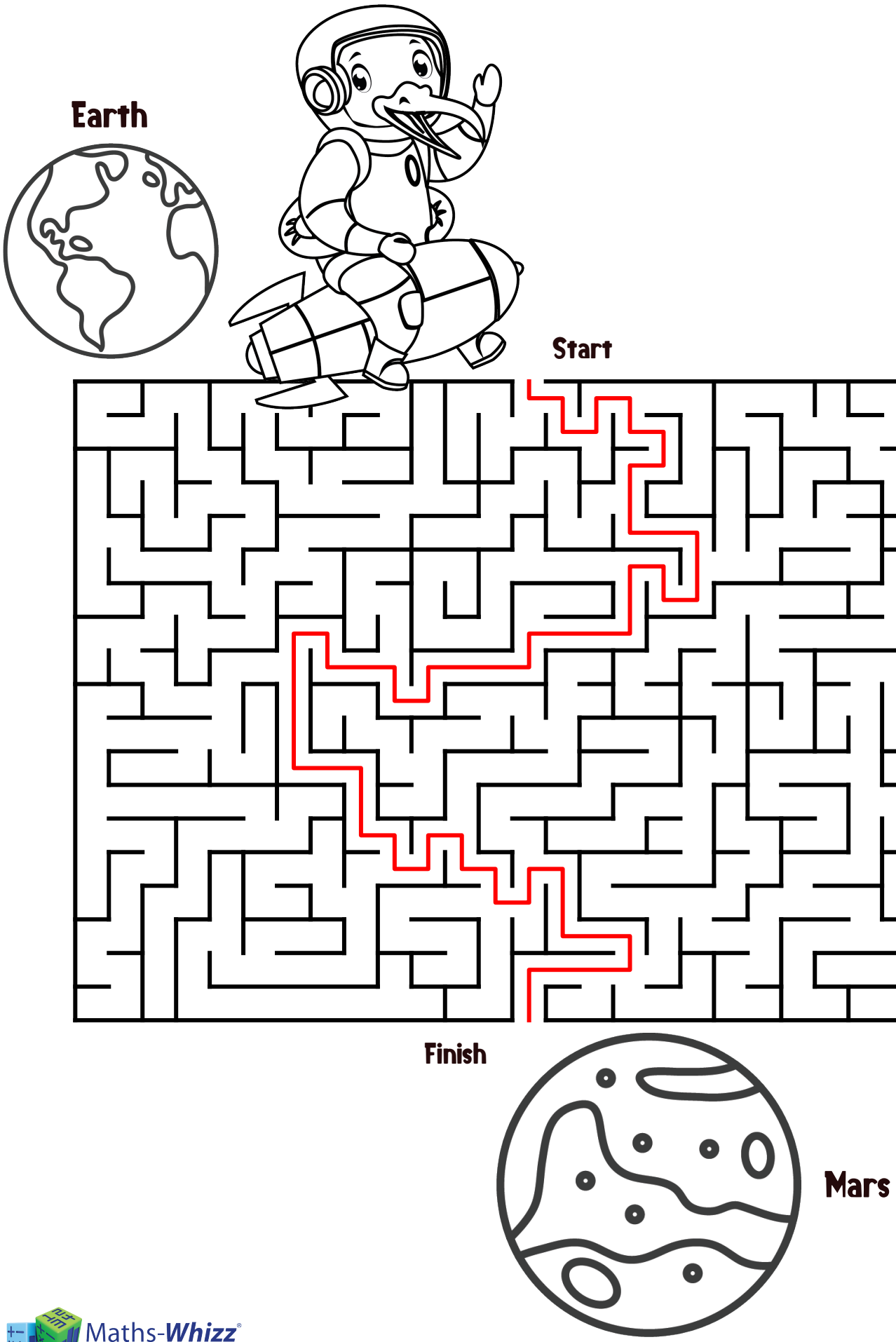
Student Activity

Help Kalani make his way through the maze to get from Earth to Mars.



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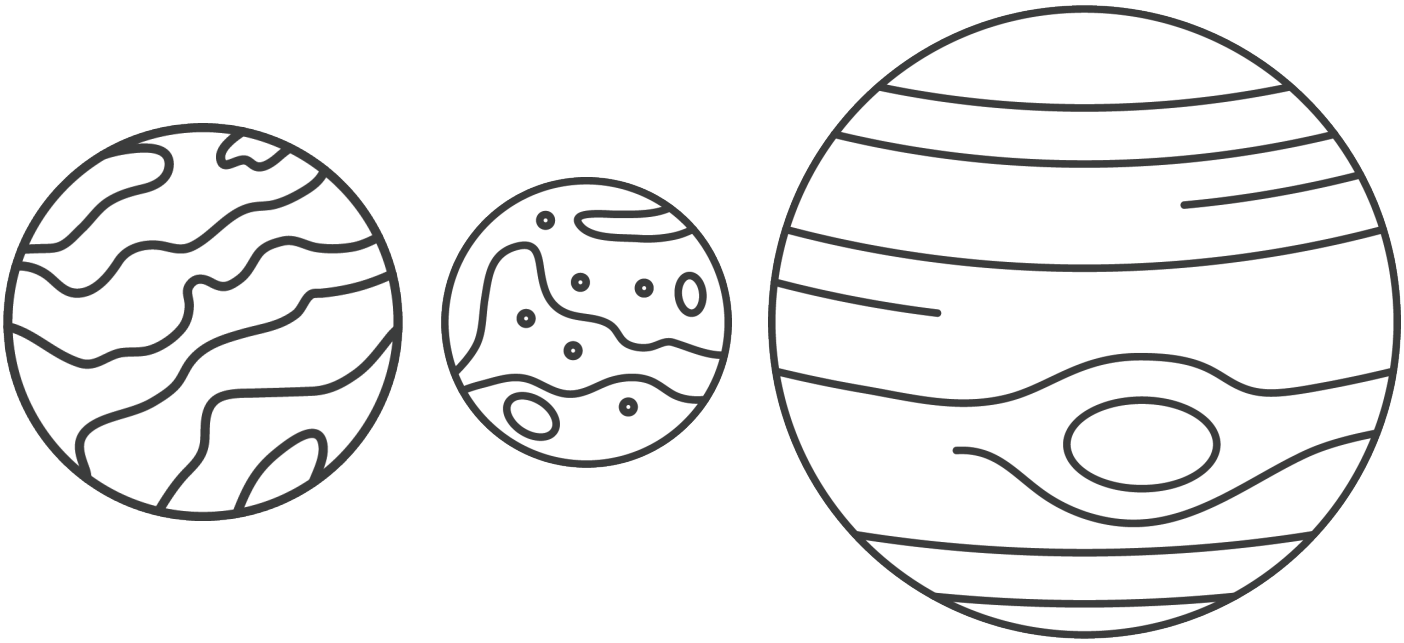
Welcome to Mars!

Questions:

The planets in our solar system are all different sizes, but they are all the same shape. Here are some examples:

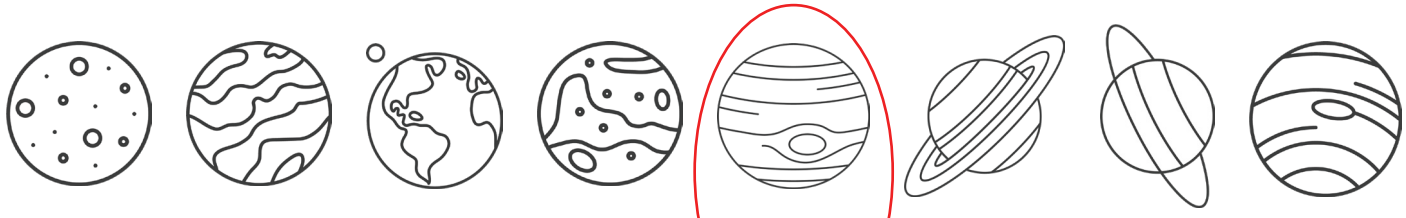


1. In maths, what is the name we give to the shape of a planet?

Sphere or Circle

The distance from edge to edge of the planet at the widest point is called it's diameter. Here are all our planets with their diameters (in kms).

2. Circle the largest planet



Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune
4900	12,100	12,800	6800	143,000	121,000	51,000	50,000

3. Which planet is the closest in size to Earth?

Venus

4. Which planet is the smallest?

Mercury

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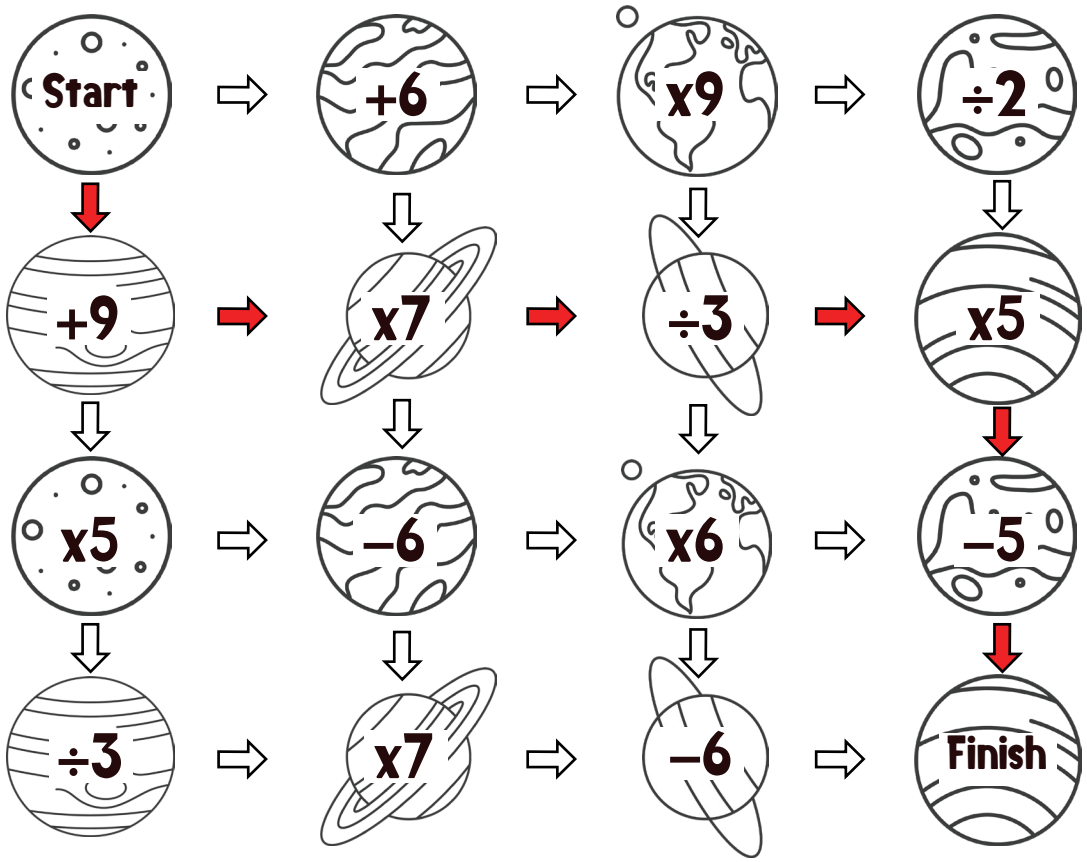
Student Activity

Waka Ātea Data Log

Changes you make	Distance Traveled in cm				
	Test 1	Test 2	Test 3	Test 4	Test 5

Questions:

Find a route from 'start' to 'finish' that totals exactly 100.
Start from 0 and colour in the arrows that create the path to equal 100.



1. Which route has the highest total? (eg. +6, x7, −6, x6, etc.)

+9, x7, −6, x7, −6 = 393

2. Which route has the lowest total?

+6, x7, ÷3, x5, −5 = 65

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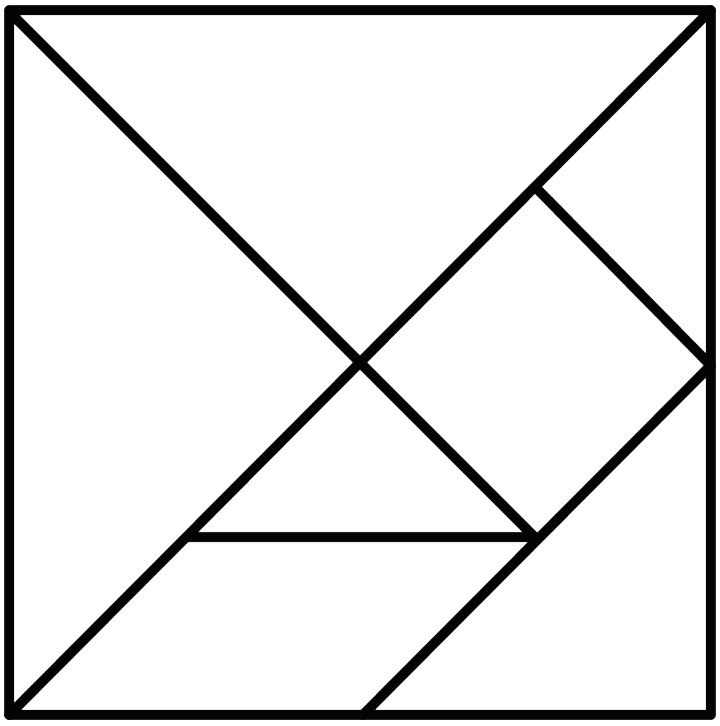
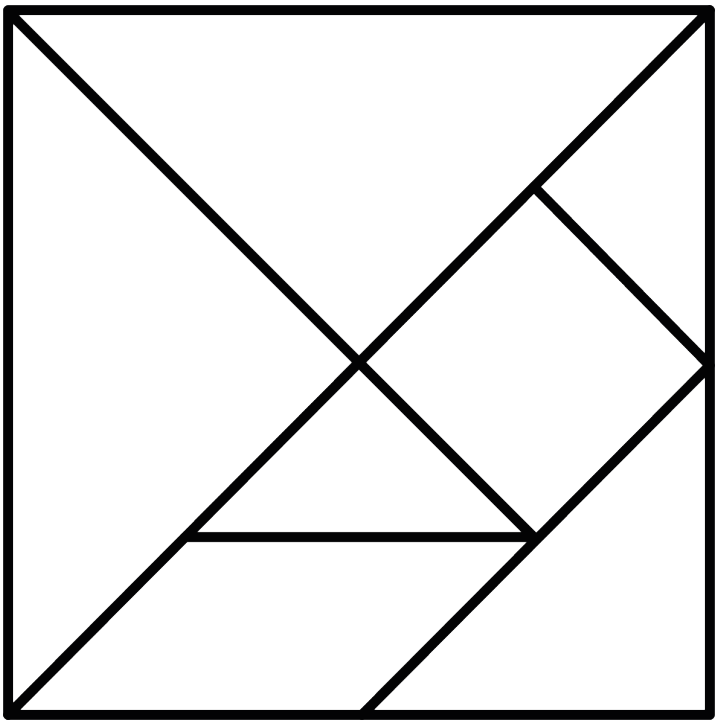
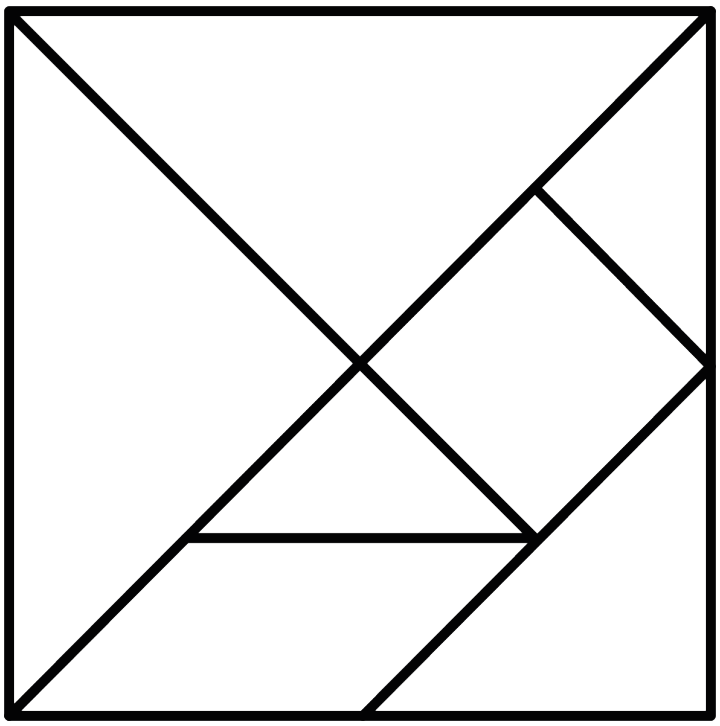
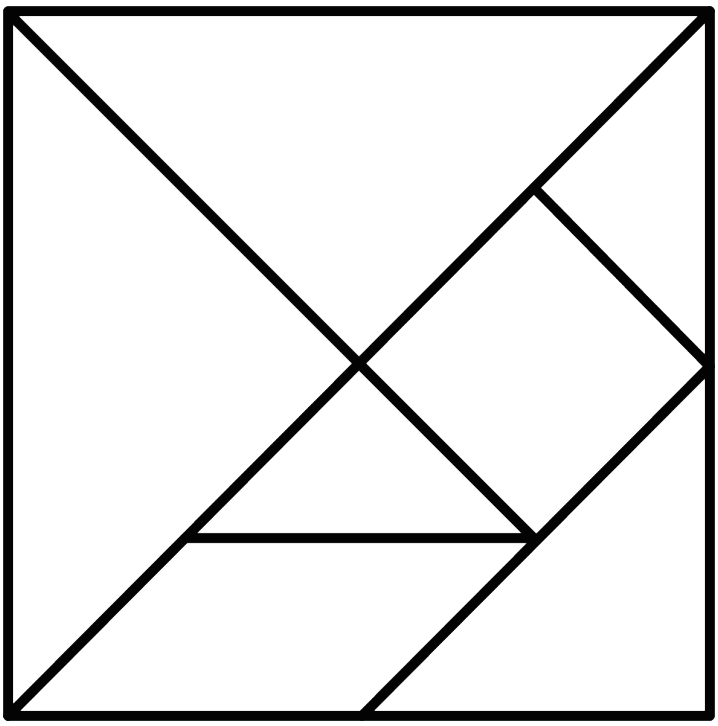
Student Activity:

Cut out the tangrams below and make a waka ātea using the shapes.









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Student Activity

Lots of moons

Planet	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune
Number of Moons	0	0	1	2	79	82	27	14

Write the name of each planet in the correct box.
(Hint: You may have to write the name of a planet more than once!)

No Moons	Less than 10 Moons	More than 10 Moons	More than 50 Moons
Mercury Venus	Earth Mars	Jupiter Uranus Saturn Neptune	Jupiter Saturn

1. What is the maximum number of moons a planet has?

82

2. What is the minimum number of moons a planet has?

0

3. What is the average number of moons the planets have?

25.6

4. How many moons are there in total?

205

5. What fraction of all of the moons orbit Saturn?

a) express this as a fraction of the total

82/205

b) express the fraction in its simplest form

2/5

6. How old are you in years?

7. How old are you in months?

8. How old are you in weeks?

9. How old are you in days?

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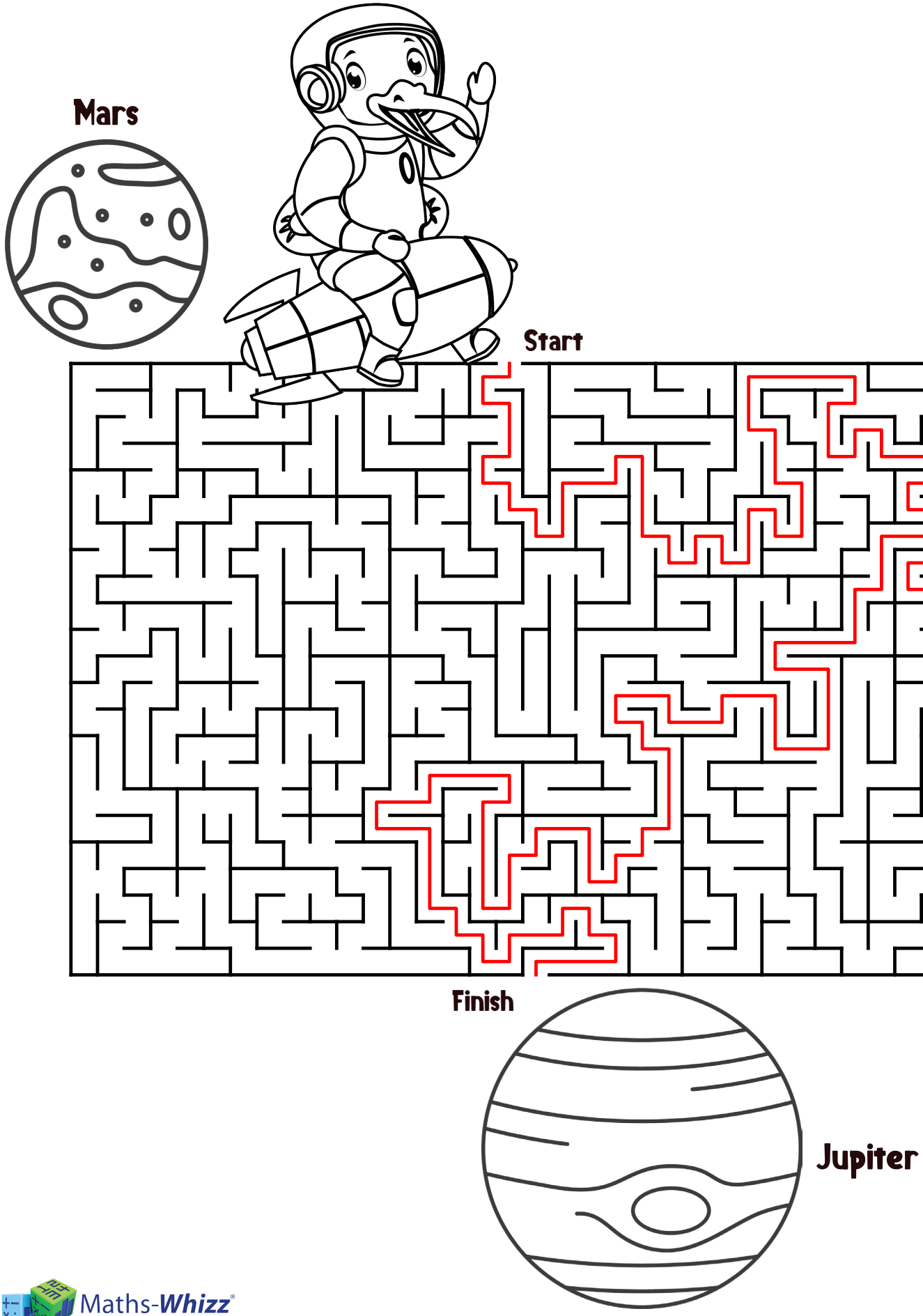
Student Activity

Help Kalani make his way through the maze to get from Mars to Jupiter.



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Welcome to Jupiter!

Student Activity

Rugby Rumble

Every 4 years there is an interplanetary rugby competition. Each planet can send a team to represent them at the competition.

If each team plays one match against the other teams, how many matches will there be played in total if there are:

1. 3 teams?

   3

2. 6 teams?

   15

3. 9 teams?

   36

4. 25 teams?

   300

5. 100 teams?

   4950

Number of teams (n)	Number of games (g)
3	3
6	15
9	36
25	300
100	4950
n	Rule: g = n(n–1) ÷ 2

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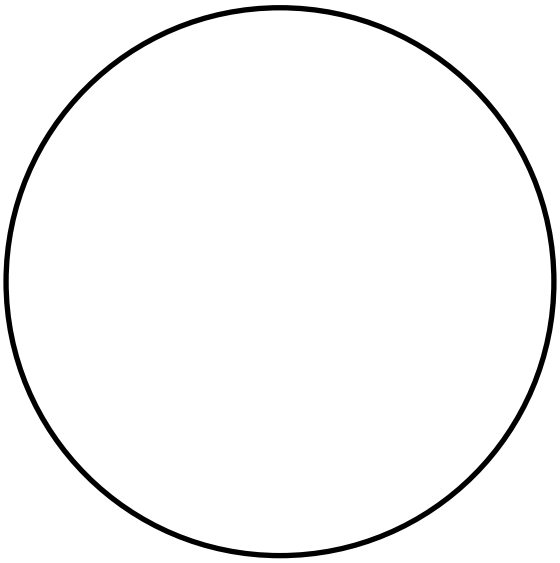
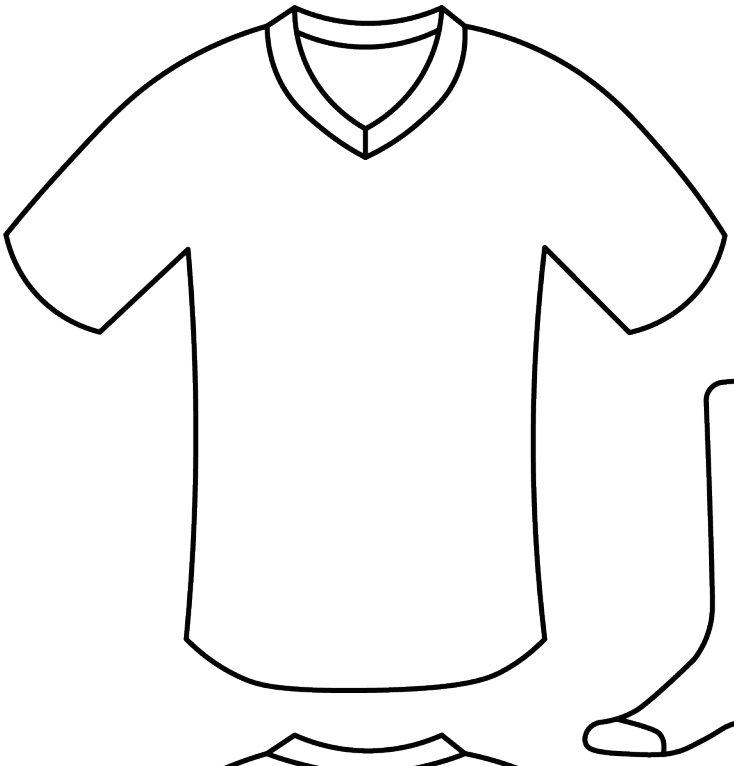
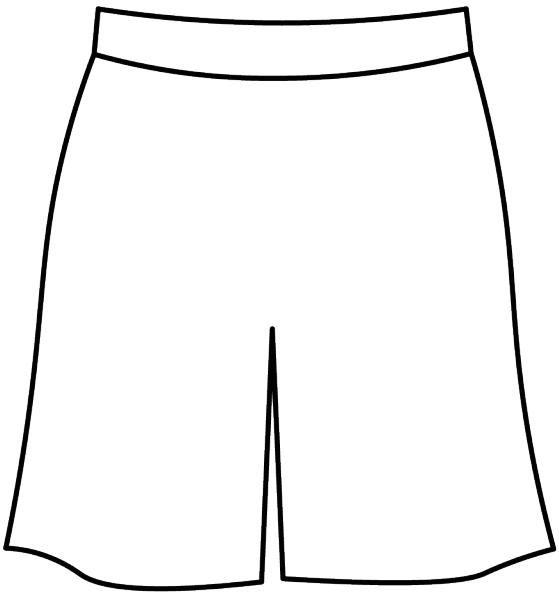
Design your planet

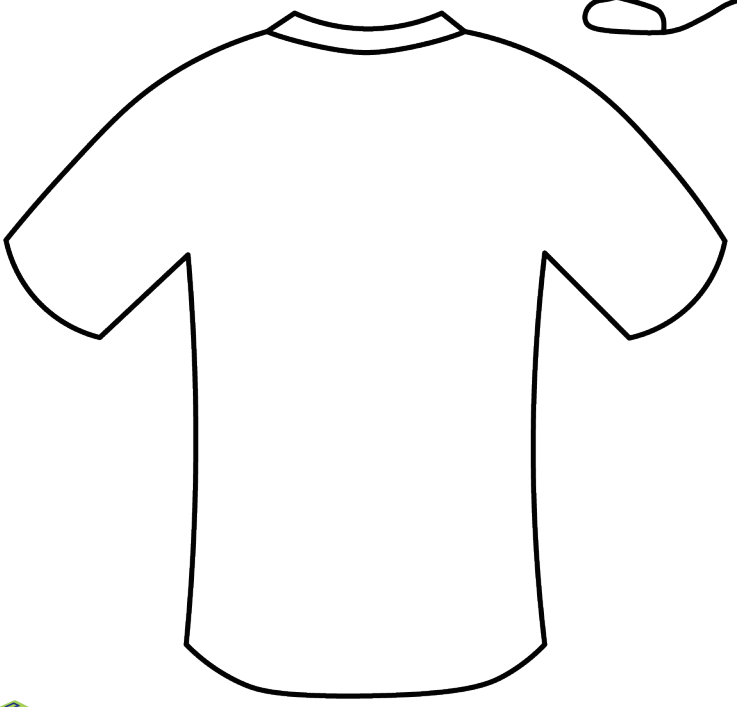
Planet Name:

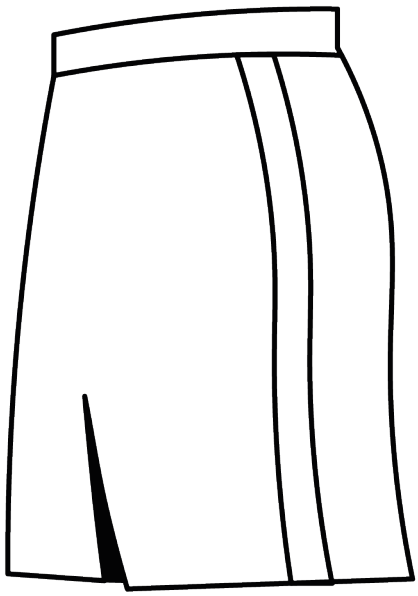
Team Name:











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Questions:

Jupiter is approximately 800 million km from Earth. Kalani wants to know if he is getting closer to the stars that he sees in the night sky from Earth.

Light travels at around 300,000,000 m/s.

1. How fast is this in km/h?

1,080,000,000 km/hr

Light takes around 8.5 minutes to travel from the Sun to Earth.

2. How many km is this?

153,000,000 km

The distance from Earth to our next closest star is approx 4.4 light years.

3. How many km is this from Earth?

41,627,520,000,000 km

4. If we traveled at 100 km/h, how long would it take us to get there?

416,275,200,000 hours or 17,344,800,000 days or 47,520,000 years

5. If Earth, Jupiter and our next closest star were all in a line, Jupiter was 800 million km from Earth (and therefore 800 million km closer to this star), how much further does he still have to travel?

41,626,720,000,000 km

Rockets will orbit the Earth at around 28,000 km/h.

6. Why do rockets have to travel so fast to orbit the Earth?

If they go too slow, then Earth's gravity will pull them back to Earth and they will crash.

7. What would happen if they traveled slower?

(As above) They would crash into the Earth.

8. What would happen if they traveled faster?

The Earth's gravity won't be strong enough to hold them in orbit and they would fly off into outer space.

9. At 28,000 km/h, how long would it take for you to get to our next closest star (after the sun) on a rocket traveling at 28,000 km/h?

1,486,697,142.8 hrs or 61,945,714.3 days or 169,714.3 years

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Student Activity

Planetary Statistics

	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune
Diameter (km)	4879	12,104	12,756	6792	142,984	120,536	51,118	49,528
Gravity (m/s^2)	3.7	8.9	9.8	3.7	23.1	9.0	8.7	11.0
Rotation Period (hours)	1407.6	-5832.5	23.9	24.6	9.9	10.7	-17.2	16.1
Length of Day (hours)	4222.6	2802.0	24.0	24.7	9.9	10.7	17.2	16.1
Orbital Period (days)	87.9	224.7	365.2	687.0	4332	10,759	30,688	60,182
Orbital Period (years)	0.24	0.61	1.00	1.88	11.86	29.45	84.02	164.77
Average Orbital Velocity (km/s)	47.4	35.0	29.8	24.1	13.1	9.7	6.8	5.4
Axial Tilt (degrees)	0.01	117.4*	23.4	25.2	3.1	26.7	97.8	28.3
Mean Temperature (C)	167	464	15	-65	-110	-140	-195	-200
Number of Moons	0	0	1	2	79	82	27	14

1. What is 'Rotational Period' a measure of?

How long a day is

2. What is 'Orbital Period' a measure of?

How long a year is

3. How long (in hours) is 1 day on Saturn?

10.7 hrs

4. How long (in days) is 1 year on Mars?

687 days

5. How many times heavier would you be on Jupiter than on Earth?

2.4

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6. If you weighed 50kg on Earth, how heavy would you be on Jupiter?

118kg

7. On which planet would you weigh the least?

Mercury and/or Mars

8. How heavy would you be?

19kg

We sometimes read about whether we could live on Mars.

9. What is it about Mars that makes it a possible planet for people to live on?

The length of day is similar to Earth. It's temperatures are such that it could be possible for humans to survive there.

10. What would make life on Mars difficult?

No atmosphere (oxygen to breathe), no water, and it is very cold

11. Data on planets;

a) Arrange in ascending order of size

Mercury, Mars, Venus, Earth, Neptune, Uranus, Saturn, Jupiter

b) How many times bigger is Jupiter than Earth?

11.2 (based on diameter)

c) How many times smaller is Mercury than Earth?

2.6 (based on diameter)

d) How many earths will fit inside Jupiter?

1408 (vol of a sphere $4/3\ \pi r^3$ $\frac{\text{Vol Jupiter}}{\text{Vol Earth}}$ $= 1408$

12. Uranus was discovered on 13 March 1781 and Neptune on 23 September 1846. How many years have passed on the two planets since those dates?

Uranus Discovery:
242 Earth years and/ or 2.9 Uranus year

Neptune Discovery:
177 Earth years and/or 1.1 Neptune years

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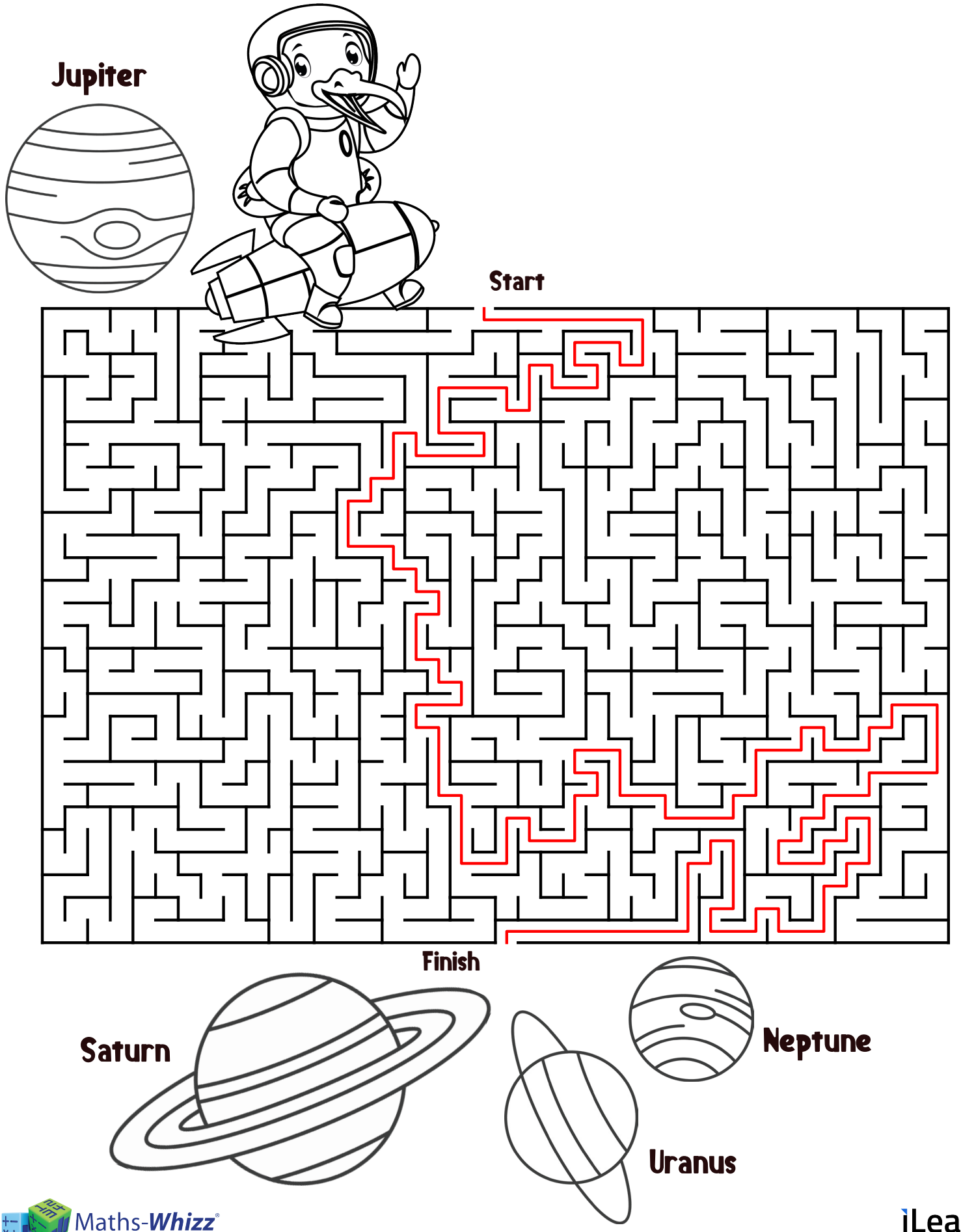
Student Activity

Help Kalani make his way through the maze to get from Jupiter to the Outer Planets.



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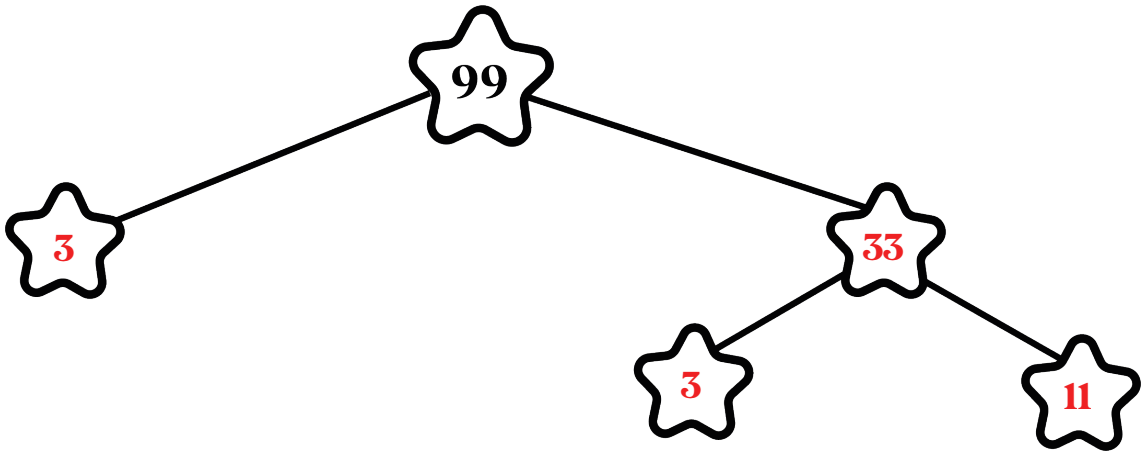
Welcome to the Outer Planets!

Student Activity:

Prime Time!

Complete the constellations by showing the top number as a product of its prime factors.

1.



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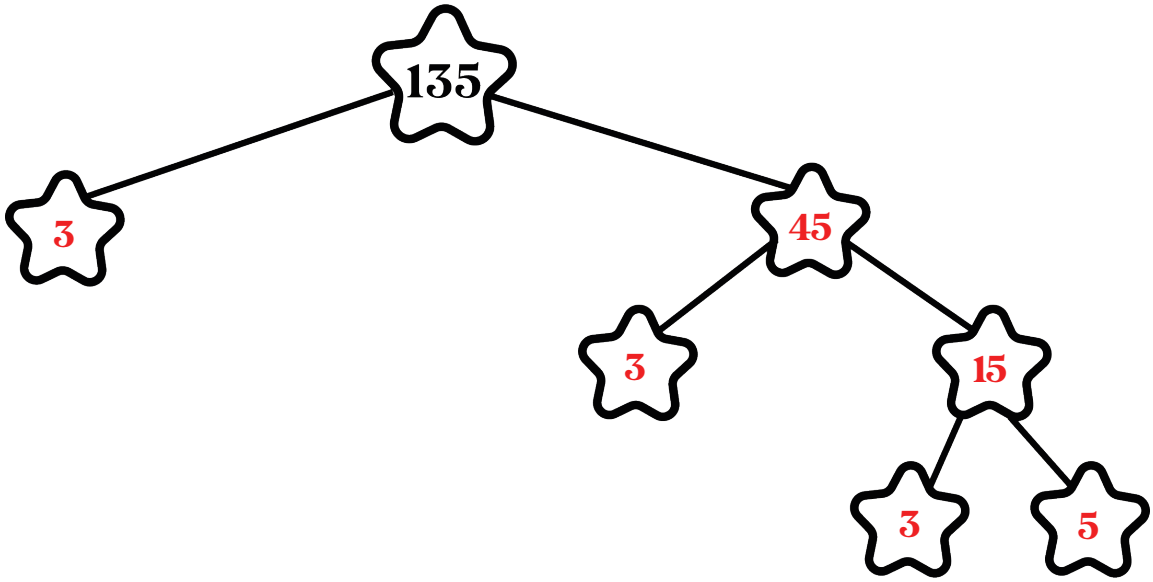

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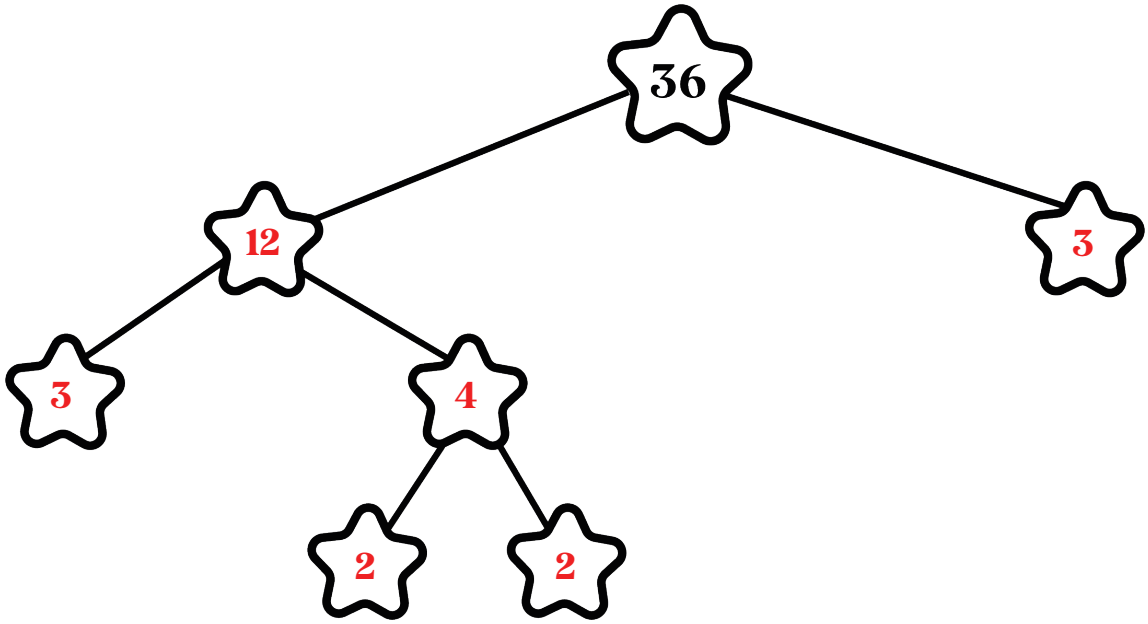

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Student Activity

Planet Sequences

1. Mercury has a huge range in temperatures. During the day the temperature can go from around 168 ° to 427°

- **Fill in the blanks in the table below to complete the number sequences**
- **Find the rule**

n	1	2	3	4	5	6	7	8
T/Temp	168	205	242	279	316	353	390	427

Rule: T = 37n + 131

2. Venus has a mean temperature of 452° but it can get as hot as 480°

- **Fill in the blanks in the table below to complete the number sequences**
- **Find the rule**

n	1	2	3	4	5	6	7	8
T/Temp	480	452	424	396	368	340	312	284

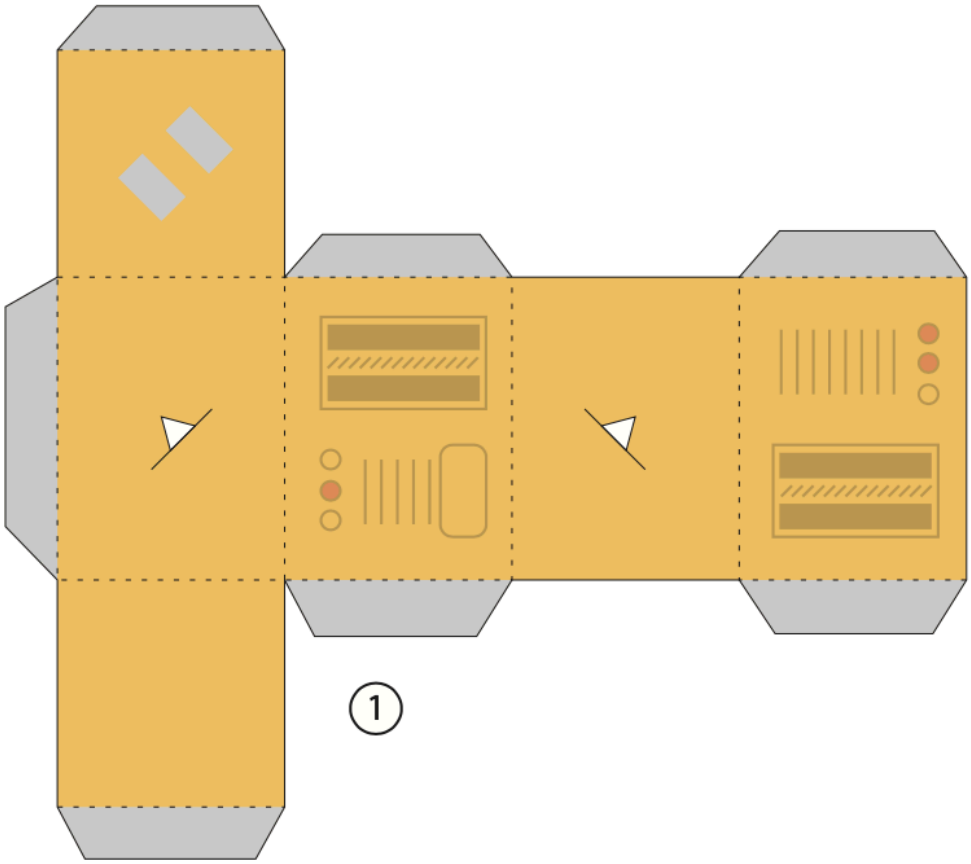
Rule: T = −28n + 508

3. The temperature on Earth ranges from around −88° to 59°

- **Fill in the blanks in the table below to complete the number sequences**
- **Find the rule**

n	1	2	3	4	5	6	7	8
T/Temp	−88	−67	−46	−25	−4	17	38	59

Rule: T = −21n − 109



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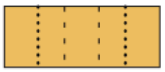

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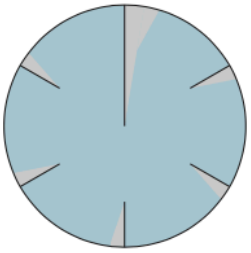

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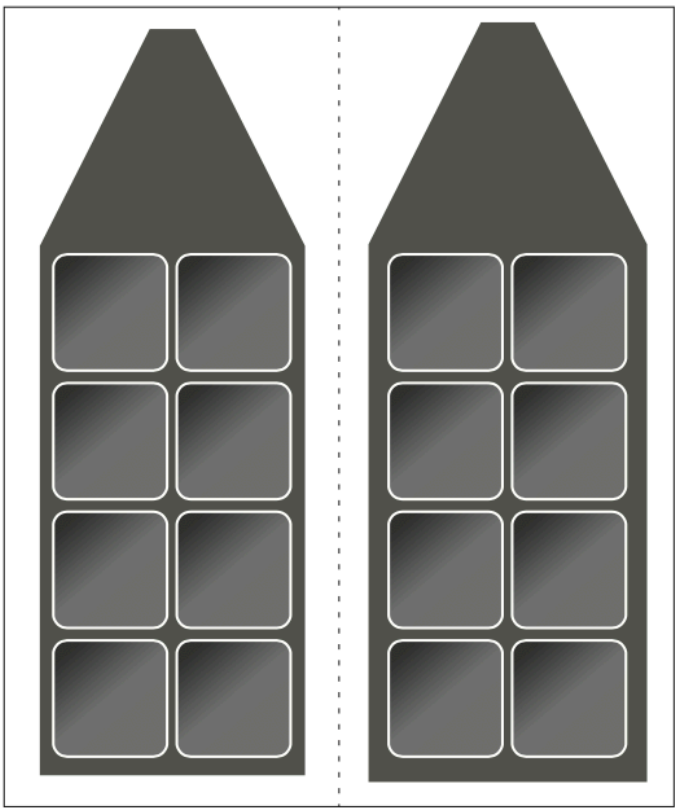

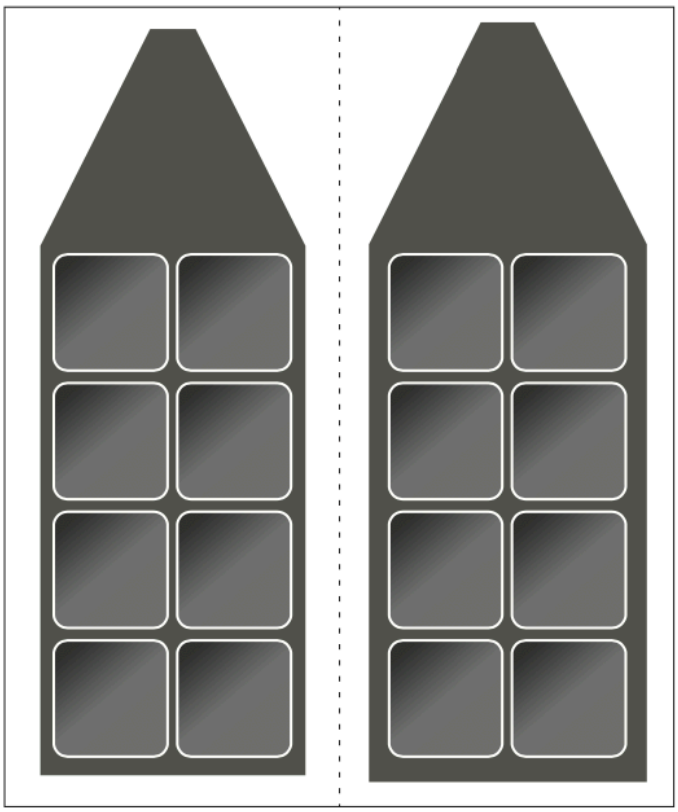

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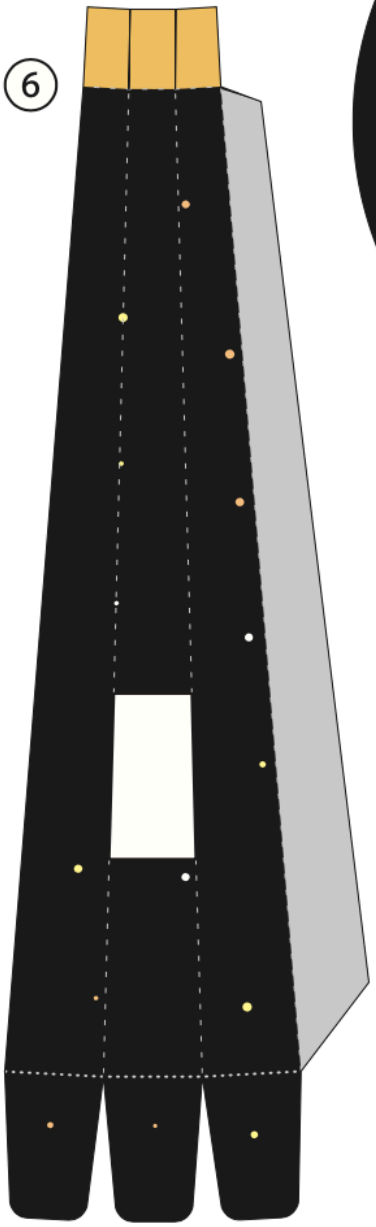
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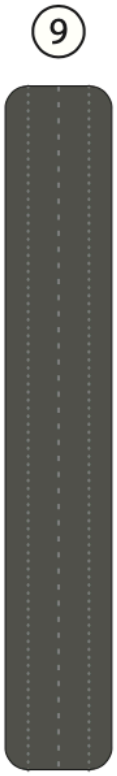
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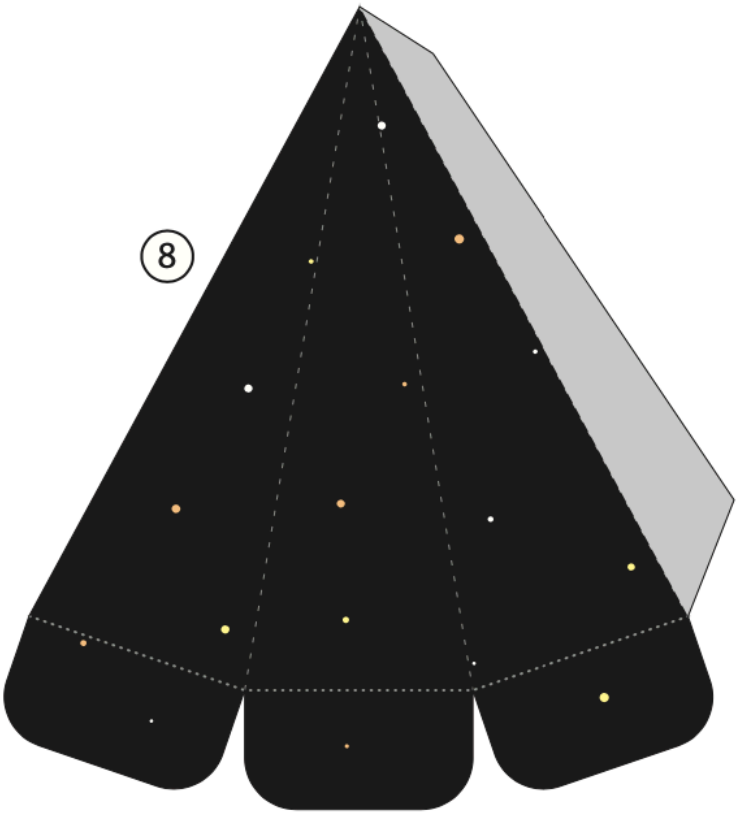
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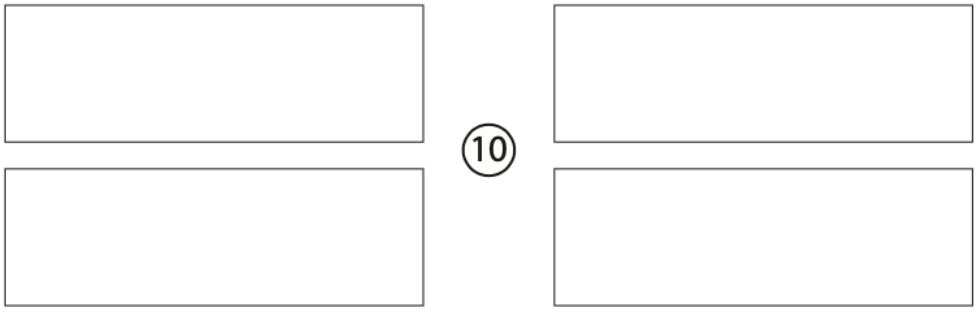
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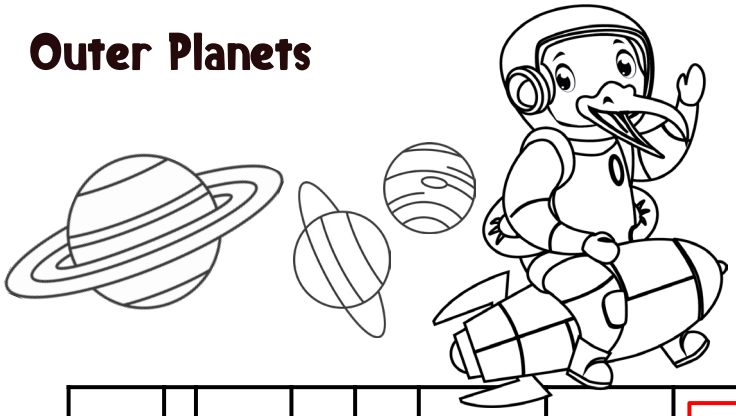
Student Activity

Help Kalani make his way through the maze to get from the Outer Planets to return home to Earth.



Start

Finish

Earth

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Welcome Home!