Funky Foosball

Grade: 3-4

Time: 45min

Activity Overview :

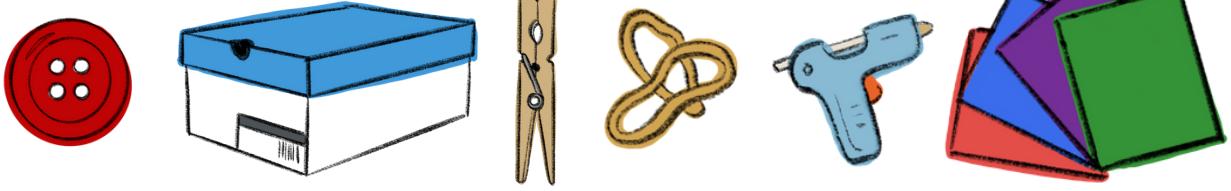
There are tons of games played in the arcade like Pacman, air hockey and skee ball! A popular game played in many arcades is Foosball! Ever wonder how they're made or have you wanted to take the game home? Let's bring the arcade to you! Today you will be making your very own mini Foosball Table game by using materials that you can find right at home! You'll be engineers trying to use what you can to create a smooth-running game.

Before we begin think about the following questions:

- What is considered when making sports equipment and why?
- What role does friction play in the materials used?
- Which of Newton's laws are being applied in the game?

Materials:

- 1 large shoebox
- 1 piece of paper - big enough to fit in the bottom of the box
- 6 large skewers
- 6 buttons or medium styrofoam balls
- 12 rubber bands
- 12 clothespins
- Scissors
- Hot glue gun/ wet glue
- Markers
- 1 Ping pong ball or ball made of tape!
- Small styrofoam balls (optional)



Activity:

1. Take the large shoebox and make medium rectangular cuts in the two shorter sides. These will be your nets.

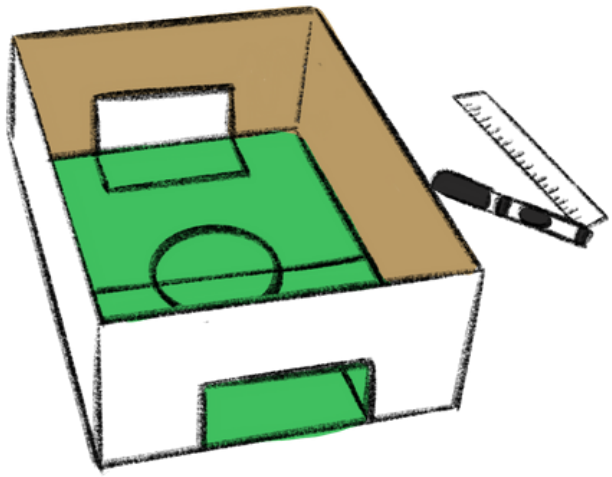
2. On the piece of paper, use the markers to design the field you'd like to play on! You can design it like a typical soccer field or be more creative and make your own design! Ensure you have a line that indicates the middle of the playing field as well as the goalie's box. Glue it to the bottom of the shoebox when finished.

3. Evenly place the 6 skewers on top of the box and mark their place on the box. Puncture a hole through the two sides about 2-3 cm down from your marking. You might need an adult to help you here!

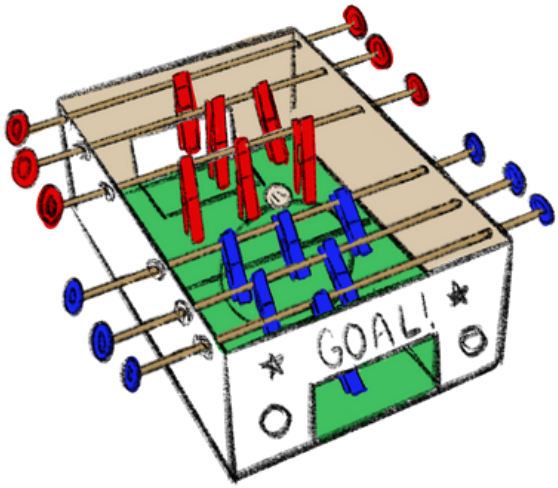
4. Use the markers to colour 6 of the clothespins in one colour, and the other 6 in another colour. These will be your players. Feel free to attach a small styrofoam ball at the top of each player for their head! Decorate the players however you'd like!

5. Place one player of one team on the skewer in front of the goalie's net, 2 players of the same team on the skewer in front of their goalie and then 3 players of the opposite team on the next skewer which is closer to the middle of the field. Repeat this with the remaining players. Make the goalie in the center of the skewer and make the rest of the players evenly spread out in the skewer and glue them in place.

Step 1 - 2



Step 3 - 5



7. Add a rubber band on each side of the skewer on the outside of the box so you are still able to move the skewers back and forth without accidentally pulling it out completely.

8. Glue a button on one edge of the skewer for one team. Glue the buttons for the other team on the other side. This will give you more control when moving your players. You can also use larger styrofoam balls as handles if that gives you more control!

9. Time to play! Grab someone to play with and drop the ping pong ball in the centre and see who can get it into the other person's net!

Engineering and Science Connections

creating equipment that will be used by many players. It has to be able to provide the player with protection as well as comfort, while also allowing them to play with ease. Depending on the field or court being played on, the choice of materials used will vary. In your case, the materials used are important to ensure that your game works well. For example, if you used straws instead of skewers, the handles would be very flimsy and are more likely to bend when twisting.

The role of friction is also considered when choosing materials because it can make a big difference in how a game runs. When playing hockey, you want skates that will glide on the ice with little friction, but when you play basketball or soccer you want shoes that can grip to the ground to give you more control. In your game, a ping pong ball was used since it is light and moves easily instead of using something that creates a lot of friction like a rock.

After you play the game, you'll be able to see that all three of Newton's laws can be seen in foosball. Newton's first law states that any object at rest will remain at rest unless acted upon by an external force. This is seen any time the ball is hit by a player on the field. The second law states that the acceleration of an object depends on the mass of the object as well as the force applied. When you hit the ping pong ball lightly, it moves slower than when you hit it harder. Finally, the third law states that every action results in an equal and opposite reaction. This is seen when the ball hits a wall and bounces back in the opposite direction.

Extensions

- To challenge yourself, try to make a larger version of the game using different materials that will allow the game to move smoothly. If you have motors available to you at home, try to make the game with a moving part, such as a goalie moving side to side guarding the net.

Share your creations!

Don't for get to share your experiments and creations with us! We would love to see what you've made. You can Email us at: esqinfo@uwaterloo.ca or send us a message/tag us on our social media!

Facebook: @uwengoutreach **Twitter:** @UWEngOutreach **Instagram:** @uwengoutreach

Thanks for exploring, discovering, and learning with us!

3, 2, 1 Done!

3 - Write or draw 3 things you learned from this activity

2 - Write or draw 2 things you found super interesting or cool and want to learn more about

1 - Do you have any questions about the activity? Did something make you wonder...what if? how? or why?