PCS edventures!™
Experts in Hands-On STEM Education

Sweat It Out With 5 Frisbee-Based STEM Games

Let's blend fitness and physics into one-of-a-kind fun! Inspired by the incredible activities found in the Flying Disc Enrichment Camp, get ready to get physical with these five high-flying, frisbee-based STEM games.

No matter the weather, season or skill level, these games combine the seemingly simple science of flying discs with calorie-burning STEM activities, leveling-up learning for all ages.

HANDS-ON STEM EDUCATION

STEAM ENRICHMENT

For over 30 years, PCS Edventures has inspired students to develop a passion for Science, Technology, Engineering and Mathematics (STEM), focusing our efforts on making learning and discovery a fun and interactive process for grades K-12.

- Classroom
- After-School
- Home Learning

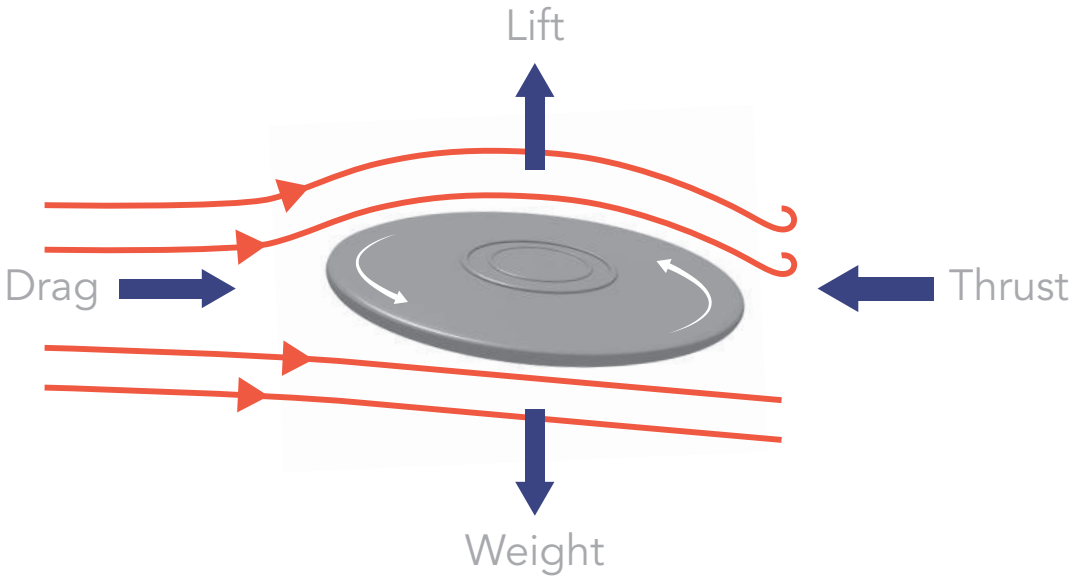
Background Information

How Do Frisbees Fly?

Is that a flying saucer? No — it's a frisbee in flight! It may seem simple, but frisbees (also called discs) use a ton of science to stay in the air.

There are two main reasons discs fly and float: their *shape* and ability to *spin*.

A disc's shape creates an *airfoil*. That unique shape helps a frisbee generate *lift*. Airplane wings, birds and gliders — just like a frisbee, these special lift-making designs help keep flyers up in the air.



Frisbees spin like a top when they are thrown correctly. That spinning motion creates something called *angular momentum*. As the frisbee spins, it uses its dizzy motion to build momentum and stay level in the air. Spin creates stability. That spinning lets a disc stay in the air longer and fly further — the more spin on a disc, the further it goes!

Frisbees only create lift when they fly through the air. When a disc is thrown, the thrower transfers energy into the disc as they propel it forward. As the disc moves, air travels above and below the frisbee. That movement of air creates a downward force that "lifts" the frisbee into the air. As the frisbee spins, it maintains its flight path, allowing it to cut through the air in a steady movement. Unlike an airplane that can generate constant thrust to stay airborne, frisbees eventually disperse their energy and drop out of the sky.

How To Throw a Frisbee

Learners probably know how to throw a softball or kick a soccer ball, but throwing a frisbee is an entirely different skill. It's going to take some practice. If anyone gets discouraged, remind them that even the world's best frisbee throwers started with the basics.

1 Grip Your Disc

Hold the frisbee in your fist with your thumb on top. Run your index finger straight along the rim, and tuck your other fingers under the disc.

2 Set Your Feet

Create a 90-degree angle with your feet where your lead foot points towards your target. If you are right-handed, your right foot is your lead foot. If you're left-handed, lead with your left foot.

3 Raise Your Arm

Curl your wrist towards your body as you pull your arm back behind you. Keep your elbow up and keep your arm straight.

(*Pro Tip:* Try to touch the inside of your forearm with the disc to create as much spin as possible.)

4 Set Your Aim

Point the frisbee towards your target. Keep your throwing arm parallel to the ground. The straighter your arm, the straighter the disc will fly!

5 Snap Your Wrist

With your wrist curled towards your body, move your arm forward towards your target. Think like you're trying to point to something in front of you as fast as possible. As your arm extends, flick your wrist. The flick/snap movement creates spin. Release the disc and watch it fly.

6 Experiment!

See what happens if you don't spin the disc. Can you throw it harder or softer? What happens if you release at shoulder height instead of near your belly button? Throw, throw, and throw some more until you really start to get the hang of it. And remember… spin is your friend!

There are a ton of very helpful videos online that show the steps to throw a disc. If anyone is still struggling after these steps, seek out a sample video to help teach this new skill.

5 Frisbee-Based STEM Games for All Skill-Levels

Once learners have their throws down, try introducing one (or all) of these disc games for hours of physics, fitness and fun.

Frisbee Darts

This game is all about aim! Test your learners' throwing skills with a Bocce Ball-inspired target toss challenge.

Materials:

- Frisbees (1 per player)
- Tennis Ball or Cardboard Target

PLAYERS:

- 2+

RULES:

- Start by having all players stand behind a "throwing line."
- Toss the tennis ball or set the target around 30-40 feet away from the throwing line.
- Have players throw their discs one by one toward the target.
- The player who gets the closest to the target is awarded 1 point.
- After everyone throws, reset the target.
- The first player to reach five points wins!
- If a player lands their disc on the target, they are awarded 3 points and get to reset the target wherever they want.

Ramp up the STEM!

Set up multiple targets and have players answer a math question before making their throw. Be sure to have enough discs and space that no players cross a thrower's path. Add a timer and see who can answer all their questions and make the closest throws faster than any other player. Award the fastest player bonus points and see whose aim and brain reign supreme!

Frisbee Tac Toss

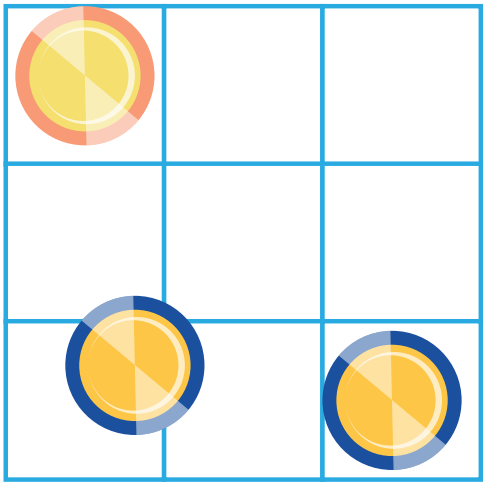
Part skill, part strategy, Frisbee Tac Toss pits teams against each other in a large-scale game of tic tac toe!

MATERIALS:

- 12 Frisbees (of 2 different colors)
- Chalk, Tape or Large Cardboard Sheets

PLAYERS:

- Teams of 2+



RULES:

- Start by creating a traditional tic tac toe grid with chalk, tape or cardboard.
- Draw a throwing line.
- Keep the throwing line a challenging distance away.
- Players (or teams) take turns throwing a disc towards the grid as they try to land three in a row.
- Discs only need to be 50% in a square to be considered "in."
- Have players or teams strategize together about the best place to throw their disc. As frisbees bounce and miss their target, it's a team's challenge to re-evaluate and determine their next turn!

Ramp up the STEM!

Add a rule for discs that land in an already occupied square. Have teams compete in a race or other physical activity to see which disc wins the "battle" for the square. Alternatively, have a bank of multiple choice questions or problems for teams to answer. If a thrower's disc lands in an occupied square, they'll need to answer a question correctly to win the battle. Adding ways to clear or replace portions of the grid tests teamwork and strategies.

Shield Toss

Take a page out of *The Science of Superpowers* with this Captain America shield-throwing challenge.

Can your learners channel his disc throwing talents?

MATERIALS:

- Frisbees (1 Per Group)
- Empty Plastic Bottles, Blocks or Other Stackable Objects

PLAYERS:

- Groups of at least 2

RULES:

- Separate players into groups and give them stacking materials.
- Have groups decide who will be the Superhero and who will be the builders. Make sure groups are taking turns with each position.
- The builders' job is to create a tower that is impervious to the Superhero's frisbee. The Superhero's job is to knock the tower down with the frisbee.
- Give builders five minutes to build their tower.
- After five minutes, have the Superheros step back from the tower (around 15-20 steps). They have three throws to knock down the tower.
- Have Superheros keep score of how many bottles or blocks they knocked over. Once everyone has had a chance to play the role of hero, see which team knocked over the most!

Ramp up the STEM!

Give teams more time to create their most stable structure. Give them a mix of materials and allow them to work together to test and decide what's going to create the most challenging structure to knock down. These considerations open doors to all sorts of discussions on gravity, impact, stability and more.

Frisbee H-O-R-S-E

Get creative and see who has truly mastered the disc with this skills-based challenge. From distance throws to balancing acts, part of the fun lies in seeing what your learners come up with.

MATERIALS:

- 1 Frisbee

PLAYERS:

- 2+

RULES:

- Just like the basketball game, Frisbee H-O-R-S-E is all about challenging each other to odd frisbee tasks or skills.
- Players take turns trying to best one another in a frisbee-based throw or challenge.
- Whether it's throwing a certain distance, throwing the disc upside down, carrying a frisbee on your head for 20 seconds or wherever else a player's creativity takes them, they need to first showcase a skill before challenging other players to duplicate it.
- If a player can't duplicate the skill, they earn a letter in the word HORSE. If they earn the "E," they're out.
- Frisbee H-O-R-S-E can be expanded to any number of players and only requires one disc. Give every player a chance to duplicate a skill, then it's someone else's turn to come up with the challenge.

Ramp up the STEM!

Give players opportunities to re-enter the game by solving problems or answering questions. Depending on group size and the number of frisbees available, expand the game by creating "stations" of particular types of STEM skills that players and groups rotate through. Can players guess what animal would throw a disc this way? Can they count to 30 by 3s while spinning a disc on their fingertip? Can they engineer a throwing technique that makes the frisbee boomerang back towards them?

Frisbee Tag

It's time to team up! Ramp up for a high-paced game or keep things skillful and strategic — Frisbee Tag offers a ton of flexibility to match your group's skill level.

MATERIALS:

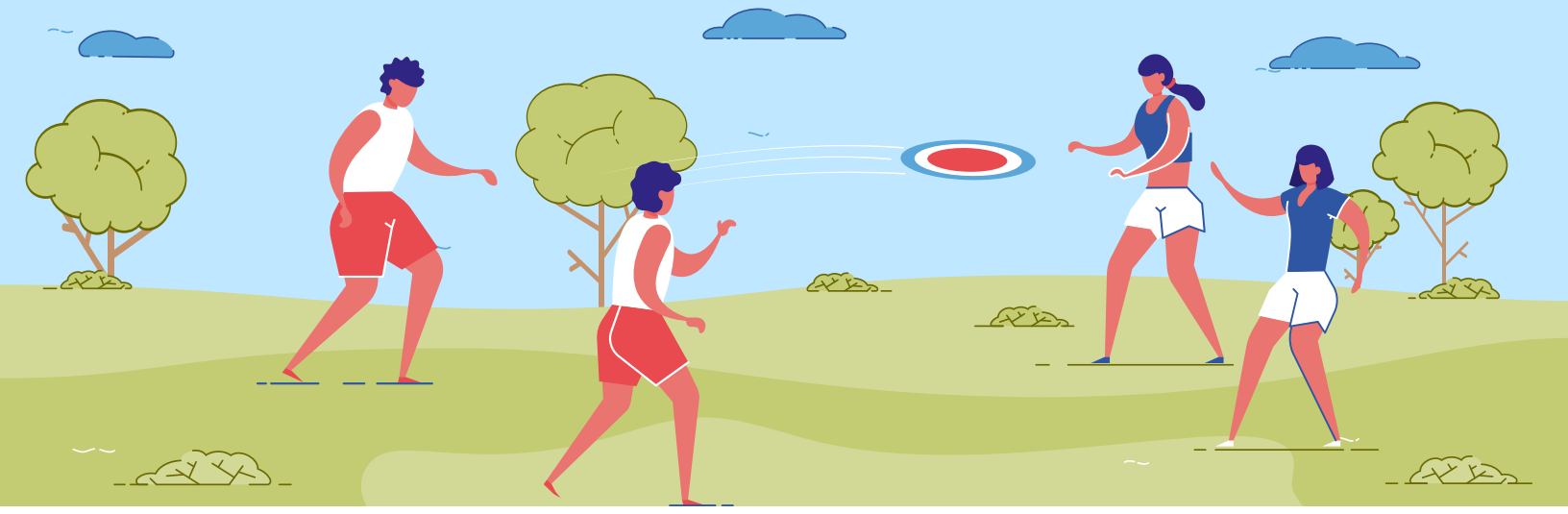
- 1 Frisbee

PLAYERS:

- Teams of 5+

RULES:

- Separate players into two teams.
- Determine which team will be "it" first. They are the "blockers."
- The team that is not "it" spreads out. They are the catchers. Each catcher should be within throwing distance of one another.
- When you say GO, the catcher team tries to throw the frisbee to one another. Catchers cannot move from their spot.
- The blocker team tries to block the frisbee from making it to its intended catcher.
- Blockers can move.
- If the catchers don't catch the disc, the teams swap and blockers become catchers.
- Set a timer, and whichever team is the catcher when the time expires wins!



If your players are still developing their throwing and catching skills, implement these rules to keep the game moving.

- Blockers can only move 3 steps between throws.
- Catchers don't need to "catch" the disc. It's okay if it touches the ground.
- Blockers can only block a disc while it's in the air.
- Give Catchers three strikes before swapping roles.

Ramp up the STEM!

Bring geometry into Frisbee Tag by having catchers create shapes with their throws. Triangles are worth one point, squares are worth two, pentagons are worth three, and so forth. Make it so blockers can only take one step towards a disc in flight and see how many shapes teams can create before a blocker makes an interception.

Discussion Questions:

1. What two things help a frisbee fly?
2. What did you change about your frisbee form to improve your throws?
3. Are there any other things that create lift?

Extensions:

Can your learners come up with their own frisbee game? Separate participants into four groups and task them with creating a disc game based on Science, Technology, Engineering or Math.

References:

Buddies, Science. "Soaring Science: The Aerodynamics of Flying a Frisbee." Scientific American, Scientific American, 9 Aug. 2012, https://www.scientificamerican.com/article/bring-science-home-frisbee-aerodynamics/.

Featured Product

Lift. Thrust. Drag. Gravity!

Since 700 B.C., flying discs have made a name for themselves. In this high-flying program, students zoom through the disc's history while learning valuable physics concepts. While enjoying the fresh air, they investigate how discs fly because of spin (lift), angular momentum (thrust), shape (drag) and weight (gravity). With different shapes and sizes of flying objects, learners practice the most effective throwing, flying and catching techniques, gaining an understanding of the forces of motion upon objects in flight. After capturing a thorough knowledge of founding physics concepts, end the final lesson with an exciting game of STEM ultimate frisbee!

Looking for more Fitness-Filled STEM Fun?

As survivalists, learn exactly what to do through this team-based study of real-world survival skills. In Survivor, learners use ingenuity to gain crucial skills such as knot tying, water purification and compass navigation. Bringing STEM to the great outdoors, instructors love the hands-on, collaborative curriculum. With each activity, learners problem-solve, putting their new skills to the test to conquer everything Mother Nature throws their way.

Channel inner competitive spirit to complete 60-second STEM challenges. From exploring energy conservation by rolling marbles over tape to understanding the power of air pressure by making cups fly, these micro-challenges demonstrate the expansive world of STEM through fast-paced action. Think fast, move quickly and apply real-world principles to earn the honor of being called a true STEM champion!

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