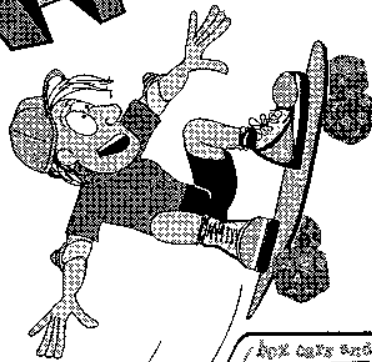


# box cars and one-eyed jacks®

Presents

# RADICAL MATH



Presented By

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Waco TX, July 2011

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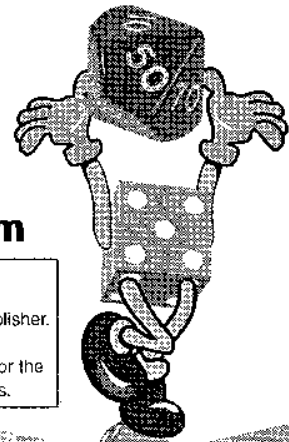
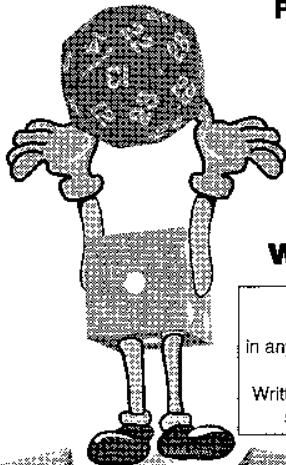
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# Batters Up!

**Skills:** Place Value to 100 000s, Addition with Expanded Notation

**Equipment:** Cards 0-9, Place Value System die, paper/pencil

**Goal:** Greatest total sum after ten rounds wins

## Getting Started:

Each player builds a number in the 100 000s with their cards

Build in order from 100 000s place to 1s place (Example 230 516)

Each player reads their number to the other players.

One player rolls the PV System die and calls out the place value

Players identify the value at that place value in their number (this is their score for the round) and record their score for that round. Example: **ten thousands** is rolled, 3 is in the 10 000s place, score for that round is 30 000

Play 10 rounds, (rotate roller) then total your score.

## BATTERS UP!

Round	Number	Roll	Value/Points/Score
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Total Score =

# ROLL ON... DECIMALS

Roll Number	Ones	Tenths 10ths	Hundredths 100ths	Thousandths 1000ths	Running Total
1		●			
2		●			+ =
3		●			+ =
4		●			+ =
5		●			+ =

difference from whole number (+/-)



Name \_\_\_\_\_

# Order In The Court

Date \_\_\_\_\_


**Reject Rolls**



**Reject Rolls**



**Reject Rolls**



**Reject Rolls**



**Reject Rolls**



**Reject Rolls**


*Use Double Sided Dice; 6-Sided Dice; or 1-12 Dice*

**Goal:** To get as many fractions in a row as possible

- Roll one die at a time (Variation: You may roll all the dice at once and race your partner to line them up)
- Write the fraction into the chain or put into the reject boxes
- Points are awarded at the end of 7 rolls. 1 point for each fraction in the chain.
- Use Fraction Circles or Fraction Bars to check accuracy

# Fractions, Decimals, Percents

1 Whole Number											
1/1    1.0    100%											
2/2											
3/3											
4/4											
5/5											
6/6											
7/7											
8/8											
9/9											
10/10											
11/11											
12/12											

One half											
1/2    .5    50%											
2/3											
3/4											
4/5											
5/6											
6/7											
7/8											
8/9											
9/10											
10/11											
11/12											

One Third											
1/3    .333    33.3%											
2/3											
3/4											
4/5											
5/6											
6/7											
7/8											
8/9											
9/10											
10/11											
11/12											

One Fourth											
1/4    .25    25%											
2/4											
3/4											
4/4											

One Fifth											
1/5    .2    20%											
2/5											
3/5											
4/5											
5/5											

One Sixth											
1/6    .166    16.6%											
2/6											
3/6											
4/6											
5/6											
6/6											

One Seventh											
1/7    .142    14.2%											
2/7											
3/7											
4/7											
5/7											
6/7											
7/7											

One Eighth											
1/8    .125    12.5%											
2/8											
3/8											
4/8											
5/8											
6/8											
7/8											
8/8											

One Ninth											
1/9    .111    11.1%											
2/9											
3/9											
4/9											
5/9											
6/9											
7/9											
8/9											
9/9											

One Tenth											
1/10    .1    10%											
2/10											
3/10											
4/10											
5/10											
6/10											
7/10											
8/10											
9/10											
10/10											

One Eleventh											
1/11    .0909    9%											
2/11											
3/11											
4/11											
5/11											
6/11											
7/11											
8/11											
9/11											
10/11											
11/11											

One Twelfth											
1/12    .083    8.3%											
2/12											
3/12											
4/12											
5/12											
6/12											
7/12											
8/12											
9/12											
10/12											
11/12											
12/12											

# FOOTBALL FACTOR

## Player Two

	Touchdown	Field Goal	Total
1st Quarter			
2nd Quarter			
3rd Quarter			
4th Quarter			
Total Football Score			

## Player Two

	Touchdown	Field Goal	Total
1st Quarter			
2nd Quarter			
3rd Quarter			
4th Quarter			
Total Football Score			

## Player One

	Touchdown	Field Goal	Total
1st Quarter			
2nd Quarter			
3rd Quarter			
4th Quarter			
Total Football Score			

## Player One

	Touchdown	Field Goal	Total
1st Quarter			
2nd Quarter			
3rd Quarter			
4th Quarter			
Total Football Score			

## COMMIT AND CAPTURE

1.  $\square \times (\square - \square) - \square =$

2.  $\square + \square \times \square \div \square =$

3.  $\square^2 - \square \times \square - \square =$

4.  $\square + \square \div \square \times \square =$

5.  $\square \times (\square + \square) - \square =$

6.  $\square [ \square^3 \times (\square - \square) ] =$

7.  $\square \div \square + \square \times \square =$

8.  $\square \div \square \times \square - \square =$

# BIG SUMS



**SKILLS:** Problem solving, gathering data, recording data, interpreting data

**PLAYERS:** Students work in groups of 2, 3 or 4

**EQUIPMENT:** 36 regular dice per group, paper and pencil, chart

**ACTIVITY I:** The goal of the activity is to find the sum of 36 dice after they have been rolled.

**TEACHING TIP:** Allow students several rounds to develop their own method of adding the dice. Use **Chart I** to record the methods. Teach the patterns below and show the students how to group the dice.

1	2	6
2	4	7
3	6	8
<u>+4</u>	<u>+8</u>	<u>+9</u>
10	20	30

**THOUGHT PROVOKERS:**

1. What is the most efficient pattern to start with? Why?
2. In which order should we use the patterns to be most efficient? Why?
3. What is the largest sum we could have? What is the smallest?

**ACTIVITY II:** The goal is the same but we are trying to determine the range of possible sums. Use **Chart II** to record the sums that are used.

**THOUGHT PROVOKERS:**

1. What is the estimate for the mean value of the sums?
2. Can anyone give an explanation for the mean?
3. (Challenger) What is the mean sum of 48 dice?

**CHART I:**

	Prediction	Method Used	Actual Sum	+ / - Difference
1.				
2.				
3.				
4.				
5.				

**CHART II:**

150+	141-150	131-140	121-130	111-120	101-110	90-100

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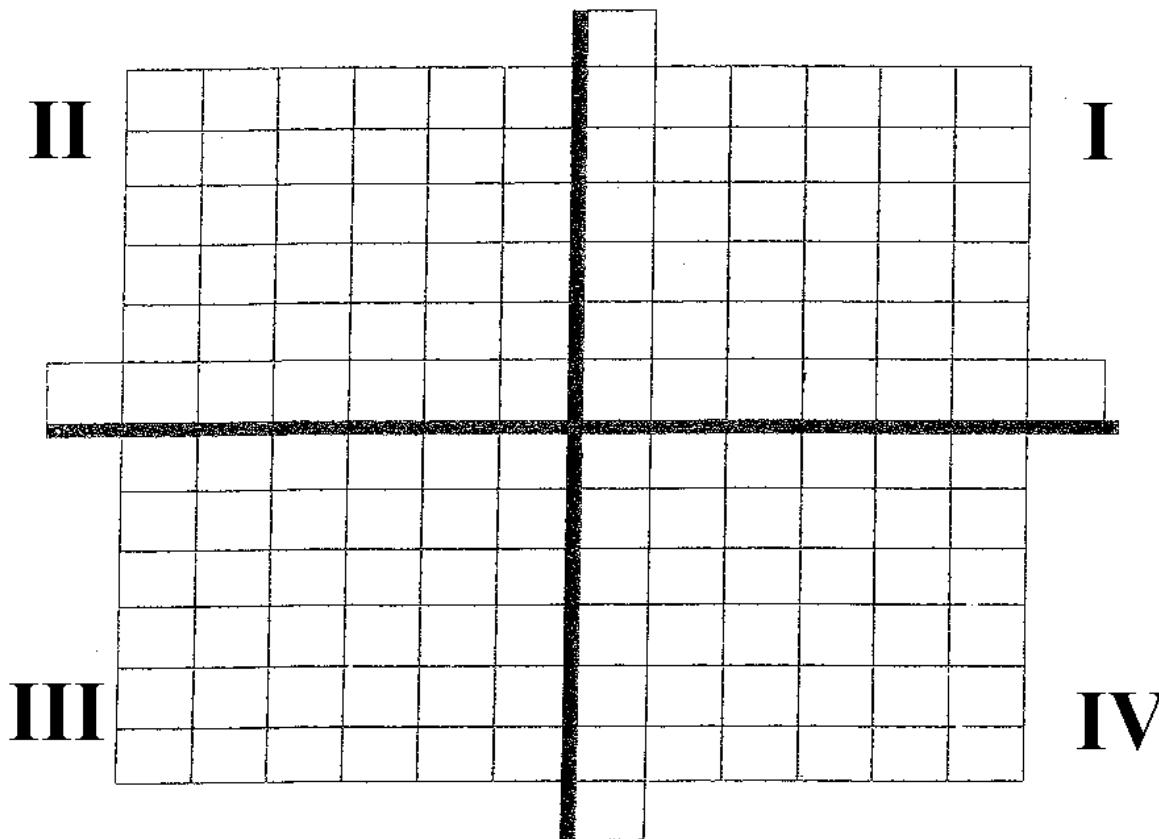
**Hit Target**

**Goal:** To get 3 in a row in each quadrant

**Directions:** Two players on each grid. Players take turns plotting points.

**When it's your turn:**

- Roll the double die.
- Choose the number or numbers to be negative or positive
- Record the Ordered Pair in the Column for the correct quadrant before you plot the point.



Player 1:				Player 2			
Quadrant I	Quadrant II	Quadrant III	Quadrant IV	Quadrant I	Quadrant II	Quadrant III	Quadrant IV

## COMBO FIVE

**LEVEL:**

Grade 3 and up

**SKILLS:**

Mixed operations (+, -, x, ÷), problem solving

**PLAYERS:**

Teams of 2 vs. 2

**EQUIPMENT:**

One 20-sided die, cards Ace - King (Ace = 1, Jack = 11, Queen = 12, King = 0)

**GETTING STARTED:**

Both teams take five cards and place them face up. The goal of the game is to equal the rolled target number each round. To begin, one team rolls the target number for the round. This number will be used by both teams. Teams now begin finding combinations that equal the target number rolled - all operations may be used. A single card cannot be taken off. Teams may take off two, three, four or five card combinations. Teams may also take off a two card and a separate three card combination or two, two card combinations leaving one card behind for the next round. Each card may only be used once in any combination (i.e., in the following example 4 can only be used once and not again in a second combination).

**EXAMPLE:**

Cards drawn are as follows:

Team One	4	9	7	2	11
Team Two	2	3	8	10	5

Target rolled = 11

Team One made the following combinations and removed the cards as follows:

$$9 + 2 = 11 \text{ and } 4 + 7 = 11$$

leaving behind the 11 card as it was not used in any combination.

Team Two made the following combinations and removed the cards as follows:

$$(2 \times 3) + 5 = 11$$

leaving behind the 8 and 10 cards.

## SWEET 16

"A REAL FAVOURITE"

**LEVEL:**

Grade 4 and up

**SKILLS:**

mixed operations, problem solving

**PLAYERS:**

1 (scullaire) or whole class in cooperative teams

**EQUIPMENT:**

1 thirty-sided die, cards (Ace = 1) - K, Jack = 11, Queen = 12, King = 0

**GETTING STARTED:**

All teams build a four x four grid with sixteen random cards, face up.

The goal of the game is for each team to remove all the cards from their grid. All cards remaining at the end of a round equal their face value score AGAINST the team, (i.e. 4 and 3 left - score against = 7). The lowest and best possible score per round is zero.

To begin play the teacher rolls a target number for the first round with the die. This number will be used by all cooperative teams. Teams now begin finding combinations that equal the target number rolled - all operations may be used. Players may take off two, three, four or five card combinations.

Grid was randomly drawn as follows:

King	4	10	2
Jack	3	9	7
6	Ace (1)	8	6
5	4	10	2

# BETWEENERS

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000 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | >

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Hundreds	Tens	Ones	Hundreds	Tens	Ones
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**Player One**

**Player Two**

# MYSTERY ROLL

You will need to play either 50 or 100 rounds. Play in groups of 3. Every round record L, E and G plus figure out the RANGE between G and L. Use a calculator if you wish. When you are playing you should use your highlight pen to mark any unusual rolls - for example, tie rolls, sequences, unusual winning rolls, etc. Circle the points you score.

Round #	Least	Between	Greatest	Range	Analyze
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Once you have completed either 50 or 100 rolls  
answer the following questions.

Work Together!

1. What is the average range of the rolls?
2. What percentage of the time does a tie roll happen?
3. What percentage of the time did you score a point? If you kept track of all winners, what percentage of the time did all 3 players score a point?
4. Describe your most unusual round. Try to interpret the probability of that event happening. Remember  $\frac{1}{30}$  chance of rolling any number.
5. Write one question for the rest of the group to use with their data.

Game # \_\_\_\_\_

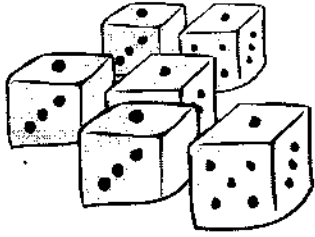
\_\_\_\_\_

Skills: \_\_\_\_\_

Players: \_\_\_\_\_

Equipment: \_\_\_\_\_

Rules:



## **Invent-a-game Assignment**



Use the following format:

### **Game Title**

**Level:** How hard is it? What grade is it for? Your game can be made in the grade 4-6 levels. Check out the skills in the curriculum guide.

**Skills:** What math skills do you use to play?

**Players:** How many?

**Equipment:** What you need to play.

**Getting Started:** This is a full description of your game's goals, rules, and play written in *complete sentences*. Make sure to describe how the game ends and how points are accumulated.

**Example:** If possible, you should play out a few rounds of your game to make an example and to work out your directions in "*getting started*" to get them as clear as possible.

**Variations:** If any.

**Teaching Tips:** Strategies and/or other helpful hints.

**Jokes:** if you want to jazz-up your page.

**Thought Provokers:** Write a few questions to have your players answer.

### **Marking:**

The bare minimum is doing the Level, Skills, Players, Equipment, Getting Started, and Example. Doing the other components will increase your marks!

**DUE DATE:** \_\_\_\_\_

**TOTAL:**        /30

# Implementation Plan

List 3 ways you can incorporate the Box Cars strategies into your classroom, program or school.

1.

2.

3.

Identify the game/activity that you will try first, when you get back later this week.

Find a colleague in this room whom you will contact at the end of the week. The two of you will be agreeing to hold a conversation regarding what you did to start implementing what you learned today.

Who:

From:

Phone:

Email:

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