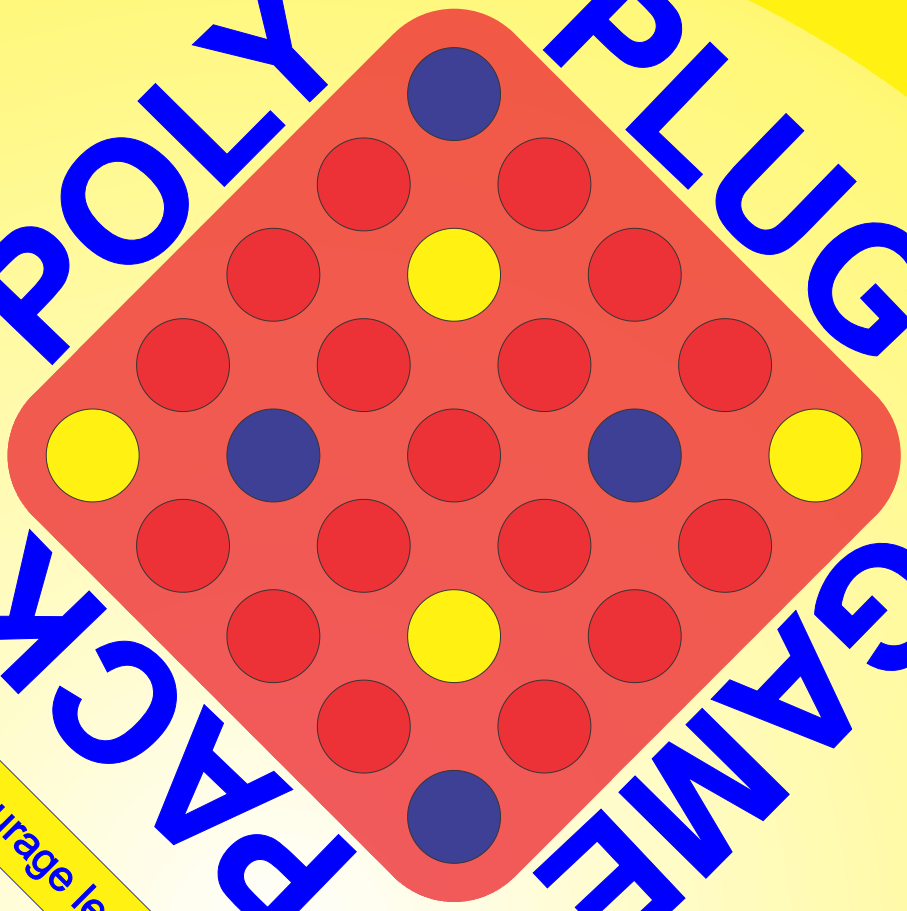
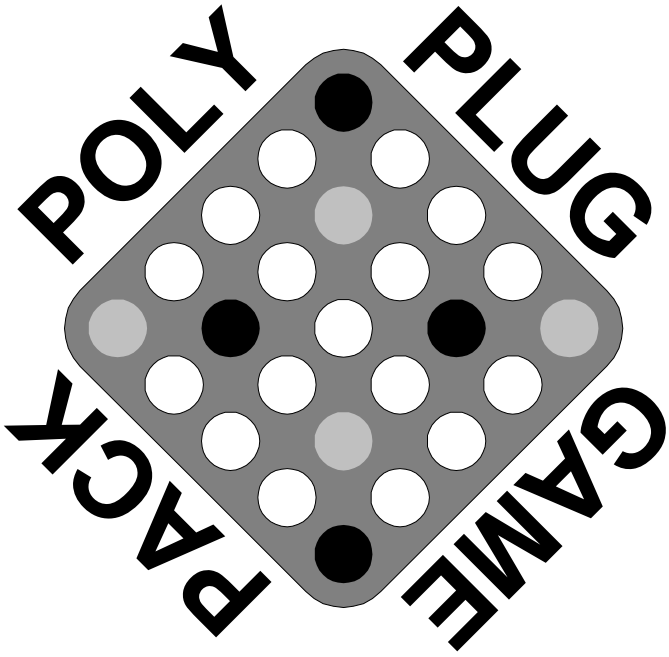
POLY PLUG GAME PACK



Strategy games which encourage learners to ask, and answer, the question "What happens if ...?"

Resource Book

Doug Williams



Publisher: Black Douglas Professional Education Services
4/71 Greenhill Road
Bayswater North
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 First published 1995. Reviewed 2019. ISBN No: 0 646 26589 X

My thanks to Roland Seidel, a colleague of many years past, who increased my sense of freedom.
...Doug Williams

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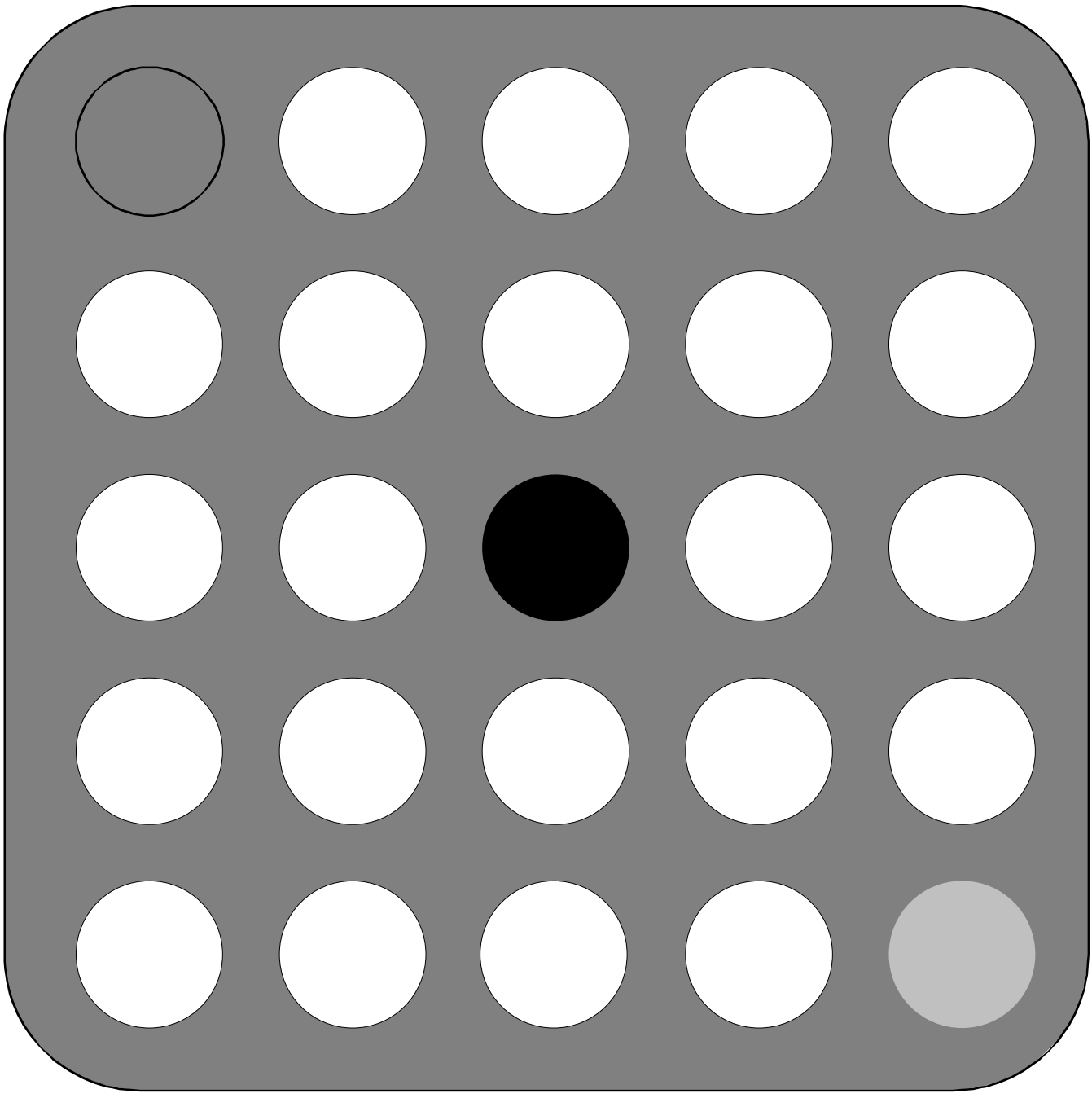


RED BLUE YELLOW

THE MATERIALS

This book needs one Poly Plug set for each pair of players. Poly Plug is two 5 x 5 frames; a thin red one with removable red plugs and a thick yellow/blue one with removable plugs which are yellow on one side and blue on the other. A set comes in a press-seal bag.

The red frame is the Playing Board. In fact it is a large variety of playing boards. Not all of the games in the pack are played on a 5 x 5 board, so by placing red plugs into an 'empty' red board to 'mask' unwanted spaces, new board shapes are created with the remaining *unplugged* ones.

The yellow/blue board is the Storage Board. The plugs are the playing pieces. Player A uses them yellow side up and Player B uses them blue side up. Not all of the plugs may be necessary for a particular game, so the unused ones are stored in this board. This board also provides storage for the red plugs which have been removed from the Playing Board to make the shape of a particular game board. To do so, insert them in the spaces sideways. The yellow/blue plugs are twice as thick as the red board, so they are easy to grip and easy to move from space to space when playing.

Packing up is efficient, because the set is complete when all red plugs are back in the red board and all yellow/blue plugs are in the yellow/blue board. This can be checked visually. "Hold up your bag and show me both sides."

This Resource Book (the Poly Plug Game Pack) contains rules for four games in each of four families, and puzzles based on the games which are designed for collaborative group discussion. Throughout the text the shadings shown on the previous page are used to represent the Poly Plug colours. However, the print materials supplied are only starting points, albeit extensive ones, and it will be the degree to which children are allowed to ask and investigate their own questions which adds meat to these bones. The games supplied have been used successfully with children aged from 7 to 15 and beyond. Their order in the text reflects what appears to be a general increase in complexity, although, children being as creative and adaptable as they are, it would be incorrect to attempt to classify particular games as suitable for particular ages.

Our web site, developed by creative teachers using Poly Plug for teaching and learning all sorts of mathematics, is full of ideas and activities. You are invited to extend your use of Poly Plug by visiting:

http://mathematicscentre.com/taskcentre/polyplug.htm

LEARNING TO REASON

Children and adults alike make many decisions every day. Some are trivial; some important; some vital. But how many of them are reasoned and how many are merely reactions? How often do we stop to think about alternatives? In fact, how often do we realise that there are alternatives?

The Poly Plug Game Pack is designed to contribute to the development of children's reasoning by encouraging them to ask, and answer, the question: "What happens if...?" Poly Plug Game Pack is a non-threatening set of game situations, which give children the opportunity to develop an attitude which looks for, and examines, alternatives. Such learning is consistent with the mathematics curriculum of many countries. In fact, most make reference to the development of reasoning powers through experience with "If... then... ", or "What if ...?" situations.

Motivation is a key element in all learning and the combination of the attractive materials, and games which are easy to learn and to play, provides children with a great deal of enjoyment. As is always the case, it will be the teacher who capitalises on this enjoyment and leads children on; firstly to examine the alternatives in these games and secondly, to apply similar scrutiny to other classroom and general situations.

It is important that each time a new game from the set is introduced, it is played for the enjoyment it can offer. It is equally important that once children have developed a familiarity with a new game, they are encouraged to explore its strategy and examine the alternatives it holds. Finally it is important, over a period of time, to focus on the *types of questions* that are asked and apply them beyond the game context, in order to learn to transfer reasoning powers to the general events of life.

This resource book is intended to assist teachers to use the Poly Plug Game Pack to maximum advantage. It does not provide everything you need. Your most important resource will be yourself and your children. This book provides a basis from which you can explore. Your children's investigations into their own games will provide many rewarding experiences.

LIFE-SIZE LOGIC

The whole physiology *is* involved in learning, and far more than the brain is involved in successful learning. A complete theory to explain this process is difficult to find in educational literature, but its validity is supported, in part, by our individual experiences of learning to type, learning to drive or, unfortunately for many, by the negative feelings which have, in the past, attached to the learning of mathematics.

The Mathematics Curriculum and Teaching Program, Lovitt and Clarke (1988), however, does provide a rationale for the involvement of the whole of the body in learning tasks and in part reports that teachers who have applied the technique find that:

> *a very strong visual image remains with the participants and that this image can be 'tapped' in follow-up formal work inside the classroom.*

In another study cited in this rationale, MacKenzie and White (1982), it was found that:

> *Pupils who had been actively involved, physically, demonstrated far greater long-term recall of knowledge and skills.*

Poly Plug Games provide the opportunity for whole body involvement and teachers who have explored these games find it is a motivational benefit to introduce one game in each family on a life-size board. To do so requires either a grid of squares, which have sides of about 75cm, to be painted on the school playground, or, for inside use, to mark a sheet of plastic, or the carpet, with the same size grid by using electrician's tape or masking tape. Sheets of newspaper, or similar, are used to mask unwanted squares in particular games.

With these easy to prepare resources, teams of children become the playing pieces. Teams can be easily identified by using coloured ribbons, paper hats, socks up or down, or in many other non-gender based ways. Teams are encouraged to consult, quietly of course, so the opposing team won't overhear the strategy, before placing a team member on the board. This process has the added advantage of introducing the concept of planning and analysing strategy as a team, rather than as an individual procedure. There is a direct parallel here with the consultative process which we often use before making important decisions in life.

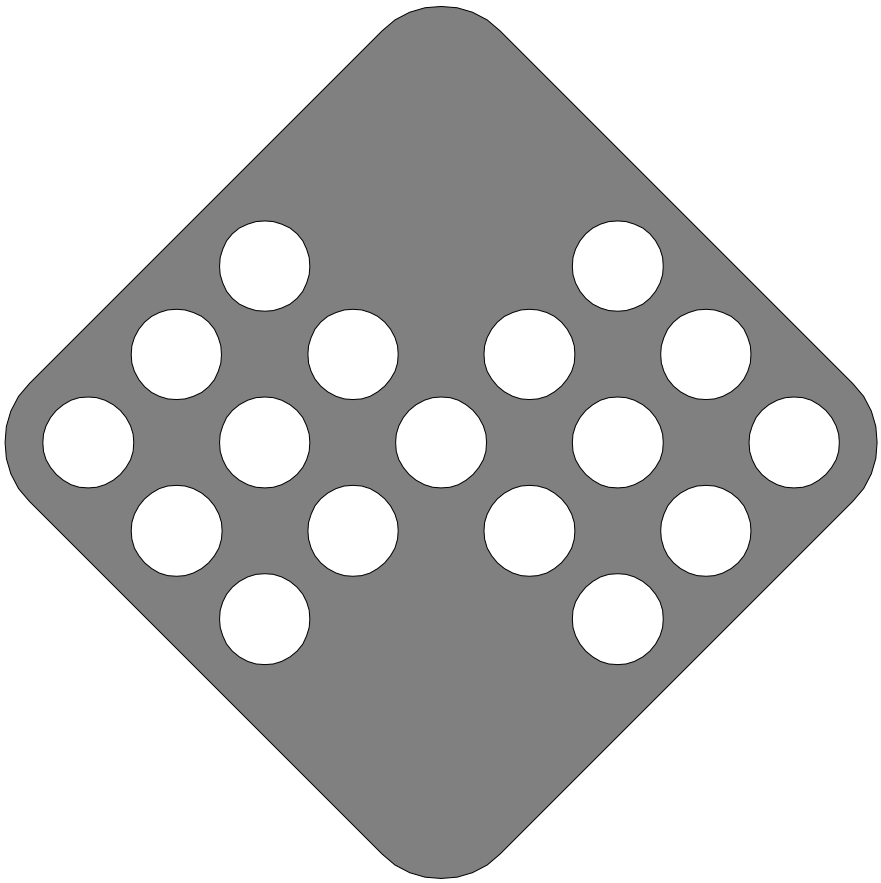
Before returning to the classroom to play the Poly Plug version of the game, the teams' strategies can be discussed with the whole class sitting around the life-size board and squares of coloured paper used to represent the playing pieces:

> *Why did your team play here...?*
> *What would have happened if you played here instead...?*

In this way, the sequence of:

- whole body involvement
- representation of the physical experience
- discussion of the children's responses

becomes a powerful teaching technique; one which is applicable, in fact, to the learning of a considerable amount of mathematics.



TAKING CONTROL

In his closing address to the 1991 conference of the Association of Teachers of Mathematics (U.K), Dave Hewitt comments:

> *To gain a sense of freedom you only need to be aware that you have a choice.*

Poly Plug Game Pack is designed to encourage children to 'see' and examine choices.

Consider the example of Noughts & Crosses. This simple game is played endlessly the world over despite the fact that there can only be a winner if one player makes an unwise move. Little thought is ever given to altering the game. It is as if the rules and the format, enshrined in stone, were handed down from heaven. However the rules of any game are in the hands of the players. What is suggested as rules is *one* way that the game can work satisfactorily; it may not be the only way. For example, Poly Plug Game Pack provides three variations on the traditional Noughts & Crosses. In two of the variations, the rules remain the same and the board shape changes. In one, both the board shape and the rules change. Your children will provide other variations. The most enjoyable one may be waiting for invention.

Consider, for example, the possibility of playing Noughts and Crosses on the board shown on previous page:

> *Do some positions have more 'power' than others? Why?*
> *Does Noughts & Crosses played on this board need additional rules?*
> *What happens if the game is played so that either player may play either colour on any turn?*

It is through challenging 'givens' and exploring the consequences that mathematics, and indeed humanity, has advanced throughout history. Poly Plug provides challenges to traditional 'given' games and then encourages challenges of itself by suggesting in each of its games that children could:

Change the rules to make a new game
Change the board shape to make a new game

Blank drawings of Poly Plug boards are supplied so that children can present their explorations in quality format. However using Poly Plug may encourage children to think beyond its 5 x 5 'given' so alternative representations will be required. In either case, it is best to encourage children to produce their games and present their ideas to the highest possible standard.

THINKING IT THROUGH

Poly Plug Game Pack supplies puzzles corresponding to each game which involve analysing the Best (Worst) Next Move in a partly completed game. Discussion and experiment will be a vital component in the analysis of these problems. In fact, the discussion, experimentation and justification of a decision is far more important in developing children's reasoning powers than the particular solution itself. Blank drawings are also supplied so that children may design more of this type of problem. If the children are encouraged to use black ball point pens, or fine black markers, and different shading patterns for each part of the board, then their work will photocopy well. In this way a library of strategy based problems can be built up from the children's efforts.

If you choose to encourage colour, then a digital camera might be a better way to record.

Children should also be encouraged to record the moves of a game as it is played, so that the game may be analysed later, or, so they can explore alternatives as they play. In Nick's Year 2 class in a London primary school, the children represented the Noughts & Crosses game board they were using with squares on graph paper (another model of the life size games they had played outside). Then they coloured each square as it was occupied and numbered it according to which move it was in the game. This method works if plugs are placed, and remain, in a space as in Noughts & Crosses. But what recording method can be developed in a game where the plugs can change positions? Can the class computer be enlisted to keep track?

Finally, it is important that when exploring game strategies with children, the children are encouraged to assume that they are playing against the best possible opponent; one who doesn't make any mistakes. After all if you win a race against a one-legged horse, what have you achieved? How have you stretched yourself? What have you learnt from your opponent?

References

Hewitt, D. (1991), *Into Our Fortieth Year: Finding Our Freedom*, Mathematics Teaching 136, September 1991, Association of Teachers of Mathematics, p. 5

Lovitt, C. & Clarke, D. (1988), *Mathematics Curriculum and Teaching Program Volume 1*, Curriculum Corporation, Melbourne, p.187

MacKenzie, A. A. & White, R. T. (1982), *Fieldwork In Geography and Long-Term Memory Structures*, American Educational Research Journal, 19(4), pp. 623-632

NOUGHTS & CROSSES FAMILY

NOTES - Noughts & Crosses Family

1. Young children sometimes don't realise that the aim of Noughts & Crosses is to make three in a row of your colour *while also trying to block your opponent's efforts to make three*. Children who are operating at this level play the game almost independently of their opponent and concentrate on making their own three. To encourage them to achieve the earliest level of strategic thinking, that is, noting the consequences of your opponent's moves while also thinking out your own, it helps to explain that two very good players in this game should always draw. Class discussion around a life-size board can establish this idea.

   Children can then be encouraged to help each other as they play a few more games, by explaining to each other the consequences of each move.

   > *That was a good move because now...*
   > *I think you should take that move back because otherwise I will be able to...*

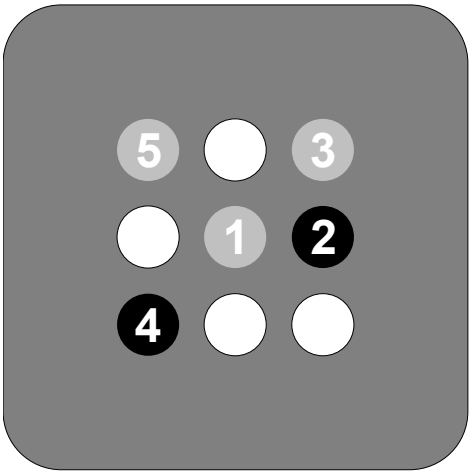
   To achieve such co-operative play, the teacher needs to develop an atmosphere which sees Poly Plug Games as:

   > *...helping us learn to think. When we help each other to learn to play the games better, we will enjoy playing them more just for fun.*

   Children can then be complimented if they play their best possible moves and obtain a draw.

   > *Another draw! Wow, that must mean you are two very good players.*

2. A common strategy in Noughts and Crosses is the Two Way Trap. That is, attempting to force a situation such as:



In this situation yellow must win, because on Move 6 blue can only block *one* of yellow's possible threes.

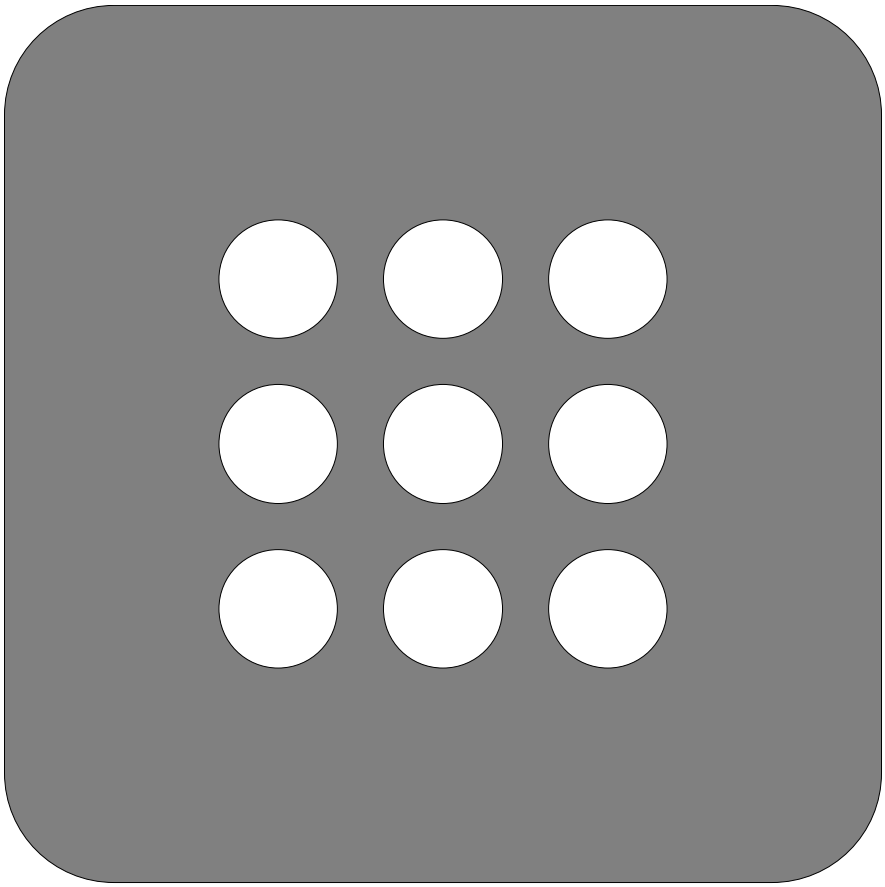
The situation should not have happened of course, and the incorrect move by blue was actually Move 2.

The variations on Noughts & Crosses which are included with this family, not only offer extra rows, columns and diagonals along which threes can be made, but provide new situations which lead to the Two Way Trap. For example, if a player can place two of their plugs side by side on an empty row of four, then a three can be completed on either side. Noughts and Crosses should always be a draw. But in the variations, one player should always win. Can the children work out which player and how?

Noughts & Crosses Family

NOUGHTS & CROSSES

Start with your Poly Plug board looking like this:



AIM

To make three in a row with your colour.

RULES

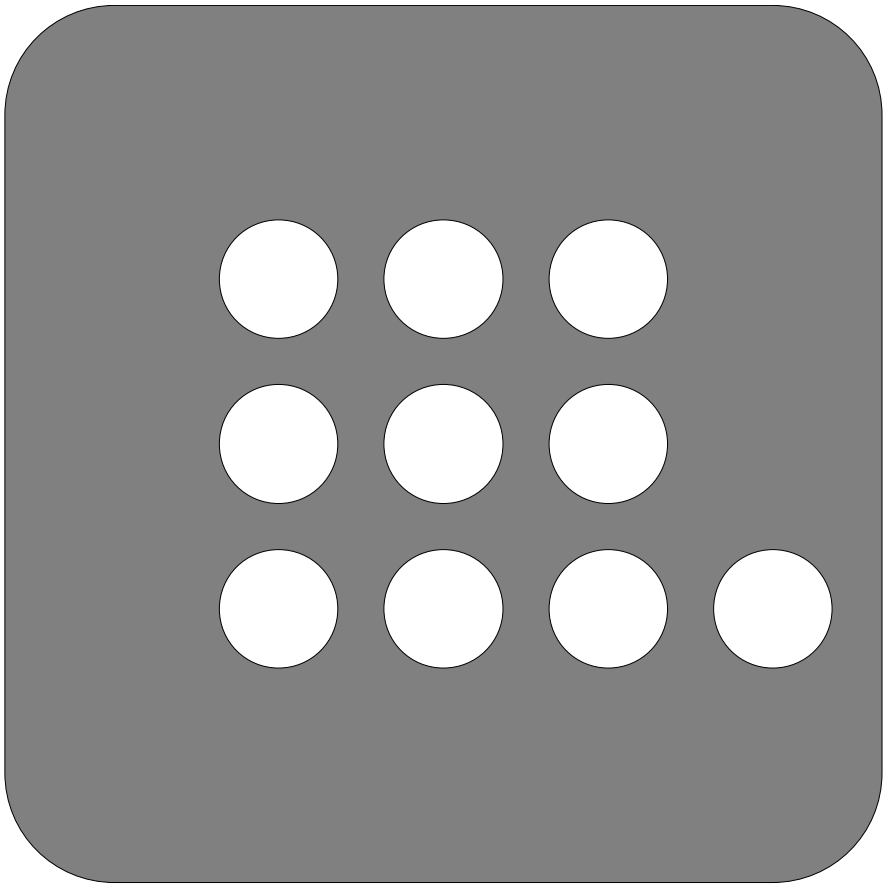
Players take turns to place a plug of their colour.

Change the rules to make a new game.
Change the board shape to make a new game.

Noughts & Crosses Family

BIG TOE NOUGHTS & CROSSES

Start with your Poly Plug board looking like this:



AIM

To make three in a row with your colour.

RULES

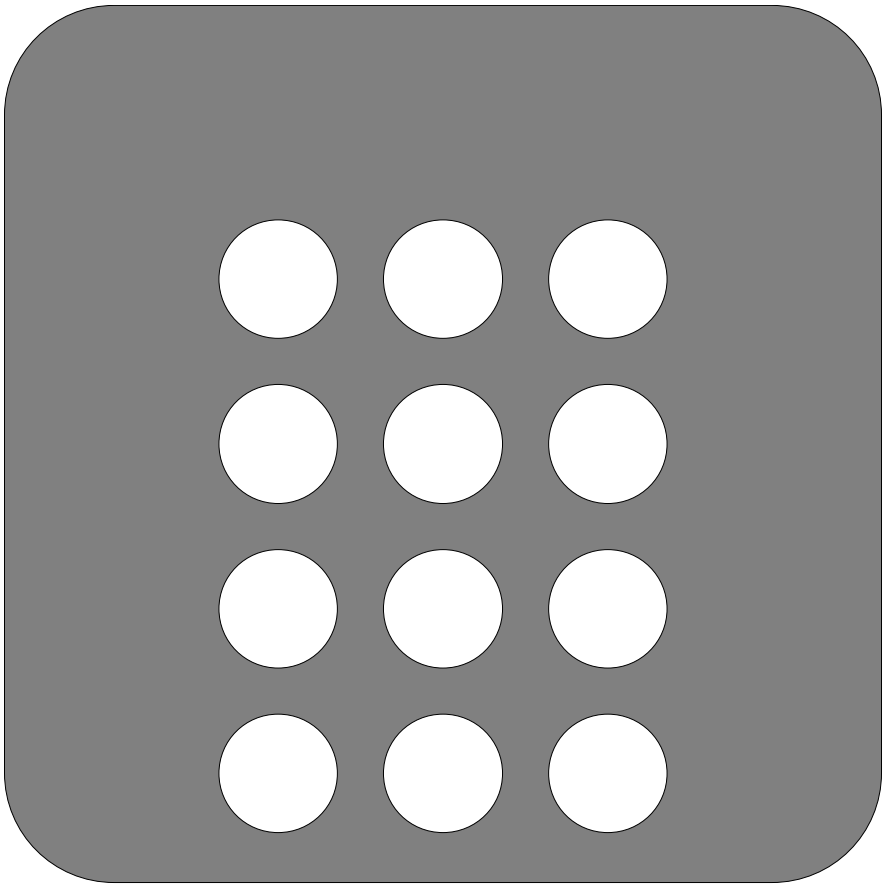
Players take turns to place a plug of their colour.

Change the rules to make a new game.
Change the board shape to make a new game.

Noughts & Crosses Family

LONG NOUGHTS & CROSSES

Start with your Poly Plug board looking like this:



AIM

To make three in a row with your colour.

RULES

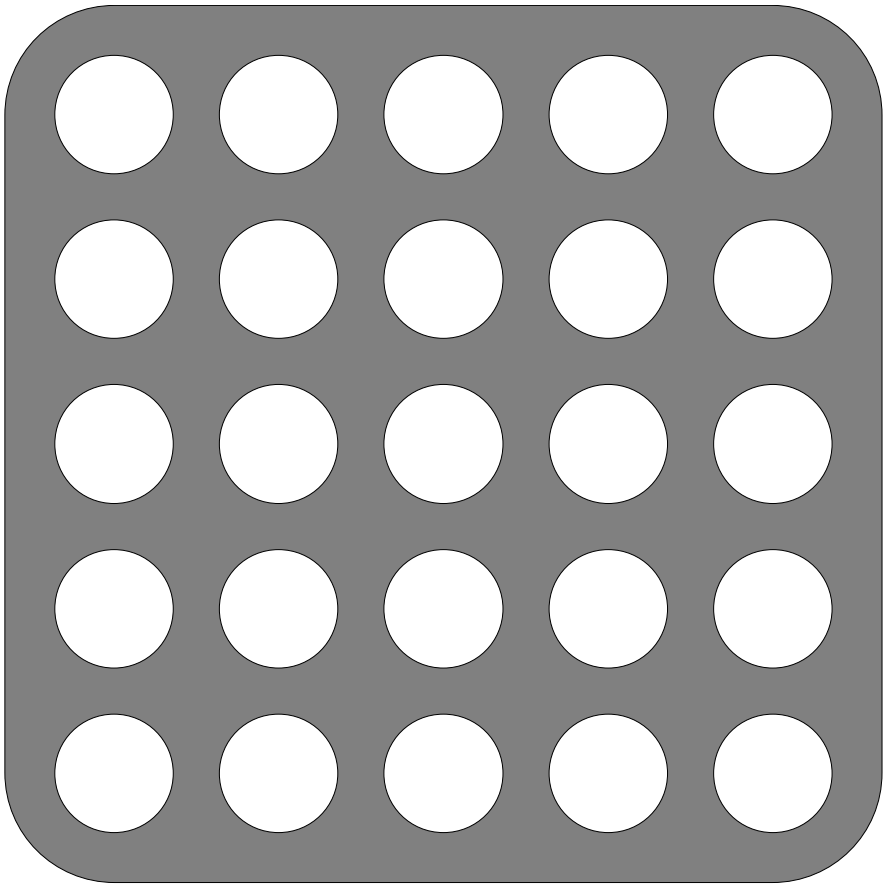
Players take turns to place a plug of their colour.

Change the rules to make a new game.
Change the board shape to make a new game.

Noughts & Crosses Family

5 X 5 NOUGHTS & CROSSES

Start with your Poly Plug board looking like this:



AIM

To make three or four or five in a row with your colour as many times as possible.

RULES

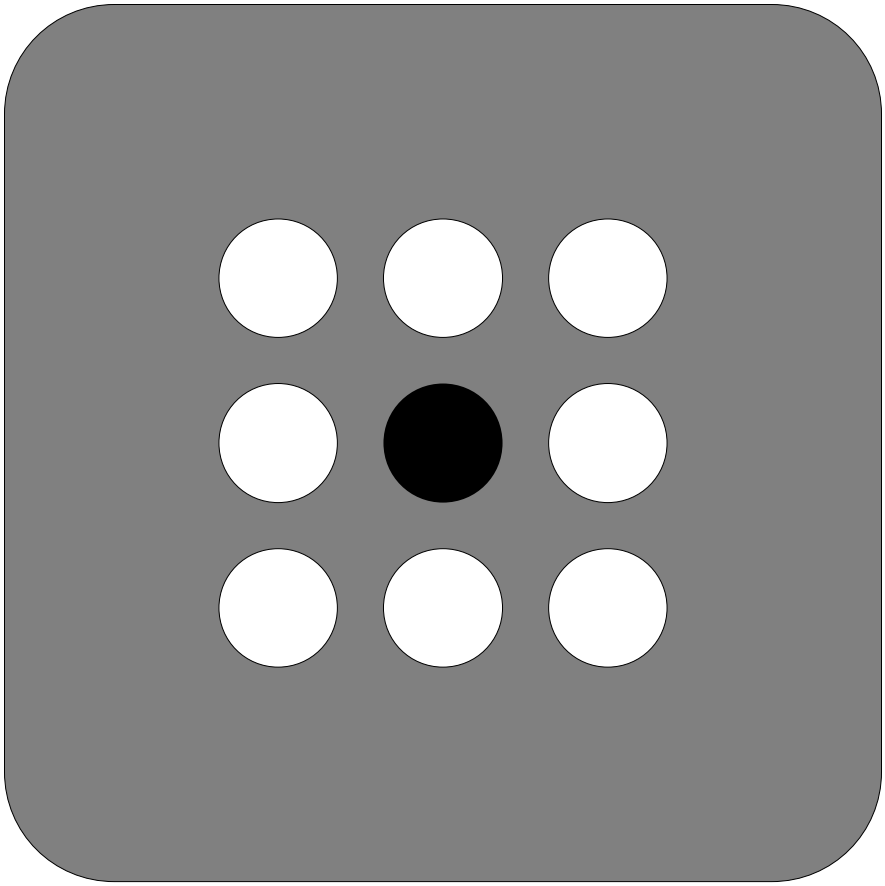
1. Players take turns to place a plug of their colour.
2. Play until all the spaces are filled.
3. Score ***5*** points for each *five* in a row, ***3*** points for each *four* in a row, ***1*** point for each *three* in a row.
4. The player with the higher total score wins.

Change the rules to make a new game.
Change the board shape to make a new game.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
NOUGHTS & CROSSES



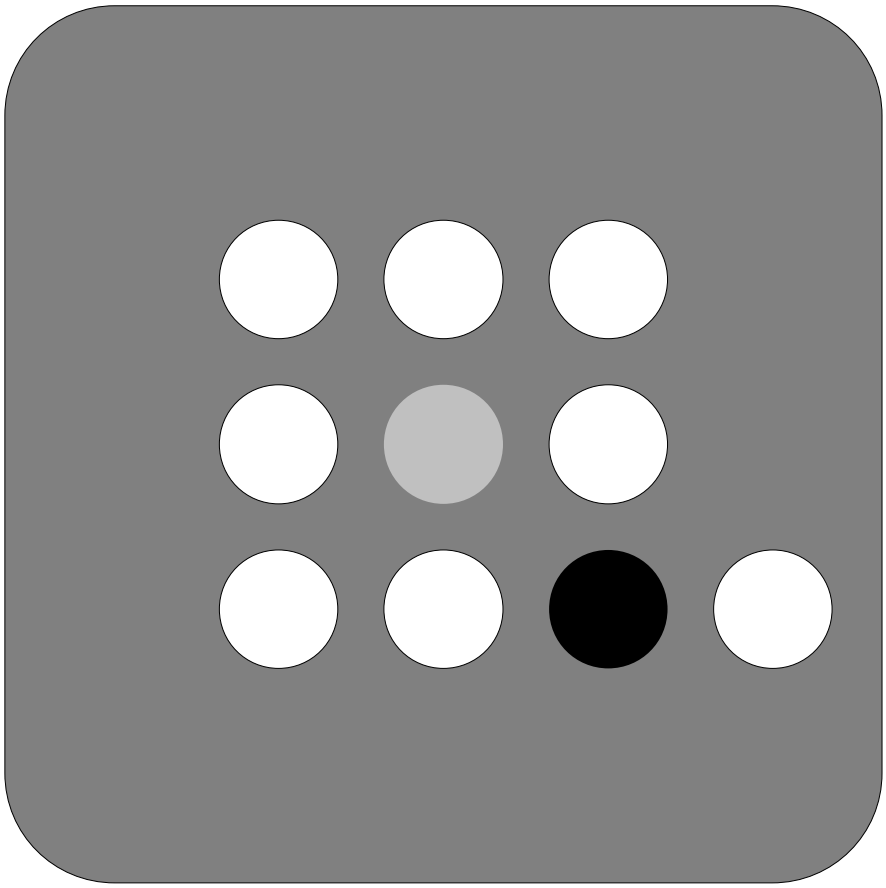
to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
BIG TOE NOUGHTS & CROSSES



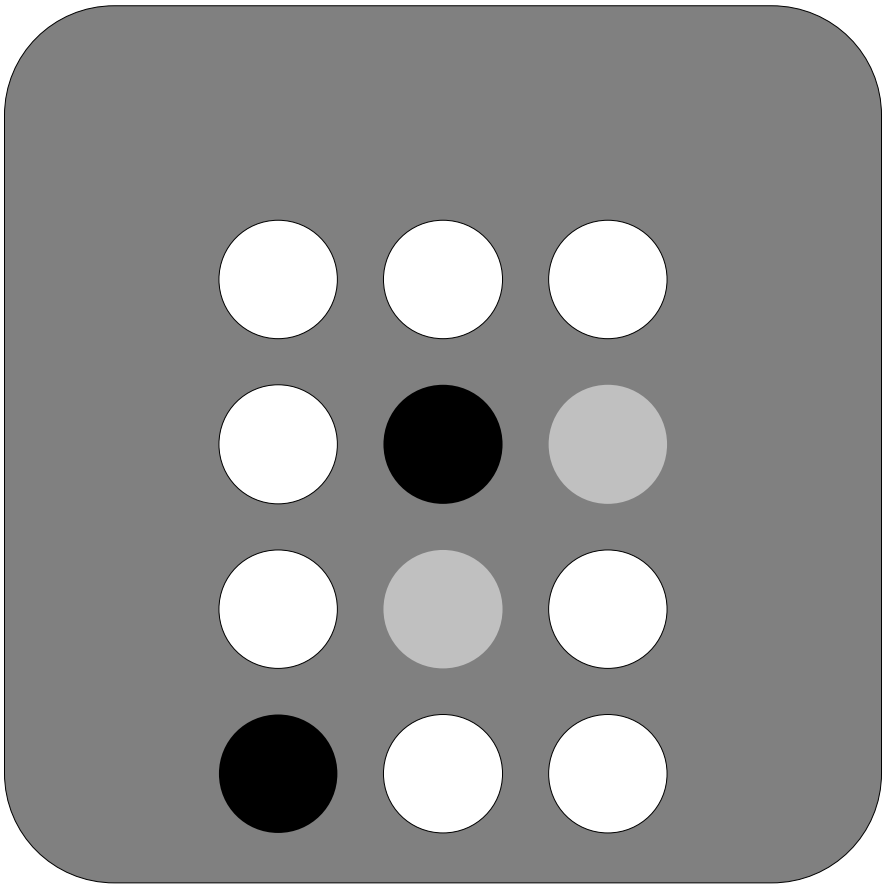
to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
LONG NOUGHTS & CROSSES



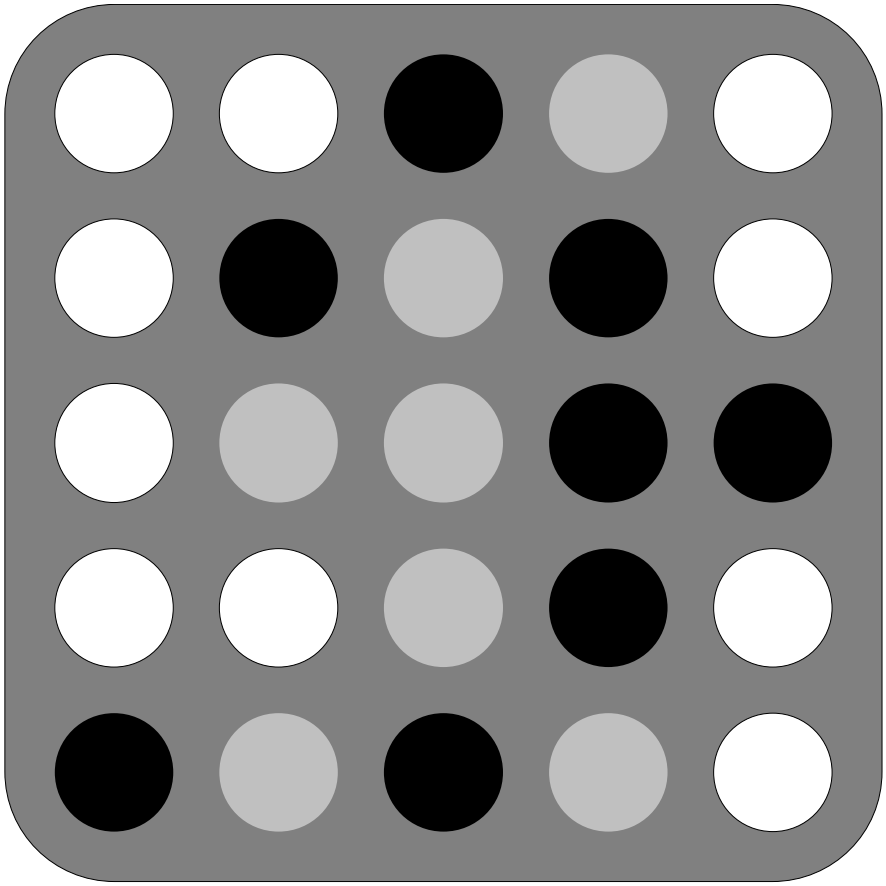
to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
5 x 5 NOUGHTS & CROSSES



to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

MAKE & TAKE FAMILY

NOTES - Make & Take Family

1. These games use the Noughts & Crosses concept of making three in a row, but add changes in two ways. Firstly the games have two distinct stages. In Part A, players alternate placing their plugs, aiming to make three in a row. Two very good players will be able to prevent each other from doing that in this stage, so the secondary aim is to be in the best position to begin Part B. In Part B, players can move their plugs from gap to gap, the second variation on Noughts & Crosses, again trying to make a three.

   Making a three, however is not the end of the game. The three is only a position of power which allows the player to remove one of the opponent's plugs from the board. The aim is to remove all of the opponent's plugs, but it is true that the player who first removes an opponent's plug has the advantage of an extra playing piece and should win.

2. Make & Take games are similar to the well known "Morris" games - Nine Men's Morris, Eleven Men's Morris and so on - and teachers with access to references containing these games could include them in the classroom program.

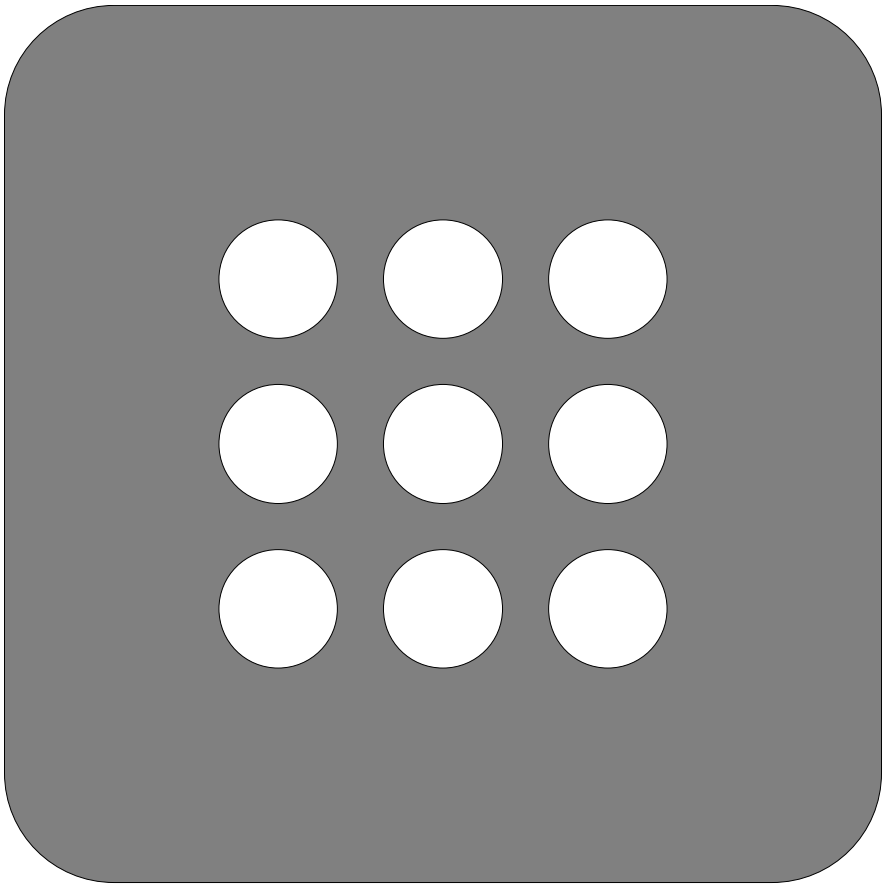
3. In spite of the apparently simple rules and board layouts, children find these games considerably more sophisticated than Noughts & Crosses, because the players need to be aware of what is happening in so many more directions.

4. In what ways can children force the equivalent of a Two Way Trap situation in these games?

Make & Take Family

SQUARE M & T

Start with your Poly Plug board looking like this:



AIM

To remove all your opponent's plugs.

RULES

1. The game has two parts: PLACING and MOVING.

   In both parts, if a player makes three in a row in any direction, they can remove one of their opponent's plugs.

2. PLACING (Part A): Players have ***3*** plugs each and take turns to place them.

3. MOVING (Part B): Diagonal moves or moves parallel to the edge. No jumps.

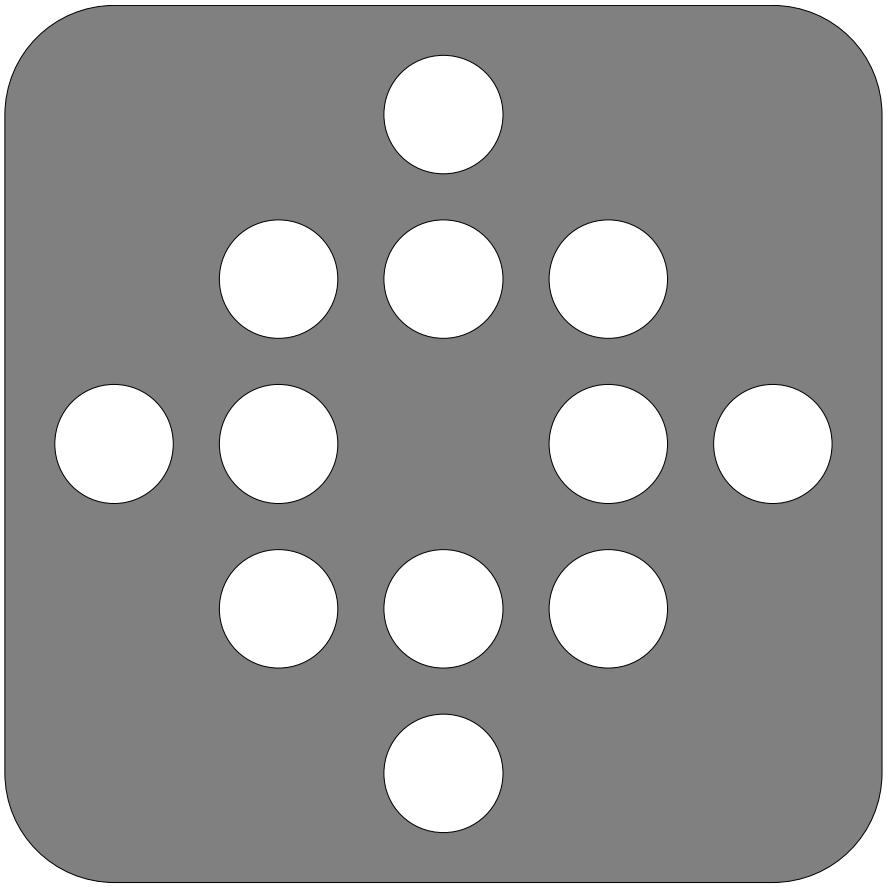
4. A three in a row must be *unmade and made again* before it can be used to remove another one of the opponent's plugs.

Change the rules to make a new game.
Change the board shape to make a new game.

Make & Take Family

CRISS-CROSS M & T

Start with your Poly Plug board looking like this:



AIM

To remove all your opponent's plugs.

RULES

1. The game has two parts: PLACING and MOVING.

   In both parts, if a player makes three in a row in any direction, they can remove one of their opponent's plugs.

2. PLACING (Part A): Players have ***4*** plugs each and take turns to place them.

3. MOVING (Part B): Diagonal moves or moves parallel to the edge. No jumps.

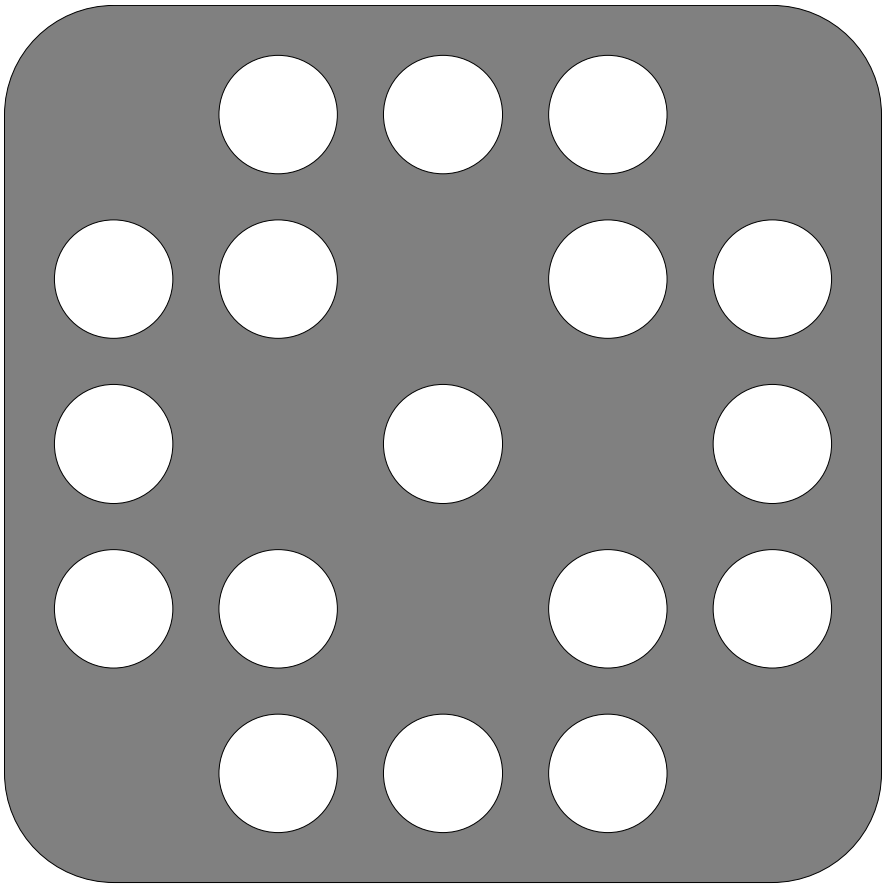
4. A three in a row must be *unmade and made again* before it can be used to remove another one of the opponent's plugs.

Change the rules to make a new game.
Change the board shape to make a new game.

Make & Take Family

ROUND M & T

Start with your Poly Plug board looking like this:



AIM

To remove all your opponent's plugs.

RULES

1. The game has two parts: PLACING and MOVING.

   In both parts, if a player makes three in a row in any direction, they can remove one of their opponent's plugs.

2. PLACING (Part A): Players have ***5*** plugs each and take turns to place them.

3. MOVING (Part B): Diagonal moves or moves parallel to the edge. No jumps.

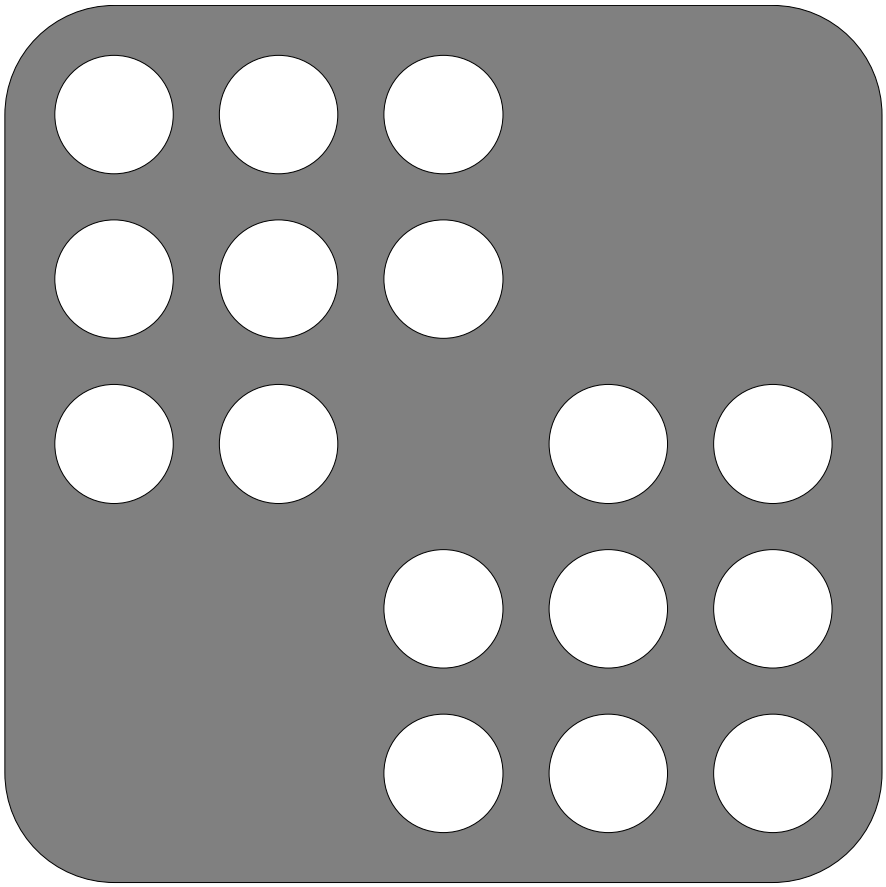
4. A three in a row must be *unmade and made again* before it can be used to remove another one of the opponent's plugs.

Change the rules to make a new game.
Change the board shape to make a new game.

Make & Take Family

SATELLITE M & T

Start with your Poly Plug board looking like this:



AIM

To remove all your opponent's plugs.

RULES

1. The game has two parts: PLACING and MOVING.

   In both parts, if a player makes three in a row in any direction, they can remove one of their opponent's plugs.

2. PLACING (Part A): Players have ***5*** plugs each and take turns to place them.

3. MOVING (Part B): Diagonal moves or moves parallel to the edge. No jumps.

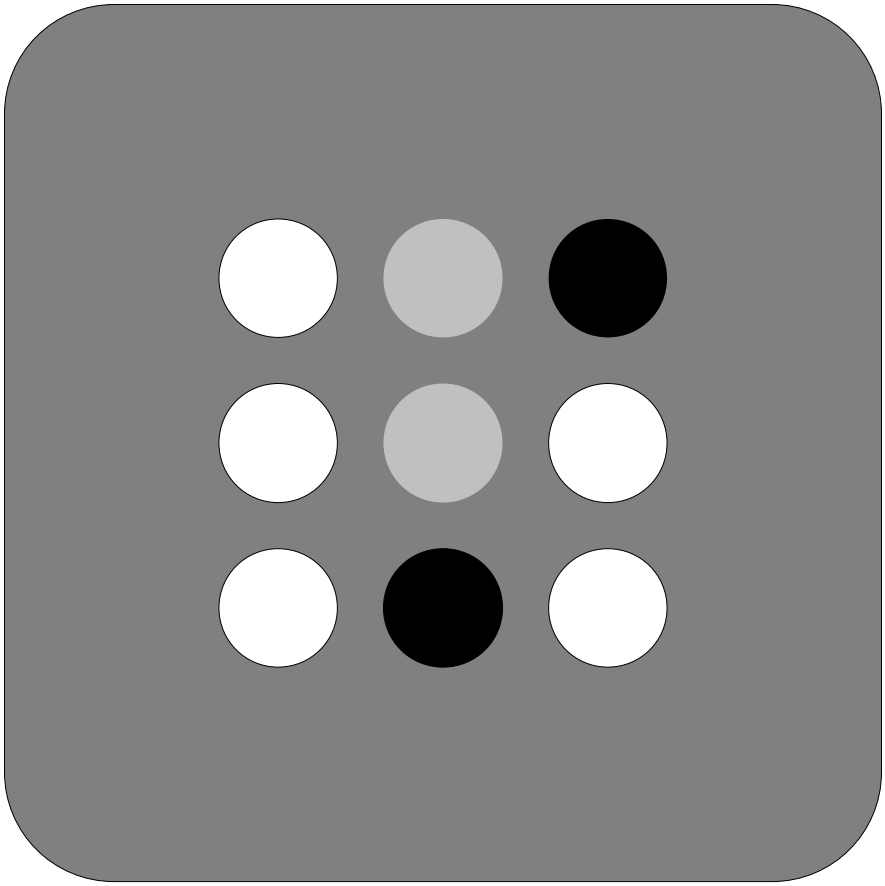
4. A three in a row must be *unmade and made again* before it can be used to remove another one of the opponent's plugs.

Change the rules to make a new game.
Change the board shape to make a new game.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
SQUARE M & T (Placing - Part A)



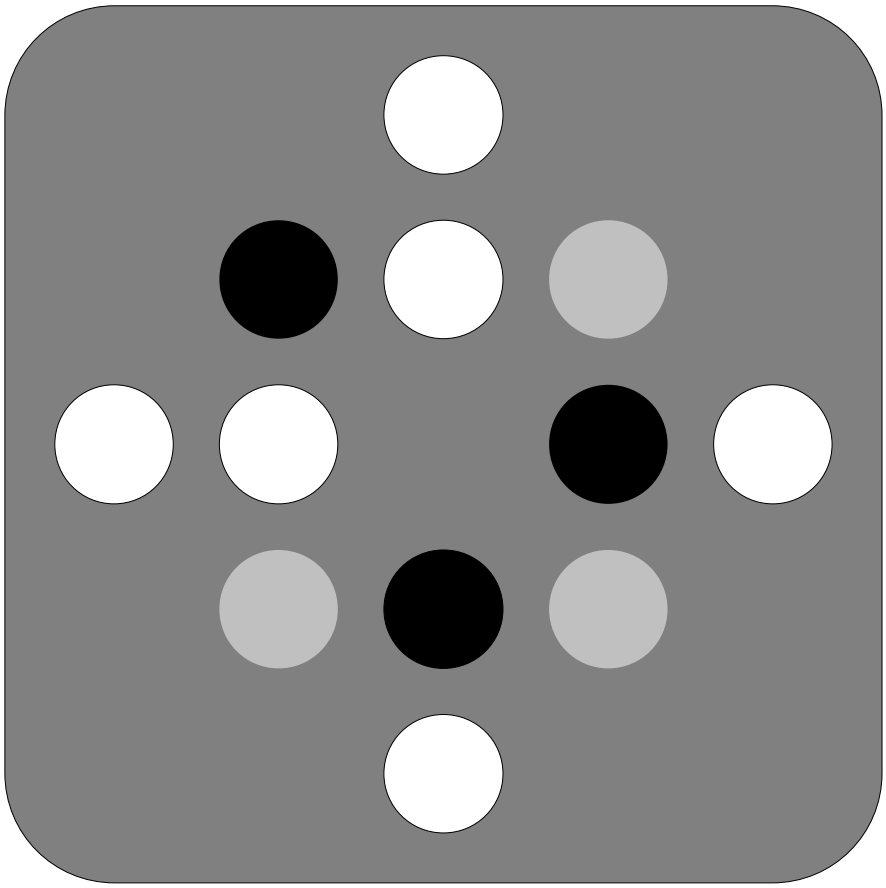
to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
CRISS-CROSS M & T (Placing - Part A)



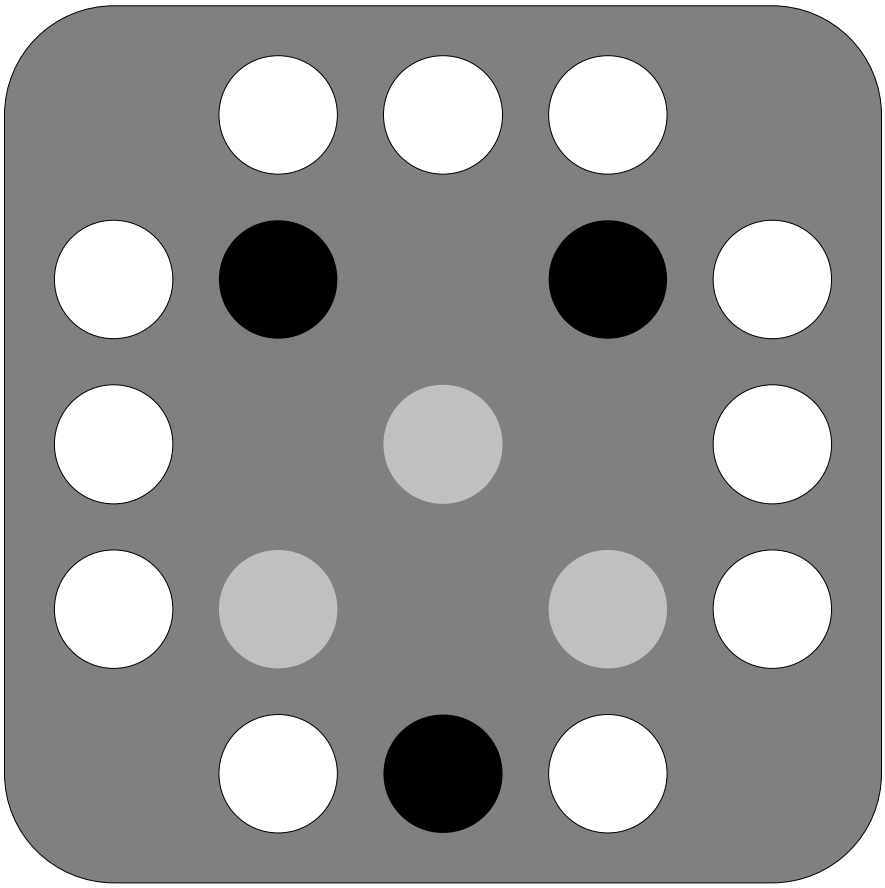
to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
ROUND M & T (Placing - Part A)



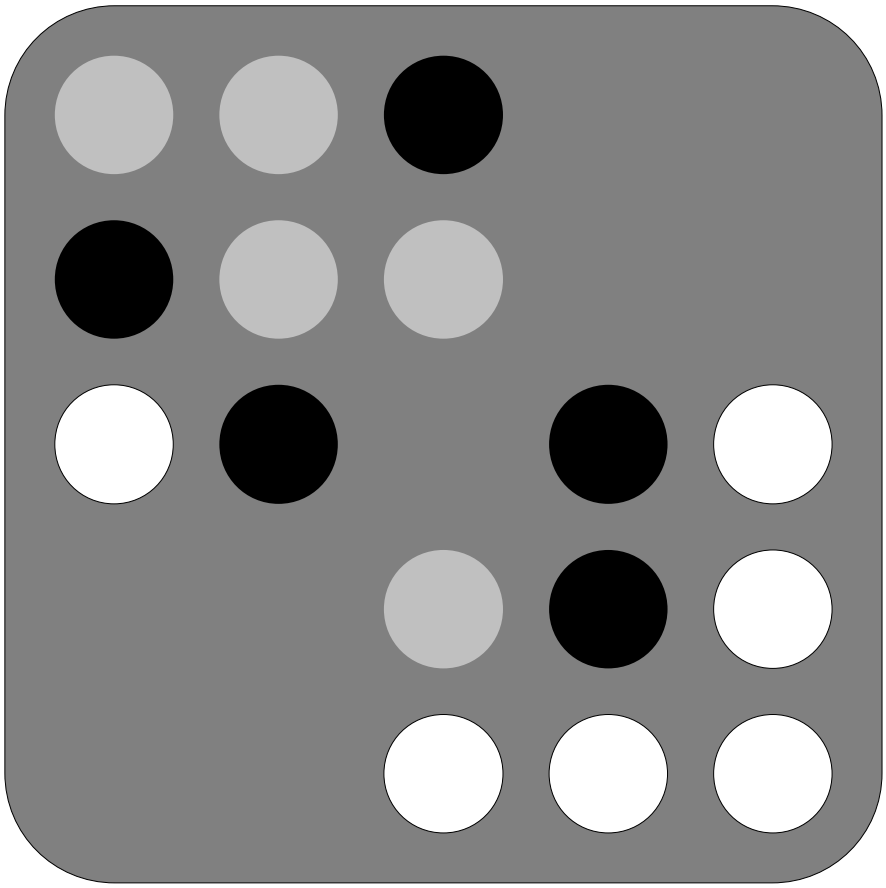
to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
SATELLITE M & T (Moving - Part B)



to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

HUNT FAMILY

NOTES - Hunt Family

1. At first children may think that these games are 'unfair', since one player has many plugs and the other has only one. It is vital therefore that they have an opportunity to play the game from both viewpoints, so that they can discover that superior numbers may not necessarily predetermine winning.

2. Teachers may choose to introduce this family through media reports which tell of large numbers of one group unsuccessfully pursuing an individual. For example a pop star besieged by fans. If it were necessarily true that having the higher number of contestants predetermined the outcome of such situations, then many such stars would have long since fallen victim to frenzy.

   Alternatively, legendary figures such as Robin Hood show us that a determined and canny individual can outwit extensive forces massed in opposition.

   Certainly this family of games can be played just for enjoyment. Certainly too they can be analysed to help develop reasoning skills. "What happens if... ?" questions are as appropriate to this set as they are to the previous families of games. However they can also be related to discussion of broader educational issues concerning individuality and group cohesion and the difficulties and benefits of standing apart from a group.

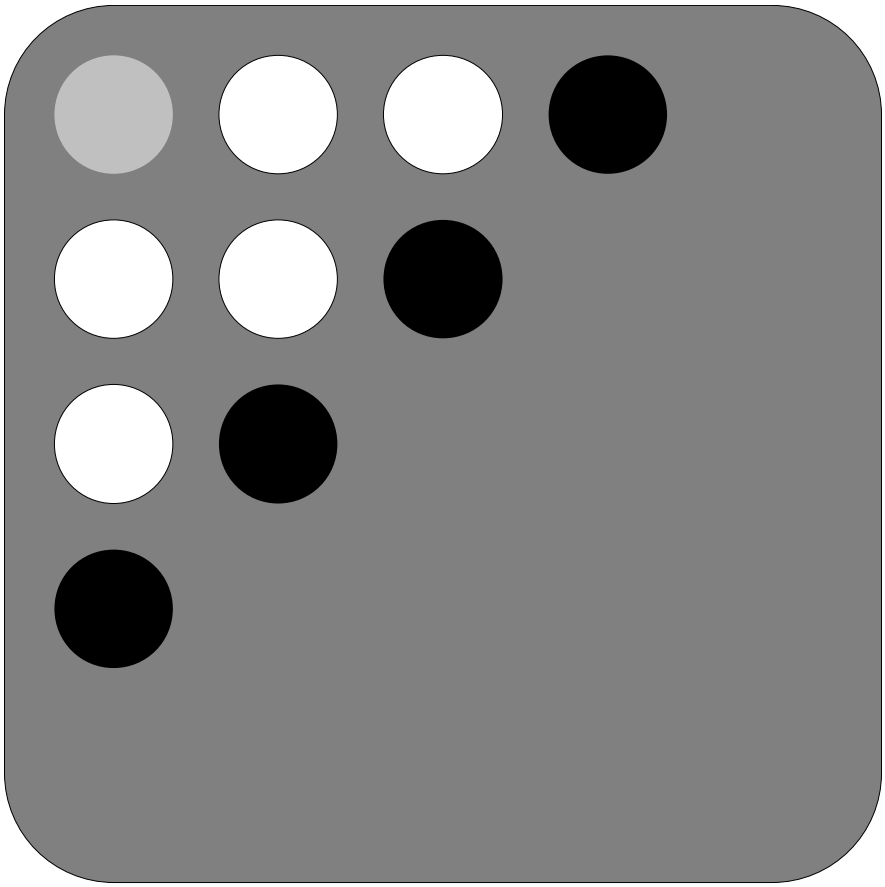
   One of the major uses of mathematics is to model the real world. To the extent that these games recreate something of those aspects of life which involve 'pursued' and 'pursuer', they are a mathematisation of life itself.

3. Does it matter who plays first?

Hunt Family

RABBIT HUNT

Start with your Poly Plug board looking like this:



AIM

Hunter wins if the Rabbit is forced into a position where it cannot move.

Rabbit wins if it removes enough Hunters so that it cannot be trapped.

Rabbit: Hunters:

RULES

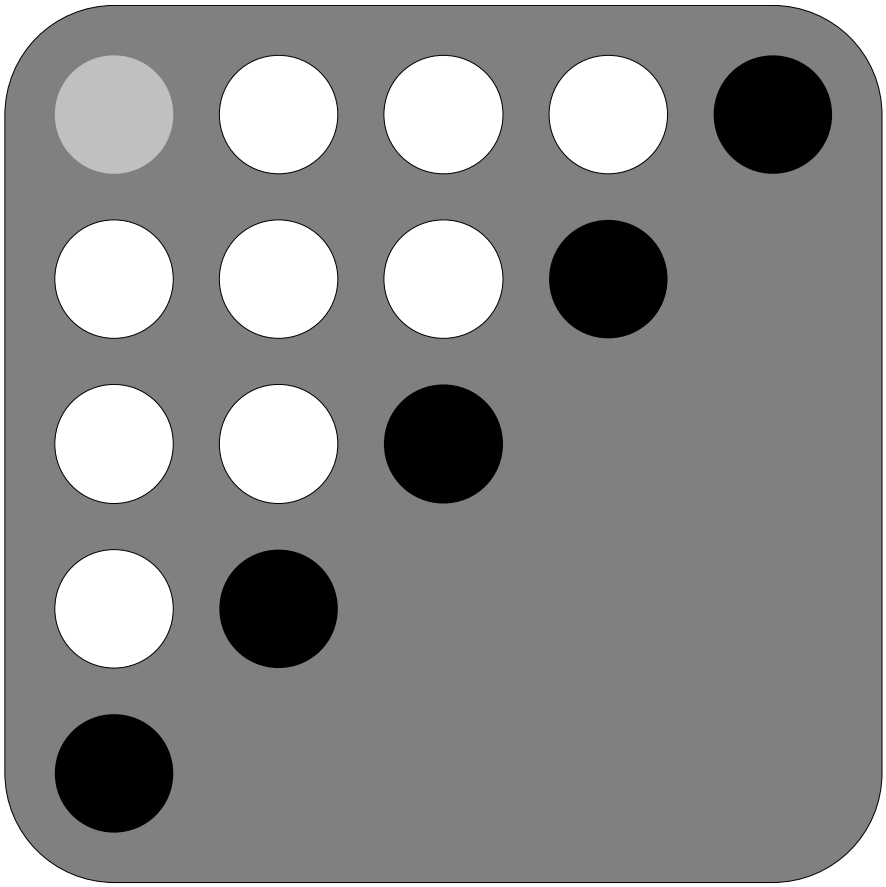
1. Rabbit *can jump* a Hunter and remove it.
2. Hunters *cannot jump*.
3. All moves and jumps are parallel to the edge of the board.

Change the rules to make a new game.
Change the board shape to make a new game.

Hunt Family

DEER HUNT

Start with your Poly Plug board looking like this:



AIM

Hunter wins if the Deer is forced into a position where it cannot move.

Deer wins if it removes enough Hunters so that it cannot be trapped.

Deer: Hunters:

RULES

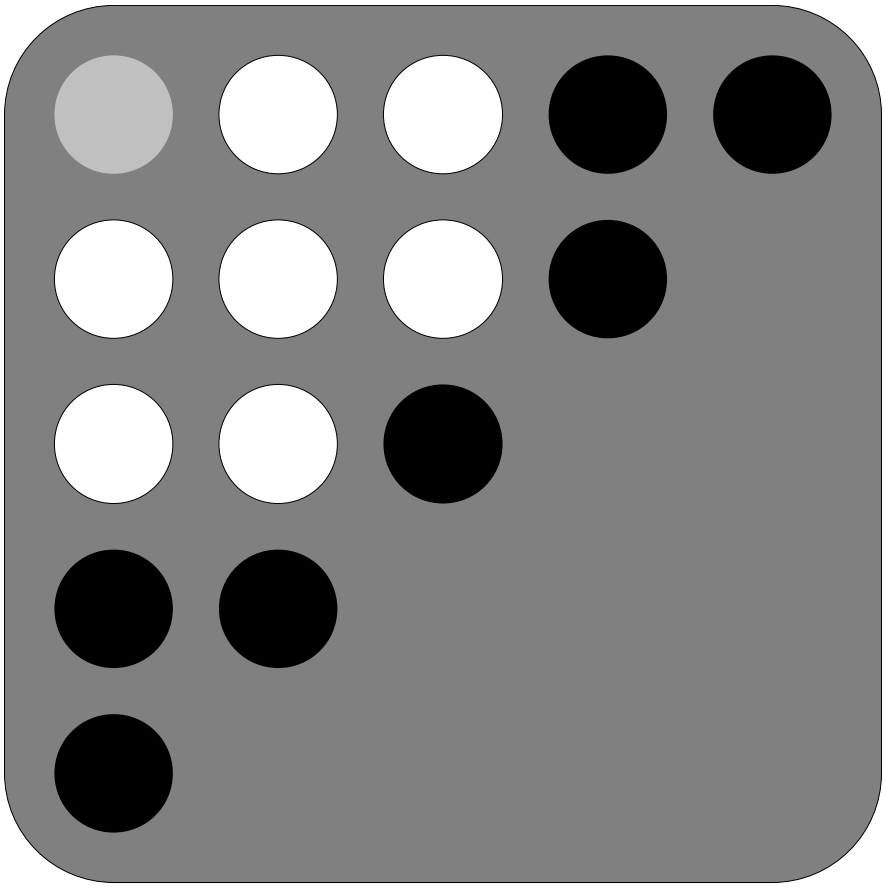
1. Deer *can jump* a Hunter and remove it.
2. Hunters *cannot jump*.
3. All moves and jumps are parallel to the edge of the board.

Change the rules to make a new game.
Change the board shape to make a new game.

Hunt Family

TIGER HUNT

Start with your Poly Plug board looking like this:



AIM

Hunter wins if the Tiger is forced into a position where it cannot move.

Tiger wins if it removes enough Hunters so that it cannot be trapped.

Tiger: Hunters:

RULES

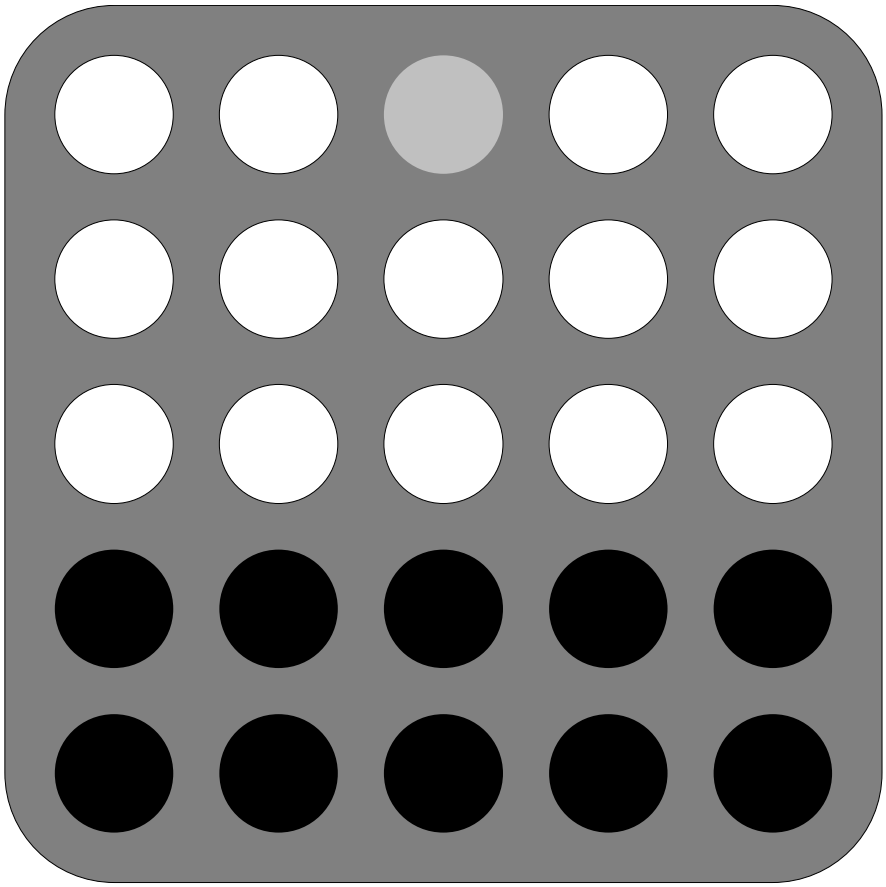
1. Tiger *can jump* a Hunter and remove it.
2. Tiger can move and jump *diagonally or parallel to the edge*.
3. Hunters *cannot jump*.
4. Hunters can only move *parallel to the edge*.

Change the rules to make a new game.
Change the board shape to make a new game.

Hunt Family

PRISONER HUNT

Start with your Poly Plug board looking like this:



AIM

Guards wins if the Prisoner is forced into a position where it cannot move.

Prisoner wins if it breaks through the line of guards and reaches the opposite side.

Prisoner: Guards:

RULES

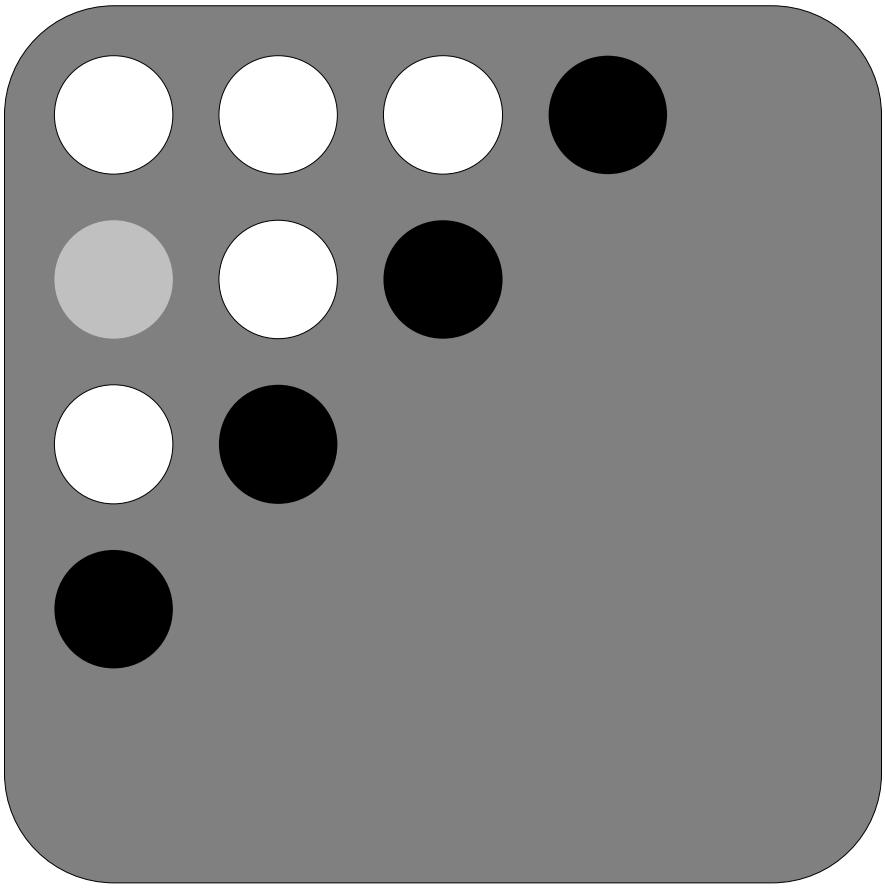
1. Prisoner *can jump* a Guard and remove it.
2. Prisoner can only *move parallel to the edge* and only *jump diagonally*.
3. Guards *cannot jump*.
4. Guards can only move *straight forward*.

Change the rules to make a new game.
Change the board shape to make a new game.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
RABBIT HUNT



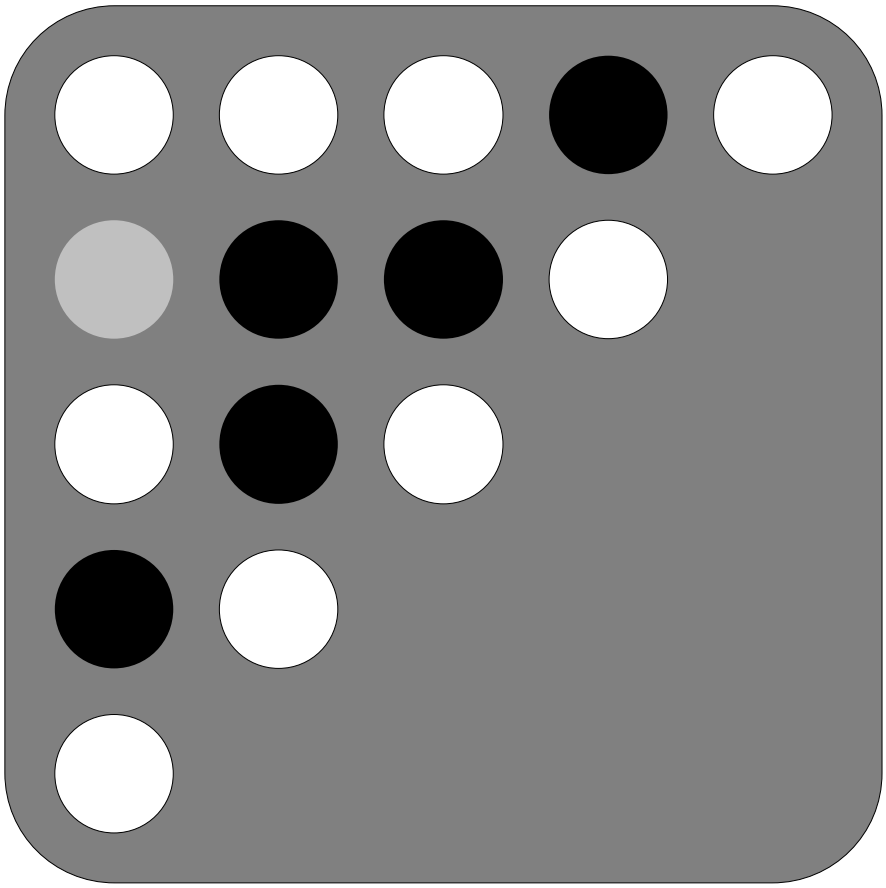
to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
DEER HUNT



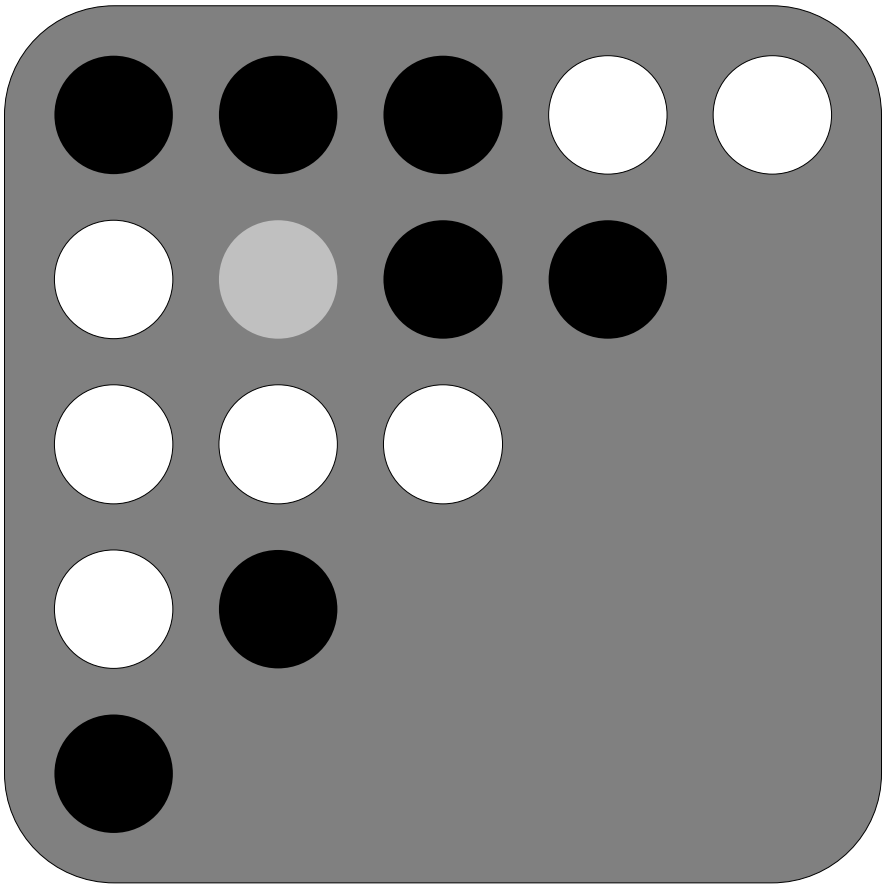
to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
TIGER HUNT



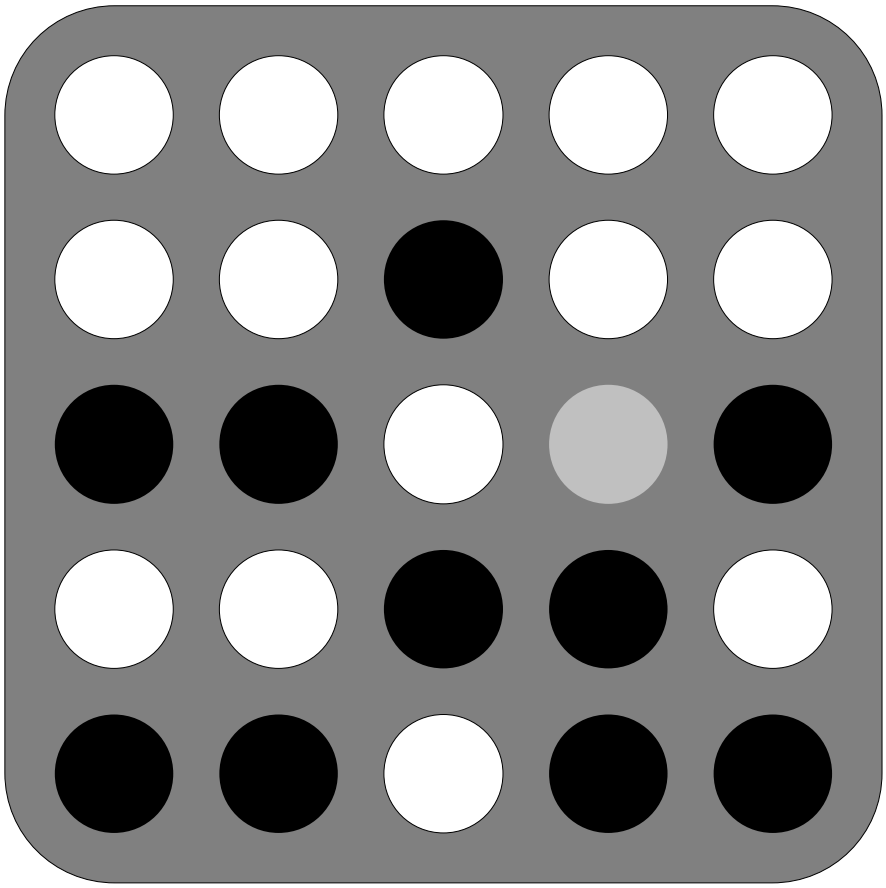
to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
PRISONER HUNT



to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

SQUEEZE FAMILY

NOTES - Squeeze Family

1. The simpler variations of the Squeeze family provide situations where it is relevant to count the number of moves you and your opponent will take to complete the game. This type of thinking can help decide which is the best move from among the alternatives available.

2. The more complex variations of the Squeeze family offer the opportunity to apply the strategy of sacrifice, an important element in much more sophisticated games such as chess. In these variations of the game the board appears to be so crowded that there is little that either player can do until a series of sacrifices begins. The aim, of course, is to be in a position of advantage after the exchanges.

   As with Hunt games, there is an opportunity for teachers to use these games to illustrate, or support, teaching of broader concepts of life. There are many examples both in history and contemporary society of individuals who have put aside their own needs for the benefit of others on their 'team'. Science too provides the principle that the life of the individual can be sacrificed for the survival of the group or species.

3. An interesting variation of the rule of capture suggested for this family is to squeeze an opponent as described and then remove that plug *and replace it with an extra one of your own*. This means that a player who successfully makes a squeeze not only *decreases* the number of the opponent's plugs by one, but simultaneously *increases* their own number of plugs by one.

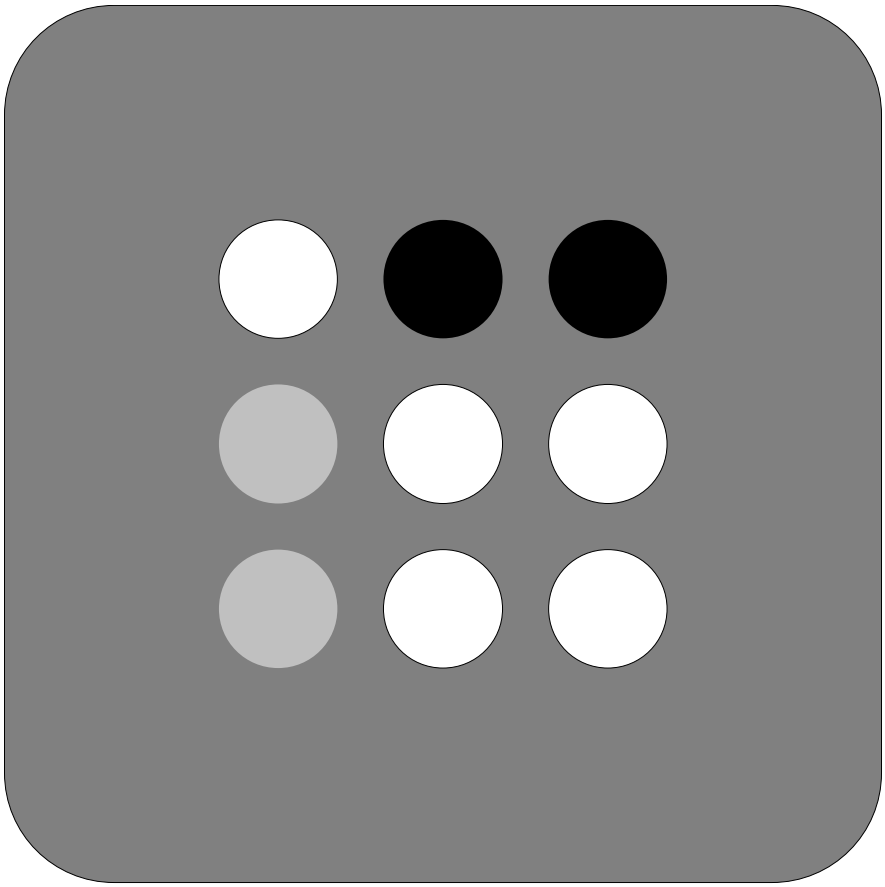
4. Children may also consider investigating a 'suicide' rule whereby it is *not safe* to move into a space between two of the opponent's plugs.

5. Is there an advantage in playing first?

Squeeze Family

MINI SQUEEZE

Start with your Poly Plug board looking like this:



AIM

To move your plugs across the board *and off it* on the opposite side to your starting position.

Player with the most plugs across wins.

RULES

1. To capture an opponent you must squeeze one of their plugs between two of yours like this:

   The blue plug can now be removed from the game.

2. It is *safe to move* your plug *between* two of your opponent's, if there is a space.

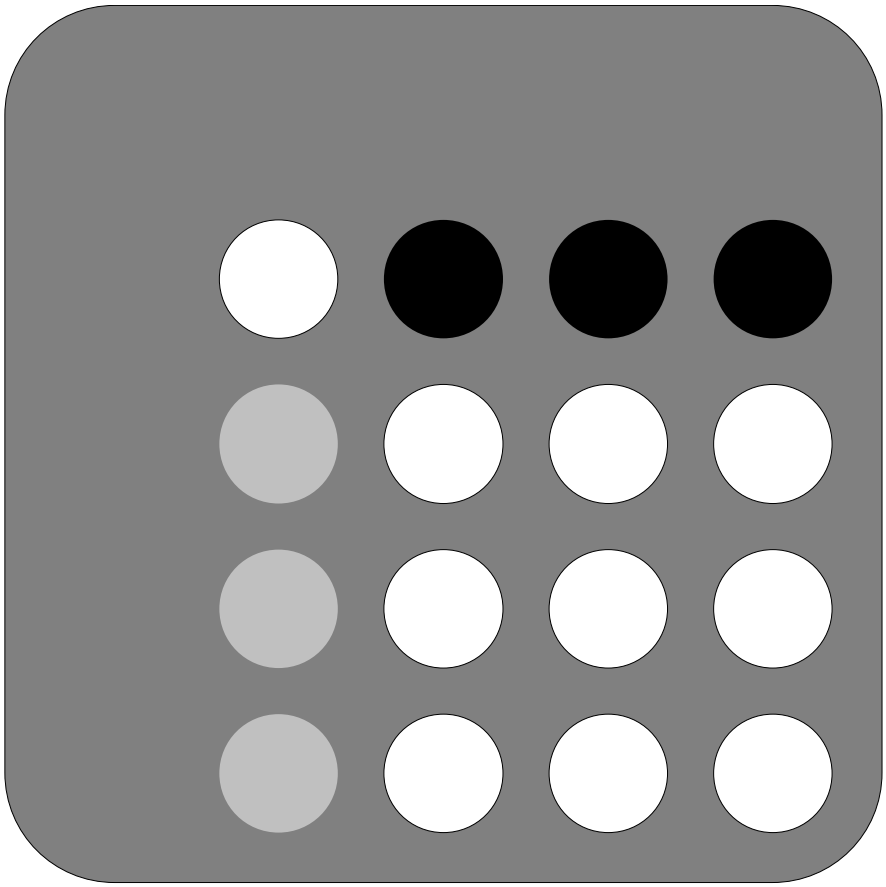
3. Move and squeeze in any direction.

Change the rules to make a new game.
Change the board shape to make a new game.

Squeeze Family

SMALL SQUEEZE

Start with your Poly Plug board looking like this:



AIM

To move your plugs across the board *and off it* on the opposite side to your starting position.

Player with the most plugs across wins.

RULES

1. To capture an opponent you must squeeze one of their plugs between two of yours like this:

   The blue plug can now be removed from the game.

2. It is *safe to move* your plug *between* two of your opponent's, if there is a space.

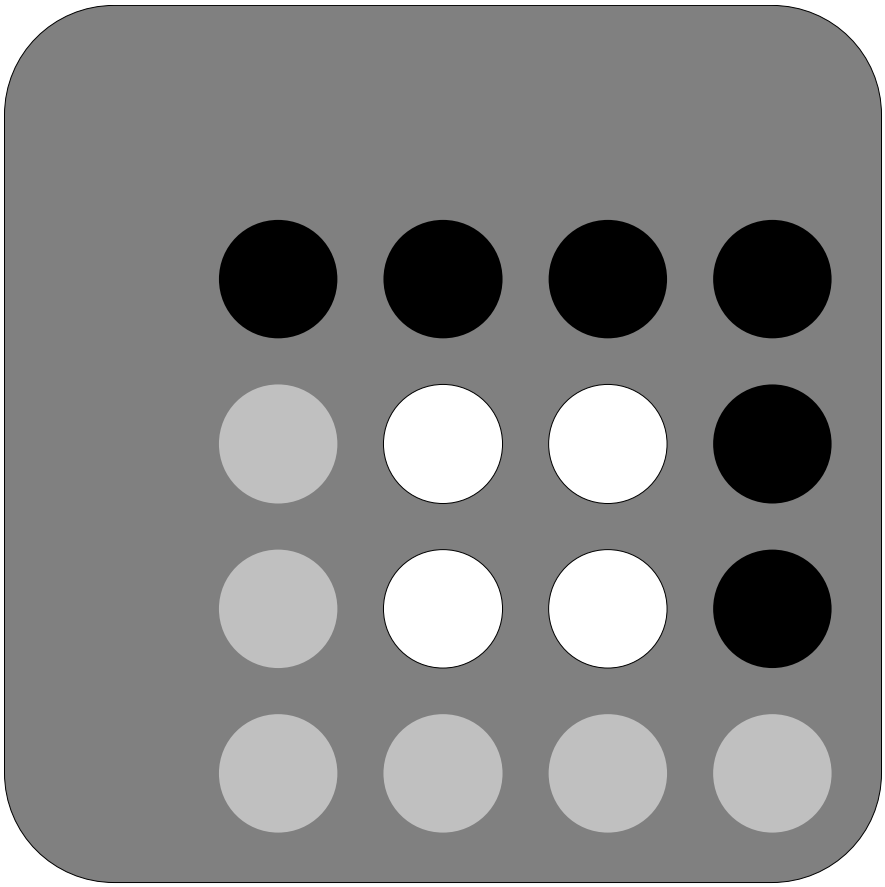
3. Move and squeeze in any direction.

Change the rules to make a new game.
Change the board shape to make a new game.

Squeeze Family

BIG SQUEEZE

Start with your Poly Plug board looking like this:



AIM

To capture all your opponent's plugs.

Player with the last plug on the board wins.

RULES

1. To capture an opponent you must squeeze one of their plugs between two of yours like this:

   The blue plug can now be removed from the game.

2. It is *safe to move* your plug *between* two of your opponent's, if there is a space.

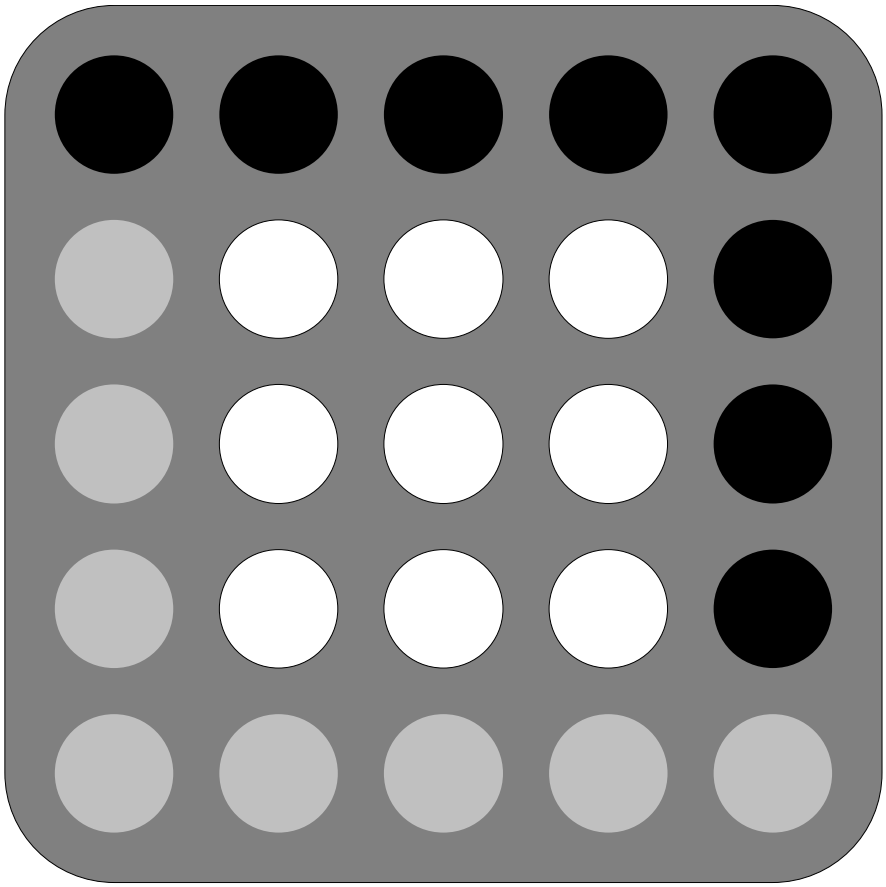
3. Move and squeeze in any direction.

Change the rules to make a new game.
Change the board shape to make a new game.

Squeeze Family

GIANT SQUEEZE

Start with your Poly Plug board looking like this:



AIM

To capture all your opponent's plugs.

Player with the last plug on the board wins.

RULES

1. To capture an opponent you must squeeze one of their plugs between two of yours like this:

   The blue plug can now be removed from the game.

2. It is *safe to move* your plug *between* two of your opponent's, if there is a space.

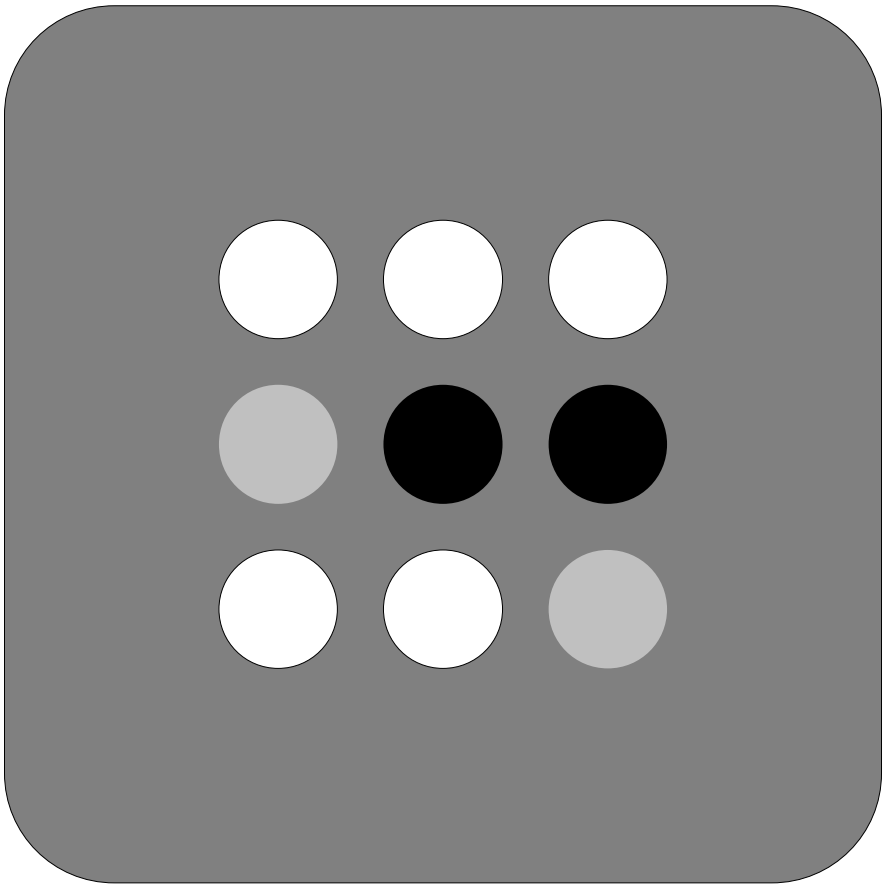
3. Move and squeeze in any direction.

Change the rules to make a new game.
Change the board shape to make a new game.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
MINI SQUEEZE



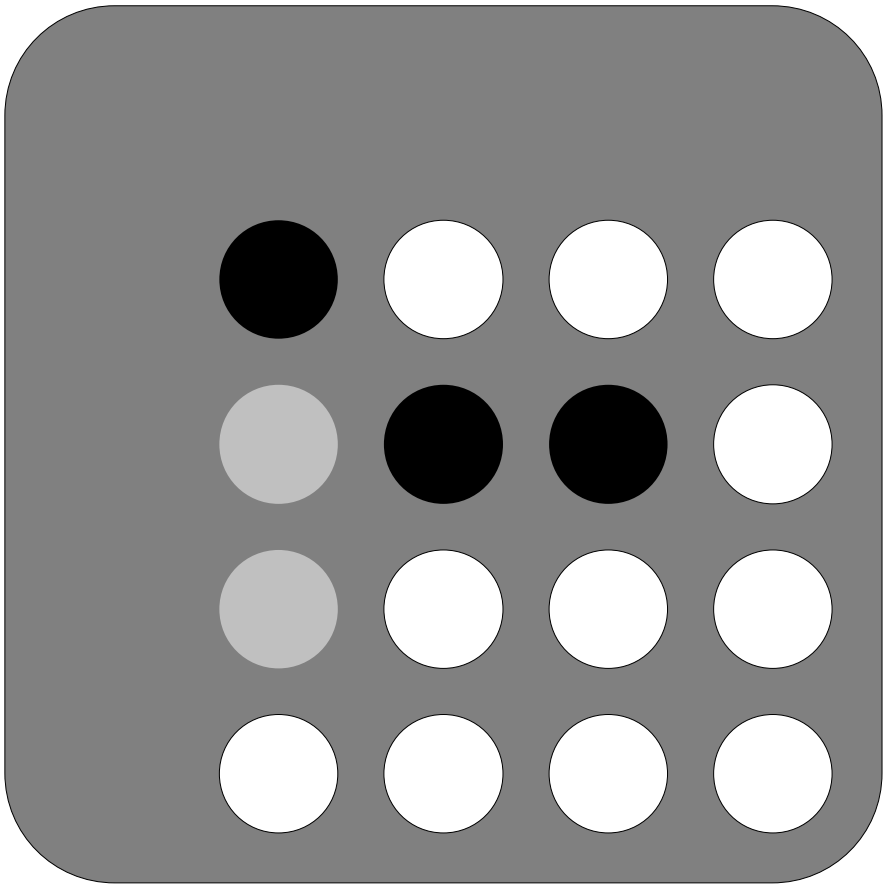
to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
SMALL SQUEEZE



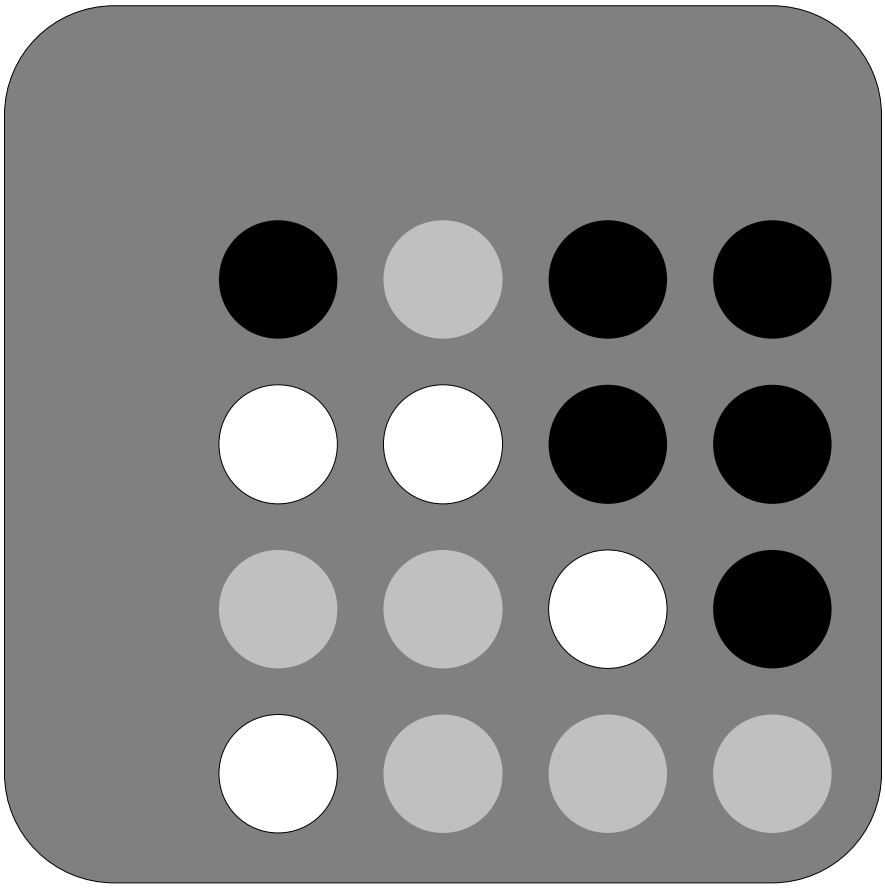
to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
BIG SQUEEZE



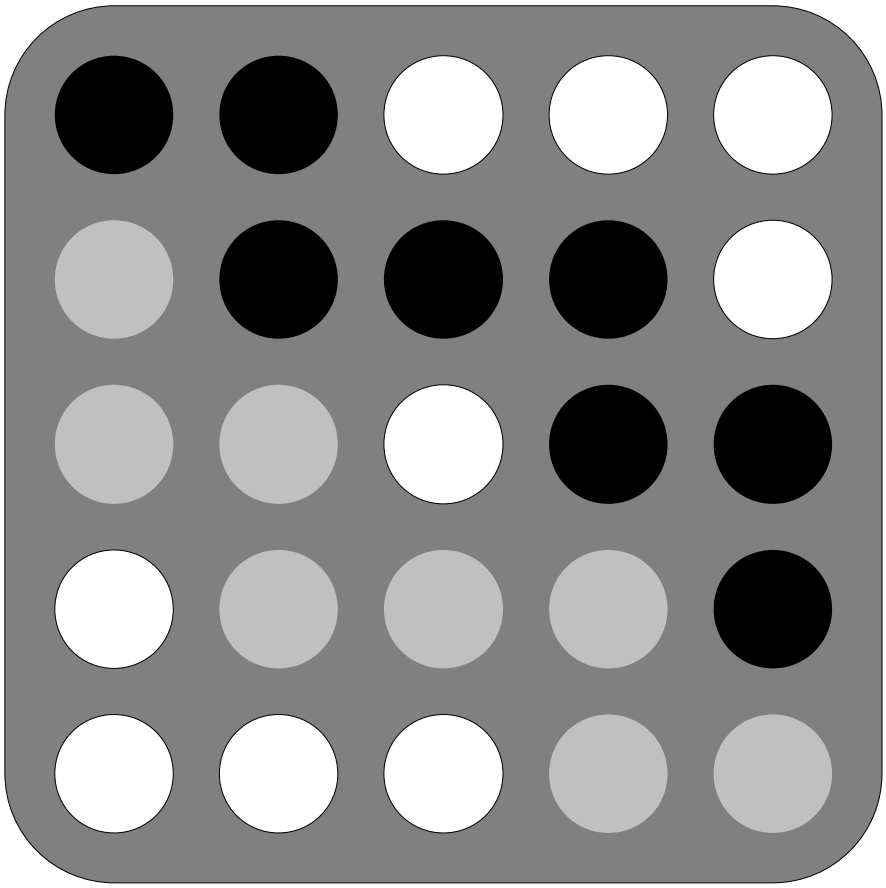
to play next. What is the BEST move? What is the WORST move?

Write or draw your answers to the two questions here. Explain what you talked about.

Names:.....

THINKING IT THROUGH

Talk about this partly played game of
GIANT SQUEEZE



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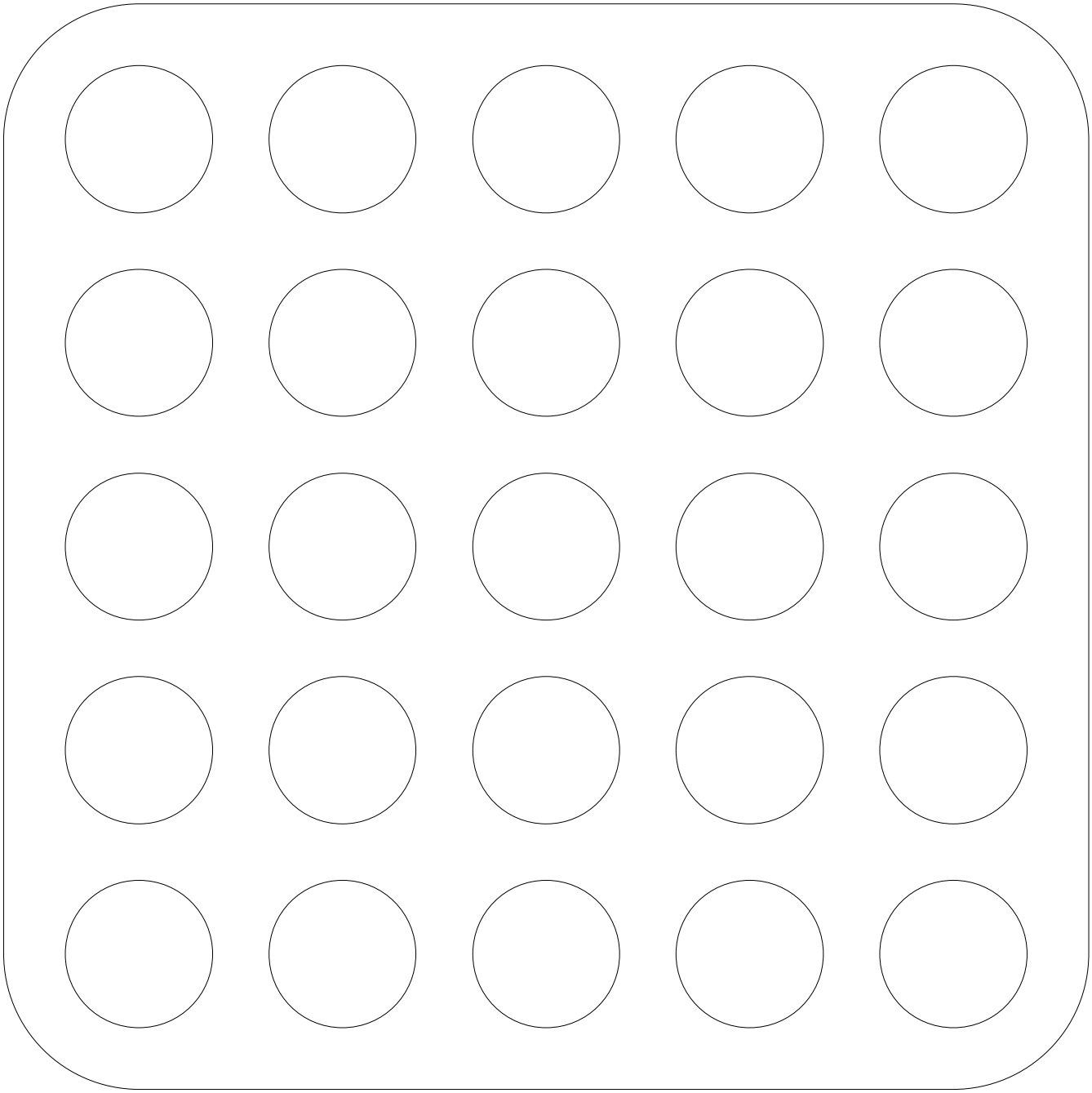
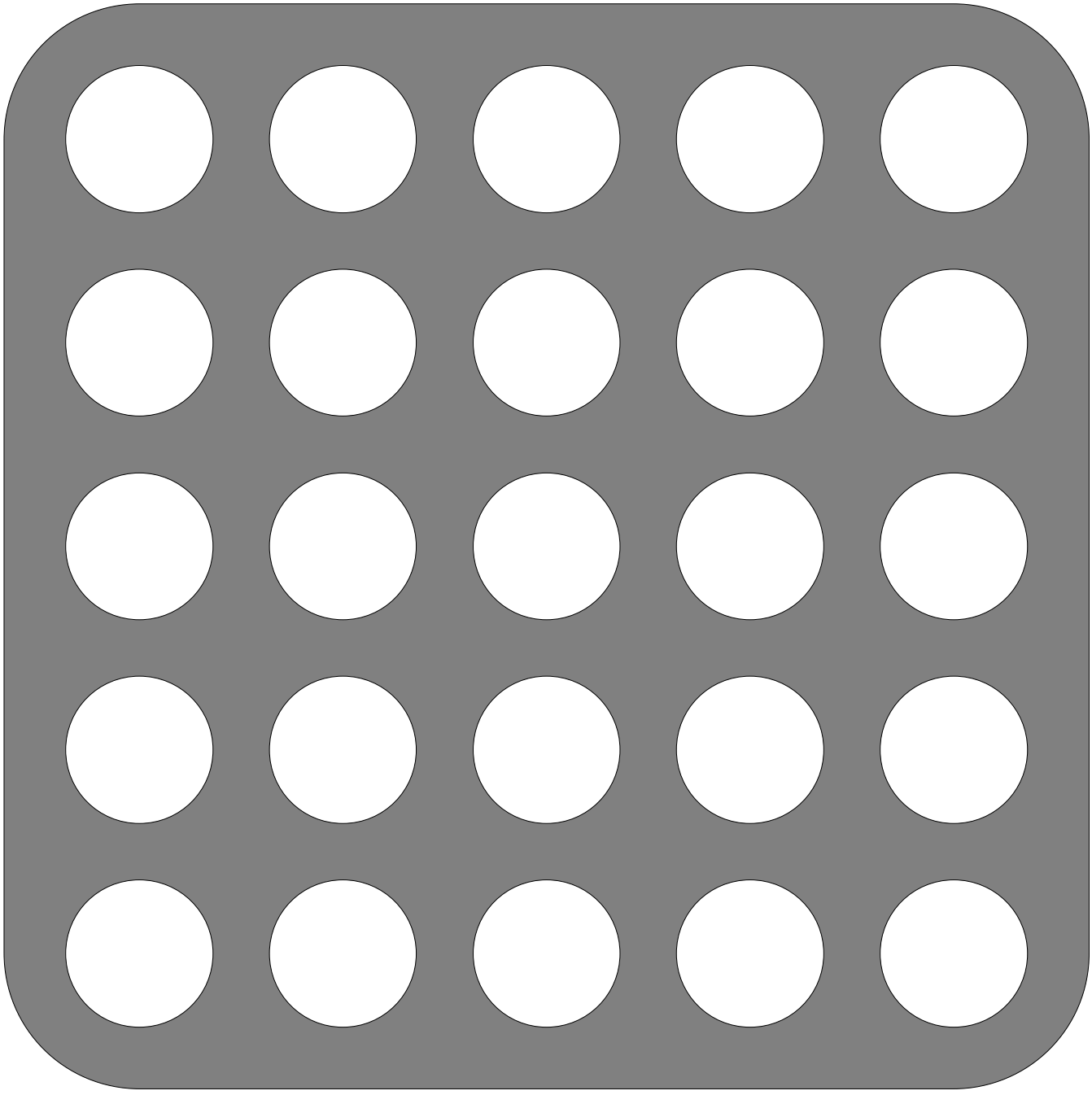
Write or draw your answers to the two questions here. Explain what you talked about.

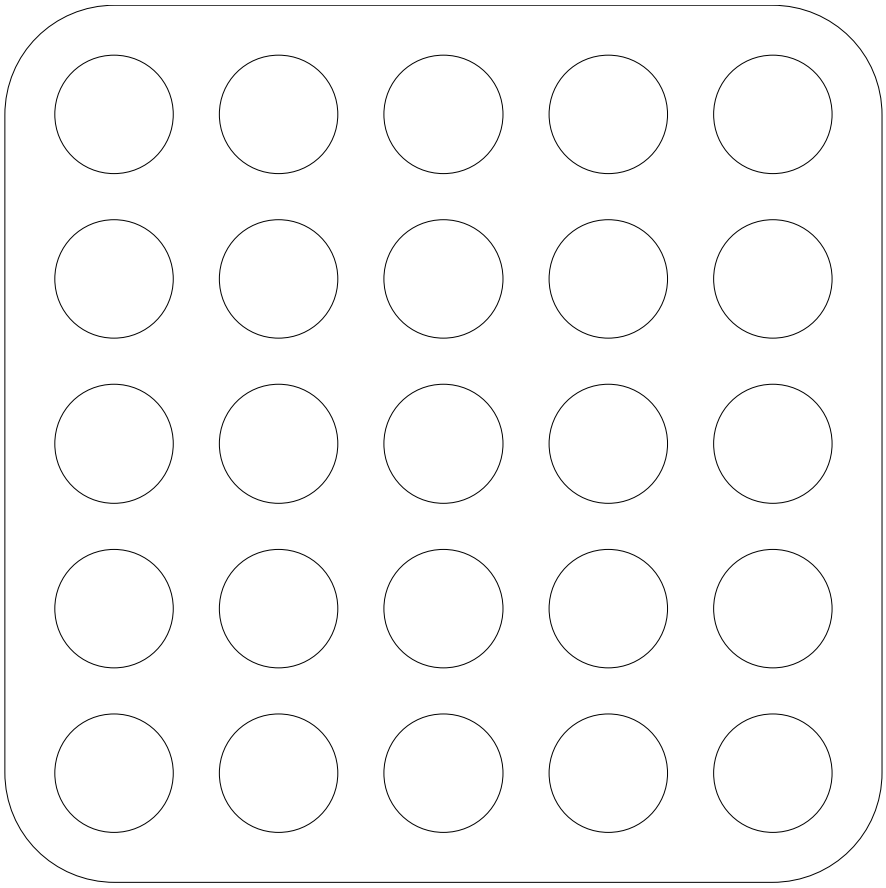
BLANK BOARDS





This game was designed by: .....

Start with your Poly Plug board looking like this:



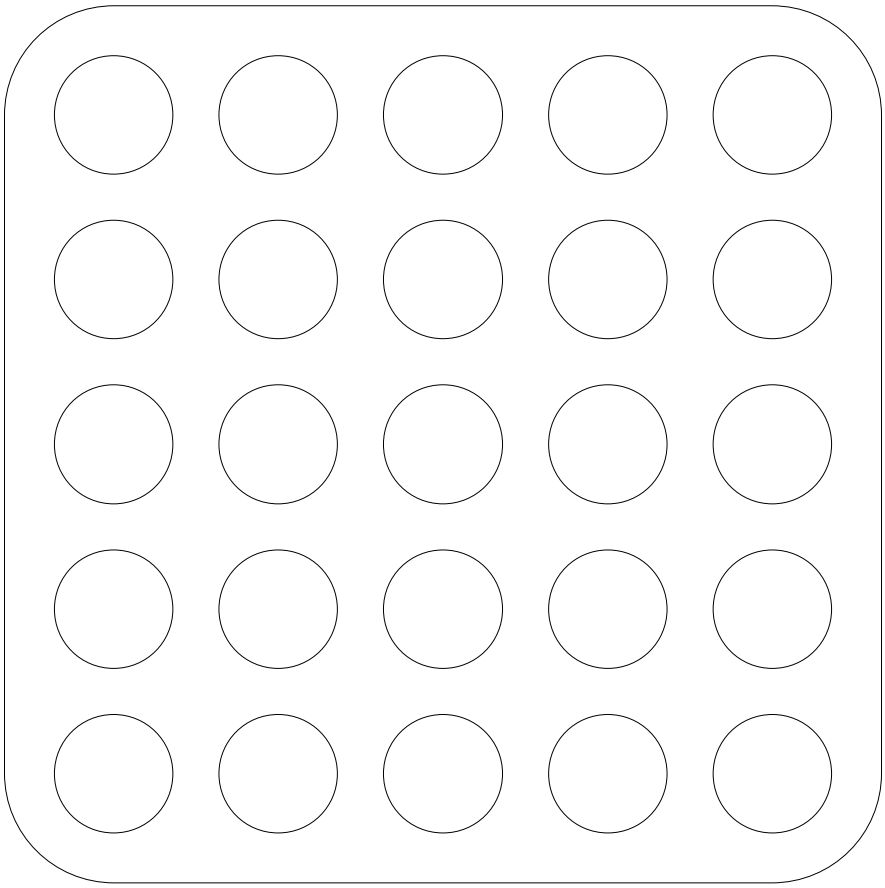
AIM

RULES

Names:.....

THINKING IT THROUGH

Talk about this partly played game of



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Write or draw your answers to the two questions here. Explain what you talked about.