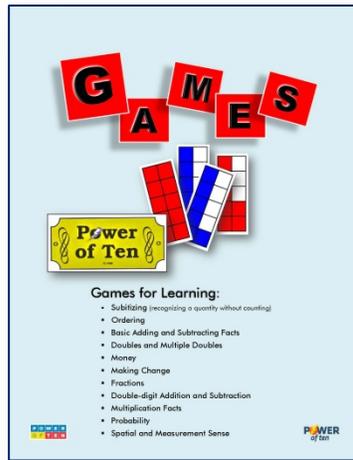# GAMES

Power of Ten
© 1996

Games for Learning:

- **Subitizing** (recognizing a quantity without counting)
- **Ordering**
- **Basic Adding and Subtracting Facts**
- **Doubles and Multiple Doubles**
- **Money**
- **Making Change**
- **Fractions**
- **Double-digit Addition and Subtraction**
- **Multiplication Facts**
- **Probability**
- **Spatial and Measurement Sense**

Click on each 'topic' or 'specific game' in the list below to move directly to that topic or game.

- **Power of Ten Cards™ – Learning the Basic Facts – Finding and Using the Major Patterns Needed to Develop Number Sense**

- **Table of Games**

- **Games:** (subitizing, ordering, basic adding/subtracting facts, doubles/multiple doubles, multiplying by 5 and 10)

- **Games:** (money and making change)
  - Store
  - Scoop It
  - Change

- **Games:** (double-digit addition, double-digit subtraction, multiplication facts, probability)
  - Ninety-Nine
  - Subtraction Strategy Game
  - One Hundred
  - One Hundred (Subtraction)
  - Strategy Two Hundred
  - Strategy Five Hundred
  - Place Value and Probability Game

- **Games:** (fraction recognition)
  - Face Off
  - More Less Different Compare
  - Power of 1 Solitaire
  - Make a Tenths Number Line
  - Power of 1 Fish
  - Power of 1 Match It
  - Power of 1 Concentration
  - Slap Jack 1
  - Power of 1 Face Off
  - Power of $\frac{9}{10}$ Face Off
  - Power of $\frac{5}{10}$ Face Off
  - Power of $\frac{8}{10}$ Face Off
  - Salute (two players)
  - Salute Challenge (three players)

- **Games:** (spatial and measurement sense)
  - Predict My Shape
  - Grid Match
  - Hexagon-A-Blast
  - Hex-A-Hit

- Number Strips for Teen Mania Game

- Games Tally Sheets (English format)
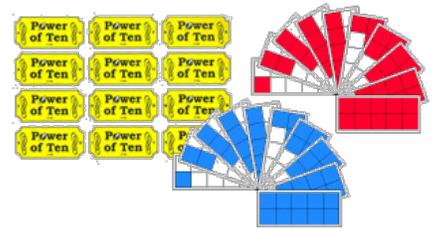
- Games Tally Sheets (French format)

- Student Sheets
  - Card Sums
  - Bingo Cards
  - Fractions Frequency Table
  - Hexaflex Game Board
  - Hundred Squares

- Games are an Essential Tool in the Teaching of Mathematics (Kindergarten to Grade Three)

- Games are an Essential Tool in the Teaching of Mathematics (Grade Four and above)

Power of Ten Cards^{TM}

Learning the Basic Facts
Finding and Using the Major Patterns Needed to Develop Number Sense

The **Power of Ten**^{TM} has been designed to build on what appears to be almost everyone's major strategy for learning. Some authorities claim we get 83% of new learning using sight and 11% by hearing. If students say the numbers when they are playing the games, they are connecting sight and hearing which is very powerful. Others suggest that 65% of all learners use visual cues as their main strategy. No one is exclusively a visual, auditory or kinesthetic learner. We all have our own individual style of learning. Please see http://www.calproonline.org/ERIC/docs/pab00007.pdf for a comprehensive view of the effects of learning style, family style and culture on learning.

The first step is to learn to subitize. This is the ability to look at a set of objects and immediately know the number without counting. The numbers from one to ten are crucial to the process of learning basic adding facts. The games that are crucial in the process of subitizing are blue (1-10) in the list of games (following page). **Being able to 'get started' is a crucial characteristic of good problem solvers** and games help develop this.

The next step is to create opportunities for the brain to learn the patterns. This is one of four major strands in the curriculum and, combined with the numeracy strand, accounts for over 80% of the intended learning outcomes in Grades K-2. **Games are a very effective way of learning patterns** because they are social. Games are fun if played with someone at your level or someone you love (such as a parent or favorite aunt). The **work of learning patterns** and **developing number sense** appears effortless when playing a game you enjoy with a person you like.

The main problem solving strategies that the brain learns through the **Power of Ten**^{TM} games are:
- **Breaking Up Numbers** (subtraction and addition)
- **Making the Problem Simpler** (making or identifying tens)
- **Looking for a Pattern** (verbally stating a rule or describing how a pattern works)
- **Predicting and Checking** (the brain subconsciously creates an expectation and then tests the answer)
- **Use a Diagram** (visualizing the '8-card' and then think of how to subtract 3 or 5, the 8-card has 16 basic fact equations that can be done just by visualizing)
- **Using a Model** (ten-frame models can be made from egg cartons for the kinesthetic learner)
- **Using a Number Sentence** (the equations are eventually connected to **All the Facts** sheets)
- **Using Logic** (this helps develop and articulate the patterns that are explored in the games)

The problem solving strategies listed above and the qualities of a good problem solver are presented in poster form on the Power of Ten^{TM} Website (available in English and French formats).

All learning requires reinforcement through practice. When students apply the strategies learned in the games to the **All the Facts** sheets, they are transferring the oral and visual skills to a different context. Students are encouraged to write a story problem and therefore create another context for the equations. This gives yet another form of meaning. Meaning is crucial to developing understanding and making connections between short and long term memory.

Table of Games

*Crucial means this game should be taught and is very helpful at this grade level

	# players	Game	Pre–K or Struggling with Subitizing	K	1	2	3	Video Grade
1	2	Match It 1-5						GR 1
2	2	Match It 1-10	Crucial*	Crucial	Crucial			GR 1
3	2-4	5 Up	Crucial	Crucial				GR 1
4	2-4	7 Up						GR 1
5	2-4	10 Up						GR 1
6	2	Order It	Assess	Assess	Assess	Assess		GR 1
7	2	Order It Numerals	Assess	Assess	Assess	Assess		GR 1
8	2-4	Fish						GR 1
9	2-4	Concentration						GR 1
10	2	Face Off		Crucial	Crucial	Crucial	Crucial	GR 1
11	2-4	Friendly Fish		Crucial	Crucial			GR 1
12	2-4	Friendly Match It		Crucial	Crucial			GR 1
13	2-4	Friendly Concentration			Crucial	Crucial	Crucial	GR 1
14	2	Slap Jack 10				Crucial	Crucial	GR 1
15	2	Power of Ten Face Off			Crucial	Crucial	Crucial	GR 1
16	2	Power of Nine Face Off				Crucial	Crucial	GR 1
17	2	Power of Five Face Off				Crucial	Crucial	GR 1
18	2	Power of Eight Face Off				Crucial	Crucial	GR 1
19	2	Slap Jack + or − 5				Crucial	Crucial	GR 1
20	2	Slap Jack 1				Crucial	Crucial	GR 1
21	2	Slap Jack 2				Crucial	Crucial	GR 1
22	2	Power of Ten Solitaire				Crucial	Crucial	GR 1
23	2	Salute (2 players)				Crucial	Crucial	GR 3
24	3	Advanced Salute (3 players)					Crucial	GR 2
25	2	Face Off Challenge				Crucial	Crucial	GR 2
26	2	Doubles Challenge				Crucial	Crucial	GR 2
27	2	More-Less-Difference-Compare				Crucial	Crucial	GR 2

# Strategies for Managing and Teaching the Power of Ten™ Cards

1. Create **guided math groups** by placing students of equal ability in a group. Students like to play games where they have to pay attention in order to win. If the opponent is not at the same level, the child does not have to pay attention.

2. The **games** can be played in any order, but they **have been listed in the most likely order** to present them. No game in the orange (11-24) or yellow (25-27) rows should be played before the child can subitize one through ten. Not all games in the blue (1-10) need be learned. As soon as children can subitize, they should be moved to the orange (11-24) games. If a game is marked *crucial* then it is important to teach at that grade level. All other games are optional and can be used for variety, reinforcement, enrichment or an idea in a new context.

3. Each player in a game is given **20 red** (or **20 blue** cards) in their deck for all the games (except for the 'Order It' genre of games). Each card in a 20-card deck should have the same letter on the *non-ten-frame side* of the card. This means that an errant card found on the floor can be easily placed back in the correct deck.

4. When a player wins a round, he should **organize the winnings into a red pile and a blue pile.** This avoids wasted time sorting the colors at the end of the game.

5. Students put the rubber band that keeps the cards together for storage around one of their fingers or wrist so it does not get lost. Some teachers put the cards into a small plastic bag and assign a specific deck to a student with the child's name inside the bag.

6. **Struggling students** may appear in any grade. If they have trouble subitizing, focus on the games in the blue section (1-10).
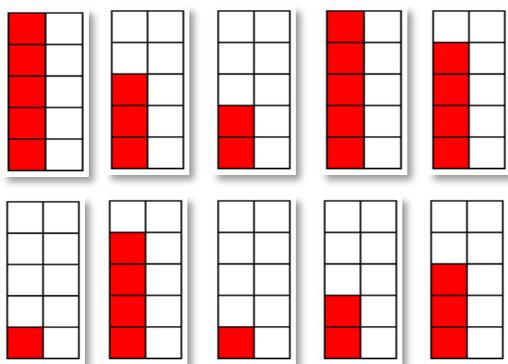
Match IT 1 – 5

Materials:

10 **Power of Ten**™ cards all one color
(either all red or all blue).
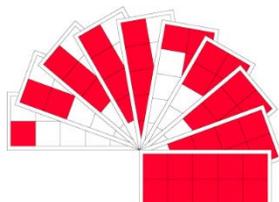
Method of Play:

Shuffle the cards. Spread all 10 cards face up on a table or the floor. It is easiest if the cards are placed in a **two** by **five** array.

Player one picks a card that he knows the name of then finds the other card with the same number. If the player does not know the name he may count. It is important that the parent or teacher watch to see if the child counts systematically (i.e., the row of five then the row of four to get nine, or counts by pointing at two in the same row such as the bottom two then the next two, etc.).

Player two then does the same. If player two is a parent (or a teacher) then the parent should usually pick the eight, seven or six card as these are the hardest for the preschooler to pick out. When the parent picks up the eight-card she should say, "I am having trouble finding the other eight. Can you help me?" Try to get the preschooler to learn the ten without counting and then learn the five and then the nine followed by the six or the eight and finally the seven. Sometimes it is useful to teach the child to give you ten using both hands and to give you five using only one hand and make this connection to the cards. Then **nine** is **10 − 1** or ten fingers with one finger down. **Six** is **5 + 1**. **Eight** is **10 − 2** and **seven** is **5 + 2**.

Teaching Strategies:

Repetition is necessary. The key is to try to build a track in the brain so a number can be made without counting. Children can often do this for one, two, three, five and ten without effort. The rest are taught using the five or the ten as a base.

The key is getting the ten known by memory early. The student then accepts that it is possible to know how many there are without counting. This is an important track to build in the brain, otherwise the emphasis is on counting which means the student cannot get to ten without first counting to nine.
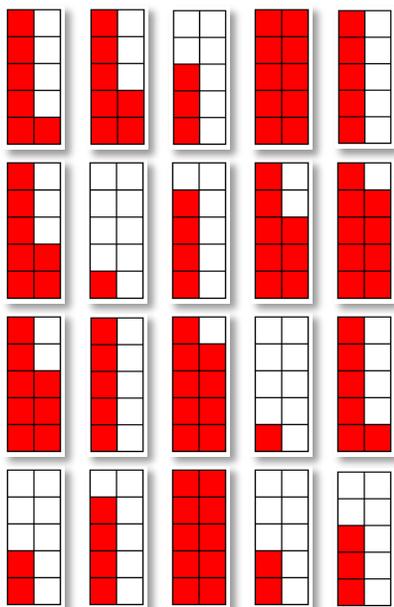
Now start to play dice and domino games to get a different picture for **3**, **4**, **5** and **6**.
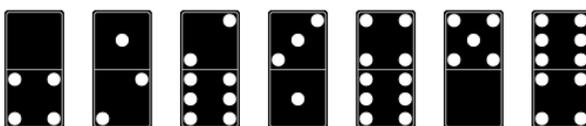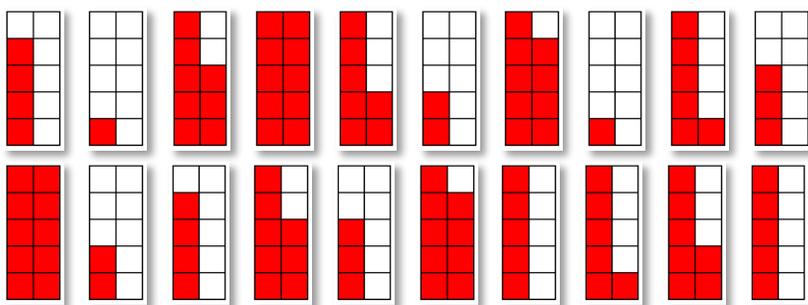
Match IT 1-10

Method of Play:

Shuffle the cards. Spread all 20 cards face up on a table or the floor. It is easiest if the cards are placed in a **four by five** or **two by ten** array.

(option one with a 4 by 5 array)

(option two with a 2 by 10 array)

Now start to play dice and domino games to get a different picture for **3**, **4**, **5** and **6**.
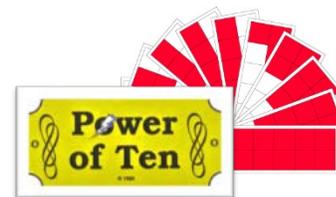

Friendly Match IT

The rules are the same, except the two ten-cards are removed. This can be a 3 by 6 or a 2 by 9 array. Instead of matching, the objective is to have two cards that add to 10.

Materials:

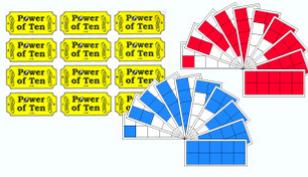20 **Power of Ten**™ cards all one color (either all red or all blue).

Player one picks a card that he knows the name of then finds the other card with the same number. If the player does not know the name he may count. It is important that the parent or teacher supervisor watch to see if the child counts systematically (i.e., the row of five then the row of four to get nine, or counts by pointing at two in the same row such as the bottom two then the next two, etc.).

Player two then does the same. If player two is a parent (or a teacher) then the parent should usually pick the eight, seven or six card as these are the hardest for the preschooler to pick out. When the parent picks up the eight-card she should say, "I am having trouble finding the other eight. Can you help me?" Try to get the preschooler to learn the ten without counting. Then learn the five, nine, six, eight, and finally the seven. Sometimes it is useful to teach the child to give you ten using both hands, to give you five using only one hand – always make this connection to the cards. Then nine is **10 − 1** or ten fingers with one finger down. Six is **5 + 1**. Eight is **10 − 2** and seven is **5 + 2**.

Teaching Strategies:

Repetition is necessary. The key is to try to build a track in the brain so a number can be made without counting. Children can often do this for one, two, three, five and ten without effort. The rest are taught using the five or the ten as a base.

The key is getting the ten known by memory early. The student then accepts that it is possible to know how many there are without counting. This is an important track to build in the brain otherwise the emphasis is on counting which means the student cannot get to ten without first counting to nine.

5^{Up} game for 2 players

- Shuffle 2 decks of **Power of Ten**^{TM} cards together.
- Deal 5 cards to each player, face down in a line.
- Place the remaining cards face down in a 'pick-up' pile in the centre.

1) **Player #1** chooses a card from the 'pick-up' pile in the centre.

2) If the card is a **1**, **2**, **3**, **4**, or **5**, he places it face up in the appropriate 'spot'.

3) He turns over the card that was face down in that 'spot' and sees if it fits in a remaining 'spot' (whatever is not face up in the number line).

4) He continues until the card turned over cannot be used in the number line, either because it is already there, or it does not fit in the number line.

5) If the card cannot be used, he places it in a 'discard' pile (face up).

6) **Player #2** takes a turn and can draw from the 'pick-up' pile or the 'discard' pile.

For example:

Player #1 draws a **5-card** and places it in the '**5**' spot.

'**1**' spot

'**2**' spot

'**3**' spot

'**4**' spot

'**5**' spot

- The **5-card** is placed in the '**5**' spot and the card that was there is turned face up.
- The **2-card** that is turned over is placed in the '**2**' spot and the card that was there is turned face up.
- If the card cannot be used, it is placed in a 'discard' pile (face up).
- **Player #2** takes a turn and can draw from the 'pick-up' pile or the 'discard' pile.
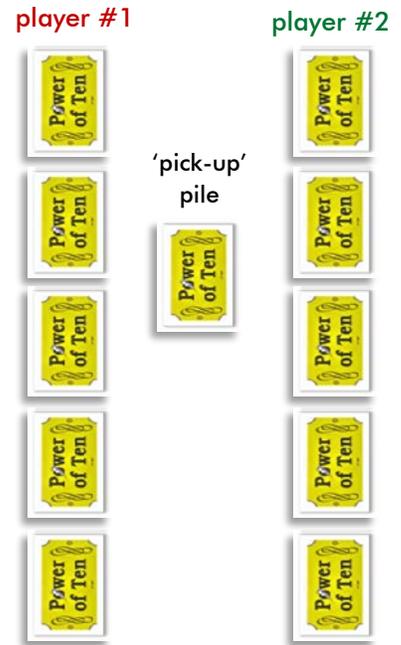
The first player to complete his/her number line is the winner.

Contributed by Power of Ten Presenter Colleen Neves

See also 7^{Up} and 10^{Up} games.
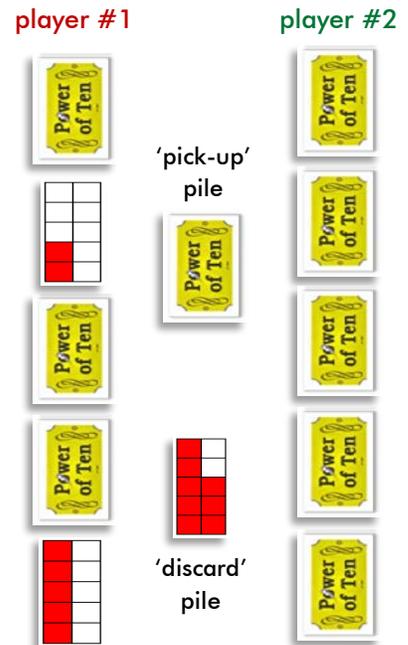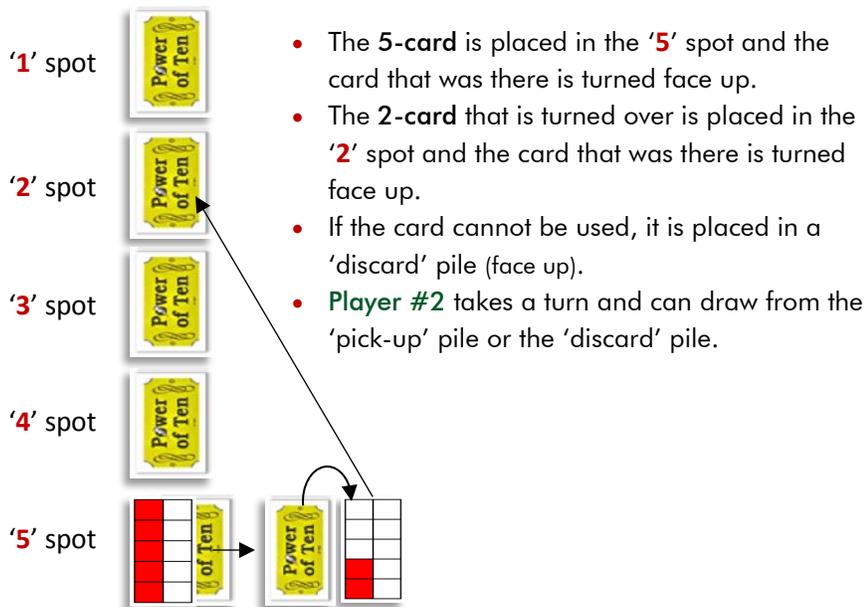
7 Up

game for 2 players
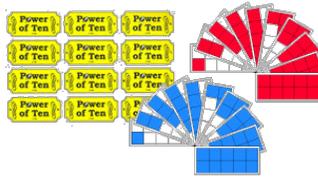
- Shuffle 2 decks of **Power of Ten™** cards together.
- Deal 7 cards to each player, face down in a line.
- Place the remaining cards face down in a 'pick-up' pile in the centre.

---

1) **Player #1** chooses a card from the 'pick-up' pile in the centre.

2) If the card is a **1**, **2**, **3**, **4**, **5**, **6**, or **7**, it is placed face up in the appropriate 'spot'.

3) She turns over the card that was face down in that 'spot' and sees if it fits in a remaining 'spot' (whatever is not face up in the number line).

4) She continues until the card turned over cannot be used in the number line, either because it is already there, or it does not fit in the number line.

5) If the card cannot be used, she places it in a 'discard' pile (face up).

6) **Player #2** takes a turn and can draw from the 'pick-up' pile or the 'discard' pile.

For example:
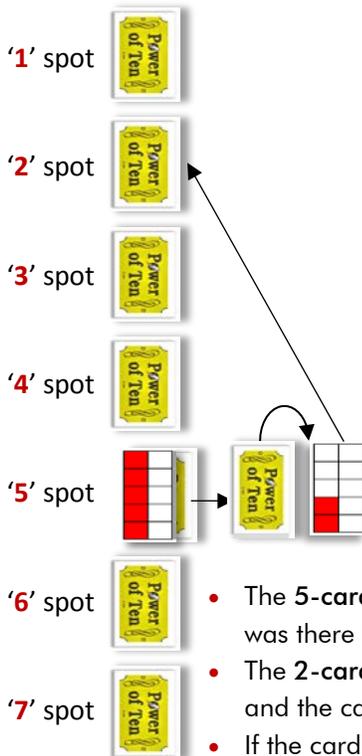**Player #1** draws a **5-card** and places it in the '**5**' spot.

'**1**' spot

'**2**' spot

'**3**' spot

'**4**' spot

'**5**' spot

'**6**' spot

- The **5-card** is placed in the '**5**' spot and the card that was there is turned face up.
- The **2-card** that is turned over is placed in the '**2**' spot and the card that was there is turned face up.
- If the card cannot be used, it is placed in a 'discard' pile (face up).
- **Player #2** takes a turn and can draw from the 'pick-up' pile or the 'discard' pile.

'**7**' spot

player #1   player #2

'pick-up' pile

player #1   player #2

'pick-up' pile

'discard' pile

The first player to complete his/her number line is the winner.

Contributed by Power of Ten Presenter Colleen Neves

10^Up

game for 2 players
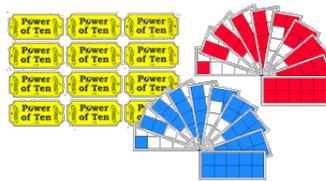
- Shuffle two 20-card decks (one red and one blue) of **Power of Ten™** cards together.
- Deal 10 cards to each player, face down in a line.
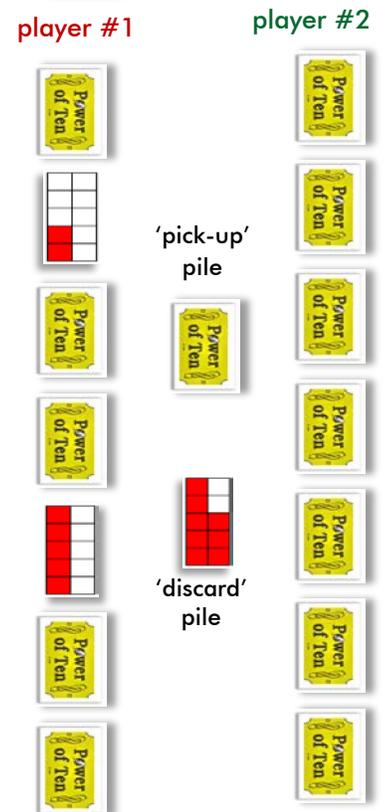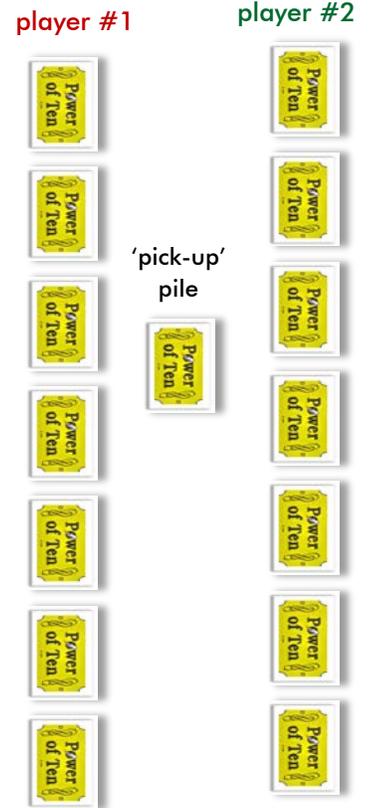- Place the remaining cards face down in a 'pick-up' pile in the centre.

1) **Player #1** chooses a card from the 'pick-up' pile in the centre.
2) The card is placed face up in the appropriate 'spot'.
3) She turns over the card that was face down in that 'spot' and sees if it fits in a remaining 'spot' (whatever is not face up in the number line).
4) She continues until the card turned over cannot be used in the number line, either because it is already there, or it does not fit in the number line.
5) If the card cannot be used, she places it in a 'discard' pile (face up).
6) **Player #2** takes a turn and can draw from the 'pick-up' pile or the 'discard' pile.

For example:
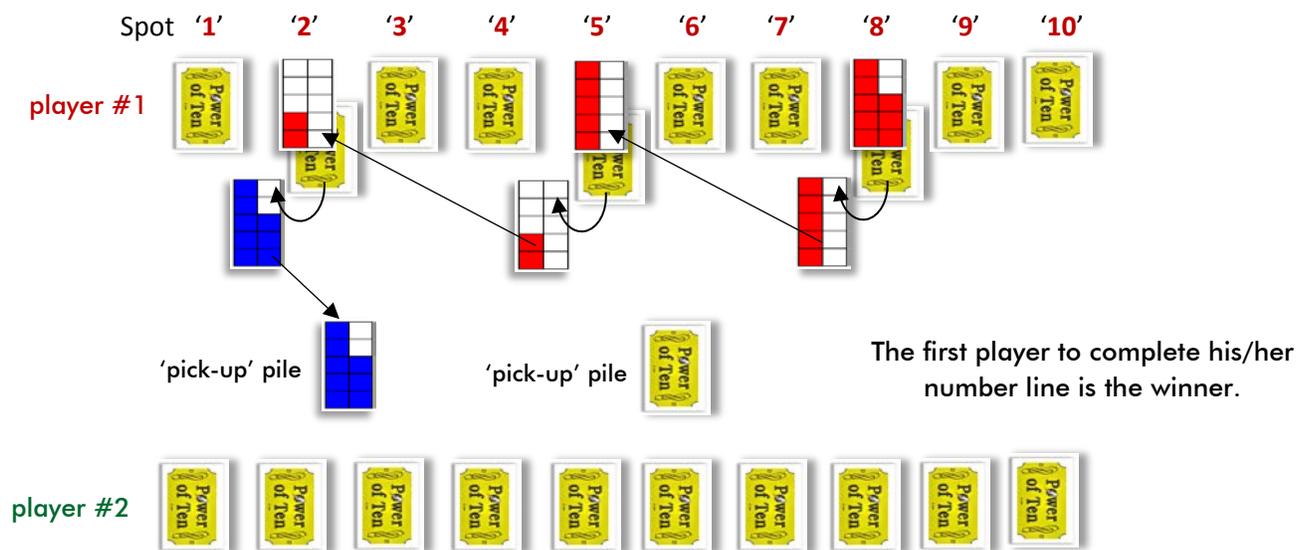**Player #1** draws an **8-card** and places it in the '**8**' spot.

Spot '**1**' '**2**' '**3**' '**4**' '**5**' '**6**' '**7**' '**8**' '**9**' '**10**'

player #1

'pick-up' pile   'pick-up' pile

The first player to complete his/her number line is the winner.

player #2

- **Player #1** picks an **8-card** from the 'pick-up' pile and places it in the '**8**' spot, and then turns over a **5-card**.
- The **5-card** is placed face up in the '**5**' spot and then a **2-card** is turned up.
- The **2-card** is placed in the '**2**' spot and an **8-card** is turned up. The card cannot be used as it is already in the number line.
- This **8-card** is then placed in the 'discard' pile and **player #2** now takes a turn, selecting a card from either the 'pick-up' pile or the 'discard' pile.

Contributed by Power of Ten Presenter Colleen Neves

Order It or
Make a Number Line
Assessment Game
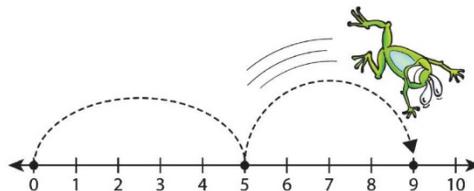
Materials:

Ten **Power of Ten™** cards including 1, 2, 3, … 10.

Players: 1

How to Play:

Shuffle the cards and place in a single pile. Turn over one card and say how much it is. Turn a second card over and put it in the appropriate place in the number line.

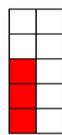**Teaching Strategies:**

Notice the cards are not looked at 'face up' but are 'turned over'. This means students have to pay attention to the number of colored squares on the card and not look for the one, then the two and so on.
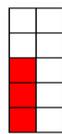
Discuss the need for leaving space.

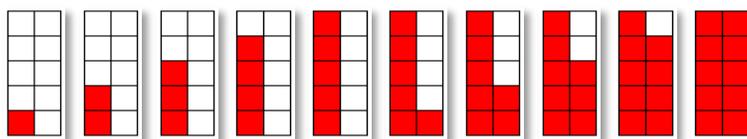The **first card** can be placed anywhere.

The **second card** must be placed to the right or left and 'close to' or 'far from' the first card.

The **third card** is placed in the appropriate 'spot' on the number line.

Continue until **all ten cards** are placed in their proper locations.

In a Kindergarten or Grade One class, this can be played at the carpet with the whole class. The 'student of the day' picks the card from the teacher's card pile and then places it, asking for help if needed. In a Kindergarten class, try to pick a student who will probably figure it out on her first try, leaving the students with the least number sense to watch until they have seen lots of successful examples. This game can also be played with students in the higher grades.

Connections:

Once a student knows the cards and can put them in order successfully, pass out the **place value numerals** and have the student place the numerals with the correct cards to see if they can match numeral with number. Now ask, what number comes next? **Eleven**. Ask, "How do you make eleven?" If the student says "One and one." show him that **1 + 1 = 2**.

Now show *eleven* using the place value cards and ask the student to pull out the one on the left-hand side. The look of surprise when it is not a one but a ten is often delightful. Show that **11 = 10 + 1** and then ask about *twelve*. Continue the pattern until the student knows that a teen number is ten and the number or until the student loses interest.

$$11 \quad 1(1 \rightarrow = 10 + 1$$

Order It Numerals

Assessment Game

Materials:

Ten **Power of Ten**^{TM} cards including 1, 2, 3, … 10.

Players:

One

How to Play:

Shuffle the cards and place in a single pile. Turn over one card and say how much it is. Then turn a second card over and put it in the appropriate place in the number line.

Teaching Strategies:

Notice the cards are not looked at 'face up' but are 'turned over'. This means students have to pay attention to the number of colored squares on the card and not look for the one, then the two and so on.

> Discuss the need for leaving space.

The **first card** can be placed anywhere.

The **second card** must be placed to the right or left and 'close to' or 'far from' the first card.

The **third card** is placed in the appropriate 'spot' on the number line.

Continue until **all ten cards** are placed in their proper locations.

Connections:

Once a student can put the ten-frame cards from one to ten in the correct order, take the place value unit cards and give them randomly to the student.

In a kindergarten or grade one class, this can be played at the carpet with the whole class. The 'student of the day' picks the card from the teacher's card pile and then places it, asking for help if needed. In a kindergarten class, try to pick a student who will probably figure it out on her first try, leaving the students with the least number sense to watch until they have seen lots of successful examples. This game can also be played with students in the higher grades.

Have the student put each place value unit card under the appropriate ten-frame card.
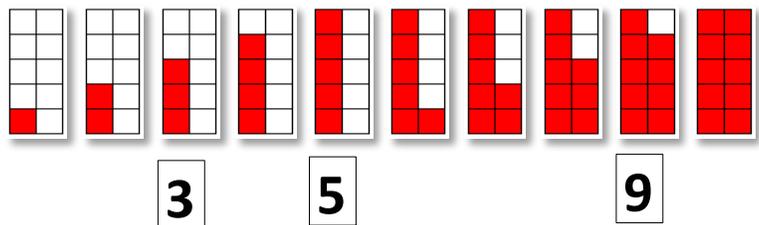
Name It
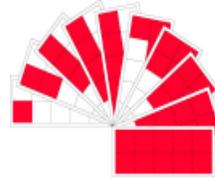
Materials: Twenty **Power of Ten**™ cards

Players: 2

How to Play: Shuffle the cards and place face down in one pile.
The teacher (or parent) turns over one card and the child says
how many squares are colored. If the child's answer is correct,
it goes into the child's pile; if not, it goes into the parent's pile.
Do this until the deck is finished.

Teaching Strategies: When the deck has been gone through once, look at the cards
that the child **does not know** and make a decision on what to teach next.

<u>Do not</u> do any of the activities below unless the child appears interested.
Try playing this game with an older sibling, so that the younger child gets interested
through mimicking.

| **Child Knows:**	**What to Teach Next:** (depending on the child's answer, be prepared to accept a different order from the child, than the one shown below)
1, **2**, **3** and **10**	Child **is not** ready, go back and play the *Match IT* game.
1, **2**, **3**, **5** and **10**	From the **not known** pile pick the *four* and the *nine*. Compare the 4 to the 5 – ask the child what is different about the two cards. Accept: "it is one shorter, one fewer, one more, has more white squares, fewer white squares" etc. Show *five* on your fingers then make it into a *four* by subtracting *one*. If the child is three years old, ask how old he will be on his next birthday.
	Now work on the *nine*, it is one less than *ten*; do the finger thing where you show *ten* and make it into *nine* by putting down one finger. Put *ten* in an 'egg carton ten-frame' and make it into *nine*.
	Do the same with *five* and make it into *four* by subtracting *one*.
	Go back and play the *Make a Number Line or Order Solitaire* activity and focus on the *ten* and the *nine*; and the *five* and the *four*. Continue this activity until these numbers are known in either the *Match It* game or the *Order It (Make a Number Line)* game activity.
1, **2**, **3**, **4**, **5**, **9** and **10**	Now focus on the *six* and the *eight,* using the same strategies that were used for the *four* and *nine* above.
1, **2**, **3**, **4**, **5**, **6**, **8**, **9** and **10**	Use the strategy of making the *five* from the *seven,* using the egg carton and hand activities above.

POWER OF TEN

Fish

Materials: Two different colored 20-card decks of Power of Ten™ cards.

Number of Players: 2 to 4

Object and Scoring: To be the first player to lay down all their cards.

Method of Play:

1. Mix the two decks, deal 5 cards to each player. The rest of the cards are placed face down between the players in a 'pick-up' pile.

2. Player #1, the dealer, asks Player #2 on her left for a card to match one of her cards. If Player #2 does not have a match, she says, "Fish", and the asking player draws a card from the 'pick-up' pile.

   If Player #1 gets a match, she lays the matching pair down and asks again for a card to match one of the remaining cards in her hand. If there is no match from the 'fished' card, the player adds this card to her hand and the next player begins.

3. The game finishes when a player has no cards left.

Concentration

Materials:

One deck of **Power of Ten™** playing cards
(a full deck features twenty cards with two cards
of each number denomination).

With younger students you may wish to use half a deck, or ten cards. Begin by using all the cards to number 5 and then add 10, 9, 8, 6, 7 in that order. Student ability and experience with the game will dictate the number of cards you choose to employ.

Number of Players: 2 to 4

Object of the Game and Scoring:

The object of the game is to **obtain as many pairs** (two cards showing the same number) **as possible**. When a player finds a pair, she takes another turn. The player with the most cards at the end of the game wins.

Method of Play:

1. Shuffle the cards and spread them face down on a table or on the floor. Arrange the cards in equal rows (two rows of ten or four rows of five). This matrix may also be featured during calendar time, and within other contexts that focus upon the related multiplication and division operations:

    2 x 10   20 ÷ 10   4 x 5   20 ÷ 5

2. Player #1 turns over two cards, one at a time, while pronouncing the value of each. Where the two cards *are the same*, the player retains both cards and continues to take another turn. Where the two cards upturned *are dissimilar*, the cards are then returned face down to the spread of cards.
3. Player #2 then takes his turn and turns over two cards, stating the value of each.
4. The game continues until all cards have been claimed.
5. The winner is the person who retains the most cards.

Adaptations and Extensions of Concentration

Once a player has turned over one card, he may then ask other players if the matching (or equal-value) card that he seeks has already been shown. If the answer is 'yes', then directions for locating the matching card must then be provided by other players without pointing. Students must use directive coordinates such as 'row four, over three', or 'column two, up one'. **This activity introduces the concept of coordinates in geometry, and encourages students to think spatially.** The player guided in his card search must interpret information provided from the point of view of those directing his movements. If the answer is correct, they each get one of the cards. Where a student provides incorrect or misleading directions, he forfeits a turn. The winner is the person with the greatest sum when all his card values have been totalled, or the person with the most cards.

Friendly Concentration

Remove the two ten-cards, leaving 18 cards. Arrange the cards in a **3 x 6** or **2 x 9** matrix. *Friendly Concentration* is played by seeking two cards with values that equal ten.
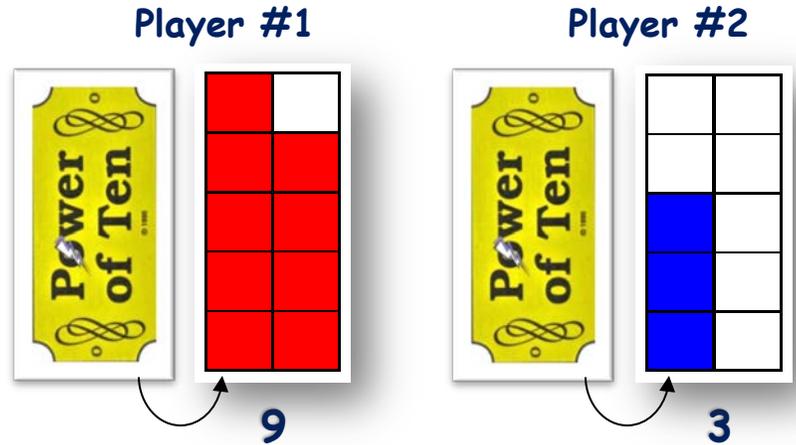
FACE OFF

Materials:

Two decks of **Power of Ten™** playing cards (a full deck features 20 cards with 2 cards of each number denomination).

Number of Players: 2

Object of the Game and Scoring:

The object of the game is to obtain as many cards as possible.

Player #1

9

Player #2

3

Method of Play:

1. Each player has a deck of twenty cards. Each deck is shuffled and placed face down.
2. Player #1 and player #2 simultaneously flip over cards and state the values of each. The player with the card showing the greatest number of colored squares *(or the largest number)* wins.
3. When a student wins a round she collects her winnings and creates a blue pile and a red pile of winnings.
4. Ties are settled by each person winning their own card _or_ both players turn over another card and the winner of that round takes everything.
5. Very young children *(even three or four-year-olds)* may play this game successfully without stating the number values shown on the cards. However, children aged five or six years should be able to recognize and state number values shown. It is essential that children learn to say the numbers shown on the cards out loud. The brain 'hears' the number and 'sees' the card, thus making a connection and laying down a memory track. Discourage the shouting out of numbers in order to keep classroom noise to a minimum.
6. The **winner is the person who holds the most cards**.
7. This game may either be played continuously until one player wins all available cards, or until a designated playing time has elapsed.

FACE OFF CHALLENGE

Both players turn over a card. The first player to say the correct sum wins.

Friendly Fish
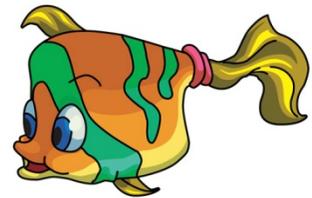
Materials: 20-card deck of Power of Ten™ cards.   **2 players**

Five **Power of Ten** cards are dealt to each player (as in regular 'Fish').

The remainder of the cards are placed face-down in an 'unused card pile'.

Both players lay down any **'friendly pairs'** (pairs that add to 10) that they have in their hands.

> *Player #1* asks *Player #2* if she has a card that will make a **'friendly pair'**.

> *For example:* *Player #1* asks for an '**8**' and *Player #2* has an '**8**', then *Player #1* lays down her '**2**' with the '**8**'.

> If *Player #2* does *not* have an '**8**', he says, "Go Fish".
> *Player #1* goes to the 'unused card pile' and draws the top card.
> If she gets an '**8**' she lays down the '**2**' and the '**8**'.

> If she does *not* draw an '**8**', she adds the card she has drawn to the cards she has in her hand.

> *Player #2* asks for a card which will give him a **'friendly pair'**.

Play continues until one of the players has no cards left in his/her hand.

Connect to **All the Facts**.

Contributed by Power of Ten Presenter Dorothy Galvin

Friendly MATCH IT

Method of Play:

This game can be played by the whole class on the carpet. Shuffle the cards. Spread all 18 cards face up in a **three by six** array.
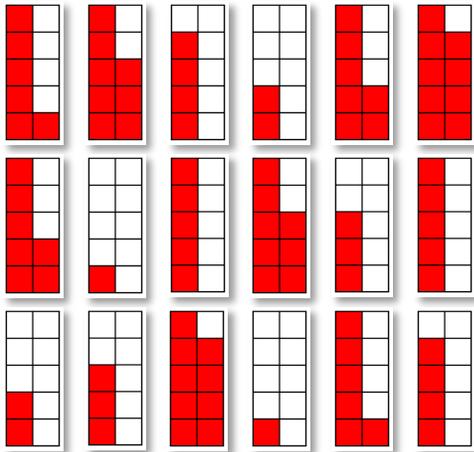
… or a **two by nine** array.
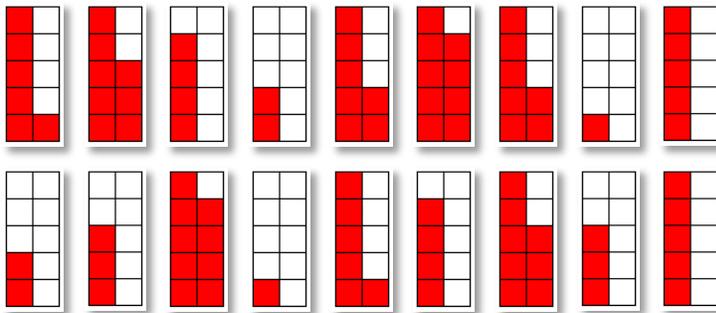
Player one picks a card.

Another player picks the card **that adds to 10**. (eg., 6 and 4).

The teacher writes **4 + 6 = 10** on the board and the students say the equation in unison.

Eventually the teacher can have students connect the equation to a story problem and to the **All the Facts sheets** (All the Facts Addition/Subtraction Forms A through L).

Materials:

18 **Power of Ten**^{TM} cards all one color (either all red or all blue). The two 10-cards are removed.
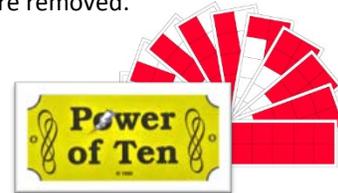
Objective:

Have two cards that add to 10.

All the ADDITION Facts You Ever Need to Know (A)			
8 + 8 =	6 + 0 =	2 + 9 =	4 + 0 =
4 + 5 =	6 + 9 =	7 + 7 =	2 + 1 =
6 + 8 =	3 + 4 =	8 + 1 =	5 + 5 =
3 + 2 =	6 + 3 =	1 + 4 =	8 + 9 =
1 + 1 =	4 + 9 =	4 + 7 =	4 + 4 =
7 + 9 =	8 + 3 =	3 + 3 =	1 + 3 =
4 + 8 =	5 + 6 =	0 + 1 =	1 + 7 =
0 + 9 =	2 + 5 =	6 + 7 =	2 + 0 =
3 + 9 =	2 + 2 =	8 + 0 =	2 + 8 =
0 + 3 =	1 + 5 =	2 + 4 =	7 + 0 =
5 + 8 =	4 + 6 =	3 + 5 =	2 + 6 =
5 + 0 =	6 + 1 =	2 + 7 =	1 + 9 =
9 + 9 =	5 + 9 =	6 + 6 =	7 + 5 =
7 + 8 =	3 + 7 =		
Column 1 _____	Column 2 _____	Column 3 _____	Column 4 _____

Name _____   left to learn _____

All the SUBTRACTION Facts You Ever Need to Know (A)			
16 − 8 =	6 − 0 =	11 − 9 =	4 − 0 =
9 − 4 =	15 − 9 =	14 − 7 =	3 − 2 =
14 − 8 =	7 − 4 =	9 − 8 =	10 − 5 =
5 − 2 =	9 − 3 =	5 − 4 =	17 − 9 =
2 − 1 =	13 − 9 =	11 − 4 =	8 − 4 =
16 − 7 =	11 − 8 =	6 − 3 =	4 − 1 =
12 − 8 =	11 − 5 =	1 − 0 =	8 − 7 =
9 − 0 =	7 − 5 =	13 − 6 =	2 − 0 =
12 − 9 =	4 − 2 =	8 − 0 =	10 − 8 =
3 − 0 =	6 − 5 =	6 − 4 =	7 − 0 =
13 − 8 =	10 − 6 =	8 − 5 =	8 − 6 =
5 − 0 =	7 − 1 =	9 − 2 =	10 − 9 =
18 − 9 =	14 − 9 =	12 − 6 =	12 − 5 =
15 − 8 =	10 − 7 =		
Column 1 _____	Column 2 _____	Column 3 _____	Column 4 _____

Name _____   left to learn _____

POWER OF TEN

Friendly Concentration

Materials:

One deck of **Power of Ten**™ playing cards (a full deck features 20 cards with 2 cards of each number denomination). Remove the 2 ten-cards, leaving 18 cards.

Number of Players: **2 to 4**

Object of the Game and Scoring:

The object of the game is to **obtain as many cards as possible**. When a player finds two cards with a value that equals ten, she takes the two cards and has another turn. The player with the most cards at the end of the game wins.

Method of Play:

1. Shuffle the cards and spread them face down on a table or on the floor. Arrange the cards in a **3 x 6** grid.
2. Player #1 turns over two cards, one at a time, while pronouncing the value of each. Where the two cards **have a value that equals ten**, the player retains both cards and continues to take another turn. Where the two cards upturned *do not equal a value of ten*, the cards are then returned face down to the spread of cards.
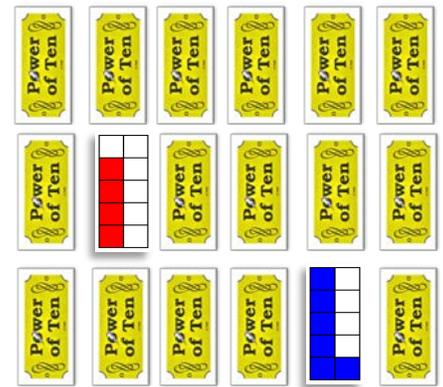3. Player #2 then takes his turn and turns over two cards, stating the value of each.
4. The game continues until all cards have been claimed.
5. The winner is the person who retains the most cards.

Connections to All the Facts

Connections to Stories

Give the **All the Facts** sheets meaning by connecting to story problems.

[click on 'printer icons' to access **Primary Story Problems** pdf files]

ENGLISH Grades 1 & 2

FRENCH Grades 1 & 2

ENGLISH Grades 2 & 3

FRENCH Grades 2 & 3

All the ADDITION Facts You Ever Need to Know {A}

8 + 8 =	6 + 0 =	2 + 9 =	4 + 0 =
4 + 5 =	6 + 9 =	7 + 7 =	2 + 1 =
6 + 8 =	3 + 4 =	8 + 1 =	5 + 5 =
3 + 2 =	6 + 3 =	1 + 4 =	8 + 9 =
1 + 1 =	4 + 9 =	4 + 7 =	4 + 4 =
7 + 9 =	8 + 3 =	3 + 3 =	1 + 3 =
4 + 8 =	5 + 6 =	0 + 1 =	1 + 7 =
0 + 9 =	2 + 5 =	6 + 7 =	2 + 0 =
3 + 9 =	2 + 2 =	8 + 0 =	2 + 8 =
0 + 3 =	1 + 5 =	2 + 4 =	7 + 0 =
5 + 8 =	4 + 6 =	3 + 5 =	2 + 6 =
5 + 0 =	6 + 1 =	2 + 7 =	1 + 9 =
9 + 9 =	5 + 9 =	6 + 6 =	7 + 5 =
7 + 8 =	3 + 7 =		
Column 1 _____	Column 2 _____	Column 3 _____	Column 4 _____

Name _____ left to learn _____

All the SUBTRACTION Facts You Ever Need to Know {A}

16 − 8 =	6 − 0 =	11 − 9 =	4 − 0 =
9 − 4 =	15 − 9 =	14 − 7 =	3 − 2 =
14 − 8 =	7 − 4 =	9 − 8 =	10 − 5 =
5 − 2 =	9 − 3 =	5 − 4 =	17 − 9 =
2 − 1 =	13 − 9 =	11 − 4 =	8 − 4 =
16 − 7 =	11 − 8 =	6 − 3 =	4 − 1 =
12 − 8 =	11 − 5 =	1 − 0 =	8 − 7 =
9 − 0 =	7 − 5 =	13 − 6 =	2 − 0 =
12 − 9 =	4 − 2 =	8 − 0 =	10 − 8 =
3 − 0 =	6 − 5 =	6 − 4 =	7 − 0 =
13 − 8 =	10 − 6 =	8 − 5 =	8 − 6 =
5 − 0 =	7 − 1 =	9 − 2 =	10 − 9 =
18 − 9 =	14 − 9 =	12 − 6 =	12 − 5 =
15 − 8 =	10 − 7 =		
Column 1 _____	Column 2 _____	Column 3 _____	Column 4 _____

Name _____ left to learn _____

Slap Jack 10

Materials:
Two decks of **Power of Ten™** playing cards.

Number of Players: 2

Object and Scoring:
The object of the game is to **obtain as many cards as possible**.

Method of Play:
1. Each player has one deck of 20 cards, which he shuffles.

2. Both player #1 and player #2 turn over a card.

3. Both players are looking for a ten-card or two cards that add together to make ten. When this occurs, the players slap their hands on the table and say "**TEN!**"

4. The player who slaps first (his or her hand will be on the bottom if both players slap together) gets all the cards turned up in both players' piles. If a player says "**TEN**" incorrectly, then the other player gets the cards.

5. Once all the cards in the two decks have been played, reshuffle and start again.

6. Play continues until one player has won all the cards or a time limit (5 minutes) has been reached.

ADDITION – Circle any questions that add to **10**.

All the ADDITION Facts You Ever Need to Know (A)			
8 + 8 =	6 + 0 =	2 + 9 =	4 + 0 =
4 + 5 =	6 + 9 =	7 + 7 =	2 + 1 =
6 + 8 =	3 + 4 =	8 + 1 =	(5 + 5 =)
3 + 2 =	6 + 3 =	1 + 4 =	8 + 9 =
1 + 1 =	4 + 9 =	4 + 7 =	4 + 4 =
7 + 9 =	8 + 3 =	3 + 3 =	1 + 3 =
4 + 8 =	5 + 6 =	0 + 1 =	1 + 7 =
0 + 9 =	2 + 5 =	6 + 7 =	2 + 0 =
3 + 9 =	2 + 2 =	8 + 0 =	(2 + 8 =)
0 + 3 =	1 + 5 =	2 + 4 =	7 + 0 =
5 + 8 =	(4 + 6 =)	3 + 5 =	2 + 6 =
5 + 0 =	6 + 1 =	2 + 7 =	(1 + 9 =)
9 + 9 =	5 + 9 =	6 + 6 =	7 + 5 =
7 + 8 =	(3 + 7 =)		
Column 1 ____	Column 2 ____	Column 3 ____	Column 4 ____

Name _____   left to learn _____

Give the **All the Facts** sheets meaning by connecting to stories.

TEN!

TEN!

TEN!

Note – it helps to keep the winnings in separate **red** and **blue** piles. This speed up collecting and putting the cards away at the end of the game.

Power of Ten FACE OFF

When students are thoroughly familiar with the number shapes shown on the cards, they are ready for the Power of Ten game.

Power of Ten is played as follows:

1. Each player places a ten-card face up on the floor or table before him. He then draws another card that he places face up alongside his ten-card. The player then states the value of the two cards *(values range from 11 to 20)*. The player with the highest total takes the two non-ten (or the units-digit) cards and retains them. In the event of a tie, each player turns over another card and the player with the highest total takes the cards for the current round and the previous round.

Player #1
19
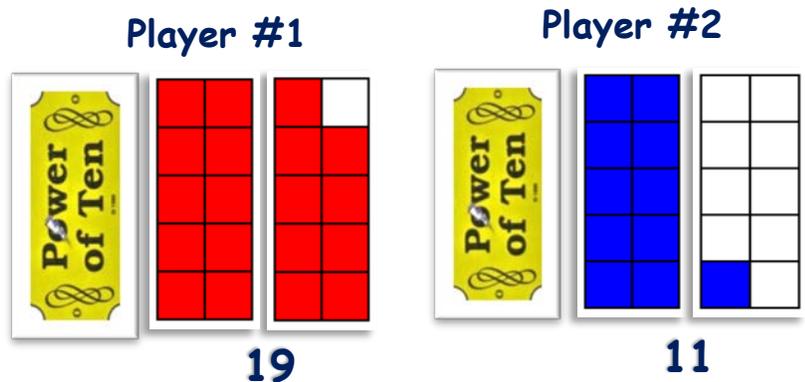
Player #2
11

2. Each player's ten-card remains in place as he turns over another card to place alongside it. Again, the person with the greatest total removes the two units-cards.

3. The game continues until all cards have been exhausted.
   Note: The Power of Ten game teaches place-value concepts and addition with **ten**. This game establishes a solid understanding of early addition.

4. Also play **Power of Nine**, **Power of Five** and **Power of Eight**. When the students have mastered the **Power of Ten**, **Nine**, **Five**, and **Eight** games, vary the activity by having each student turn over the top two cards from his deck while stating the total of both. This game is known as '**Face Off Challenge'**. The person with the greatest total wins and may remove both cards played. The game continues in this way until all cards are exhausted.

5. As students gain proficiency with each of these games, they will have learned how to add **10**, **9**, **5** and **8** to any given number. Students will now feel confident when tackling addition of all single-digit numbers, as addition of numbers less than **10, 9**, **5** and **8** will appear infinitely easier!

Power of Nine FACE OFF

When students are thoroughly familiar with the number shapes shown on the cards, they are ready for the Power of Nine game.

Power of Nine is played as follows:

1. Each player places a nine-card face up on the floor or table before him. He then draws another card that he places face up alongside his nine-card. The player then states the value of the two cards *(values range from 10 to 19)*. The player with the highest total takes the two non-nine (or the units-digit) cards and retains them.
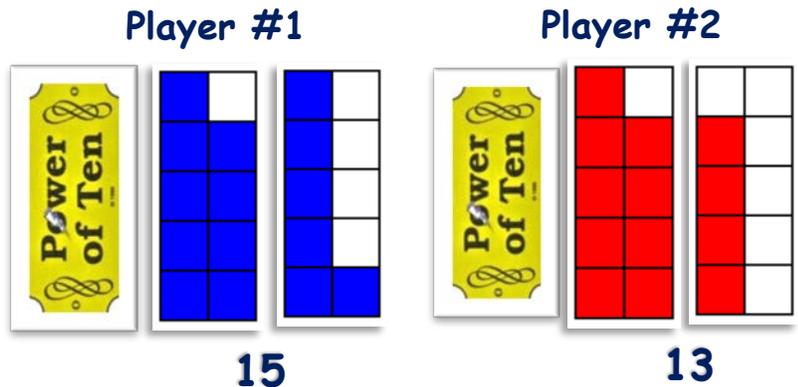
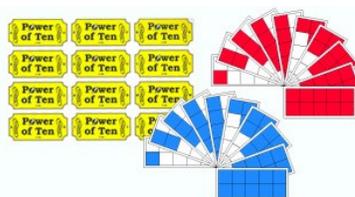   In the event of a tie, each player turns over another card and places it on top of the previous card turned over. The player with the highest total for this round takes the cards for the current round and for the previous round.

2. Each player's nine-card remains in place as he turns over another card to place alongside it. Again, the person with the greatest total removes the two units-cards.

3. When a student is playing Power of Nine, encourage him to look at the two cards and try to see how many squares are colored. Then try to figure out what the brain did – find a student who can put this into words. "It usually moves one from the smaller number to make a ten." Sometimes one student gets the first part of the sentence and then another student will get the underlined part. These two students' names can be added to the **'Rule Makers'** or **'Pattern Makers'** list.

4. The game continues until all cards have been exhausted.
   Note: The Power of Nine game teaches place-value concepts and addition with **nine**. This game establishes a solid understanding of early addition.

Player #1

15

Player #2

13

Connections to All the Facts

Circle any questions that have **9** as one or both of the addends.

Give the **All the Facts** sheets meaning by connecting to stories.

| All the ADDITION Facts You Ever Need to Know (A)			
8 + 8 =	6 + 0 =	2 + 9 =	4 + 0 =
4 + 5 =	6 + 9 =	7 + 7 =	2 + 1 =
6 + 8 =	3 + 4 =	8 + 1 =	5 + 5 =
3 + 2 =	6 + 3 =	1 + 4 =	8 + 9 =
1 + 1 =	4 + 9 =	4 + 7 =	4 + 4 =
7 + 9 =	8 + 3 =	3 + 3 =	1 + 3 =
4 + 8 =	5 + 6 =	0 + 1 =	1 + 7 =
0 + 9 =	2 + 5 =	6 + 7 =	2 + 0 =
3 + 9 =	2 + 2 =	8 + 0 =	2 + 8 =
0 + 3 =	1 + 5 =	2 + 4 =	7 + 0 =
5 + 8 =	4 + 6 =	3 + 5 =	2 + 6 =
5 + 0 =	6 + 1 =	2 + 7 =	1 + 9 =
9 + 9 =	5 + 9 =	6 + 6 =	7 + 5 =
7 + 8 =	3 + 7 =		
Column 1 _____	Column 2 _____	Column 3 _____	Column 4 _____
Name _____		left to learn _____	

Power of Five FACE OFF

When students are thoroughly familiar with the number shapes shown on the cards, they are ready for the **Power of Five** game.

Power of Five is played as follows:

1. Each player places a five-card face up on the floor or table before him. He then draws another card that he places face up alongside his five-card. The player then states the value of the two cards *(values range from 6 to 15)*. The player with the highest total takes the two non-five (or the units-digit) cards and retains them. In the event of a tie, each player turns over another card and the player with the highest total takes the cards for the current round and the previous round.

Player #1

Player #2

14

9
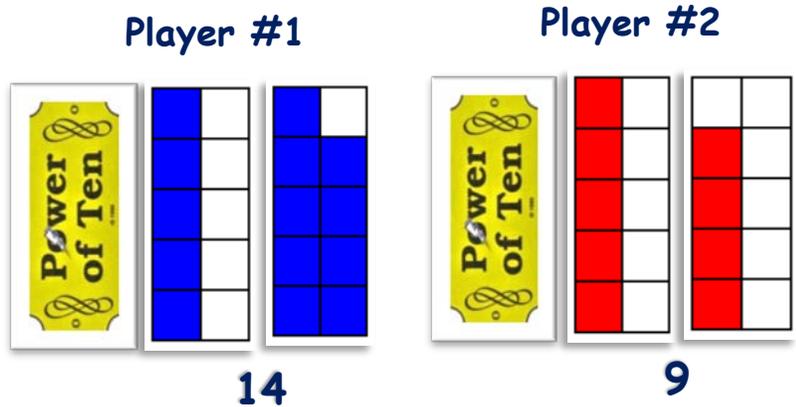
2. Each player's five-card remains in place as he turns over another card to place alongside it. Again, the person with the greatest total removes the two units-cards.

3. The game continues until all cards have been exhausted.
    Note: The **Power of Five** game teaches place-value concepts and addition with **five**. This game establishes a solid understanding of early addition.

4. Also play **Power of Ten**, **Power of Nine** and **Power of Eight**. When the students have mastered the **Power of Ten**, **Nine**, **Five**, and **Eight** games, vary the activity by having each student turn over the top two cards from his deck while stating the total of both. This game is known as '**Face Off Challenge'**. The person with the greatest total wins and may thus remove both cards played. The game continues in this way until all cards are exhausted.

Connections to All the Facts

Circle any questions that have **5** as one or both of the addends.

Give the **All the Facts** sheets meaning by connecting to stories.

All the ADDITION Facts You Ever Need to Know (A)			
8 + 8 =	6 + 0 =	2 + 9 =	4 + 0 =
4 + 5 =	6 + 9 =	7 + 7 =	2 + 1 =
6 + 8 =	3 + 4 =	8 + 1 =	5 + 5 =
3 + 2 =	6 + 3 =	1 + 4 =	8 + 9 =
1 + 1 =	4 + 9 =	4 + 7 =	4 + 4 =
7 + 9 =	8 + 3 =	3 + 3 =	1 + 3 =
4 + 8 =	5 + 6 =	0 + 1 =	1 + 7 =
0 + 9 =	2 + 5 =	6 + 7 =	2 + 0 =
3 + 9 =	2 + 2 =	8 + 0 =	2 + 8 =
0 + 3 =	1 + 5 =	2 + 4 =	7 + 0 =
5 + 8 =	4 + 6 =	3 + 5 =	2 + 6 =
5 + 0 =	6 + 1 =	2 + 7 =	1 + 9 =
9 + 9 =	5 + 9 =	6 + 6 =	7 + 5 =
7 + 8 =	3 + 7 =		
Column 1 _____	Column 2 _____	Column 3 _____	Column 4 _____
Name _____		left to learn _____	

Power of Eight   FACE OFF

When students are thoroughly familiar with the number shapes shown on the cards, they are ready for the **Power of Eight** game.

Player #1

12

Player #2

10

Power of Eight is played as follows:

1. Each player places an eight-card face up on the floor or table before him. He then draws another card that he places face up alongside his eight-card. The player then states the value of the two cards *(values range from 9 to 18)*. The player with the highest total takes the two non-eight (or the units-digit) cards and retains them. In the event of a tie, each player turns over another card and the player with the highest total takes the cards for the current round and the previous round.
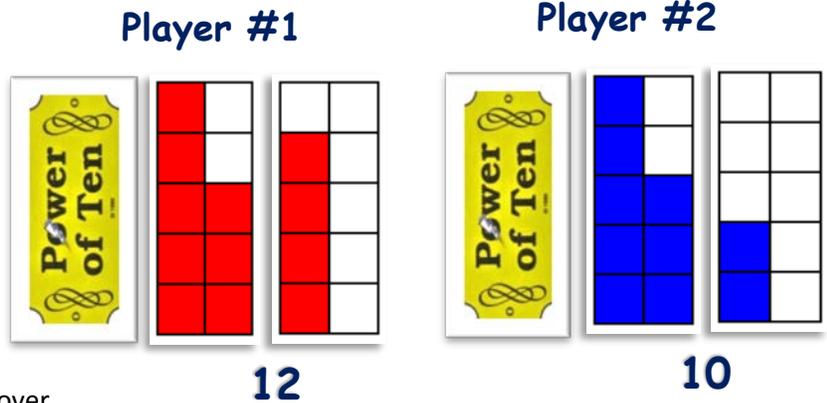
2. Each player's eight-card remains in place as he turns over another card to place alongside it. Again, the person with the greatest total removes the two units-cards.

3. The game continues until all cards have been exhausted.
   Note: The **Power of Eight** game teaches place-value concepts and addition with **eight**. This game establishes a solid understanding of early addition.

4. Also play **Power of Ten**, **Power of Nine** and **Power of Five**. When the students have mastered the **Power of Ten**, **Nine**, **Five**, and **Eight** games, vary the activity by having each student turn over the top two cards from his deck while stating the total of both. This game is known as '**Face Off Challenge'**. The person with the greatest total wins and may thus remove both cards played. The game continues in this way until all cards are exhausted.

Connections to All the Facts

Circle any questions that have **8** as one or both of the addends.

Give the **All the Facts** sheets meaning by connecting to stories.

All the ADDITION Facts You Ever Need to Know (A)

Column 1	Column 2	Column 3	Column 4
(8 + 8 =)	6 + 0 =	2 + 9 =	4 + 0 =
4 + 5 =	6 + 9 =	7 + 7 =	2 + 1 =
(6 + 8 =)	3 + 4 =	(8 + 1 =)	5 + 5 =
3 + 2 =	6 + 3 =	1 + 4 =	(8 + 9 =)
1 + 1 =	4 + 9 =	4 + 7 =	4 + 4 =
7 + 9 =	(8 + 3 =)	3 + 3 =	1 + 3 =
(4 + 8 =)	5 + 6 =	0 + 1 =	1 + 7 =
0 + 9 =	2 + 5 =	6 + 7 =	2 + 0 =
3 + 9 =	2 + 2 =	(8 + 0 =)	(2 + 8 =)
0 + 3 =	1 + 5 =	2 + 4 =	7 + 0 =
(5 + 8 =)	4 + 6 =	3 + 5 =	2 + 6 =
5 + 0 =	6 + 1 =	2 + 7 =	1 + 9 =
9 + 9 =	5 + 9 =	6 + 6 =	7 + 5 =
(7 + 8 =)	3 + 7 =		

Name _____   left to learn _____

Slap Jack ±5

Materials:

Two decks of **Power of Ten**™ playing cards.
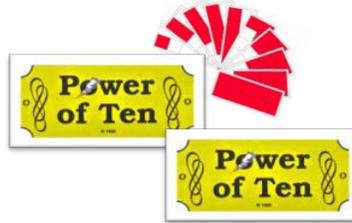
Number of Players: 2

Object and Scoring:

The object of the game is to **obtain as many cards as possible**.

Method of Play:

1. Each player has one deck of 20 cards, which he shuffles.

2. Both player #1 and player #2 turn over a card.

3. Both players are looking for two cards **that have a difference or a sum of 5**. When this occurs, the players slap their hands on the table and say "**FIVE!**"

4. The player who slaps first (his or her hand will be on the bottom if both players slap together) gets all the cards turned up in both players' piles. If a player says "**FIVE**" incorrectly, the other player gets the cards.

5. Once all the cards in the two decks have been played, reshuffle and start again.

6. Play continues until one player has won all the cards or a time limit (5 minutes) has been reached.

ADDITION – Circle any questions that add to **5**.

All the ADDITION Facts You Ever Need to Know (A)			
8 + 8 =	6 + 0 =	2 + 9 =	4 + 0 =
4 + 5 =	6 + 9 =	7 + 7 =	2 + 1 =
6 + 8 =	3 + 4 =	8 + 1 =	5 + 5 =
(3 + 2 =)	6 + 3 =	(1 + 4 =)	8 + 9 =
1 + 1 =	4 + 9 =	4 + 7 =	4 + 4 =
7 + 9 =	8 + 3 =	3 + 3 =	1 + 3 =
4 + 8 =	5 + 6 =	0 + 1 =	1 + 7 =
0 + 9 =	2 + 5 =	6 + 7 =	2 + 0 =
3 + 9 =	2 + 2 =	8 + 0 =	2 + 8 =
0 + 3 =	1 + 5 =	2 + 4 =	7 + 0 =
5 + 8 =	4 + 6 =	3 + 5 =	2 + 6 =
(5 + 0 =)	6 + 1 =	2 + 7 =	1 + 9 =
9 + 9 =	5 + 9 =	6 + 6 =	7 + 5 =
7 + 8 =	3 + 7 =		
Column 1 _____	Column 2 _____	Column 3 _____	Column 4 _____

Name _____ left to learn _____

SUBTRACTION – Circle any questions that have a difference of **5**.

All the SUBTRACTION Facts You Ever Need to Know (A)			
16 – 8 =	6 – 0 =	11 – 9 =	4 – 0 =
(9 – 4 =)	15 – 9 =	14 – 7 =	3 – 2 =
14 – 8 =	7 – 4 =	9 – 8 =	(10 – 5 =)
5 – 2 =	9 – 3 =	5 – 4 =	17 – 9 =
2 – 1 =	13 – 9 =	11 – 4 =	8 – 4 =
16 – 7 =	11 – 8 =	6 – 3 =	4 – 1 =
12 – 8 =	11 – 5 =	1 – 0 =	8 – 7 =
9 – 0 =	7 – 5 =	13 – 6 =	2 – 0 =
12 – 9 =	4 – 2 =	8 – 0 =	10 – 8 =
3 – 0 =	6 – 5 =	6 – 4 =	7 – 0 =
(13 – 8 =)	10 – 6 =	8 – 5 =	8 – 6 =
(5 – 0 =)	7 – 1 =	9 – 2 =	10 – 9 =
18 – 9 =	(14 – 9 =)	12 – 6 =	12 – 5 =
15 – 8 =	10 – 7 =		
Column 1 _____	Column 2 _____	Column 3 _____	Column 4 _____

Name _____ left to learn _____

Note – it helps to keep the winnings in separate **red** and **blue** piles. This speeds up collecting and putting the cards away at the end of the game.

Sample One (difference)

Player #1   Player #2

FIVE!

Sample Two (sum)

Player #1   Player #2

+

FIVE!

Sample Three (difference)

Player #1   Player #2

FIVE!

POWER OF TEN

Slap Jack 1

Materials:
Two decks of **Power of Ten™** playing cards.

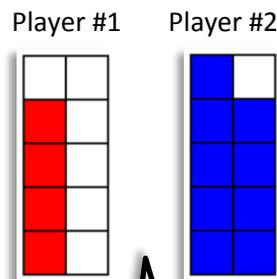## Number of Players: 2

Object and Scoring:
The object of the game is to **obtain as many cards as possible**.
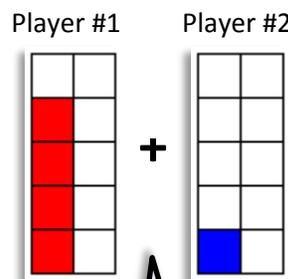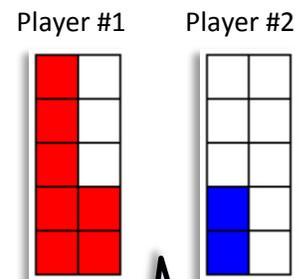
Method of Play:
1. Each player has one deck of 20 cards, which he shuffles.

2. Both player #1 and player #2 turn over a card.

3. Both players are looking for two cards **that have a difference of 1**. When this occurs, the players slap their hands on the table and say "**ONE!**"

4. The player who slaps first (his or her hand will be on the bottom if both players slap together) gets all the cards turned up in both players' piles. If a player says "**ONE**" incorrectly, the other player gets the cards.

5. Once all the cards in the two decks have been played, reshuffle and start again.

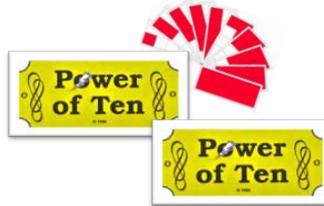6. Play continues until one player has won all the cards or a time limit (5 minutes) has been reached.

SUBTRACTION – Circle any questions that have a difference of **1**.

All the SUBTRACTION Facts You Ever Need to Know (A)

16 – 8 =	6 – 0 =	11 – 9 =	4 – 0 =
9 – 4 =	15 – 9 =	14 – 7 =	(3 – 2 =)
14 – 8 =	7 – 4 =	(9 – 8 =)	10 – 5 =
5 – 2 =	9 – 3 =	(5 – 4 =)	17 – 9 =
(2 – 1 =)	13 – 9 =	11 – 4 =	8 – 4 =
16 – 7 =	11 – 8 =	6 – 3 =	4 – 1 =
12 – 8 =	11 – 5 =	(1 – 0 =)	(8 – 7 =)
9 – 0 =	7 – 5 =	13 – 6 =	2 – 0 =
12 – 9 =	4 – 2 =	8 – 0 =	10 – 8 =
3 – 0 =	(6 – 5 =)	6 – 4 =	7 – 0 =
13 – 8 =	10 – 6 =	8 – 5 =	8 – 6 =
5 – 0 =	7 – 1 =	9 – 2 =	(10 – 9 =)
18 – 9 =	14 – 9 =	12 – 6 =	12 – 5 =
15 – 8 =	10 – 7 =		

Column 1 _____	Column 2 _____	Column 3 _____	Column 4 _____

Name _____   left to learn _____

Give the **All the Facts** sheets meaning by connecting to stories.

Sample One

Player #1   Player #2

ONE!

Note – it helps to keep the winnings in separate **red** and **blue** piles. This speed up collecting and putting the cards away at the end of the game.

Sample Two

Player #1   Player #2

ONE!

Slap Jack 2

Materials:
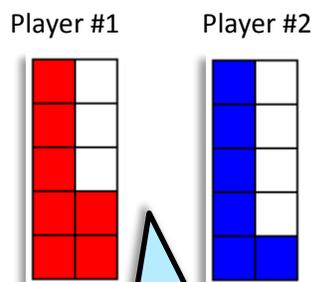Two decks of **Power of Ten™** playing cards.
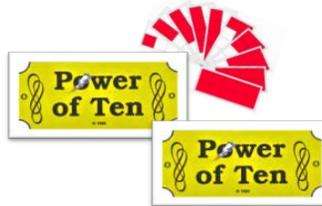
Number of Players: 2

Object and Scoring:
The object of the game is to **obtain as many cards as possible**.

Method of Play:
1. Each player has one deck of 20 cards, which he shuffles.

2. Both player #1 and player #2 turn over a card.

3. Both players are looking for two cards **that have a difference of 2**. When this occurs, the players slap their hands on the table and say "**TWO!**"

4. The player who slaps first (his or her hand will be on the bottom if both players slap together) gets all the cards turned up in both players' piles. If a player says "**TWO**" incorrectly, the other player gets the cards.

5. Once all the cards in the two decks have been played, reshuffle and start again.

6. Play continues until one player has won all the cards or a time limit (5 minutes) has been reached.
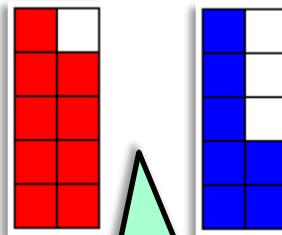
Note – it helps to keep the winnings in separate **red** and **blue** piles. This speed up collecting and putting the cards away at the end of the game.

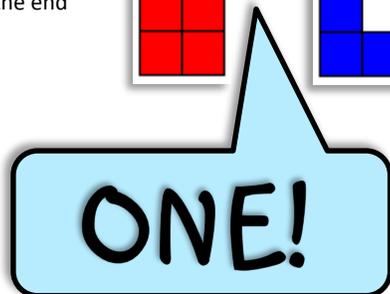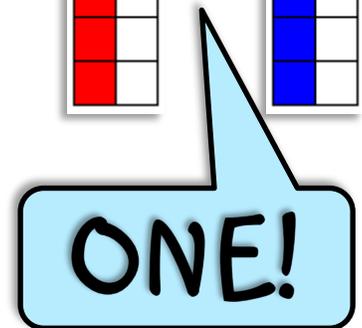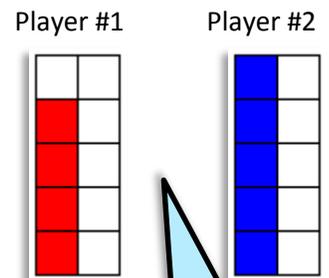**SUBTRACTION** – Circle any questions that have a difference of **2**.

All the SUBTRACTION Facts You Ever Need to Know (A)			
16 – 8 =	6 – 0 =	(11 – 9 =)	4 – 0 =
9 – 4 =	15 – 9 =	14 – 7 =	3 – 2 =
14 – 8 =	7 – 4 =	9 – 8 =	10 – 5 =
5 – 2 =	9 – 3 =	5 – 4 =	17 – 9 =
2 – 1 =	13 – 9 =	11 – 4 =	8 – 4 =
16 – 7 =	11 – 8 =	6 – 3 =	4 – 1 =
12 – 8 =	11 – 5 =	1 – 0 =	8 – 7 =
9 – 0 =	(7 – 5 =)	13 – 6 =	(2 – 0 =)
12 – 9 =	(4 – 2 =)	8 – 0 =	(10 – 8 =)
3 – 0 =	6 – 5 =	(6 – 4 =)	7 – 0 =
13 – 8 =	10 – 6 =	8 – 5 =	(8 – 6 =)
5 – 0 =	7 – 1 =	9 – 2 =	10 – 9 =
18 – 9 =	14 – 9 =	12 – 6 =	12 – 5 =
15 – 8 =	10 – 7 =		

| Column 1 _____ | Column 2 _____ | Column 3 _____ | Column 4 _____ |

Name _____ left to learn _____

Connect to **All the Facts**.

Sample One

Player #1   Player #2

TWO!

Sample Two

Player #1   Player #2

TWO!
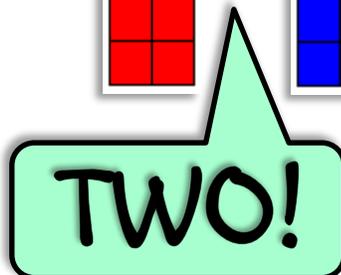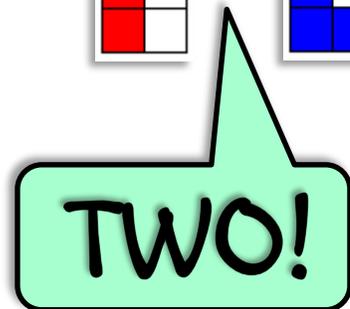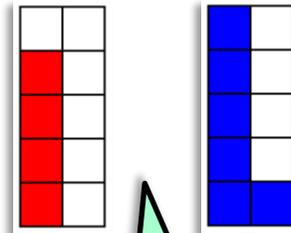
Power of Ten Solitaire

Materials:

One deck of **Power of Ten**™ playing cards for each player.

(a full deck features twenty cards with two cards of each number denomination)

Number of Players: 2 to 4

Object of the Game and Scoring:

The object of the game is to acquire as many **'friendly' tens** as possible. ('Friendlies' are numbers that add to ten.) Each 'friendly' pair is worth **10** points. When all 'friendly' tens are exhausted, each player totals his acquired tens. Totaling the count is easier if the tens are stored in separate piles as they are acquired. Students then count: 10, 20, 30, 40, etc., until the final tally is reached, which may be as high as **110**.

When **Power of Ten Solitaire** is played **by a single player**, any score equal to **60** or more is considered a win. A score of **110** is regarded as a double or **'perfect'** win.

When the game is played by **more than one player**, all players play simultaneously and count their own scores.

Method of Play:

1. Each player shuffles his/her deck of cards and then turns five cards face up. Students seek 'friendly' tens within their five upturned cards. They remove any 'friendly' tens found. For example, when a student turns over cards showing **5**, **6**, **3**, **4** and **9**, he will choose to remove the **6** and **4**, thus scoring **10**.

2. The game continues as new cards are turned over to replace those already removed. In the example, the **6** and **4** that have been removed may perhaps be replaced with a **2** and **7**. The player now sees **5**, **2**, **3**, **7**, and **9** before him. He has two choices: he may select either the **3** and **7**, or the **5**, **2**, and **3**. The **3** and **7** is the wiser choice, as selecting three cards (rather than two) will ultimately leave him with a stray, non-partnered card. Where the player eliminates the **2** and **3**, he has also rendered an **8** and a **7** without possible partners later in the game.

3. The game continues as new cards are turned over to replace those already removed. In the example, the **3** and **7** may perhaps be replaced by **8** and **6** yielding: **5**, **2**, **8**, **6**, **9**. The player then selects the **2** and **8**. He now has a score of **30**.

4. The game continues as new cards are turned over to replace those already removed. In the example, the player perhaps now replaces the **10** with a **9**, yielding **5**, **7**, **9**, **6**, **9**. There are no further available 'friendlies' in the five cards before him. He therefore concludes with a final score of **30**.

   Teachers can make connections to multiplication and division by saying, "John has a score of 30, how many tens does he have?" Then write: _____ x 10 = 30 or 30 ÷ 10 = _____ .

Player #1 [first draw]

6 + 4 = 10
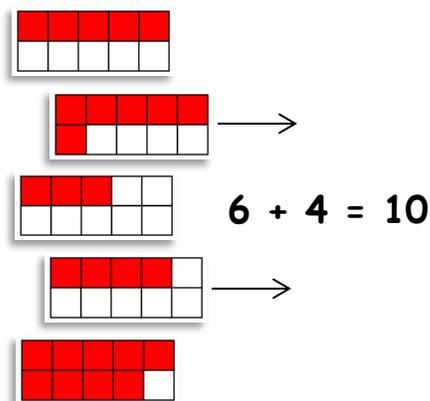
Player #1 [second draw]

10

10
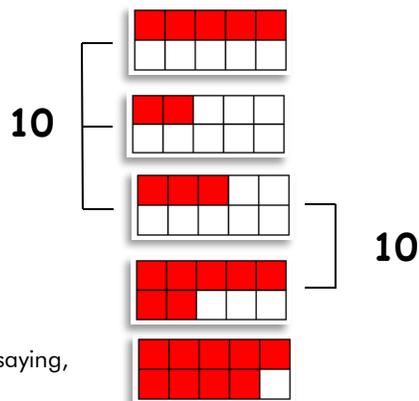
Teen Mania

Number of Players: 2

Materials:

1 deck of **Power of Ten™** cards
2 number strips from 11 to 19
Unifix cubes (or other markers)

11	12	13	14	15	16	17	18	19
11	12	13	14	15	16	17	18	19
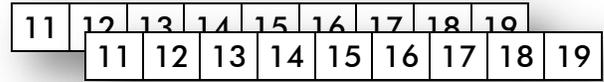
How to Play:

A **ten-card** is taken from the deck and placed in front of each player.
The remaining cards are placed face down in the center as the **'pick-up'** pile.
Each player also has a **number strip**.
Players take turns taking a card from the 'pick-up' pile and placing it beside their ten-card.

11	12	🔵	14	15	16	17	18	19

Player #1

11	12	13	14	🟡	16	17	18	19
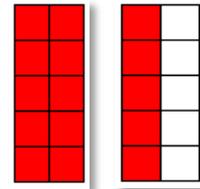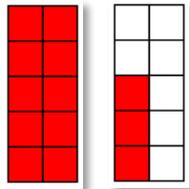
Player #2

Player #1 says his number – i.e. if he turns over a three-card, as he places it beside the ten-card he says, "thirteen".

Then, he takes a marker and covers the '13' on his number strip.
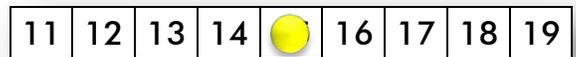
Player #2 says her number – i.e. if she turns over a five-card, as she places it beside the ten-card she says, "fifteen".

Then, she takes a marker and covers the '15' on her number strip.

If a player gets a number more than once, he loses that turn.

The first player to cover all her numbers is the winner.

If players run out of cards, the 'pick-up' pile is re-shuffled to finish the game.

Game courtesy of Colleen Neves
(Strawberry Vale School, Victoria, B.C.)

SALUTE
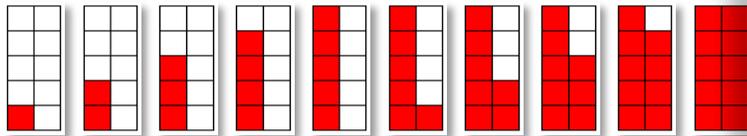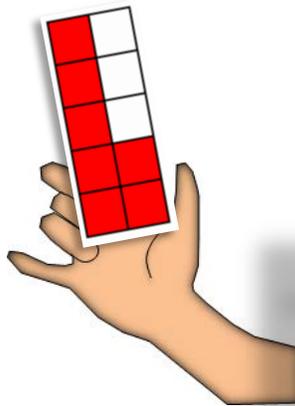
The object of the game is to practice SUBTRACTION facts.

Method of Play:

1. Each player has a deck of 20 cards, which he shuffles.

2. Without looking at the card, player #1 holds up a card showing the face of the card to player #2.

3. Player #2 tells player #1 how many **white squares** are on the card being held up.

4. Then, still not looking at the card, player #1 says how many squares on the card **are colored**. If correct, player #1 keeps the card, otherwise he hands the card to player #2.

5. Play continues until one player has won all the cards or a time limit (5 minutes) has been reached.

Advanced SALUTE
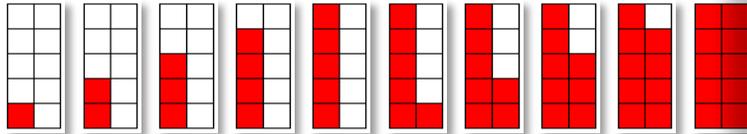
Materials:

Three decks of *Power of Ten*^{TM} playing cards
(a full deck features 20 cards with two
cards of each number denomination)

Number of Players: 3

The object of the game is to practice SUBTRACTION facts.

Method of Play:

1. Each player has a deck of 20 cards, which he shuffles.

2. Without looking at their cards, player #1 and player #2 each hold up a card. Each player sees the other player's card.

3. Player #3 tells the sum of the **colored squares** on both players' cards.

4. Still without looking, the first player to tell the value of his own card gets a point or a counter.

5. If player #3 gives the correct sum, he also gets a point or a counter.

6. If player #3 gives an incorrect sum, he must give one point or counter to each of the other two players.

7. The play then rotates with players #2 and #3 holding up cards, and player #1 stating the sum.

8. Keep rotating until one player has a designated number of points or counters, or until a time limit (5 minutes) has been reached.
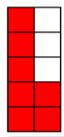
Player #1   **Player #2**

Player #3 says, **"The sum of colored squares for both cards is 13."**

Player #1 is first to say, **"My card is a seven-card."**

Player #3 gets a point for giving the correct sum, and player #1 gets a point for correctly naming his card. Play then rotates with players #2 and #3 holding up cards and player #1 stating the sum.

FACE OFF CHALLENGE

Player #1

6

Player #2

8

Materials:

Two decks of **Power of Ten**™ playing cards (a full deck features 20 cards with 2 cards of each number denomination).

Number of Players: 2

Object of the Game and Scoring:

The object of the game is to obtain as many cards as possible.
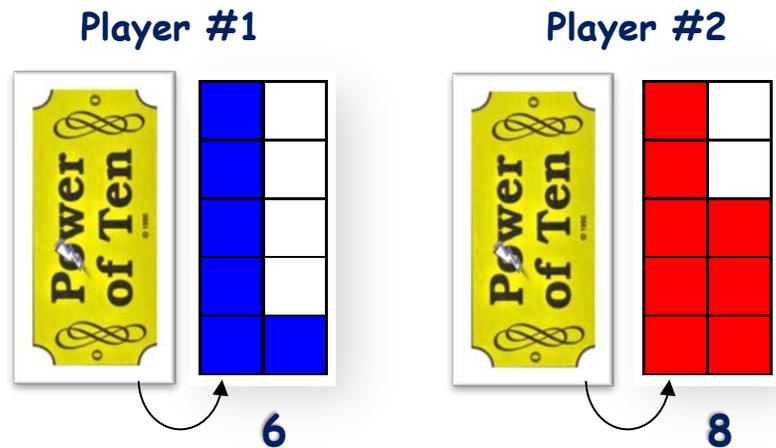
Method of Play:

1. Each player has a deck of twenty cards. Each deck is shuffled and placed face down.

2. Player #1 and player #2 simultaneously turn over a card. The first player to say the **SUM** wins.

3. A player may challenge if she thinks the sum is incorrect. The player who is actually correct wins the cards. When a student wins a round, she collects her winnings and creates a blue pile and a red pile of cards.

4. Ties are settled by each person winning their own card _or_ both players turn over another card and the winner of that round takes everything.

5. The **winner is the person who holds the most cards**.

6. This game may either be played continuously until one player wins all available cards, or until a designated playing time has elapsed.

Doubles Challenge

Materials:
Two decks of **Power of Ten**TM playing cards
(a full deck features twenty cards with two cards
of each number denomination).

Number of Players: 2

Object of the Game:
The player with the most cards at the end of the game wins.

Method of Play:
1. Each player shuffles her deck of cards.
2. Each player turns over a card.
3. **If the sum is a double**, the first player to say **"double"** wins all the cards.
4. The losing player can say **"challenge"**. The winning player must then tell which doubles make the number. If she cannot, she gives half the cards to the other player.

For example: ROUND ONE

Player #1   **Player #2**

1st play   + = **13**

2nd play   + = **11**

3rd play   + = **12**

This game should only be played by students who get most or all of the questions on an 'All the Facts' sheet correct.

Note: Students may learn the rule –
'When the sum is even, it is a double'.

On the 3rd play **Player #2** says **"double"** and starts to take all 6 cards.
Player #1 says **"challenge"**.
Player #2 does not know that the sum is **12** so **6 + 6** is the double.
Player #2 then gives 3 of the cards to **player #1**.

More

Less
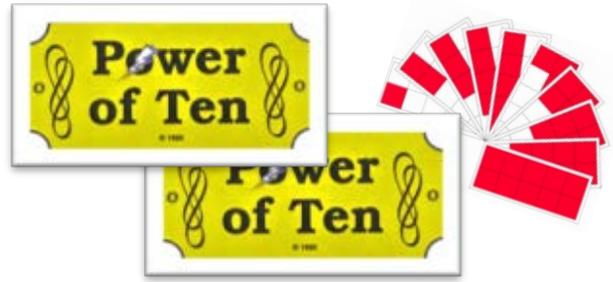
Different

Compare

Materials:

Two decks of **Power of Ten™** playing cards.

Number of Players: 2

Object and Scoring:

The object of the game is to **obtain as many cards as possible**.

Method of Play:

1. Each player shuffles one deck of 20 cards.

2. Both player #1 and player #2 turn over a card.

3. The player who tells the **difference** first wins both cards.

4. In the case of a tie, each player keeps a card.

Player #1   **Player #2**
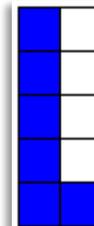
difference   **=**

Alternative Version

To make this a less stressful game, player #1 gets first chance to tell the difference. If she gets it correct, she takes both cards. If she makes an error, the player who identifies the error and proves her wrong gets the cards. On the next turn, player #2 gets to say the difference first.
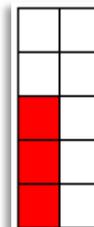
Player #1   **Player #2**

difference   **=**

Power of Ten

BINGO
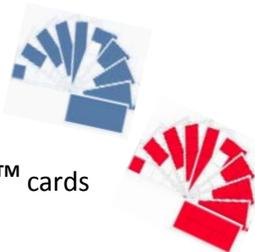
B	I	N	G	O

Materials: Two 20-card decks of **Power of Ten**™ cards (one *red* deck and one *blue* deck)

Number of Players: 2 to 4

Directions: Place the decks side by side (face-down).

Each player takes a bingo card and randomly writes the numbers from '2' to '20' in the squares on his bingo card. (One square is left blank.)

Player #1 turns over two cards (one from each deck), declares the sum and crosses out the corresponding sum on his bingo card. Then **player #2** turns the cards.

The first player to have a line or column crossed out calls "**BINGO**" and the game is replayed.
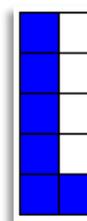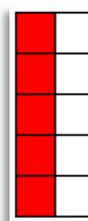
B	I	N	G	O
2	5	17	6	18
16	9	12		~~19~~
14	8	15	3	13
~~7~~	20	10	4	~~11~~
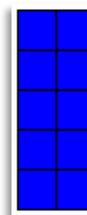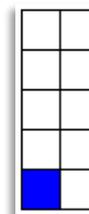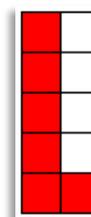
Click 'printer icon' for printable Power of Ten™ BINGO cards.

5 + 6 = 11

9 + 10 = 19

6 + 1 = 7

Contributed by Power of Ten Presenter Dorothy Galvin

POWER OF TEN

Friendly BINGO Version ONE

Materials: a ten-sided dice,
20-card decks of **Power of Ten™** cards.

Number of Players: 2 to 4

Directions: Each player shuffles a 20-card deck of **Power of Ten™** cards and places them face up in a four-by-five grid. **Player #1** begins by rolling the single die with ten faces. The **0** is interpreted as a ten. As the die is rolled each player turns over **one set** of the appropriate 'friendly numbers' that makes up the number rolled on the die. The first player to 'turn over' a **full row** or **column** declares a **BINGO**.

Example:

Three players have their 20-deck cards set out as shown:

Player #1   Player #2   Player #3
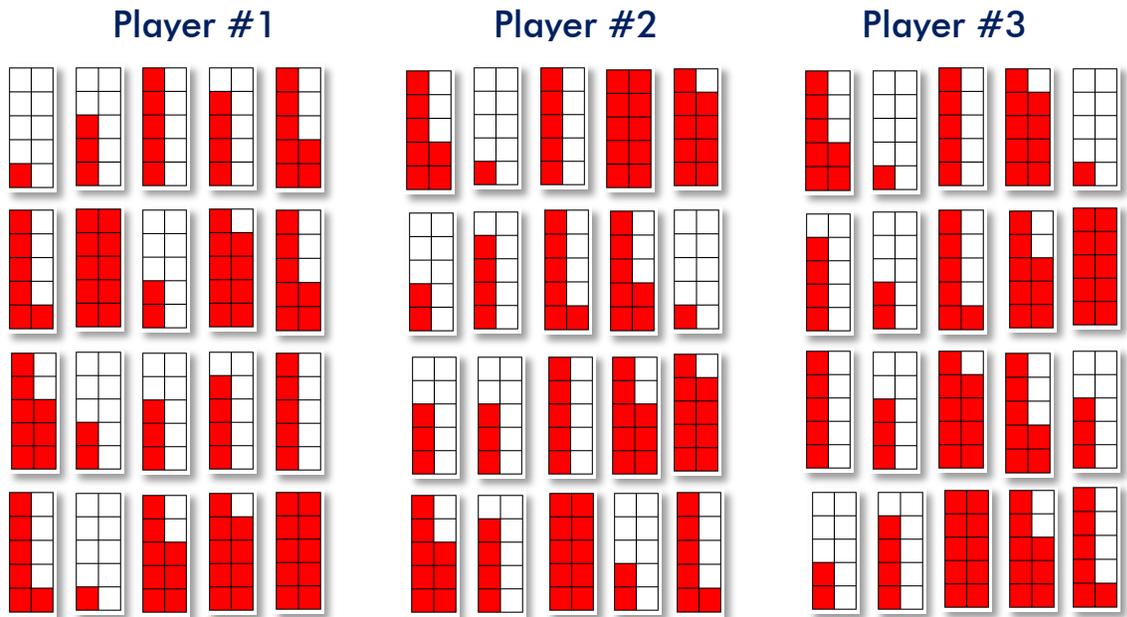
…. **player #1** rolls a '**2**' on the die, and each player turns over **one** '2' and **one** '8'

…. then **player #2** rolls a '**7**' on the die, and each player turns over **one** '7' and **one** '3'.

…. **player #2** declares **BINGO**!

Now reshuffle and start again.

Player #1   Player #2   Player #3
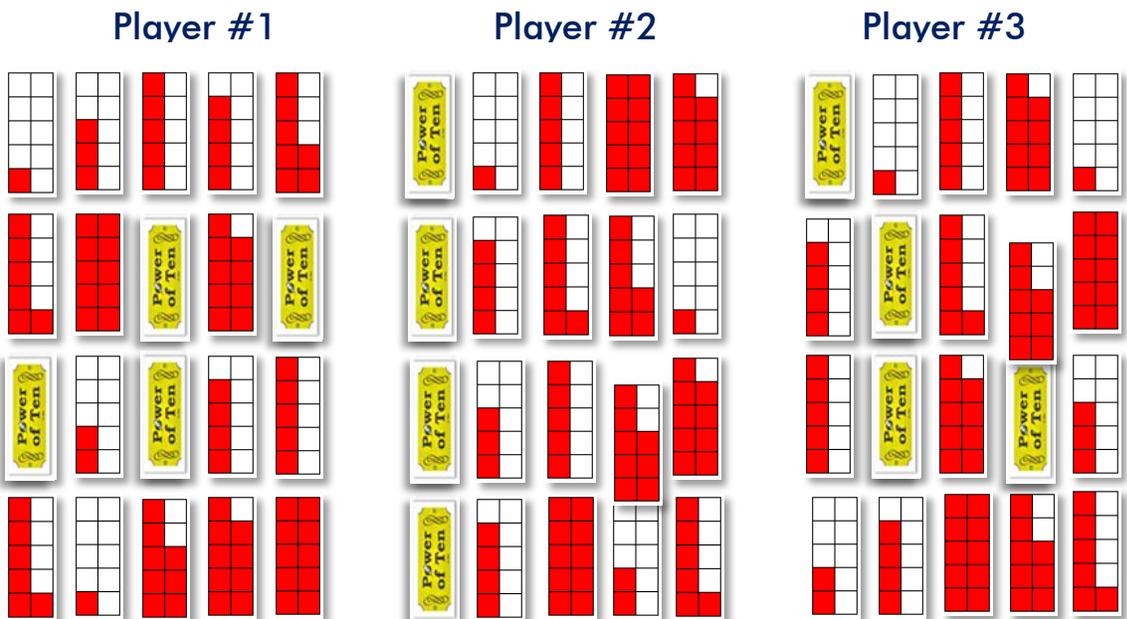
Contributed by Power of Ten Presenter Dorothy Galvin

Friendly BINGO

B	I	N	G	O

Materials: a ten-sided die (**0** is interpreted as **10**)
Power of Ten™ BINGO cards.

Number of Players: 2 to 4

Directions: Each player has a **Power of Ten™ BINGO** card and writes the numbers from '**1**' to '**10**' in any order (twice) in the four-by five grid.

As the die is rolled, each player crosses out one set of the 'friendly numbers' (i.e., if a '**2**' is rolled, **one** '**2**' and **one** '**8**' is crossed out; if a '**6**' is rolled, **one** '**6**' and **one** '**4**' is crossed out).

The first player to **X** a full row or column declares a **BINGO!**

B	I	N	G	O
~~2~~	5	7	6	~~8~~
~~6~~	9	10	3	9
~~4~~	8	5	10	3
7	2	7	4	1

Note: Depending on the abilities of the students, this game may also be played with the winning BINGO being:

B	I	N	G	O
X	X	X	X	X
X				X
X				X
X	X	X	X	X

a 'square' around the outside edge

B	I	N	G	O
X				
X				
X				
X	X	X	X	X

the shape of 'L'

B	I	N	G	O
X	X	X	X	X
		X		
		X		
		X		

the shape of 'T'

B	I	N	G	O
X				X
X				X

only the 'four' corners

B	I	N	G	O
	X			
X	X	X	X	X
	X			
	X			

'two' rows or columns

[click icon to access printable Power of Ten™ BINGO cards]

Contributed by Power of Ten Presenter Dorothy Galvin
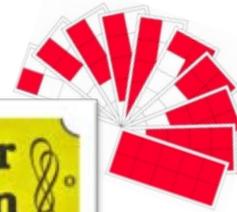
POWER OF TEN

Double

12!

Materials:

One 20-card deck of **Power of Ten™** cards

(or a deck of ordinary playing cards with the face cards removed).

Number of Players: 2 to 4

Method of Play:

1. The dealer turns over the top card from the deck.
2. The first player to say the correct answer to **'double'** wins the card.
3. Another card is turned over and the process is repeated until all cards have been turned over.
4. The player with the most cards at the end wins.
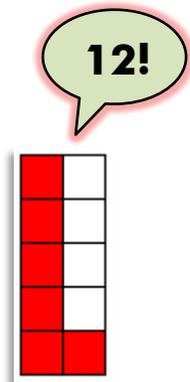
Connections to All the Facts Sheets:

The teacher connects the game to a multiplication **All the Facts** sheet by having students circle all questions that involve **multiplication by two**. Students do the 'twos' first and then any other questions for which they know the answer. Finally, a connection is made to the **All the Facts** sheet by making note of the **'fact families'**. Some teachers copy the multiplication and division **All the Facts** sheets back-to-back.

Alternately, the teacher can connect the game to an addition **All the Facts** sheet by having students circle all questions that involve doubles.

All the MULTIPLICATION Facts You Ever Need to Know (A)

0 x 1 =	4 x 5 =	10 x 1 =	2 x 6 =
7 x 8 =	2 x 3 =	7 x 7 =	2 x 10 =
1 x 4 =	8 x 9 =	6 x 0 =	9 x 9 =
10 x 9 =	7 x 2 =	9 x 4 =	6 x 3 =
8 x 5 =	4 x 8 =	6 x 7 =	0 x 10 =
9 x 6 =	3 x 7 =	0 x 2 =	3 x 5 =
4 x 0 =	6 x 8 =	3 x 9 =	10 x 6 =
7 x 5 =	3 x 3 =	1 x 5 =	7 x 9 =
4 x 4 =	5 x 0 =	6 x 6 =	8 x 8 =
5 x 6 =	7 x 4 =	8 x 3 =	1 x 7 =
9 x 2 =	1 x 8 =	10 x 10 =	5 x 9 =
3 x 4 =	2 x 4 =	5 x 2 =	8 x 2 =
6 x 1 =	3 x 10 =	1 x 3 =	10 x 7 =
4 x 10 =	4 x 6 =	10 x 8 =	5 x 5 =
2 x 1 =	9 x 0 =	3 x 0 =	0 x 8 =
9 x 1 =	2 x 2 =	0 x 7 =	1 x 1 =
5 x 10 =	0 x 0 =		
Column 1 ____	Column 2 ____	Column 3 ____	Column 4 ____

Name _____   left to learn ____

All the ADDITION Facts You Ever Need to Know (A)

8 + 8 =	6 + 0 =	2 + 9 =	4 + 0 =
4 + 5 =	6 + 9 =	7 + 7 =	2 + 1 =
6 + 8 =	3 + 4 =	8 + 1 =	5 + 5 =
3 + 2 =	6 + 3 =	1 + 4 =	8 + 9 =
1 + 1 =	4 + 9 =	4 + 7 =	4 + 4 =
7 + 9 =	8 + 3 =	3 + 3 =	1 + 3 =
4 + 8 =	5 + 6 =	0 + 1 =	1 + 7 =
0 + 9 =	2 + 5 =	6 + 7 =	2 + 0 =
3 + 9 =	2 + 2 =	8 + 0 =	2 + 8 =
0 + 3 =	1 + 5 =	2 + 4 =	7 + 0 =
5 + 8 =	4 + 6 =	3 + 5 =	2 + 6 =
5 + 0 =	6 + 1 =	2 + 7 =	1 + 9 =
9 + 9 =	5 + 9 =	6 + 6 =	7 + 5 =
7 + 8 =	3 + 7 =		
Column 1 ____	Column 2 ____	Column 3 ____	Column 4 ____

Name _____   left to learn ____

[click 'printer icons' to access **All the Facts** pdf files]

[ENGLISH]   [FRENCH]

Double Double

Materials:

One 20-card deck of **Power of Ten™** cards.

Number of Players: 2 to 4

Method of Play:

1. The dealer turns over the top card from the deck.
2. The first player to say the correct answer to **'double the double'** wins the card (this is the same as multiplying by four).
3. Another card is turned over and the process is repeated until all cards have been turned over.
4. The player with the most cards at the end wins.

16!
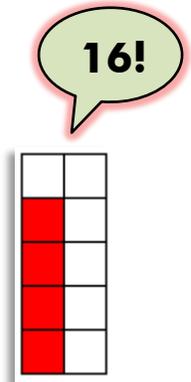
Connections to All the Facts Sheets:

The teacher connects the game to a multiplication **All the Facts** sheet by having students circle all questions that involve multiplication by two, and connecting those to multiplication by four. A connection is made to the division **All the Facts** sheet by making note of the **'fact families'**.

Triple Double

This game is played as **Double Double** above, but the players must 'double the double's double' (or multiply the card's value by eight).

Connections to All the Facts Sheets:

The teacher connects the game to a multiplication **All the Facts** sheet by having students circle all questions that involve multiplication by eight, and connecting those to multiplication by four and two. A connection is made to the division **All the Facts** sheet by making note of the **'fact families'**.

Doubles Challenge

Materials:
Two decks of **Power of Ten™** playing cards (a full deck features twenty cards with two cards of each number denomination).

Number of Players: 2

Object of the Game:
The player with the most cards at the end of the game wins.

Method of Play:
1. Each player shuffles her deck of cards.
2. Each player turns over a card.
3. **If the sum is a double**, the first player to say **"double"** wins all the cards.
4. The losing player can say **"challenge"**. The winning player must then tell which doubles make the number. If she cannot, she gives half the cards to the other player.

For example: ROUND ONE

Player #1   **Player #2**

1st play   + = **13**

2nd play   + = **11**

3rd play   + = **12**

This game should only be played by students who get most or all of the questions on an 'All the Facts' sheet correct.

Note: Students may learn the rule – 'When the sum is even, it is a double'.

On the 3rd play **Player #2** says **"double"** and starts to take all 6 cards.
Player #1 says **"challenge"**.
Player #2 does not know that the sum is **12** so **6 + 6** is the double.
Player #2 then gives 3 of the cards to **player #1**.

POWER OF TEN

'fiver'

Materials:

One 20-card deck of **Power of Ten™** cards

(or a deck of ordinary playing cards with the face cards removed).

Number of Players: 2 to 4

Method of Play:

1. The dealer turns over the top card from the deck.
2. The first player to say the correct answer to **'5 groups of'** wins the card.
3. Another card is turned over and the process is repeated until all cards have been turned over.
4. The player with the most cards at the end wins.
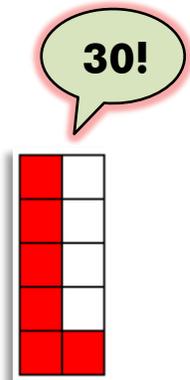
Connections to All the Facts Sheets:

The teacher connects the game to a **multiplication** **All the Facts** sheet by having students circle all questions that involve **multiplication by five**. Students do the **'fives'** first, then any other questions for which they know the answer. Finally, a connection is made to the **All the Facts** sheet by making note of the **'fact families'**. Some teachers copy the **multiplication** and **division** **All the Facts** sheets back-to-back.

[click on 'printer icons' for **All the Facts** pdf files]

[ENGLISH]   [FRENCH]

'tenner'

Power of Ten

Materials:

One 20-card deck of **Power of Ten**™ cards

(or a deck of ordinary playing cards with the face cards removed).

Number of Players: **2 to 4**

Method of Play:

1. The dealer turns over the top card from the deck.
2. The first player to say the correct answer to **'10 groups of'** wins the card.
3. Another card is turned over and the process is repeated until all cards have been turned over.
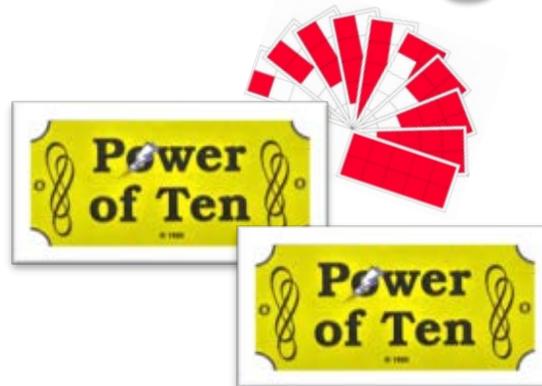4. The player with the most cards at the end wins.

60!
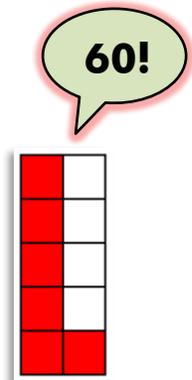
Connections to All the Facts Sheets:

The teacher connects the game to a **multiplication** **All the Facts** sheet by having students circle all questions that involve **multiplication by ten**. Students do the **'tens'** first, then any other questions for which they know the answer. Finally, a connection is made to the **All the Facts** sheet by making note of the **'fact families'**. Some teachers copy the **multiplication** and **division** **All the Facts** sheets back-to-back.

[click on 'printer icons' for **All the Facts** pdf files]

New! **All the Facts** for Teaching Fact Families

Forms A through L — Addition, Subtraction, Multiplication, Division

ENGLISH FORMAT

New! **All the Facts** for Teaching Fact Families

Forms A through L — Addition, Subtraction, Multiplication, Division

FRENCH FORMAT

[ENGLISH]   [FRENCH]

All the MULTIPLICATION Facts You Ever Need to Know (A)

Column 1	Column 2	Column 3	Column 4
0 x 1 =	4 x 5 =	(10) x 1 =	2 x 6 =
7 x 8 =	2 x 3 =	7 x 7 =	2 x (10) =
1 x 4 =	8 x 9 =	6 x 0 =	9 x 9 =
(10) x 9 =	7 x 2 =	9 x 4 =	6 x 3 =
8 x 5 =	4 x 8 =	6 x 7 =	0 x (10) =
9 x 6 =	3 x 7 =	0 x 2 =	3 x 5 =
4 x 0 =	6 x 8 =	3 x 9 =	(10) x 6 =
7 x 5 =	3 x 3 =	1 x 5 =	7 x 9 =
4 x 4 =	5 x 0 =	6 x 6 =	8 x 8 =
5 x 6 =	7 x 4 =	8 x 3 =	1 x 7 =
9 x 2 =	1 x 8 =	(10) x (10) =	5 x 9 =
3 x 4 =	2 x 4 =	5 x 2 =	8 x 2 =
6 x 1 =	3 x (10) =	1 x 3 =	(10) x 7 =
4 x (10) =	4 x 6 =	(10) x 8 =	5 x 5 =
2 x 1 =	9 x 0 =	3 x 0 =	0 x 8 =
9 x 1 =	2 x 2 =	0 x 7 =	1 x 1 =
5 x (10) =	0 x 0 =		

Name _____ left to learn _____

All the DIVISION Facts You Ever Need to Know (A)

Column 1	Column 2	Column 3	Column 4
0 ÷ 1 =	20 ÷ 5 =	(10) ÷ 1 =	12 ÷ 6 =
56 ÷ 8 =	6 ÷ 2 =	49 ÷ 7 =	20 ÷ 2 =
4 ÷ 1 =	72 ÷ 8 =	0 ÷ 6 =	81 ÷ 9 =
90 ÷ (10) =	14 ÷ 7 =	36 ÷ 9 =	18 ÷ 3 =
40 ÷ 5 =	32 ÷ 8 =	42 ÷ 6 =	0 ÷ (10) =
54 ÷ 6 =	21 ÷ 3 =	0 ÷ 2 =	15 ÷ 3 =
0 ÷ 4 =	48 ÷ 8 =	27 ÷ 9 =	60 ÷ 6 =
35 ÷ 7 =	9 ÷ 3 =	5 ÷ 1 =	63 ÷ 7 =
16 ÷ 4 =	0 ÷ 5 =	36 ÷ 6 =	64 ÷ 8 =
30 ÷ 6 =	28 ÷ 4 =	24 ÷ 8 =	7 ÷ 1 =
18 ÷ 2 =	8 ÷ 1 =	100 ÷ (10) =	45 ÷ 5 =
12 ÷ 3 =	8 ÷ 2 =	(10) ÷ 5 =	16 ÷ 2 =
6 ÷ 1 =	30 ÷ (10) =	3 ÷ 1 =	70 ÷ (10) =
40 ÷ (10) =	24 ÷ 6 =	80 ÷ 8 =	25 ÷ 5 =
2 ÷ 1 =	0 ÷ 9 =	0 ÷ 3 =	0 ÷ 8 =
9 ÷ 1 =	4 ÷ 2 =	0 ÷ 7 =	1 ÷ 1 =
50 ÷ (10) =			

Name _____ left to learn _____

STORE

- Select a coin or bill such as **$10**, **$5**, **$2**, or **$1**.
  (Selection will depend on the skill level or experience of the players.)

- Distribute flyers or pictures showing items costing less than the value of the coin or bill selected.

- Player #1 (the shopper) chooses or 'purchases' an item shown, and player #2 (the storekeeper) makes change.

- The answer is checked on a calculator.

- Player #1 continues until he runs out of money.

- The buyer earns one point for each item purchased.

- The storekeeper earns two points each time change is made correctly.

- Roles are then switched.

- The game concludes when each player has had the opportunity to play purchaser and storekeeper at least twice.

- The player with the most points wins.

It is useful to have each student bring a Ziploc bag to school containing the following coins:
- a loonie
- four quarters
- five dimes
- five nickels
- twenty-five pennies

The coins add to $3.00. Student name cards are placed inside the Ziploc bags, and bags are then stored in a locked drawer.

PRIMARY MONEY GAME

Scoop It

Have students work with partners.

Each student scoops out an amount of money and **counts how much** he has.

One student flips a coin.

If the coin lands 'heads up', the winner is the person with the **greatest** amount.

If the coin lands 'tails up', the winner is the person with the **least** amount.

Students keep a tally of winning scores.
The first person to reach **10 winning scores** is the ultimate winner of the game.

Scoop It

	Round 1	Round 2	Round 3	Round 4	Round 5
Sarah	ЖЖ ЖЖ	ЖЖ ||	|||		
Jordan	ЖЖ |||	ЖЖ ЖЖ				

PRIMARY MONEY GAME

Change

- Select a coin such as two-dollar coin, a one-dollar coin, a quarter, or a dime. (Selection will depend on the skill level or experience of the players.)

- Distribute flyers or pictures showing items costing less than the value of the coin selected.

- Player #1(the shopper) chooses or 'purchases' an item shown, and player #2 (the storekeeper) makes change.

- The answer is checked on a calculator.

- Roles are then switched.

PRIMARY MONEY GAME

Ninety-Nine

Materials:
- Where students already know their basic facts, one deck of regular playing cards is employed in the game of **Ninety-Nine**.
- Paper and pencil for maintaining accurate scores.

Number of Players:
The game **Ninety-Nine** may be played with as many as six players. However, fewer participants mean that players spend less non-productive time awaiting their turns.

Object of the Game:
To be the only player with cards remaining in his hand.

Directions:
- The deck is shuffled and **each player is dealt three cards**.

- The deck is placed centrally before all players. As a player plays one of his three cards, he draws a replacement card from the central deck. Where a player forgets to draw a card, he forfeits one card from his initial set of three cards and must continue to play with only two cards.

- The player on the left of the dealer turns a card face up and states the amount. (See following page for values and strategies.) He then takes a card from the deck to replace the card played.

- The next player turns a card face up on the table and adds its value to the previous player's card.

- The next player turns a card face up and adds its value to the total value reached so far.

- **Play continues until a player cannot play a card without reaching a count beyond 99**. For example, where the running total stands at 97, and the cards in the player's hand are 4, 5, and 6, no further play can possibly occur for this player, as the new sum would yield 101, 102, or 103. This player must then drop out of the game and defer to the next player.

- The game continues **until only one player remains**.

See following page for card values and strategies.

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Ninety-Nine

Ace	This card has two different values.	This card is valued at **1** or **11** (whichever is to the player's advantage, depending on how close the score is to **99**).
2	This is a "tricky" card because its value is not related to its number.	This number automatically makes the score **99**. <u>For example</u>: if the first player plays a deuce the score is **99**, or if a previous player's score is **45** and the next player plays a deuce, the score becomes **99**. The **2** is an important card as it often forces the next player to drop out, unless that player has a **10**, **2**, or **9**. (See *values* and *strategies* for the **10** and **9**.) Students soon learn to avoid playing a deuce unless they are forced to, or unless they wish to force the next player out of the game.
3, 4, 5, 6, 7, 8		These cards retain their face values: **3**, **4**, **5**, **6**, **7**, **8**. These cards should be played early in the game.
9	This is a "tricky" card because its value is not related to its number.	This card is valued at **0**, and it is useful if the previous player makes **99**, as this card will maintain the count at **99**. Students soon learn to avoid playing a **9** unless they are forced to.
10	This is a "tricky" card because its value is negative. The player must subtract **10** from the total rather than adding **10** to the total.	This card is valued at **-10**, and it is useful when the previous player makes **99**, as it creates a new total of **89**. Students soon learn to avoid playing a **10** unless they are forced to.
Jack Queen King		These cards are all valued at **10**, and should be played early in the game, as they are not useful when the score reaches beyond **90**.

Subtraction Strategy Game

Materials and Object of the Game:

Subtraction Strategy is played with a deck of regular playing cards and is similar to the other Strategy Games, except the operation involved is **SUBTRACTION**. **The object of the game is to reach a running score of 0**. Players begin with scores of **100**, **200**, or **500**, depending on the skill level and experience of the players.

Directions:

- In **Subtraction Strategy**, each player turns over two cards and subtracts the sum of the two cards from his running total, unless he receives a **'poison'** card. A **Jack** is a 'poison' card. Where a player turns over a **Jack**, his score for that turn is entered as **0**, although he maintains the running score reached from his previous turns. Where a player is unfortunate enough to turn over two **Jacks** at the same time, **he loses all points subtracted to that point** in the game and he must begin again from the original starting number on his next turn.

- In order to maintain accurate scores, students maintain two tally columns. Column *ONE* shows the total subtracted for **each turn** taken. Column *TWO* shows the **total running score** so far. As each player concludes a turn, he subtracts the number for that turn from the previous running total. Where a player turns over a **Jack**, he enters a **0** for his subtracted score for that turn. Where an unlucky player turns over two **Jacks**, he must begin again from the original starting number and begin afresh to reduce points.

Player #1

	Subtract Amount	Running Total
		200
turn 1	5	195
turn 2	14	181
turn 3	11	170
turn 4	0 (J)	170
turn 5	10	160
turn 6	9	151
turn 7		
turn 8		
turn 9		

Player #2

	Subtract Amount	Running Total
		200
turn 1	13	187
turn 2	19	168
turn 3	0 (JJ)	200
turn 4	10	190
turn 5	4	186
turn 6	5	181
turn 7		
turn 8		
turn 9		

$$200 - 5 = 195$$

$$195 - 14 = 181$$

$$200 - 13 = 187$$

$$187 - 19 = 168$$

ONE Hundred

Materials:

- One **red** deck and one **blue** deck of **Power of Ten**™ playing cards. A regular deck of playing cards may be employed where students have already acquired their basic facts.
- Paper and pencil for tallying scores.
- Young students may find the use of a *hundreds chart* helpful when keeping tallies.

Object of the Game:

The object of this game is to be the **first player to acquire a score of one hundred** or to be the player with the highest score after exactly 15 minutes of play.

Directions:

- Where regular playing cards are employed, the deck is shuffled and then split into two equal piles. Where **Power of Ten**™ cards are employed, one player uses a **red** deck, and his partner uses a **blue** deck.

- Player #1 turns over two cards and adds the numbers shown on the cards to reach a score. He records his score. Player #1 will add each subsequent score acquired to his running total.

- Player #2 turns over two cards and adds the numbers shown on the cards to reach his score. He records his score. Players add each subsequent score acquired to their running totals.

- The game continues until one of the players **reaches or exceeds a score of 100**. If player #1 is the first player to exceed a score of 100, then player #2 takes another turn, in order to ensure that each player has had the opportunity to play an equal number of turns. Where an equal number of turns has, indeed, been fairly played, and both players exceed 100, the player with the highest score wins.
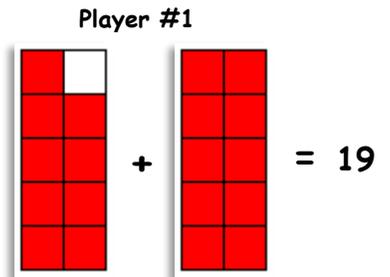
[click 'printer icons' to access printable pdf **Tally Sheet** forms]

[ENGLISH]

[FRENCH]

Player #1

+ = 19

Player #2

+ = 11

Player #1	Player #2
19	11

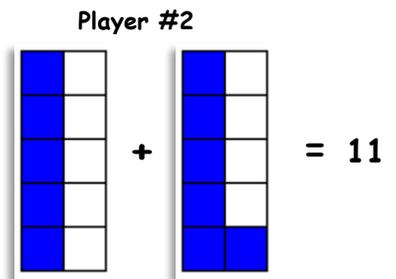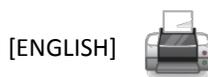POWER OF TEN

ONE Hundred SUBTRACTION

Materials:

- One **red** deck and one **blue** deck of **Power of Ten**™ playing cards.
  A regular deck of playing cards may be employed where students have already acquired their basic facts.
- Paper and pencil for tallying scores.
- Young students may find the use of a *hundreds chart* helpful when keeping tallies.

Object of the Game:

To be the **first player to reach a score** of ZERO, or the player with the lowest score after exactly 15 minutes of play.

Directions:

- Where regular playing cards are employed, the deck is shuffled and then split into two equal piles. Where **Power of Ten**™ cards are employed, one player uses a **red** deck, and his partner uses a **blue** deck.

- Players begin with a score of **100** (or 200 or 500, depending on the skill level and experience of the players).

- Player #1 turns over two cards and subtracts the sum of the two cards from his running total.

- Player #2 turns over two cards and subtracts the sum of the two cards from her running total.

- The game continues until one of the players **reaches a score of 0**. If player #1 is the first player to reach a score of 0, then player #2 takes another turn in order to ensure that each player has had an opportunity to play an equal number of turns. Where an equal number of turns have, indeed, been fairly played, the player with the lowest score is the winner.

Player #1

$+$ $= 7$

Player #2

$+$ $= 13$

In order to maintain accurate scores, students maintain two tally columns. Column **ONE** shows the total subtracted for each turn taken. Column **TWO** shows the total running score so far.

As each player concludes a turn, he subtracts the number for that turn from the previous running total.

Player #1

	Subtract Amount	Running Total
		100
turn 1	7	193
turn 2	14	179
turn 3	10	169
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		

Player #2

	Subtract Amount	Running Total
		100
turn 1	13	187
turn 2	4	183
turn 3	11	172
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		

[click 'printer icons' to access printable pdf **Tally Sheet** forms]

[ENGLISH]   [FRENCH]

POWER OF TEN

strategy TWO hundred

Materials and Object of the Game:

Strategy Two Hundred is played with a deck of regular playing cards and is similar to the **One Hundred** game. However, in **Strategy Two Hundred**, the first player to reach a score of **200** wins.

Directions:

- In **Strategy Two Hundred**, each player continues turning over two cards and adding scores to his running total, unless he receives a **'poison'** card. A **Jack** is a 'poison' card. Where a player turns over a **Jack**, his score for that turn is reduced to **0**, although he maintains the running score reached from his previous turns. Where a player is unfortunate enough to turn over two **Jacks** at the same time, **he loses all points scored to that point** in the game and he must begin again from the count of **0** on his next turn.

- In order to maintain accurate scores, students maintain two tally columns. Column *ONE* shows the total earned for **each turn** taken. Column *TWO* shows the **total running score** earned so far. As each player concludes a turn, he must add the total earned for that turn to the previous score recorded so far.

Player #1

	Turn Total	Running Total
turn 1	19	19
turn 2	6	25
turn 3	11	36
turn 4	9	45
turn 5	7	52
turn 6	13	65
turn7	0 (J)	0 (J)
turn 8	13	13
turn 9	14	27
turn 10		

Player #2

	Turn Total	Running Total
turn 1	11	11
turn 2	10	21
turn 3	7	28
turn 4	0 (J)	28
turn 5	6	34
turn 6	19	53
turn7	8	61
turn 8	20	81
turn 9	5	86
turn 10		

200

$9 + 10 = 19$

$6 + 5 = 11$

200

$5 + 1 = 6$

$8 + 2 = 10$

POWER OF TEN

strategy FIVE hundred

Materials and Object of the Game:

Strategy Five Hundred is played with a deck of regular playing cards and is similar to the **Strategy Two Hundred** game. However, the operations involved in **Strategy Five Hundred** are multiplication and addition. The first player to reach a score of **500** wins.

Directions:

- In **Strategy Five Hundred**, each player continues turning over two cards and multiplies the numbers shown on the cards. **Products are calculated** at the conclusion of each turn and added to the player's running total unless he receives a **'poison'** card. A **Jack** is a poison card. Where a player turns over a **Jack**, his score for that turn is reduced to **0**, although he maintains the running score reached from his previous turns. Where a player is unfortunate enough to turn over two **Jacks** at the same time, **he loses all points scored to that point** in the game and he must begin again from the count of **0** on his next turn.

- In order to maintain accurate scores, students maintain two tally columns. Column *ONE* shows the total earned for **each turn** taken. Column *TWO* shows the **total running score** earned so far. As each player concludes a turn, he must add the total earned for that turn to the previous score recorded so far.

Player #1

	Turn Total	Running Total
turn 1	15	15
turn 2	8	23
turn 3	40	63
turn 4	0 (J)	63
turn 5	18	81
turn 6	56	137
turn 7		
turn 8		
turn 9		

Player #2

	Turn Total	Running Total
turn 1	70	70
turn 2	12	82
turn 3	0 (J)	0 (J)
turn 4	24	24
turn 5	72	96
turn 6	6	102
turn 7		
turn 8		
turn 9		

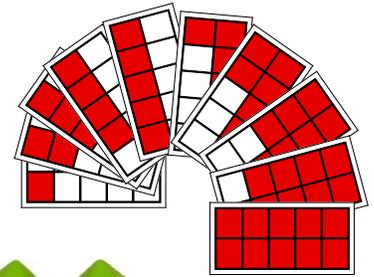$3 \times 5 = 15$ $7 \times 10 = 70$

$2 \times 4 = 8$ $6 \times 2 = 12$

500

$10 \times 4 = 40$ $4 \times 6 = 24$

[click 'printer icon' to access printable
10-page pdf **Tally Sheets**
Both ENGLISH and FRENCH formats]

Place Value and Probability Game

Materials: Power of Ten™ teacher sized cards, 1 to 10.

The game is easy to play with a 10-sided dice marked from 0 – 9 (available through *Box Cars and One-Eyed Jacks*).

Purpose: To teach place value (three to ten places, hundreds to billions) and even/odd numbers. To have students experience the feeling of '**most probable**' or '**least probable**' in a game context.

Connections: This game works well as a way to choose one of the numbers in the How Many Ways activity and as a method for enriching the curriculum.

Directions: The students count the white squares. The 10-card becomes a zero. These instructions are for teaching numbers to **999**, but the number of blanks can be extended as needed.

1. Instruct the students to draw three blanks on their sheet.
2. Shuffle the Power of Ten™ cards and ask the student helper of the day to choose a card and tell the class how many white squares are on the card. If the number of this card is **even** then the goal will be to get the greatest number. If it is **odd**, the goal will be to make the lowest number possible.
3. Students write the number on one of the three blanks.
4. Put the card back in the pack, shuffle and have a different student pick a card.
5. Students are not allowed to erase.
6. Now repeat the process until every student has all three blanks full (two more times in this case).
7. The student with the greatest (or least) number wins the game and that number is the day's third goal number in the How Many Ways activity.

Example:

This is the card the student chose. It has 4 white squares so it is **even** and the goal is to get the **greatest** number possible.
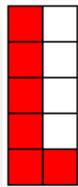
Students enter the numbers as the other two cards **(6)** and then **(1)** are selected. Student A has the greatest number and **641** is the third number of the day. More than one student often makes the best choice.

6	4	1	Student A
1	6	4	Student B
6	1	4	Student C

Extensions: Ask the students to figure out all the possible choices for the three digits chosen. If there are three blanks, there are **6** possibilities for any given three numbers (**3 x 2 x 1 = 6** different ways). Four blanks **4 x 3 x 2 x 1 = 24** ways. Five blanks **5 x 4 x 3 x 2 x 1 = 120** ways. This number is known as **five factorial**. **5! = 120**; **6! = 720**; and so on. Some students like to include factorials as a criterion on the How Many Ways sheet. For example, if **275** is one of the numbers that is generated by this game, then one way it could be made is: **6! – 520 + 75 = 275**. Some students love making numbers with factorials. Others do not understand it and simply ignore the possibilities. After all, it is not in the curriculum until Grade Eight. In Grade Eight, the game can be adjusted so that the card is not replaced and then this becomes an example of **conditional probability**.

FACE OFF

Fraction Recognition Game

Player #1   Player #2

Materials:

Two decks of **Power of Ten**™ playing cards (a full deck features 20 cards with 2 cards of each number denomination).

Number of Players: 2

Object of the Game and Scoring:

To obtain as many cards as possible.

$$\frac{3}{10} \qquad \frac{1}{10}$$
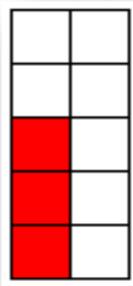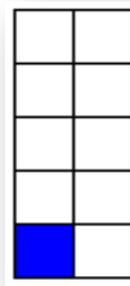
Method of Play:

1. Each player shuffles his own deck of cards and places the pile face down in front of him.
2. Each player takes one card off the top of the deck, turns it over, and says the amount.
   For example, player #1 says "three-tenths" and player #2 says "one-tenth".
   Player #1 wins, and takes both the cards.
   Each player is encouraged to create two piles for his winnings (one red and one blue).
   This reduces the sorting at the end of the game.
3. Once all the cards are used, the **winner is the person who has the most cards**.
4. In the event of a tie (two cards of equal value are upturned), each player draws another card and places it directly on top of the previous card played. (The cards are not added and only the top card is examined.) Alternately, ties can be solved by each player taking his or her own card and placing it in the 'winning' pile.

More Less
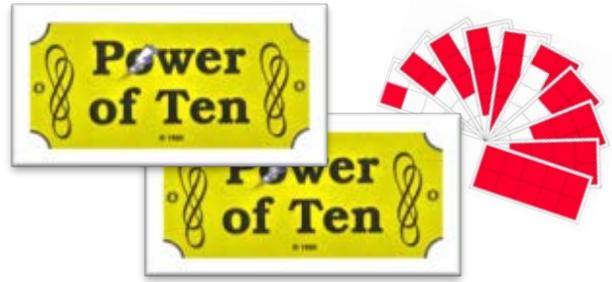
Different

Compare

Fraction Recognition Game

Materials:
Two decks of **Power of Ten™** playing cards.

Number of Players: 2

Object and Scoring:
The object of the game is to **obtain as many cards as possible**.

Method of Play:
1. Each player shuffles one deck of 20 cards.

2. Both player #1 and player #2 turn over a card and say the tenths fraction.

3. The player who tells the **difference** in tenths first wins both cards.

4. In the case of a tie, each player keeps a card.

Sample One
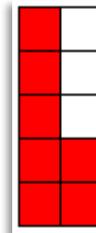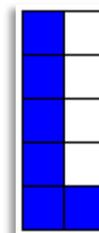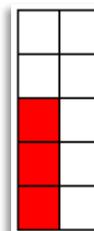
Player #1   Player #2

difference   =

$\frac{7}{10}$ $\frac{6}{10}$

Alternative Version

To make this a less stressful game, player #1 gets first chance to tell the difference. If she gets it correct then she takes both cards. If she makes an error, the player who identifies the error and corrects it gets the cards. On the next turn, player #2 gets to say the difference first.

Sample Two

Player #1   Player #2

difference   =

$\frac{3}{10}$ $\frac{10}{10}$

Power of 1 Solitaire

Materials:

A deck of **Power of Ten™** playing cards for each player.
(a full deck features twenty cards with two cards of each number denomination)

Number of Players: unlimited.

Object of the Game and Scoring:

The object of the game is to acquire as many 'ones' as possible. ('Ones' are fractions that add to one.) Each 'one' grouping is worth one point. When all 'ones' are exhausted, each player totals his acquired points. The maximum score is **11**.

Method of Play:

1. Each player shuffles his deck and then places five cards face up in a line in front of him. Each player looks at his five cards, removes cards that total '**1**', and sets them aside in a separate pile (this can be **2**, **3**, **4**, or even **5** cards). Then, from his deck, he replaces any cards he removed so he is again looking at five cards. He removes any cards that sum to '**1**' and continues as before. He places each grouping of '**1**' in a separate pile (each pile of '**1**' is worth one point in the final scoring).

2. The game continues as new cards are turned over to replace those already removed. There are two cards that are '**1**' all by themselves (and worth one point in the total score). If at any time a player cannot play (for example, he is looking at **0.1**, **0.8**, **0.4**, **0.7**, **0.7**), then he is finished.

3. Once a player is finished, she finds her total score. **The maximum score is 11**.

4. If two people are playing, the player **with the higher score wins.**

5. Sometimes the teacher records the scores and the players play against the class.

Fraction Recognition Game
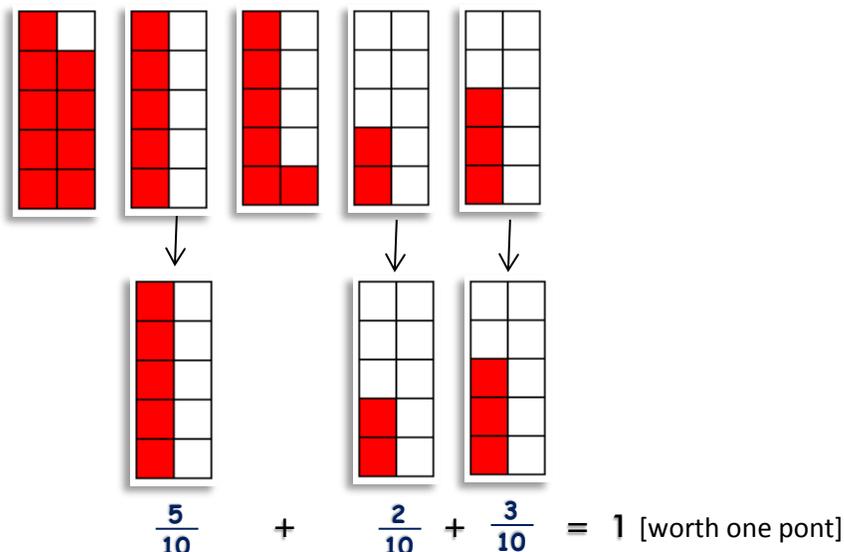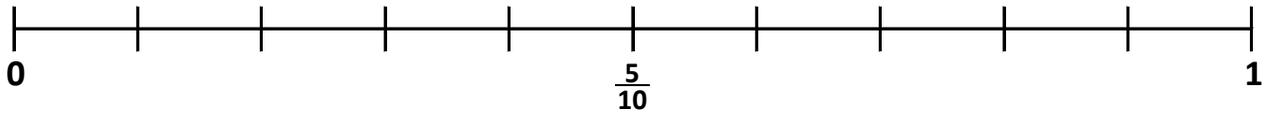
$$\frac{5}{10} \quad + \quad \frac{2}{10} + \frac{3}{10} \quad = \quad 1 \text{ [worth one pont]}$$

Make a Tenths Number Line
or   # Order Solitaire

Number line marked from **0** (with intervals) to $\frac{5}{10}$ to **1**.

Assessment Game

Materials:

Ten **Power of Ten**™ cards including 1, 2, 3, … 10.

How to Play:

Shuffle the cards and place in a single pile. Turn over one card and say how much it is as a fraction. Then, turn a second card over and put it in the appropriate place in the number line.

Players: 1

Teaching Strategies:

Notice the cards are not looked at 'face up' but are 'turned over'. This means students have to pay attention to the magnitude (number of colored squares) on the card and not look for the one-tenth, then the two-tenths and so on.

> Discuss the need for leaving space.

The **first card** can be placed anywhere.

The **second card** must be placed to the right or left and 'close to' or 'far from' the first card.

The **third card** is placed in the appropriate 'spot' on the number line.

Continue until **all ten cards** are placed in their proper locations.
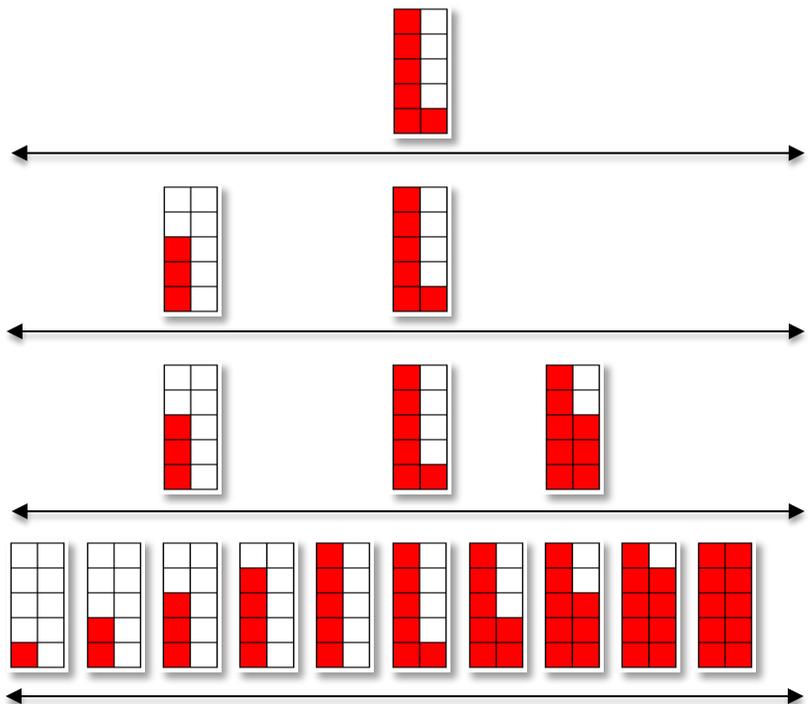
Fraction Recognition Game
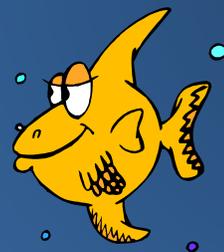
Power of 1

Fish

Materials: One 20-card deck of Power of Ten™ cards.

Number of Players: 2

Object and Scoring: To be the first player to lay down all their cards.

Method of Play:

1. The deck is shuffled and each player is dealt five Power of Ten™ cards.

2. The remainder of the cards are placed face-down in a 'pick-up' pile for players to draw replacement cards.

3. Both players place any pairs from their hands that have a sum of 1 face up in front of them.

2. **Player #1** asks **player #2** if she has a card that will work with a card in her hand to make 1.

    For example: **player #1** asks, "Do you have a three-tenths card?"
    If **player #2** has a *three-tenths* card, he gives it to **player #1** and **player #1** places her new pair of cards face up in front of her. $\frac{7}{10}$ $\frac{3}{10}$

    Now **player #2** asks for a card from **player #1**. If a player does not have the card requested, she says, "GO FISH" and the player goes to the 'pick-up' pile and draws the top card. If she gets the card she asked for, she lays down the 'friendly' pair.

    If she does not draw the requested card, she puts the card she has drawn with the cards she has in her hand, and it is the other player's turn to request a card.

3. Play continues until one of the players has no cards left in his/her hand.

$\frac{3}{10}$
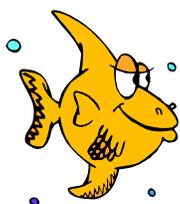
Fraction Recognition Game

Power of 1 Match It

Method of Play:

Shuffle the cards. Spread all 18 cards face up on a table or the floor. It is easiest if the cards are placed in a **three by six** array.
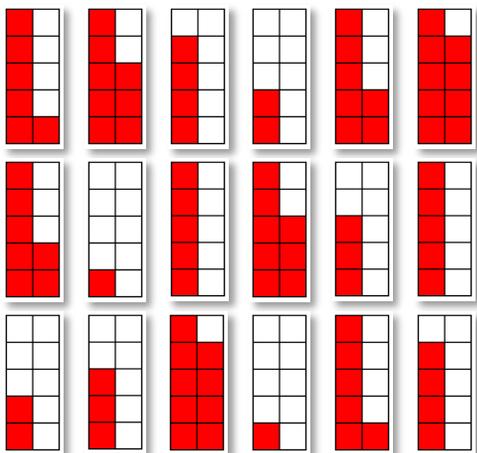
… or a **two by nine** array.

Materials:

18 **Power of Ten**TM cards all one color (either all red or all blue). The two 10-cards are removed.

Number of Players: 2 to 4
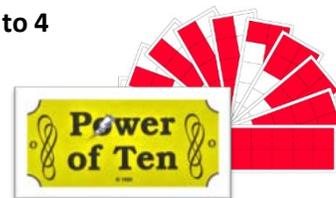
Fraction Recognition Game
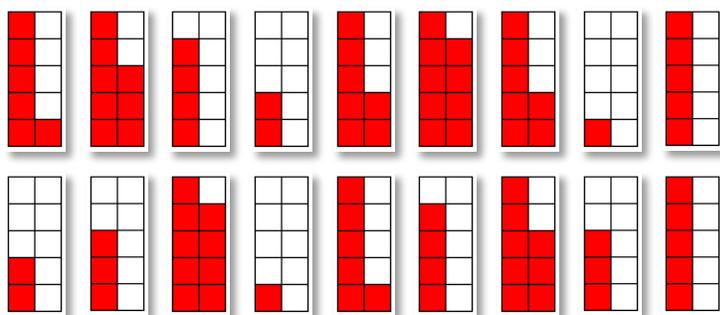
Objective:

Find pairs of cards that add to a '**1**'. The player with the highest **total** wins.

Player one picks a card and then finds the other card that adds with it to make '**1**'.

Then, player two does the same.

Fractions Power of 1 Concentration Game

For a greater challenge, have students play the **Fractions Power of 1 Concentration** game.

Power of 1
Concentration

Fraction Recognition Game

Number of Players: 2 to 4

Object of the Game and Scoring:

The object of the game is to **obtain as many pairs** (two cards showing the same number) **as possible**. When a player finds a pair, she takes another turn. The player with the most cards at the end of the game wins.

Method of Play:

Only one deck of **Power of Ten™** cards is used for this game. Both cards with all the squares colored (the '1' cards) are removed before play begins. This means there are **18** cards to play with. Shuffle the cards and spread them face down on a table or on the floor. Arrange the cards in a three by six (or a two by nine) array.

Player #1 turns over a card and says the fractional amount on the card. Then, he turns up another card and says the fractional amount of that card. When the two cards are the same, the player retains both cards and takes another turn, and continues until no match is found. When the two cards upturned are dissimilar, the cards are then returned face down in their original place in the spread of cards.
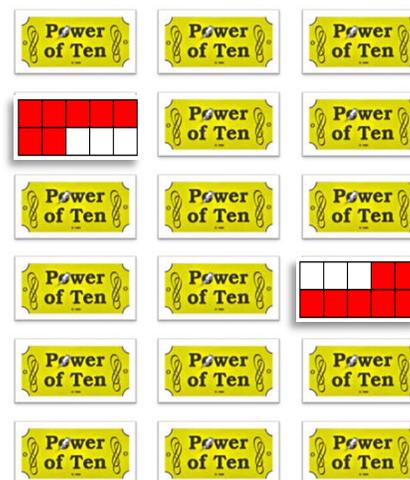
Player #2 then takes his turn and tries to find a match. The game continues until all the cards are matched and no cards remain in the array. The player with the **most cards at the end of the game wins**.

Adding Spatial Sense to the Concentration Game:

If a player remembers that she has seen a card but cannot remember where, she can ask to use her **LIFE LINE**. Each player is granted the use of one **LIFE LINE** per game and may ask for help.

If another player decides he knows where the requested card is located, he may tell the player who is using her **LIFE LINE** where the card is. However, the assisting player is not allowed to point to the card, but must use 'location words' such as **row, column, left, right, up, down, from your point of view**, etc. The person using her **LIFE LINE** may check to see if she understands the directions being given by asking questions like: "Is this the card, row, or column, you mean?" If the card is correct, then both players (the player using her **LIFE LINE** and the assisting player) each receive one of the cards to add to their winnings. As the **LIFE LINE** player does not get a second turn immediately, the play passes to the next player. If an assisting player gives incorrect directions, he loses his next turn.

Slap Jack 1

Materials:
Two decks of **Power of Ten™** playing cards.

Fraction Recognition Game

Number of Players: 2

Object and Scoring:
The object of the game is to **obtain as many cards as possible**.

Method of Play:
1. Each player has one deck of 20 cards which he shuffles.

2. Both player #1 and player #2 turn over a card.

3. Both players are looking for a '**1**' card or two cards that add together to make a '**1**'. When either of these two things occurs, the player who sees it slaps her hand on the table and says "**ONE!**"

4. The player who slaps first (his or her hand will be on the bottom if both players slap together), gets all the cards turned up in both players' piles.

5. Once all the cards in the two decks have been played, reshuffle and start again.

6. Play continues until one player has won all the cards or a time limit (5 minutes) has been reached.

Sample One

$\frac{4}{10}$ + $\frac{6}{10}$

ONE!

Sample Two

$\frac{7}{10}$ + $\frac{3}{10}$
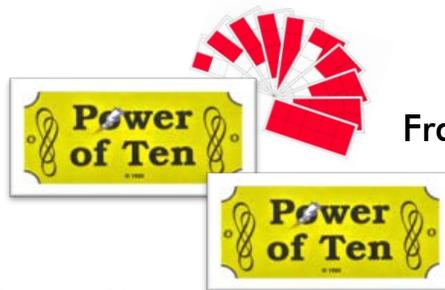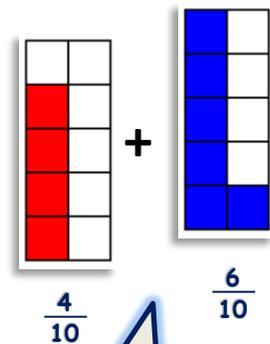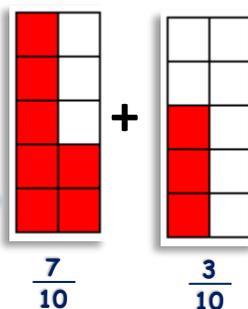
ONE!

Sample Three

ONE!
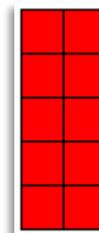
Note – it helps to keep the winnings in separate **red** and **blue** piles. This speeds up collecting and putting the cards away at the end of the game.

Power of 1 Face Off

Fraction Recognition Game

Materials:

Two decks of **Power of Ten**™ playing cards (a full deck features 20 cards with 2 cards of each number denomination).
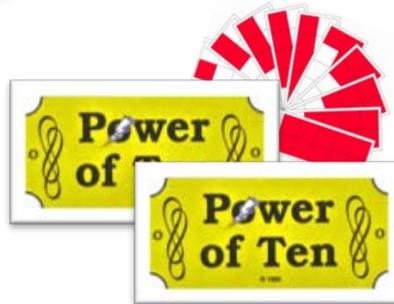
Number of Players: 2

Object of the Game and Scoring:

To obtain as many cards as possible.

Method of Play:

1. Each player takes a full card ('**1**' card) from the deck and places it in front of him.
2. Each player takes one card off the top of the deck, turns it over, and says the amount.
   For example, **player #1** says "one and seven-tenths" and **player #2** says "one and three-tenths".
   Player #1 wins but only takes the 'fractional' cards. The '**1**' card stays in place.
3. Each player is encouraged to create two piles for his winnings (one red and one blue).
   This reduces the sorting at the end of the game.
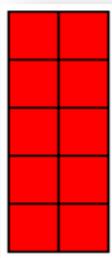
Player #1
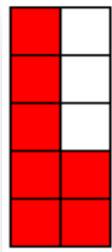
1 and $\dfrac{7}{10}$

Player #2
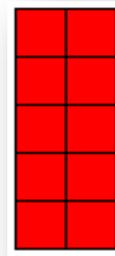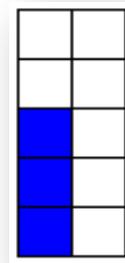
1 and $\dfrac{3}{10}$

Power of $\frac{9}{10}$ Face Off
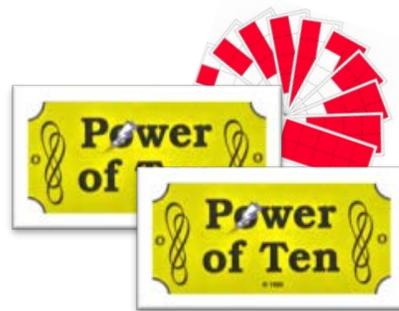
Fraction Recognition Game

Materials:

Two decks of **Power of Ten™** playing cards (a full deck features 20 cards with 2 cards of each number denomination).

Number of Players: 2

Object of the Game and Scoring:

To obtain as many cards as possible.

Method of Play:

1. Each player takes a **nine-card** from the deck and places it in front of him.
2. Each player takes one card off the top of the deck, turns it over, and says the amount.
   For example, **player #1** says "nine-tenths and seven-tenths equals one and six-tenths" and **player #2** says "nine-tenths and three-tenths equals one and two-tenths".
   Player #1 wins but only takes the 'fractional' cards. The '**nine-tenths**' card stays in place.
3. Each player is encouraged to create two piles for his winnings (one red and one blue). This reduces the sorting at the end of the game.

Player #1

$$\frac{9}{10} \text{ and } \frac{7}{10} = 1 \text{ and } \frac{6}{10}$$

Player #2

$$\frac{9}{10} \text{ and } \frac{3}{10} = 1 \text{ and } \frac{2}{10}$$
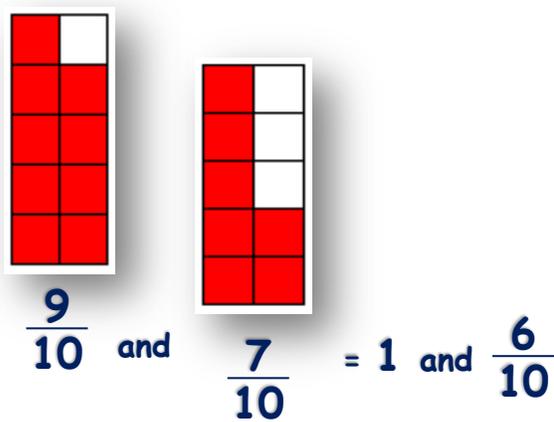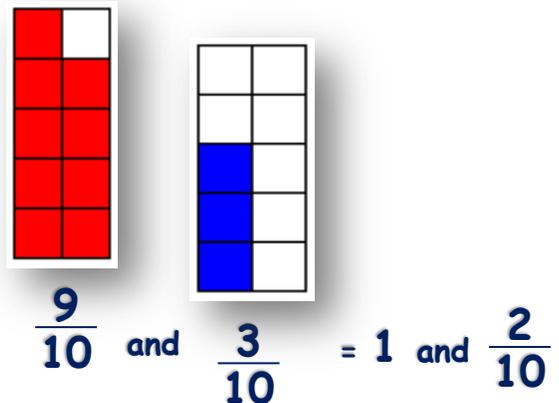
Power of $\frac{5}{10}$ Face Off
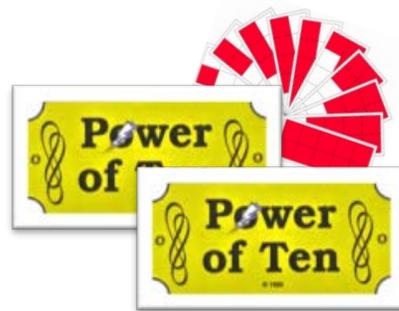
Materials:

Two decks of **Power of Ten™** playing cards (a full deck features 20 cards with 2 cards of each number denomination).

Number of Players: 2

Fraction Recognition Game

Object of the Game and Scoring:

To obtain as many cards as possible.

Method of Play:

1. Each player takes a **five-card** from the deck and places it in front of him.
2. Each player takes one card off the top of the deck, turns it over, and says the amount.
   For example, **player #1** says "five-tenths and seven-tenths equals one and two-tenths" and **player #2** says "five-tenths and nine-tenths equals one and four-tenths".
   Player #2 wins but only takes the 'fractional' cards. The '**five-tenths**' card stays in place.
3. Each player is encouraged to create two piles for his winnings (one red and one blue). This reduces the sorting at the end of the game.

Player #1

$\frac{5}{10}$ and $\frac{7}{10}$ = 1 and $\frac{2}{10}$

Player #2

$\frac{5}{10}$ and $\frac{9}{10}$ = 1 and $\frac{4}{10}$

Power of $\dfrac{8}{10}$ Face Off

Fraction Recognition Game

Materials:

Two decks of **Power of Ten**^{TM} playing cards (a full deck features 20 cards with 2 cards of each number denomination).

Number of Players: 2

Object of the Game and Scoring:

To obtain as many cards as possible.

Method of Play:
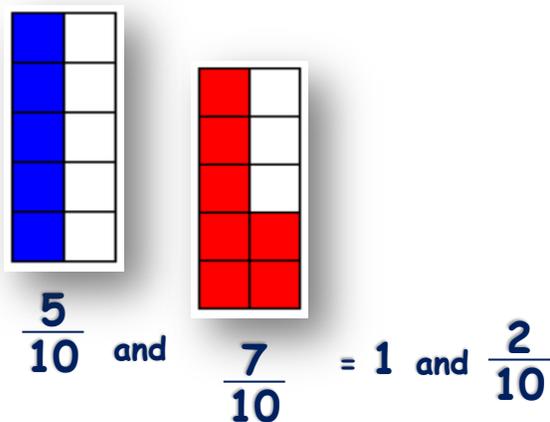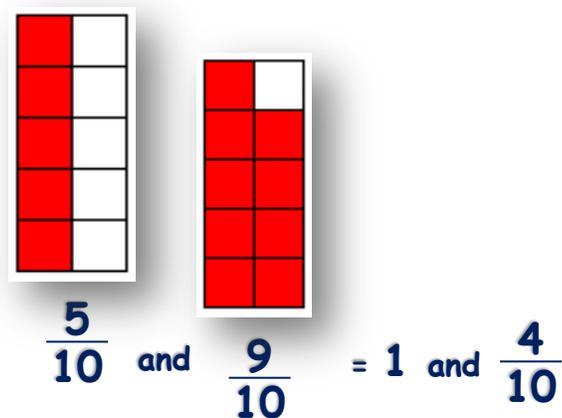
1. Each player takes an **eight-card** from the deck and places it in front of him.
2. Each player takes one card off the top of the deck, turns it over, and says the amount.
   For example, **player #1** says "eight-tenths and eight-tenths equals one and six-tenths" and **player #2** says "eight-tenths and three-tenths equals one and three-tenths".
   Player #1 wins but only takes the 'fractional' cards. The '**eight-tenths**' card stays in place.
3. Each player is encouraged to create two piles for his winnings (one red and one blue). This reduces the sorting at the end of the game.

Player #1

$\dfrac{8}{10}$ and $\dfrac{8}{10}$ = 1 and $\dfrac{6}{10}$

Player #2

$\dfrac{8}{10}$ and $\dfrac{5}{10}$ = 1 and $\dfrac{3}{10}$
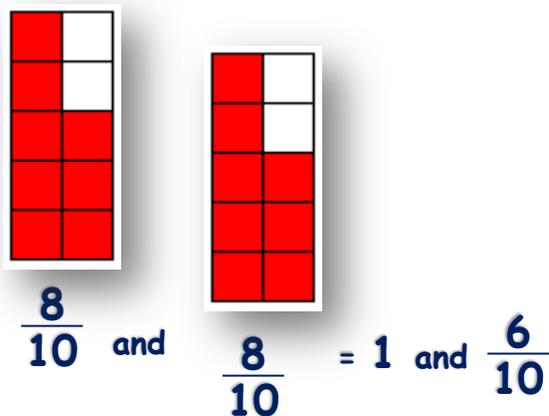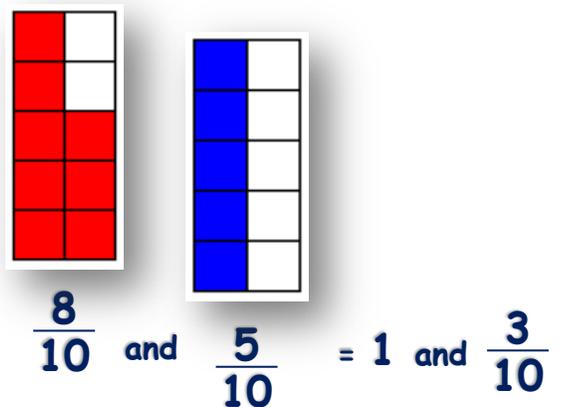
SALUTE

Fraction Recognition Game
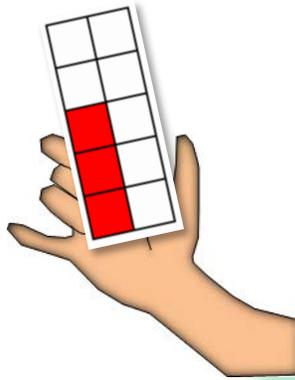
2 players

Materials:
Two decks of *Power of Ten™* playing cards
(a full deck features 20 cards with two
cards of each number denomination)

Number of Players: 2
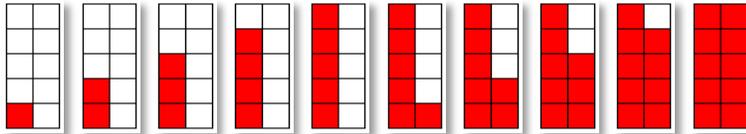
The object of the game is to practice FRACTION facts.

Method of Play:

1. Each player has a deck of 20 cards, which he shuffles.

2. Without looking at the card, **player #1** holds up a card showing the face of the card to **player #2**.

3. **Player #2** tells **player #1** what fraction is **NOT COLORED IN** (the fraction of the squares that are white).

4. Then, still not looking at the card, **player #1** says how many squares on the card **are colored**. If correct, **player #1** keeps the card, otherwise he hands the card to **player #2**. Now the roles are reversed.

5. Play continues until one player has won all the cards or a time limit (5 minutes) has been reached.

Player #1 holds up a card.
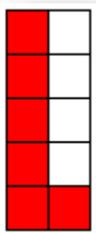
Player #2 says $\dfrac{4}{10}$

Player #1 says $\dfrac{6}{10}$ and takes the card.

fraction
SALUTE
challenge
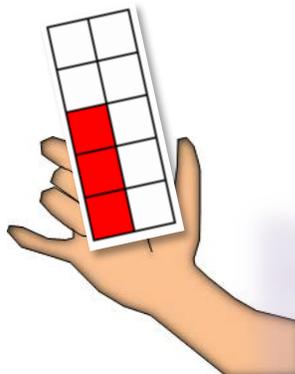
3 players

Materials:
Three decks of *Power of Ten*™ playing cards
(a full deck features 20 cards with two
cards of each number denomination)

Number of Players: 3
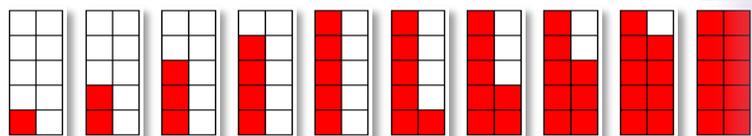
The object of the game is to practice FRACTION facts.

Method of Play:

1. Each player has a deck of 20 cards, which he/she shuffles.

2. Without looking at their own cards, **player #1** and **player #2** both hold up a card in front of their faces, showing the card to **player #3**.

3. **Player #3** states the sum of the two cards as a fraction.

4. **Player #1** and **player #2** then turn and look at each other's cards, still without looking at their own cards. They each have one chance to correctly state the value of their own card (without looking at it), and the first player to do so takes the two cards. If neither player gets her card correct, then **player #3** wins the two cards.

5. Now change roles and continue until everyone has had a chance to be **player #3**.

6. At the end of the game the **player with the most cards wins**.
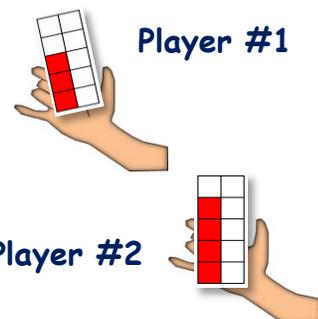
Player #1

Player #2

After looking at the cards **players #1** and **#2** are showing, **player #3** says, "The sum is $\frac{7}{10}$".

After **player #1** and **player #2** turn and look at each other's cards, **player #1** is the first to say his own card correctly "$\frac{3}{10}$".

Player #1 wins the two cards.

Fraction Recognition Game

Predict My Shape

Version One:

The teacher, or a student, hides a pattern block in a bag or envelope, and students are asked to feel the three-dimensional shape and tell which pattern block they believe is concealed. Where this activity is performed before the class, and the student fingering and feeling a shape describes his sensations and thoughts, students watching are inevitably engaged and amused.
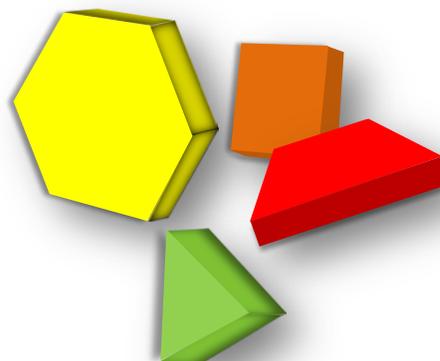
Version Two:

The teacher, or a student, hides a pattern block in a bag or envelope and students are asked to feel the three-dimensional shape and tell which pattern block is concealed. The student attempting to identify the hidden shape must answer a series of questions.

> (Note: The answers shown in brackets below relate to the triangular pattern block, which is a triangular prism.)
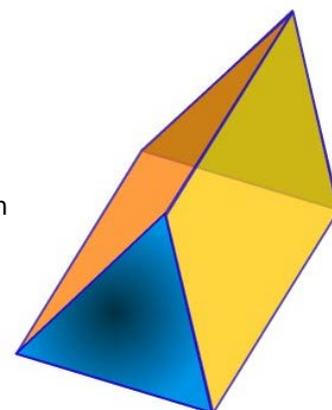
For example:

- How many vertices does the shape have? (**6**)
- How many faces does the shape have? (**5**)
- Is one of the faces a triangle? (**Yes**)
- Is one of the faces a square? (**No**)
- Is one of the faces a rectangle? (**Yes**)
- Are there three rectangular faces? (**Yes**)
- Do you think it is blue? (**No**)

A prism always has some rectangular faces. The triangular prism has 3 rectangular faces and 2 triangular faces (sometimes they are called bases). The base-face is how the shape is named.

The rectangular shape is only hard to see on the cylindrical prism (can). There the rectangle can only be seen if the two base faces are cut off, then a slice is made down the side. At that point the side can be flattened into a rectangle.

Predict My Shape

Version Three:

The teacher, or a student, creates and hides a shape using two triangles and two squares. The shape is hidden behind a screen, such as a book. The teacher or a student then describes how to create the shape, and the entire class, or a student partner, follows the directions. A check is made to see if the shape created is, indeed, identical to the original. The teacher models the correct language (listed below) for giving specific directions, although the teacher does not expect students to be able to employ such terminology in the early stages of this activity. Teachers may choose to encourage the use of correct terminology by asking a question such as, "How many of you used the word 'prism' today when talking about the pattern block?"

Creating a Shape on a Table Top: (one example)
- Place the square-prism pattern block in the centre.
- Place a triangle above the square so that the vertex points up (north) and the sides are touching.
- Place another triangle below the square so that the vertex points down (south) and the sides are touching.
- Place another square to the left of the first square.
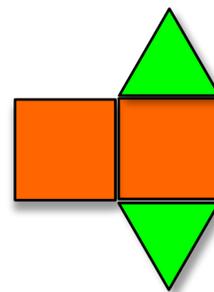
Version Four:

The teacher, or a student, creates and hides a shape using up to three shapes. The shape is hidden behind a screen, such as a book. The teacher or a student then describes how to recreate the shape, as the whole class or a student partner follows along.
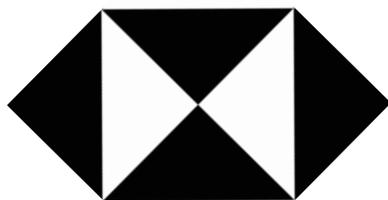
Version Five:

Choose two blocks and tell how they are alike and how they are different.
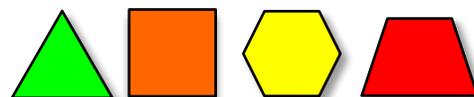
Grid Match

Age: Kindergarten and up.

Materials:

- A sheet of paper folded into fourths.
- One each orange, blue, red and yellow pattern blocks.
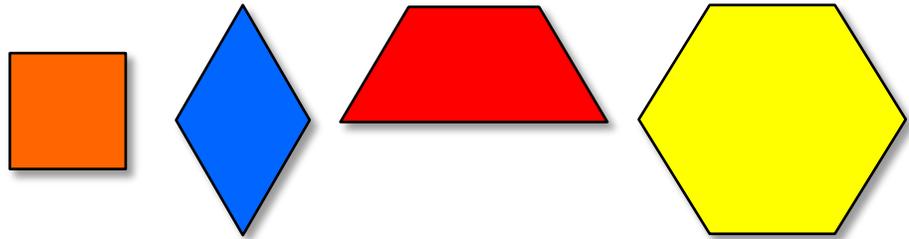
How to Play:

One player hides her paper grid behind a book or divider.

She then places the four pattern blocks on the grid.

She describes to the other players where the pattern blocks are placed.

The player may also have chosen to place her blocks on a line separating the quadrants.

The other players must attempt to replicate the grid they hear being described.

This game reinforces spatial sense and encourages the use of words: up, down, right, left, above, and below.

Note: The teacher may choose to play this game with the whole class using a document camera.
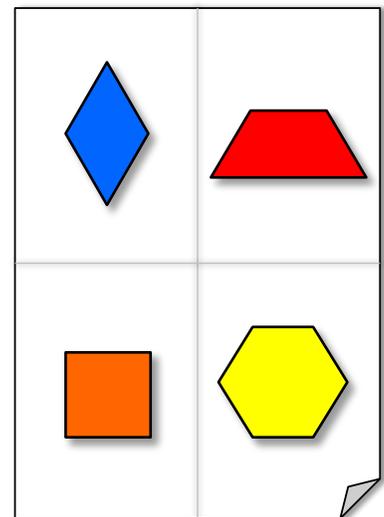
For example, the student places her four blocks and tells the others, "My block with the diamond (rhombus) shaped face is in the left top corner. The block with the square face is below the blue one. The hexagon faced block is to the right of the orange one and the trapezoid faced block is above the hexagon.

Note: try to have students avoid the use of color words as this defeats the purpose of the activity.

Hexagon-A-Blast

Materials:

Age: Grade One and up.

one die
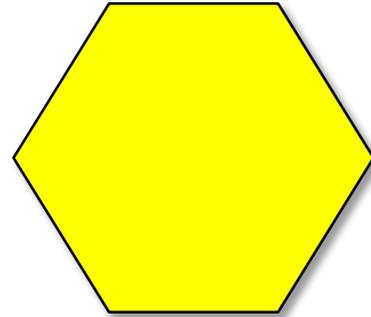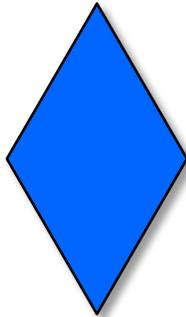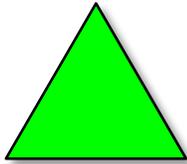
green, blue, red and
yellow pattern blocks

Students roll the die and then select the same number of pattern blocks as the die number indicates. Players are permitted to pick from the **blue rhombus**, the **green triangle**, or the **red trapezoid**.

Whenever a player is able to create a hexagon from his selection, he may trade his pieces in for a yellow hexagon. If a player uses all of his pieces and has none remaining, he obtains a bonus hexagon.

The first player to acquire a certain number of hexagons (for example, ten) is the winner.

When a player finishes, he may play again or he may try to answer the questions below:

- What were your strategies?

- Were they different for each number?

- What pieces can be used to make a hexagon?

- Can you list all the possibilities? (e.g., six triangles, two trapezoids, etc.)
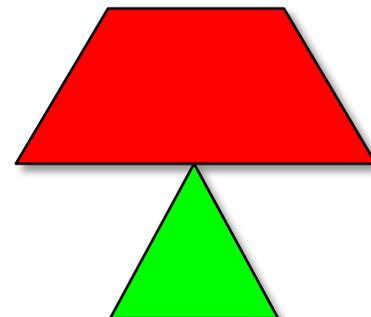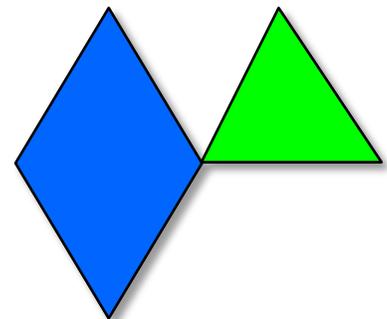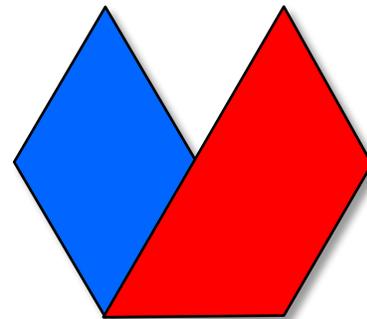
Hex-A-Hit

Age: Grade Two and up.

Materials:

3 cm cubes

1 cup (or receptacle)

1 Hexaflex Game Board

1 Hundred Square for each player
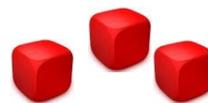
How to Play:

The first player shakes the three cubes in the cup and rolls them onto the Hexaflex game board.

The cubes landing on the Hexaflex board figures are counted as:

- Hexagon: 1 point
- Trapezoid: 2 points
- Square: 3 points
- Triangle: 4 points
- Off the Board: 0 points

Where a cube does not fall exactly within a figure, and falls on a line enjoining two (or more) shapes, the player records the amount for the lesser of the figures. For example, if a cube touches a hexagon and a triangle, the player receives one point.

Each player records his total number of points on a hundred chart by coloring in squares to represent each of his successive scores.

The first player to color all 100 squares is the winner.

Note: Students in Grade Three should be able to keep score without using a hundred grid.

11	12	13	14	15	16	17	18	19
11	12	13	14	15	16	17	18	19
11	12	13	14	15	16	17	18	19
11	12	13	14	15	16	17	18	19

Player

	Turn Total	Running Total
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		
turn 12		
turn 13		
turn 14		

Player

	Turn Total	Running Total
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		
turn 12		
turn 13		
turn 14		

Player

	Turn Total	Running Total
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		
turn 12		
turn 13		
turn 14		

Player

	Turn Total	Running Total
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		
turn 12		
turn 13		
turn 14		

Player

	Turn Total	Running Total
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		
turn 12		
turn 13		
turn 14		

Player

	Turn Total	Running Total
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		
turn 12		
turn 13		
turn 14		

Tally Sheet for 100 Subtraction Game

Player

	Subtract Amount	Running Total
		100
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		

Player

	Subtract Amount	Running Total
		100
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		

Player

	Subtract Amount	Running Total
		100
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		

Player

	Subtract Amount	Running Total
		100
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		

Player

	Subtract Amount	Running Total
		100
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		

Player

	Subtract Amount	Running Total
		100
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		

Tally Sheet for 200 Subtraction Games

Player

Subtract Amount	Running Total
	200
turn 1	
turn 2	
turn 3	
turn 4	
turn 5	
turn 6	
turn 7	
turn 8	
turn 9	
turn 10	
turn 11	

Player

Subtract Amount	Running Total
	200
turn 1	
turn 2	
turn 3	
turn 4	
turn 5	
turn 6	
turn 7	
turn 8	
turn 9	
turn 10	
turn 11	

Player

Subtract Amount	Running Total
	200
turn 1	
turn 2	
turn 3	
turn 4	
turn 5	
turn 6	
turn 7	
turn 8	
turn 9	
turn 10	
turn 11	

Player

Subtract Amount	Running Total
	200
turn 1	
turn 2	
turn 3	
turn 4	
turn 5	
turn 6	
turn 7	
turn 8	
turn 9	
turn 10	
turn 11	

Player

Subtract Amount	Running Total
	200
turn 1	
turn 2	
turn 3	
turn 4	
turn 5	
turn 6	
turn 7	
turn 8	
turn 9	
turn 10	
turn 11	

Player

Subtract Amount	Running Total
	200
turn 1	
turn 2	
turn 3	
turn 4	
turn 5	
turn 6	
turn 7	
turn 8	
turn 9	
turn 10	
turn 11	

Tally Sheet for 500 Subtraction Games

Player

	Subtract Amount	Running Total
		500
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		

Player

	Subtract Amount	Running Total
		500
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		

Player

	Subtract Amount	Running Total
		500
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		

Player

	Subtract Amount	Running Total
		500
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		

Player

	Subtract Amount	Running Total
		500
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		

Player

	Subtract Amount	Running Total
		500
turn 1		
turn 2		
turn 3		
turn 4		
turn 5		
turn 6		
turn 7		
turn 8		
turn 9		
turn 10		
turn 11		

Tally Sheet for 100, 200 or 500 Subtraction Games

Player

Subtract Amount	Running Total
	100
turn 1	
turn 2	
turn 3	
turn 4	
turn 5	
turn 6	
turn 7	
turn 8	
turn 9	
turn 10	
turn 11	

Player

Subtract Amount	Running Total
	200
turn 1	
turn 2	
turn 3	
turn 4	
turn 5	
turn 6	
turn 7	
turn 8	
turn 9	
turn 10	
turn 11	

Player

Subtract Amount	Running Total
	500
turn 1	
turn 2	
turn 3	
turn 4	
turn 5	
turn 6	
turn 7	
turn 8	
turn 9	
turn 10	
turn 11	

Player

Subtract Amount	Running Total
	100
turn 1	
turn 2	
turn 3	
turn 4	
turn 5	
turn 6	
turn 7	
turn 8	
turn 9	
turn 10	
turn 11	

Player

Subtract Amount	Running Total
	200
turn 1	
turn 2	
turn 3	
turn 4	
turn 5	
turn 6	
turn 7	
turn 8	
turn 9	
turn 10	
turn 11	

Player

Subtract Amount	Running Total
	500
turn 1	
turn 2	
turn 3	
turn 4	
turn 5	
turn 6	
turn 7	
turn 8	
turn 9	
turn 10	
turn 11	

B	I	N	G	O

B	I	N	G	O

B	I	N	G	O

B	I	N	G	O

B	I	N	G	O

B	I	N	G	O

Card Sums

Expected Probability (# of ways)	Sum	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10	Combined Trials	Experimental Probability
	2												
	3												
	4												
	5												
	6												
	7												
	8												
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												

Fractions Frequency Table

Shuffle both decks (separately) and place them face down. Turn over two fraction cards (1 red, 1 blue). **Find the sum.** Put a check (✓) mark in the appropriate column. Once **20** sums have been done, reshuffle and start again. Continue until **100** sums have been found.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0.2															
0.3															
0.4															
0.5															
0.6															
0.7															
0.8															
0.9															
1.0															
1.1															
1.2															
1.3															
1.4															
1.5															
1.6															
1.7															
1.8															
1.9															
2.0															

Hexaflex Game Board

• **Hexagon: 1 point** • **Trapezoid: 2 points** • **Square: 3 points** • **Triangle: 4 points**
Where a cube lands between two shapes, the player must score the points earned by the lowest-valued shape.

Hundred Squares for Developing 'hundredness'
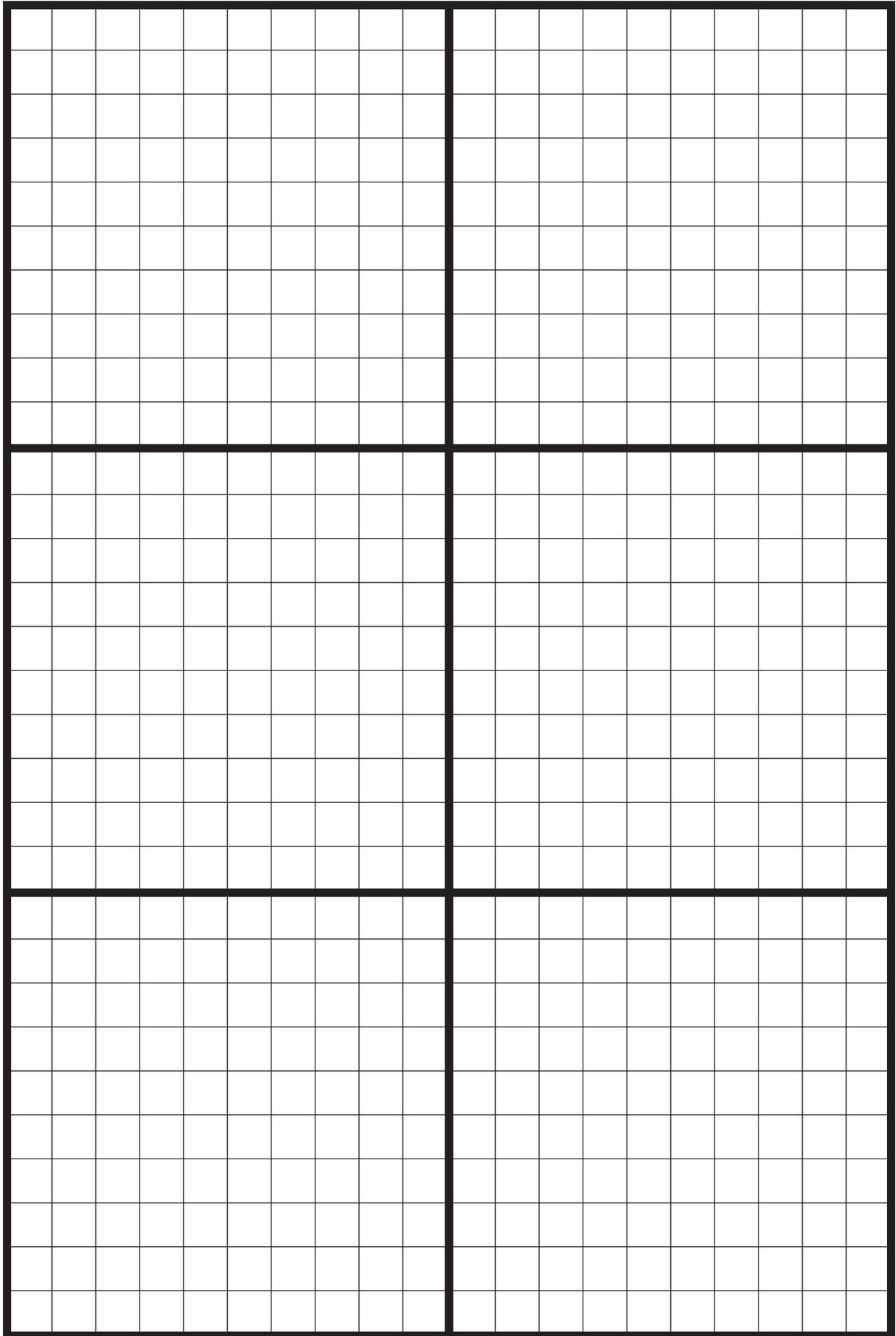
GAMES ARE AN ESSENTIAL TOOL
IN THE TEACHING OF MATHEMATICS

Kindergarten to Grade 3

Games provide meaningful contexts for the study of mathematics as **games assist students to acquire mathematical understanding**. This often proves especially true for those students who grow up within a family culture that values games play. The construction of meaning is related to issues of choice, and games often provide students with opportunities to choose not only game strategies, but also the types or genres of games they wish to play.

Games develop leadership skills in students, especially where cooperative groupings or 'jigsaw' methods of organizing student groups are employed in classrooms. In this method, a group leader learns a game and then teaches that game to other members of his or her group. (See **Using Games and Cooperative Learning as a Tool for Evaluation** following on page 5.)

Games are an excellent tool for teaching problem solving, as they reinforce the following major skills of good problem solving:

- Games require strategies.
- Games focus on relationships and patterns.
- Students often have the option of playing a game in more than one way.
- Perseverance often yields success when playing a game.
- Students often develop the ability to recognize their own errors after repeated games play.

Games provide a useful tool when assessing and evaluating students.

Establishing a regular Games Section in each period in Kindergarten/Grade One, or as part of a period three times a week in Grade Two, and twice a week in Grade Four, allows the teacher to remove either groups of students (Guided Math Group) or individual students for the purpose of interviewing or conducting 'mini-assessments'. (See **Using Games and Cooperative Learning as a Tool for Evaluation** following on page 5.)
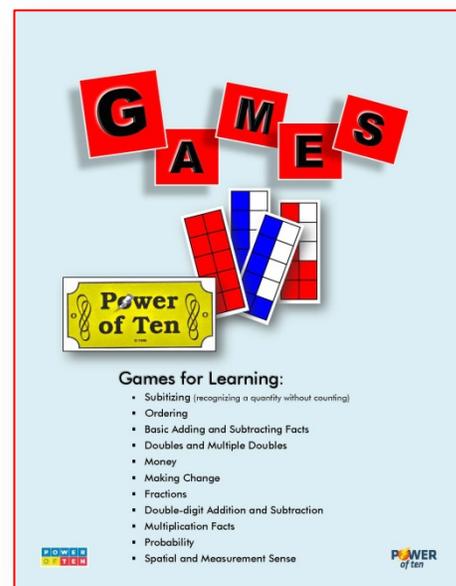
Games allow teachers to assess student levels of:

- Perseverance.
- The ability to find patterns and relationships.
- The ability to use strategies.

Games should always be taught within meaningful contexts.

In the primary grades teachers should show students that the skills learned in games almost always can be applied to learning the basic facts, acquiring fundamental concepts, and problem solving.

Parents should be involved in reinforcing the games played at school by playing these same games at home with students. **It is also important that teachers explain to parents how the games played in mathematics class relate to the mathematics curriculum**. For example: **Power of Ten**™ games **focus on visual strategies**, and it is visualizing that assists students to learn adding or subtracting nines, eights and fives.

Meaningful contexts reinforce mathematical connections to the curriculum.
They also imply that while games may be fun, they are also important learning tools.
An acceptance of games play as a useful learning tool also reinforces the concept that the **goal is to enjoy playing the game rather than winning the game**. Games provide enjoyable and engaging tools for learning, provided they are not viewed as competitive processes. Competition threatens many students. Instructors may find it necessary to group students in such a way that more accomplished players are able to challenge each other, while less accomplished players enjoy a challenge at a more comfortable level.

Creating 'Guided Math Groups'

The playing of games assists teachers to resolve the ever-present issue of student diversity in classrooms.

Students of similar ability should be grouped together for instructional and enjoyment purposes.

Teachers are able to use the time spent in games play to individualize instruction. Small groups of students may be separated from play for instructional or assessment purposes.

Exceeding Expectations Group:

This group is often challenging the materials in class and working well above grade level. They are the first group in a Grade One class to learn *Power of Ten Face Off* and start learning to add and subtract 'teen numbers'. When they arrive in Grade Two, they know all their addition and subtraction facts and are 'chomping at the bit' to work on numbers beyond one hundred.

This group can always assist in teaching games to the **Meeting Expectations** group. They are often working on creating interesting story problems for each other and the rest of the class. This group will be working independently on the *How Many Ways* activity very early in the year.

Meeting Expectations Group(s):

In most classes there may be one, two or even three groups that fit this description and they can be grouped for ability to work together as well as ability to assimilate the curriculum. They can learn new games from the **'Exceeding Expectations'** group and they can then teach the **'Minimally Meeting Expectations'** group. They will also be involved in creating story problems for each other.

These groups may be working independently on the *How Many Ways* activity very early in the year which is one way their members may be chosen. One group might have members who can work independently, while the other one or two groups may be provided with egg cartons and encouraged to learn to work independently as a group.

Minimally Meeting Expectations Group:

This group may be working on **'facts to ten games'** even in mid-year in Grade One. They can teach these games to **'Not Meeting Expectations'** group and can be utilized to teach struggling students in lower grades. This is particularly useful for helping students in Grades Two, Three or Four develop understanding and confidence as they work with Kindergarten and Grade One students.

This group may require a lot of teacher time and it is helpful to have a teaching assistant, parent or older student who can assist. This group will <u>not</u> be working independently on the *How Many Ways* activity very early in the year.

Not Meeting Expectations Group:

This group will be the greatest challenge. Try to focus on learning the subitization games over and over. They can be challenged by learning several different subitization games so they can have some choice and control over their learning. It is also helpful to have a teaching assistant, parent or older student who can assist.

This group will <u>not</u> be working independently on the *How Many Ways* activity very early in the year and may join with the **Minimally Meeting Expectations** group for the *How Many Ways* activity and the *All the Facts* activity.

Using Games and Cooperative Learning as a Tool for Evaluation

One of the major challenges to good teaching practice is finding the time to evaluate students on an individual basis. This can result in an emphasis on paper-and-pencil evaluative practices that tend to underestimate student individual achievement.

Classroom games provide teachers with a useful vehicle for creating available time during math class. While most students are playing math games, it is possible to remove individual students or small groups of students for evaluative purposes. Students may be organized into groups of four, with all groups meeting on a bi-weekly or monthly basis for a full day of games play. The following table shows possible cooperative groupings for a class of 24 students. (This example is based on a model used by Karen Able.)

Group	Week One	Week Two	Week Three	Week Four
One	a. Jimmy b. Beth c. Jen d. Larry	Person 'a' teaches the game or chooses the game	Person 'b' teaches the game or chooses the game	Person 'c' teaches the game or chooses the game	Person 'd' teaches the game or chooses the game
Two	a. Linda b. Karen c. Mary d. Kiah	Person 'a' teaches the game or chooses the game	Person 'b' teaches the game or chooses the game	Person 'c' teaches the game or chooses the game	Person 'd' teaches the game or chooses the game
Three	a. Skye b. David c. Brendan d. Kaeli	Person 'a' teaches the game or chooses the game	Person 'b' teaches the game or chooses the game	Person 'c' teaches the game or chooses the game	Person 'd' teaches the game or chooses the game
Four	a. Jane b. Dick c. Brenda d. Harvey	Person 'a' teaches the game or chooses the game	Person 'b' teaches the game or chooses the game	Person 'c' teaches the game or chooses the game	Person 'd' teaches the game or chooses the game
Five	a. Norman b. Nancy c. Jessie d. Jesse	Person 'a' teaches the game or chooses the game	Person 'b' teaches the game or chooses the game	Person 'c' teaches the game or chooses the game	Person 'd' teaches the game or chooses the game
Six	a. Jackie b. Brian c. Jerome d. Lisa	Person 'a' teaches the game or chooses the game	Person 'b' teaches the game or chooses the game	Person 'c' teaches the game or chooses the game	Person 'd' teaches the game or chooses the game

Begin by teaching all students designated 'a' one of the games.
Teach a different game to each student named 'b', 'c' or 'd'.

For example:

Student 'a' learns: **Match It 1 – 5**

Student 'b' learns: **Friendly Fish**

Student 'c' learns: **Friendly Concentration**

Student 'd' learns: **Power of Ten Face Off**

GAMES ARE AN ESSENTIAL TOOL IN THE TEACHING OF MATHEMATICS

Grade Four (and above)

Games provide **meaningful contexts** for the study of mathematics as **games assist students to acquire mathematical understanding**. This often proves especially true for those students who grow up within a family culture that values games play. The construction of meaning is related to issues of choice, and games often provide students with opportunities to choose not only game strategies, but also the types or genres of games they wish to play.

Games **develop leadership skills in students**, especially where cooperative groupings or 'jigsaw' methods of organizing student groups are employed in classrooms. In this method, a group leader learns a game and then teaches that game to other members of his or her group. (See **Using Games and Cooperative Learning as a Tool for Evaluation** following on page 3.)

> Skill in the game of chess shows a high correlation to mathematical and spatial understanding. Standardized test scores and problem-solving test scores tend to be higher in schools that teach students how to play and enjoy the game of chess.

Games are an excellent tool for teaching problem solving, as they reinforce the following major skills of good problem solving:

- Games require strategies.
- Games focus on relationships and patterns.
- Students often have the option of playing a game in more than one way.
- Perseverance often yields success when playing a game.
- Students often develop the ability to recognize their own errors after repeated games play.

Games provide a useful tool when assessing and evaluating students.

Establishing a regular **Games Day** allows the teacher to remove either groups of students or individual students for the purpose of interviewing or conducting 'mini-assessments'. (See **Using Games and Cooperative Learning as a Tool for Evaluation** following on page 3.)
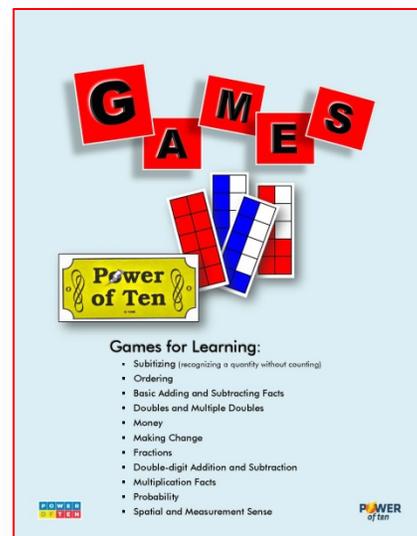
Games allow teachers to assess student levels of:

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- The ability to use strategies.

Games should always be taught within meaningful contexts.

Instructors should show students that the skills learned in games may often be applied to learning the basic facts, acquiring fundamental concepts, and problem solving.

Parents should be involved in reinforcing the games played at school by playing these same games at home with students. **It is also important that teachers explain to parents how the games played in mathematics class relate to the mathematics curriculum.** For example: **Power of Ten**™ games **focus on visual strategies**, and it is visualizing that assists students to learn adding and subtracting nines, eights and fives.

Meaningful contexts reinforce mathematical connections to the curriculum. They also imply that while games may be fun, they are also important learning tools. An acceptance of games play as a useful learning tool also reinforces the concept that the **goal is to enjoy playing the game rather than winning the game**. Games provide enjoyable and engaging tools for learning, provided they are not viewed as competitive processes. Competition threatens many students. Instructors may find it necessary to group students in such a way that more accomplished players are able to challenge each other, while less accomplished players enjoy a challenge at a more comfortable level.

The playing of games assists teachers to resolve the ever-present issue of student diversity in classrooms.

Applying strategies in games play (rather than winning) is valued. Students are encouraged to articulate and demonstrate their strategies of choice.

Teachers are able to use the time spent in games play to individualize instruction. Small groups of students may be separated from play for instructional or assessment purposes.

Choice awards students a sense of control and fosters a sense of commitment to the learning process. When students are permitted to select the game to be played, they experience a sense of control regarding their own learning. A sense of control reduces stress and establishes a relaxed state of alertness that is crucial to learning.

Using Games and Cooperative Learning as a Tool for Evaluation

One of the major challenges to good teaching practice is finding the time to evaluate students on an individual basis. This can result in an emphasis on paper-and-pencil evaluative practices that tend to underestimate student individual achievement.

Classroom games provide teachers with a useful vehicle for creating available time during math class. While most students are playing math games, it is possible to remove individual students or small groups of students for evaluative purposes. Students may be organized into groups of four, with all groups meeting on a bi-weekly or monthly basis for a full day of games play. The following table shows possible cooperative groupings for a class of 24 students. (This example is based on a model used by Karen Able.)

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Begin by teaching all students designated '**a**' one of the games.
Teach a different game to each student named '**b**', '**c**' or '**d**'.

For example:

Student '**a**' learns: **500 Multiplication**

Student '**b**' learns: **100 Addition**

Student '**c**' learns: **The '99' Game**

Student '**d**' learns: **Box Cars and One-Eyed Jacks**

> For most intermediate students, a once-weekly Games Day will prove too frequent.
> Teachers of intermediate grades often elect to establish bi-weekly Games Days.

Using Games and Cooperative Learning as a Tool for Evaluation

Classes with an uneven number of students can present a challenge. One problem that teachers may face when organizing students into co-operative groups, is that a register of an uneven number of students does not lend itself to equal groupings. For example, in a class of 23, the instructor will most likely establish five groups with four members and one group with three members. In the latter case, either one student in the group learns two games, or the teacher plays in this group until the fourth game is learned. The group with three students should either be the 'not meeting' or the 'exceeding' expectations category, because they will have to play games that can be played with three people (Concentration, Match It, 99, Crib). Face Off games can be played with three people, but the sorting of the cards at the conclusion of the game has to be by letter, not by color. This takes more time.

Evaluating Students Using This Model

Once students know the games, remove all students named 'a', 'b', 'c' or 'd' as a group and test these students in a small group setting. This provides a group of six students that may then be evaluated.

Alternatively, teachers may choose to remove Group One (or Group Two, Three, etc.), in which case there will be a smaller group of only four students to assess. Depending on the game chosen during a given week, time may allow the removal of individual students for 5-10 minute interviews.

In scheduling, always build time between interviews in order to allow for time management or disciplinary issues that may arise in the classroom. When students understand the purpose and appreciate the importance of having individual time with their teacher, they are almost always eager to cooperate. Students usually value individual time with their teacher, as this time allows for strategic planning regarding any problems they may be experiencing.