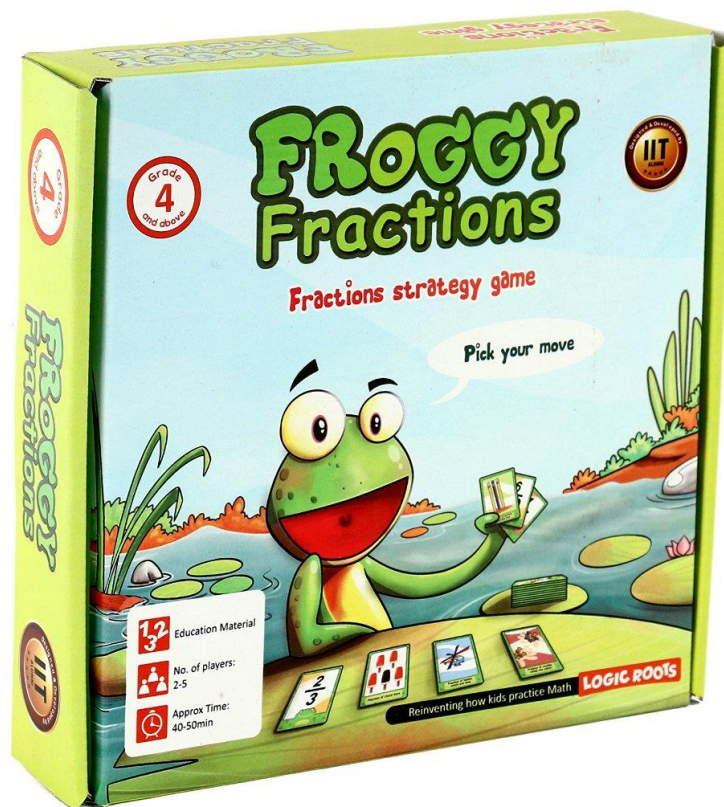


# LOGIC ROOTS

Reinventing how kids practice Maths



Teacher guide for using **Froggy Fractions** in classrooms

## Introduction

Welcome to the world of Logic Roots Math Games where students practice while playing. The games are designed so that in each session, students get to practice up to 20 times more Math problems than in class and that too with a lot more fun and engagement.

This Game Book will help you, the teachers, get most Math practice out of Logic Roots Math Games. It has been divided into the following 5 sections.

Session name	Details	When
1. Before the game play	This section describes all the activities that the teacher has to do before you get the students to play the game <ol style="list-style-type: none"><li>1. Group formation</li><li>2. Arranging the game room</li><li>3. Get acquainted with the game</li><li>4. Purpose of the game session</li></ol>	Once a year
2. Setting up the game session	This section is about introducing the students to play the game in a fun and organized manner. It includes game rules too <ol style="list-style-type: none"><li>1. Taking kids to the game room</li><li>2. Teaching them the game rules</li></ol>	Once for each game
3. During the game play	Here, we explain all the things you need to take care of, while the game is in progress <ol style="list-style-type: none"><li>1. Getting them into desired groups</li><li>2. Getting the game open in front of each group</li><li>3. Initiate play</li><li>4. Observing and managing issues</li></ol>	Every time
4. Winding up the game session	Correctly winding up the game is as important as starting the game. <ol style="list-style-type: none"><li>1. Finding winners</li><li>2. Announcing the end of game session</li><li>3. Wrapping up the game</li><li>4. Taking feedback from kids</li><li>5. Getting back to the class</li></ol>	Every time
5. After the game play	Your observations after the gameplay will help make the next sessions better <ol style="list-style-type: none"><li>1. Reviewing notes</li><li>2. Discussing with other teachers</li><li>3. Recording changes for the next game session</li></ol>	Every time

# 1. Froggy Fractions

The idea is that each child is learning by observing. So we are not going to give out the game rules yet. We will make them play and let everyone learn as we go along.

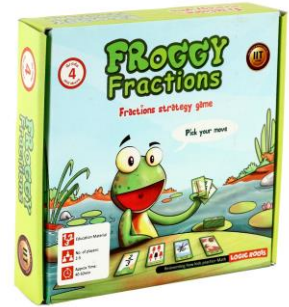
## 1.1 Before the game play

Below are the steps you need to take before playing Froggy Fractions. Often this has to be done 1 week prior to the game session.

### 1) Group Formation

Froggy Fractions is a group game where 4 students play in each group. Here we will find out how many groups will be there for your class and who will sit in which group and where will each group sit and what will each group be called.

- a) Find out how many groups will be formed. Since this is a 4 player game and suppose you have 30 students in your class then you will have 8 groups with 2 groups of 3 members and the other 6 groups of 4 members each.
- b) Skill based grouping is a good idea for Froggy Fractions. This means that for each group, you have one child who is good in Math and already takes an interest in what you are teaching. The other 3 students can be chosen at random.
  - Choose 8 leader students
  - Allocate rest of the class to these 8 groups
  - Give creative and yet easy to remember names to each of these groups. Instead of simply calling them A, B, C, D, E, F, G, H you could call them **Australia, Belgium, China, Denmark, England, Finland, Germany, and Hungary** etc. This will make it fun and build a competitive spirit.
  - Prepare this list in your diary and save it for future reference.
  - Announce this grouping and group names to students in class and tell them that they have to remember their country mates for the rest of the year because we are all going to use this formation to play a game.
- c) Visit the game room and make a mental map of where will each group sit. You can start with First block for Australia seating Belgium behind them and so on.
- d) This is once in a year activity



### 2) Arranging the game room

Before you conduct the game session, you must get the logistics in place. Before each game session, teachers must make sure that

- a) Game room has desired number of game boxes – Are the 8 Froggy Fractions boxes there? Are they in good condition and do they have all the components? You can take the help of 2 students to do this task.
- b) Game room has a place where students can sit in groups, preferably on the ground. So it has a mat but no tables and chairs.

- c) Ensure availability of the game room – Check with the head mistress / principal that the game room is available that day i.e. no other teacher is planning to use it on the same day.
- d) Ensure you have double period – Playing the game with young kids takes time to explain and have them to practice it again. So having a double period (2 periods back to back) helps in better conducting the game session.

### 3) Get acquainted with the game

Before you actually play the game with the students, it is imperative that you are fully acquainted with the game.

- a) Check all the game components to know what all is there in the box.
- b) Read the game rule book thoroughly. You should be able to explain the rules to all the students without the need of this rule book. Be aware of the skills that this game will require and get them to practice and it will reveal how the practice will be generated. The skills that will be practised through this game are –
  - Reducing fractions to simplest form
  - Identification of fractions and fraction operations
  - Strategic thinking and spatial recall
- c) You must know how the box looks, how it is opened and closed and where each component goes.
- d) You must anticipate the kind of difficulties the students may face while playing.

### 4) Purpose of the game session

For Froggy Fractions, you will have 3 such sessions. But you must plan at what stage in the course you plan to use the game and why. A clear understanding of the objective of the game will give you more benefit. We suggest the following 3 stages

- a) To build interest – When you have exposed students to fraction recognition and simplification but they do not have any proficiency yet.
- b) To build accuracy – When you have nearly completed the chapter on fractions, now use this game to build accuracy.
- c) To build speed – When you have moved to other topics but you want to use this game for revision and to build speed.

## 1.2 Setting up the game session

This section is about introducing students to play the game in a fun and organized manner. It includes game rules too and must be done separately for each game.

### 1) Taking the kids to the game room

This means getting them into the groups, forming a queue and taking to the game room.

- a) Come to the class and get the students to assemble in their groups of Australia, Belgium, China and so on.
- b) Let them now form a queue and take them to the game room.

- c) Ask the respective groups to reach their pre-assigned places and stand there.
- d) Take a quick head-count
- e) Redistribute the groups if required. If any group has 2 or less students then merge that group into other groups. For example, if Australia has just 2 people while China and Hungary have 3 people each, then allocate 1 member of Australia to China and 1 to Hungary.
- f) Now ask them to sit down at their respective places in a circle. As of now, they do not have any game box with them.

## 2) Getting them in demo groups

There are several ways to teach them to play the game, we will use the 1 session observation method

- a) Formation of demo groups
  - Choose 8 students such that you have 1 person from each group. Make sure these are NOT the group leaders. Choose students who are very sincere and will follow your instructions word for word.
  - Ask these 8 to come to the centre of the room and form 2 groups of 4. We are getting them ready to play the game. So one group sits on the right side of the teacher and the other group sits on the left side with some place in the middle for the teacher to stand and coordinate easily. We will call these 8 students as the demo-group.
- b) Getting everyone in observer position
  - Now tell everyone else to stand at their places. Group by group, ask them to come and stand near either of these 2 demo groups such that they are able see the game play.
  - Make sure that the demo groups are seated on the floor, the teacher is in the middle and everyone is surrounding them without pushing.
- c) Getting the game box
  - Point out 1 child in each demo group (let him be the demo group leader) to stand up. Ask demo group-1 leader to get desired game box with a mark of "1" on the box. Ask demo group-2 leader to get the box with a mark of "2" on it.
  - They both must go and get the box, put it in the centre of the group without opening it and sit down at their previous places. Now ask the demo group leaders to open their respective boxes. No one else must touch anything. Everyone, including the demo group players are just observing.
  - It is important to maintain decorum and discipline at this point for smooth function of the game later.
- d) Setting up the game
  - Ask the 2 demo group leaders to take out one item at a time so that everyone can see them.
  - They must take out one item at a time, open it and place it neatly on the floor such that it is in the middle of all the 4 players. You must ask everyone what this is and the entire class can respond that these are the game cards or sketch pens etc.
  - Leave the rule-book in the box, close the box lid and put it aside so that it is near the teacher and away from the other students, else they will lose attention and focus

while you are explaining the gameplay. The leader would distribute one sketch pen and a slate to each player.

### 1.3 Game rules

#### 1) Narrate the game story

- Ask everyone to pay attention to you as you are going to narrate a story for this game.
- Narrate this little story - The frogs are super smart in this pond. But they want to find the smartest frog of the pond. So they made this little game. The frog that gets 4 equivalent fraction cards in hand first is the winner and will be declared the smartest frog of the pond.

#### 2) Open the box

- We have 40 game cards in the box. Ask the game leader to bring out the cards and count them. He must say that there are 40 game cards. Now bring out the sketch pens and slates and give one to each player.
- To start with the game, ask the leader to shuffle the deck and give 4 cards to each player, face down.
- Now put the remaining pile in the centre, face down.
- Now open the top card and put it face up beside the card pile. Now the game can start.

#### 3) Make the first move

- Ask everyone to see their cards and not show them to anyone. Ask them what they observed. Try and bring out the answer that these are fraction cards. Also, help them read the picture fraction cards and make sense of them.
- Now the teacher must announce that since this is a demo game, so for this session only, we will play with open cards. Ask everyone to lay down their 4 cards, face up, in front of them.
- Now the teacher must announce that the person who gets all 4 equivalent fraction cards in hand first is the winner. You can do this by picking up cards from the pile at the centre. Let me show you how. And everyone standing can help out too.
- Ask everyone to look at their open cards, reduce them to simplest forms and then decide what kind of fraction cards will be good for them and what they can discard. Now it is the turn of the first player. Ask him to look at the open card in the central pile. Will it be useful for him? Help him come at the correct answer. Try and reduce it to simplest form, compare it to all his cards in hand and then bring out a Yes/No answer. Take all the kids along with this thinking.
- If he says no, ask him to pick up the top card from the closed pile. He can only pick from one pile, either the one with cards facing up or the one with the cards facing down.
- Now he has 5 cards in hand. He has to choose the best 4 cards and reject 1. He can even reject the one card he just picked up.
- The teacher must collectively help him make the right decision.

- Now it's the turn of the second player. He can either choose the top open card from the open pile or the top closed card from the closed pile of cards. And so on.

#### 1) The next few moves

- Now the teacher must observe and guide the students for next 2 turns just to make sure that they all have understood the rules.
- If anyone has done all 4 cards of equivalent fractions by now, they can close the game by placing the 5<sup>th</sup> card face down in the pile. Other players must evaluate this move and if it is correct, he will be the winner.

#### 5) The discipline rules

- By now, the players are getting comfortable with the gameplay. Let them play 1 move on their own under your supervision. In the meantime, keep building excitement for the game among the observers.
- Once they are comfortable with the play and rules, tell them the 2 discipline rules.
  - If any player gives incorrect answer <e.g. closes the game when he does NOT have all 4 equivalent fraction cards>, he must not play for 2 turns.
  - If any player speaks in someone else's turn, you miss a turn.
- Let them play 2 more rounds. During this time, if possible, demonstrate these 2 rules and follow them with utmost rigidity and strictness no matter what.

#### 6) Winding up the game

Now it is time to demonstrate the winding up of the game which is to be done by the leader

- Ask everyone to stop the game play and put the cards they have back on the mat.
- The one who would have a complete set of cards (4 cards of equivalent fraction) will win the game. Check to see if there is someone who has completed his pair, if yes then he will be declared as the winner.
- Now ask the leader to collect all the cards and make 4 stacks of 10 cards each. If he cannot count 4 stacks of 10 cards, he must call the teacher.
- Now the student must put the cards back in the box.
- Then the teacher must ask the student to count 4 sketch pens and 4 slates and put them back in the box.
- Ask out aloud if the rule book is still there in the box. Once the students respond in positive, ask them to close the box.
- Now the leader must get up from his place, take the box and put it back in the rack where it was. Once this is done, make sure everyone claps for the leader and the group. He must then come back and sit in his original position with the group.
- The teacher must tell them that it is the job of the group leader to make sure all the components go in the box and the box has to be kept back properly.

### 1.4 During the game play

You already have set them up in groups, each group has a group leader, they have all seen the game play once and they now have the game in front of them. Now let us come to the part about how to get the entire class to play the game.

## 1) Initiate play

The section is about getting the group to start playing. The students will take some time to get familiar with the components of the game and will need some help with the game rules. So this should be a step by step process

- Just as you worked with the demo group leader earlier, ask the leader of all the groups to get the boxes. Open the game box step by step and then set up the game to play.
- Ask the group leader to start the game. Randomly ask 2-3 students to announce their first moves and check if they are moving correctly.
- Then the next player's turn comes. Again do the same thing with 2-3 students and so on till all 4 players have had one chance to play.
- Now it's the first player's turn again. Again lead them through the next turn exactly like you lead the group leaders at the demo stage.
- Let the groups start to play on their own.
- Announce that if any group has any problem, they should call the teacher. Also announce that it is the group leader's role to keep the cards safe and game play going smoothly.

## 1.5 Observing and managing issues

As the game moves on, the teacher must keep eyes and ears open for the issues. The kind of issues that may come up are -

- Specific players in a group have not understood how to play the game – in such a case, spend 2-3 minutes in the group to help out the player. If the group leader and others have understood the gameplay perfectly, then delegate the role of helping the player to them.
- An entire group is having issues with playing – You may have to identify all such groups, get them together and repeat the process that you did with the demo groups. It might take up to 10 minutes of your time.
- The students are not following the rules – Make the student leave the group. He may not play while rest of the class is playing. Please be strict with this rule and if required, you may disqualify an entire group.
- The students cannot do the Maths – For the time being, ask them to follow the discipline rule i.e. miss a turn etc. But this is also a feedback to the teacher that the students are not yet ready with the Math and are unable to apply it in real life. They will be excited by this game session. So in the immediate next class, use this excitement to your advantage and revise the topic in a way that they can prepare for the next class.

## 1.6 Winding up the game play

When it is about 10 minutes to the end of the period, start preparing for wrapping up the game.

### 1) On completing or winning the game

- Go to that group and verify if everything was correct. You can do so by checking with other players and basing it on your knowledge of the class too.



- Announce the winner and make the class to clap for him.
- Ask the winner to now observe the progress of the game while the remaining 3 players continue playing. He must ensure that the discipline rules are being followed.

## 2) When just 10 minutes are left, stop.

### 3) Wrapping up the game

- Ask the leader to take over
- Ask everyone to stop the game play
- Now take all the leaders through the closing process exactly like we did with the demo group.
- Now the leader must get up from his place, take the box and put it back in the rack where it was. Once this is done, make sure everyone claps for the leader and the group. He must then come back and sit in his original position with the group.
- The teacher must tell them that it is the job of the group leader to make sure all the components go in the box and the box has to be kept back properly.

### 1) Taking feedback from kids

Once the game has been put back in place and leaders are seated, then ask students if they enjoyed the game. Ask them if they faced any difficulties and ask them if they would like to play again. Use this time to congratulate the winners again and state that if they are faster in identifying and simplifying fractions, they might win this the next time.

### 5) Getting back to the class

- Now that the session is complete, ask the kids to stand at their places and form a queue.
- They will now have to move back to the class.

## 1.7 After the game play

Once the game play is over, it is important for the teachers to think about the session and take steps to improve the future sessions for this and other games

### 1) Reviewing the observations

Review your observations from today. It is a good idea to record them in your teacher diary. Record major issues and major wins.

### 2) Discuss with other teachers

If other teachers from other class or other sections have played the same game, discuss your notes with them find out ways to improve.

### 3) Planning for the next sessions

There are some things that you may not have to repeat in the next session e.g. game training from scratch or group formation. But you may have to take some corrective actions. So plan these.