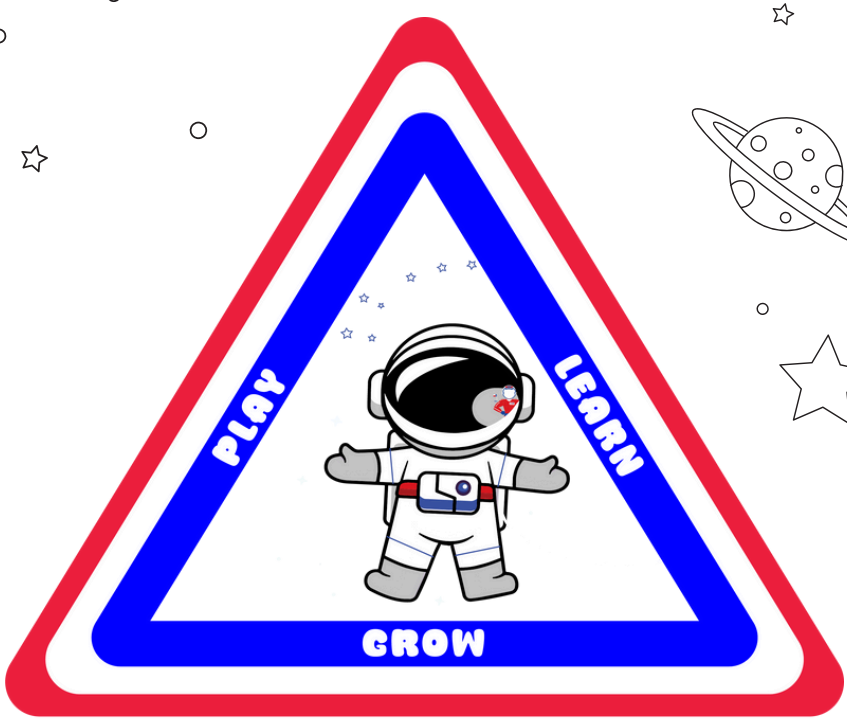
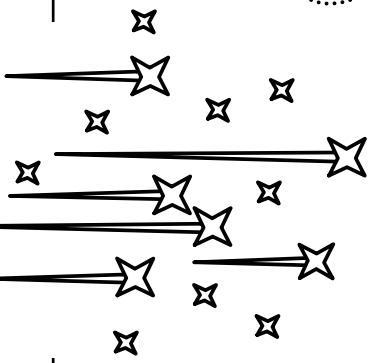
SPACE CADETS

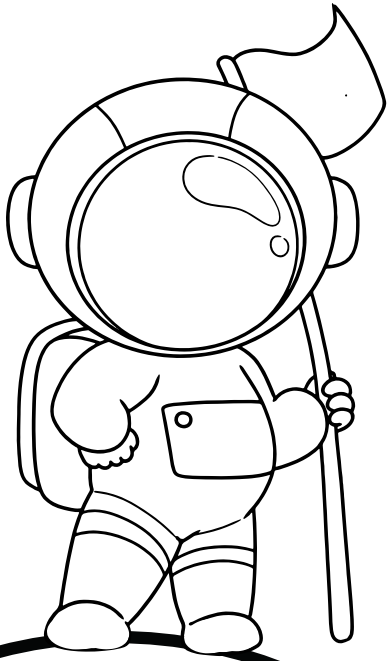
GALACTIC GUIDE

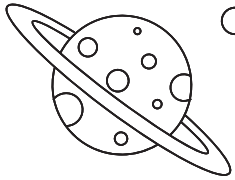
With STEM Lesson from Dr. Astro!



Space Cadets







Athletic Posture

Dr. Astro's STEM Missions

Play-Doh Person

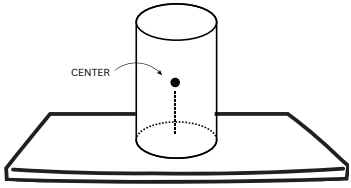
What you need:

- Can of Plah-Doh
- Table

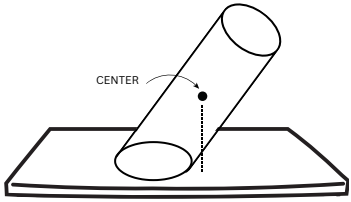
Mission:

- Build a person out of Play-Doh, with (2) arms, (2) legs, a body, and a head
- Place the Play-Doh person on the table so that it stands up without falling over

STEM Lesson:
An object will fall over if its center is not above where it contacts the ground.



This shape will STAND without falling because its center is above where it contacts the table.



This shape will FALL OVER because its center is not above where it contacts the table.

How to apply the STEM lesson:

- To help your Play-Doh person stand on their own, make the legs (feet) long & wide so that there is a larger area of contact with the table**.**

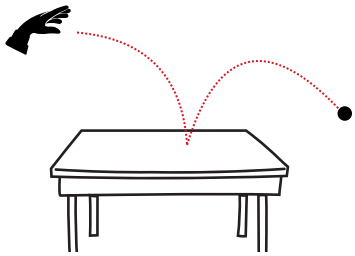
Dr. Astro's STEM Missions

Bounce & Count

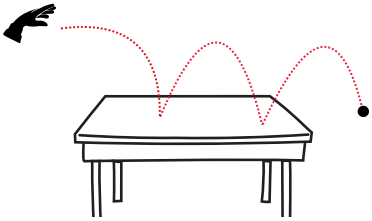
What you need:

- Ping pong ball
- Table

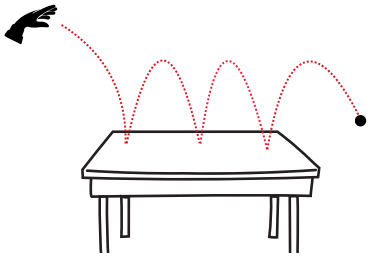
Mission:
Toss the ball so that it bounces exactly (1) time on the table



Mission:
Toss the ball so that it bounces exactly (2) times on the table



Mission:
Toss the ball so that it bounces exactly (3) times on the table



Try 4 times, 5 times, 6 times...

What did you change about the way you tossed the ball each time in order to get more bounces?

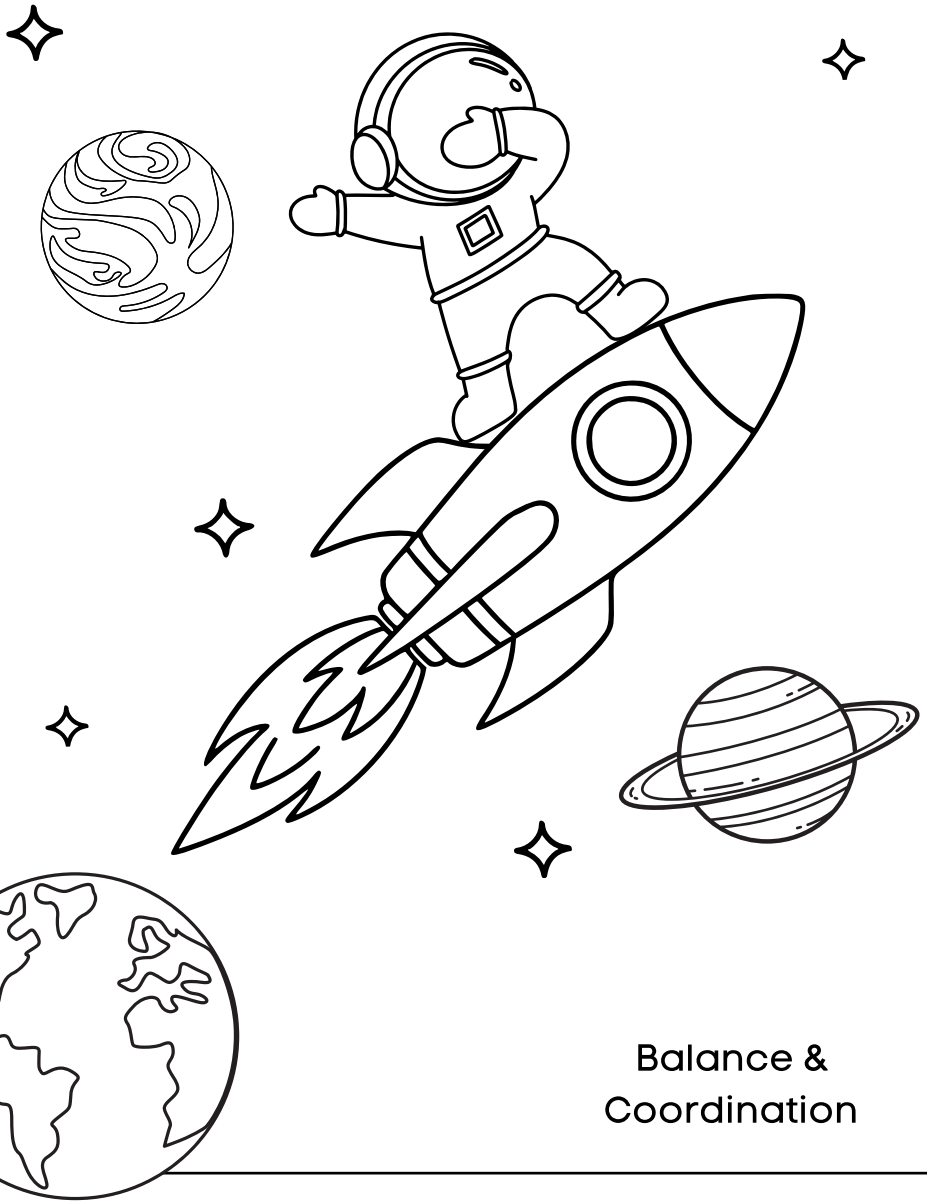
Exploration Questions:

If you toss the ball faster, does it bounce more times or fewer times? Why?

If you toss the ball from higher, does it bounce more times or fewer times? Why?

Answers: If you toss a ball faster, it will move further between bounces. This results in fewer bounces on the table. If you toss the ball from higher, it will have more time between bounces. This results in each bounce being further apart, which results in fewer bounces.

BLAST OFF!



Balance &
Coordination

Dr. Astro's STEM Missions

Find the Pattern

What you need:

- A partner/friend

Mission:
Play Rock-Paper-Scissors with another person, with each player selecting either:

ROCK

PAPER

SCISSORS

Rock beats Scissors
Scissors beats Paper
Paper beats Rock

- If both players make the same choice, it is a tie.
- You can play as many times as you like.

Mission:
Try to find the pattern of the other player so that you can beat them in Rock-Paper-Scissors. The other player will follow one of the patterns below. Keep playing until you figure out their pattern and win 4 times in a row.

Pattern 1:

Pattern 2:

Pattern 3:

Pattern 4:

Pattern 5:

Connection to STEM: Finding patterns allows you to make good predictions of the future.
Connection to Sports: In many sports, a player may choose to hit or kick a ball left, straight, or right and create a pattern. If the other team discovers this pattern, they can predict their opponent's next move and block the ball more.

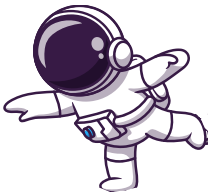
Dr. Astro's STEM Missions

Stand on One Foot

What you need:

- Stopwatch *OR* the Stopwatch/Timer app on a mobile device

Mission:
See how long you can stand on only one foot. Try it three times with each foot and record your answers.



Left Foot	**Right Foot**
_____ seconds	_____ seconds
_____ seconds	_____ seconds
_____ seconds	_____ seconds

For each foot, circle the time that is in between the other times.

STEM Lesson:
Every time you measure something, you might get a different number. Use the number in the middle.

Mission:

- For 3 days, practice standing on one foot at least 1x per day
- After those 3 days, see how long you can stand on only one foot. Try it three times on each foot and record your answers.

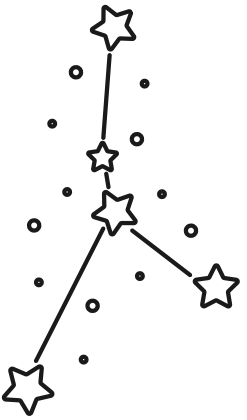
Left Foot	**Right Foot**
_____ seconds	_____ seconds
_____ seconds	_____ seconds
_____ seconds	_____ seconds

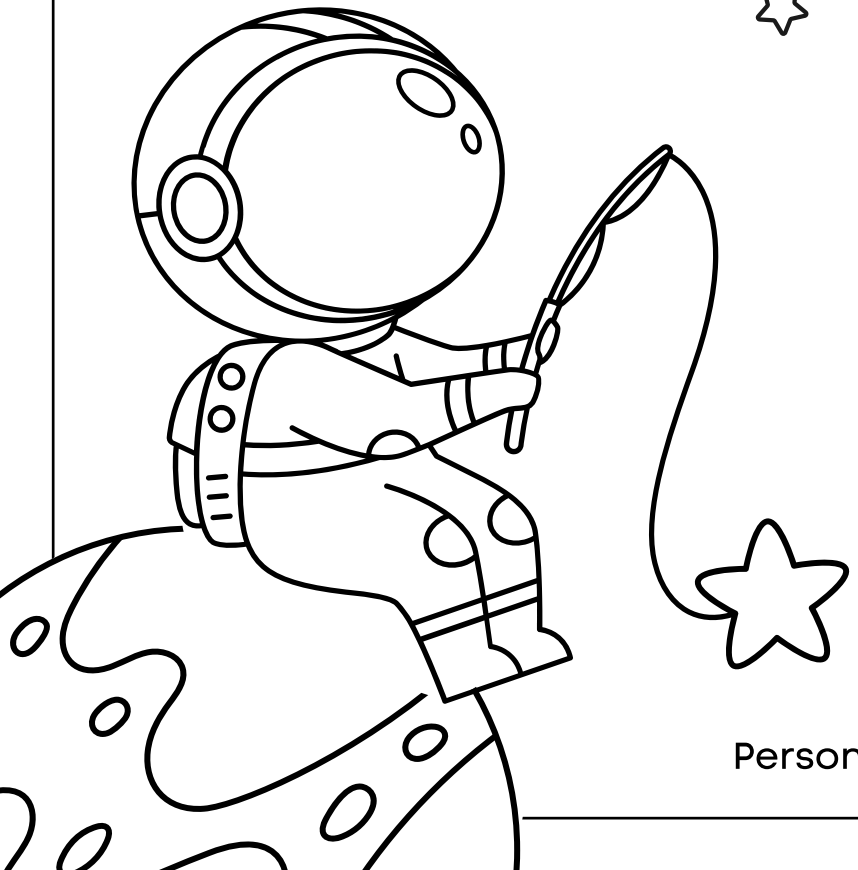
For each foot, circle the time that is in between the other times.

Did your times get longer?

Level Up: Want a harder challenge? Try to stand on one foot with your eyes closed. Be careful!

Adventure Awaits





Dr. Astro's STEM Missions

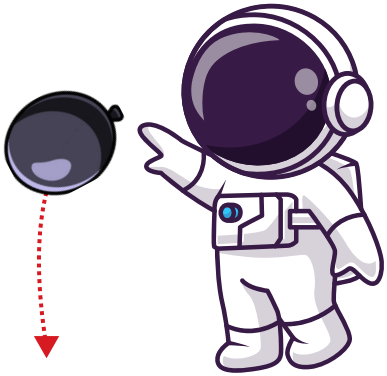
Time the Toss

What you need:

- (1) blown up balloon
- Stopwatch *OR* the Stopwatch/Timer app on a mobile device

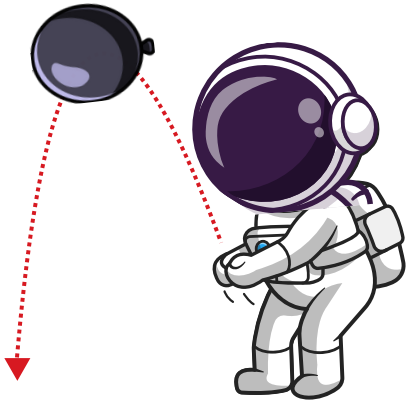
Mission:
Drop a balloon from shoulder height. Using the stopwatch, time and record how long it took for it to hit the ground.

_____ seconds



STEM Lesson:
If you toss an object up harder, it will take more time to hit the ground.

Mission:
Toss the balloon up so that it takes between 3 - 4 seconds to hit the ground. Use the stopwatch to time and record.



How to apply the STEM lesson:

- If your toss is not between 3 - 4 seconds, ask yourself if you should toss it harder or lighter the next time. Try again and record.
- If you want a greater challenge, try to toss the balloon so that it lands between 3 - 3.5 seconds.

WORD SEARCH

T	L	S	P	A	C	E	L	Y	N	L	L	A	R
E	O	S	O	A	H	H	C	C	C	R	M	C	C
K	P	L	S	K	N	B	O	J	U	A	O	O	A
C	A	B	E	T	L	T	A	R	A	S	B	A	P
O	J	U	M	P	R	S	C	C	P	S	K	A	V
R	M	A	I	M	N	C	H	P	V	N	E	P	O
C	C	S	A	A	E	P	R	A	T	O	S	A	L
E	L	K	L	A	C	A	D	E	T	O	E	T	L
E	S	A	S	P	I	K	E	A	A	C	A	C	E
D	S	T	A	R	S	C	P	V	L	P	E	N	Y
C	V	S	L	E	K	O	V	L	A	O	O	S	B
R	K	Y	O	A	C	O	O	E	A	O	M	T	A
N	T	D	B	K	M	T	O	I	M	Y	H	A	L
S	D	E	A	E	N	A	N	A	I	O	N	D	L

WORDS TO FIND:

PLAY
STARS
MOON
SPACE
JUMP
CADET
COACH
VOLLEYBALL
SPIKE
ROCKET

Dr. Astro's STEM Missions

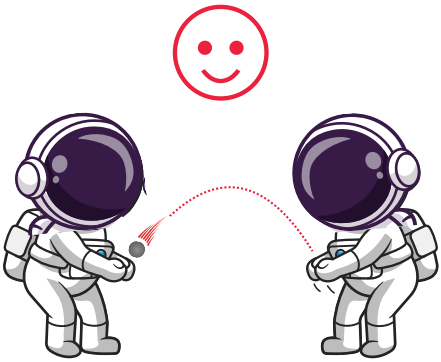
Eye on the Ball

What you need:

- Ping pong ball
- A partner/friend

Mission:
Test to see if it is easier to catch a ball with both eyes open or with one eye open.

Ask your partner to stand 3 BIG steps away. Then, with both of your eyes open, ask your partner to toss you the ping pong ball 10 times in a row.



How many times did you catch it?

Repeat, but keep only your left eye open.

How many times did you catch it?

Repeat, but keep only your right eye open.

How many times did you catch it?

- Which was easiest?
- Which was hardest?

STEM Lesson:
If you have only one eye open, it is difficult to see how far away an object is. With both eyes open, your brain sees the object from two locations. This allows your brain to figure out the objects distance from you.

Dr. Astro's STEM Missions

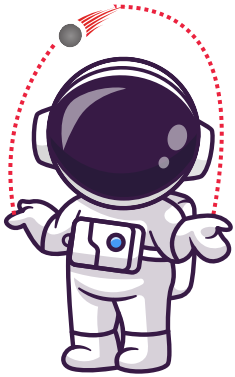
Toss to yourself

What you need:

- Ping pong ball

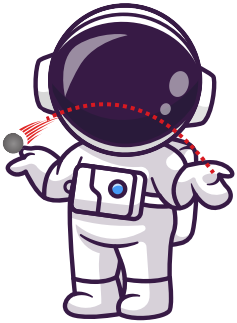
Mission:

- Hold one hand out with your palm up
- Hold the ping pong ball with your other hand
- Toss the ball up so that you can catch it with your other hand. Try not to move your other hand.



If you can catch it 3 times in a row, repeat and try to toss the ball higher.

STEM Lesson:
When you toss the ball you push it both horizontally and vertically. If you toss the ball fast, you need to toss it almost horizontal or almost vertical.



Questions: Did you find it easier to toss the ball low or high? Why?

Sample Answer:
Most people will find it easier to toss the ball low from one hand to the other. This is because if you toss the ball high, you need to be very accurate with the toss.

Ready to Learn!

Hand Eye Coordination
Projectile Motion

Dr. Astro's STEM Missions

Who is closer?

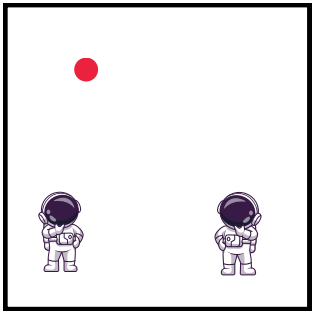
What you need:

- Piece of string or ruler

Mission:

- In the image below, two Space Cadets stand in a square court. A ball lands at the spot marked by the red circle.
- Using the string or ruler, measure to find out which Space Cadet is closer to the red ball.

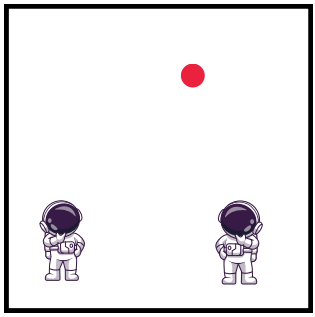
A.



STEM Lesson:
If two people move at the same speed, the person closer to the object will get there first.

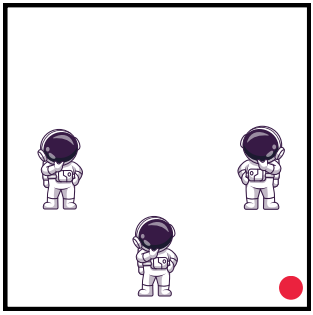
In the image below, which Space Cadet is closer to the red ball?

B.



In the image below, which Space Cadet is closer to the red ball?

C.



D. Question: In a sports game, will the closest person always get to the ball the fastest?

Answers:
A. The left person is closer **B.** The right person is closer **C.** The right most person is closer **D.** No. Different people move at different speeds. Also, if a ball is behind someone they may movemore slowly than if the ball is in front of them.

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