Game: Series and Parallel Circuits

NCF and/or NCERT Learning Outcomes:

- To understand the series and parallel circuits through an activity.

Why should you learn this?

- Playing this game will help you to learn about series and parallel circuits in a fun way. It also explains how electric current flows in parallel and series circuits and what effect a faulty component in the circuit will have on the entire circuit.

Prerequisites for the Activity:

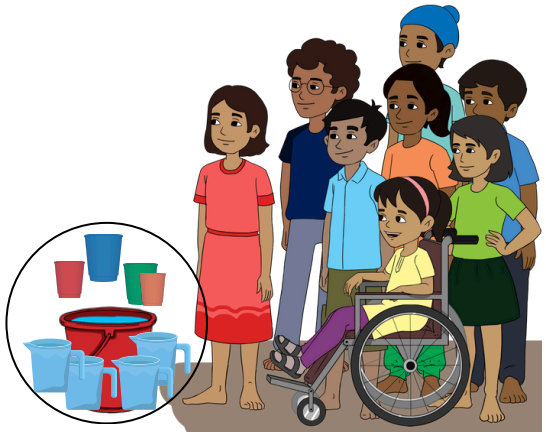
- **Location:** This game should ideally be played outdoors or in a space where water spillage is not an issue.
- **Prior Knowledge:** Children should have some knowledge of series and parallel circuits or should have watched relevant resources before playing this game.

What Do You Think?

- How can electrical components be connected to the energy source in different ways? How does this affect energy consumption?
- What are the differences between series and parallel circuits?

Let's investigate through a game!

1. Divide the children into two groups. First group has 5 players and Second group has 8 players.
2. Each group gets a bucket filled with water.
3. First group has a mug and 4 same sized of paper cups. Second group has 4 mugs and 4 different sizes of paper cups.



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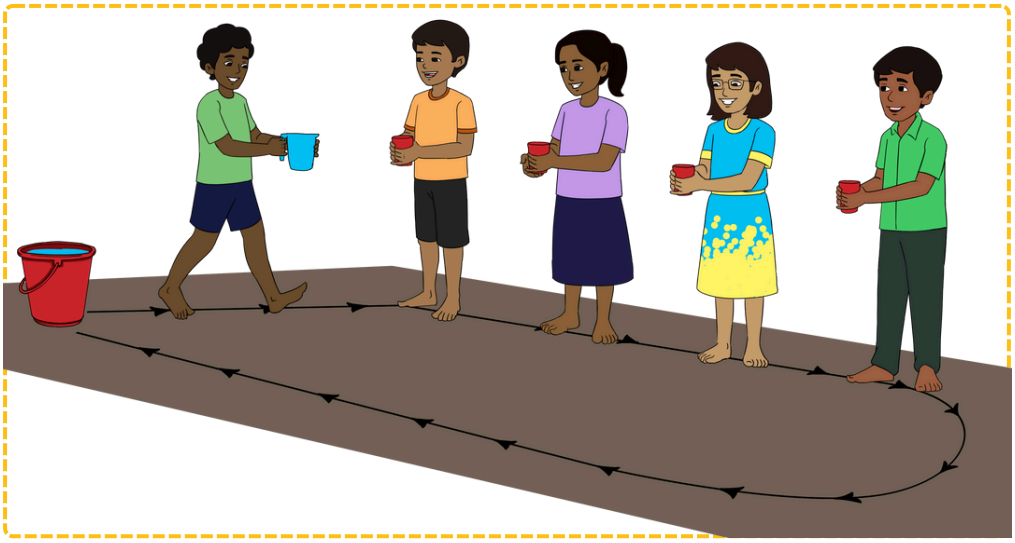
Game Rules:

- Water must always be taken from the bucket using a mug.
- Only the mug should be used to pour water into the paper cups.
- Try not to spill water on the ground.

First Method: (One-by-One, Like a Line)

- Place a bucket filled with water. One child stands near the bucket with a mug.
- Four other children hold cups of the same size and stand in a line (See the illustration).
- The children holding cups represent an electrical device eg: light bulb.



- Now, the child with the mug fills it with water from the bucket and pours water into the cups of all four children one by one.
- The child with the mug is not allowed to move forward without filling each cup.
- After that, he/she takes a U-turn and returns to the bucket at the starting point. Make sure that the path for going and returning is not the same (See the illustration).
- If a child holding a cup is not on the decided line or path the child with a mug is not allowed to fill his mug and not allowed to move.
- As soon as the child with the mug pours the remaining water back into the bucket, all the children holding cups should act as if they are bulbs.

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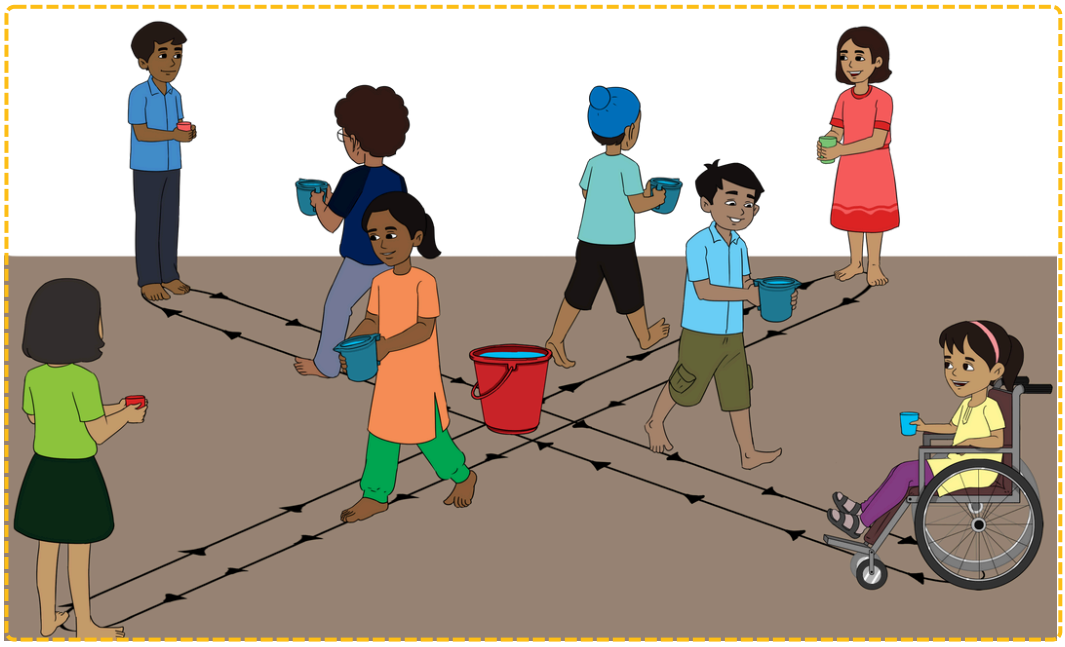
Second Method: (All at Once)

- Place a bucket filled with water. Four children stand around the bucket, close to it, each holding a mug.
- The other four children hold cups of different sizes and stand a little away from the children with mugs (see the illustration). The children represent the different electrical devices.



- Now, the children with mugs fill them with water from the bucket and pour it into the cups of the children standing little away from them.
- The children with mugs are not allowed to move forward until they have filled the cups. After that, they take a U-turn and return to the bucket at the starting point. Make sure that the path for going and returning is not the same (See the illustration).
- As soon as the children with mugs pour the remaining water back into the bucket, the children holding the cups should act as if they are different electrical devices.

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Now, if in group 1, all the children holding cups represent bulbs. In group 2, the children holding cups represent a bulb, a fan, an iron, and a mixer. The water represents electric current.
Then based on your observations, answer these questions.

Questions for discussion	First Method: (One-by-One, Like a Line)	Second Method: (All at Once)
1 What do the buckets, cups, and water represent in terms of electricity?		
2 Can you find a pattern in how the cups are being filled in terms of electrical circuit?		
3 What if you increase the number of cups? How will it affect the water bucket?		
4 What happens if we remove one boy/girl holding a cup? Does it affect the other devices?		

- Compare your experience with series and parallel circuits. Which method resembles which type of circuit? Why?
- Why was only one type of device used in the first method but different ones in the second? find out.

Conclusion

- The first method (one-by-one) is like a series circuit – all energy (or water) flows through a single path. If one point fails, the remaining devices stop functioning.
- The second method (all at once) is like a parallel circuit – multiple paths allow energy (or water) to flow freely. If one point fails, the remaining devices keep functioning.