OVERVIEW OF PROGRAM
Community Math Olympics 2002
Fun Math Activities for Parents and Children

Purpose: The materials and ideas included in “Community Math Olympics 2002” are intended to be used by teachers in schools throughout the world in order to bring parents and children together to experience good mathematics.

Description: These are hands-on mathematics activities scheduled one night a week for four weeks. Students and their parents come together to share math experiences, solve problems, and have fun with mathematics. The four-week program is based on the upcoming Olympics 2002. It is designed to help develop interest in and comfort with higher-level thinking in mathematics for both students and parents.

Group Description: Ideally the group is made up of between 18 and 40 participants (parents and children from grade levels 6, 7, and 8). For the competitive events participants will be put into teams of 6 - 8 members.

Timeline: One session per week for four consecutive weeks. Each session is one and one-half to two hours in length.
Session 1 - Number Sense
Session 2 - Measurement and Geometry
Session 3 - Algebraic Reasoning
Session 4 - Statistics and Probability

General Agenda: Each night will follow the same basic structure with adaptations as necessary, depending on the topic:

Warm Ups - As parents and children arrive, they put on name tags and work through a number of different stations of hands-on activities.

Team Competitive Events - Led by teacher-leaders, parents and children work together in teams on a variety of activities related to the math strand theme for the night. Most activities are hands-on and centered around parents and children working together to arrive at a solution.

Closure - As the evening comes to a close, the leader guides the
participants through a review of the Warm Ups from the beginning of the evening, awards the prize(s) for the closest estimates of Estimation Stations contents and certificates to first, second, and third-place teams, and distributes the home extension activities packets for both the parents and the children for the week, and encourages them to come back for more fun next week.

**Follow-Up Packets for Home Use:** Each week families receive a packet of activities related to the math strand theme of the session that they can use during the week to continue their fun and their investigation of mathematics.

**Materials:** The description of each session includes a list of the materials needed for use by the participants. Most of these materials are readily available in middle schools or can be purchased inexpensively at discount stores. Hard copies of all worksheets, overhead transparency masters, or graphics mats are included in this packet for use with parent groups.

**Description of Activities and Preparations:** The description of each session includes directions for preparations to be done prior to the event, as well as guidelines on how to present each activity, and solutions to some of the explorations.
SESSION ONE

Number Sense
Community Math Olympics 2002 - Session 1
Topic: Number Sense

Warm Ups

Nametags
Estimation Stations
The Story of the Olympics
Meet the Mascots: Hare Today, Gone Tomorrow
Utah Scramble
Olympic Rings Stack

Introductions

Welcome and Introduction of Leaders
Overview of the Program

Team Competitions

Triathlon

Home Extension Activities

Pattern Warm Ups
The Story of the Olympics
Hare Today, Gone Tomorrow
The Salt Lake City 2002 Story
Bear’s Boating Dilemma

Closure

Review of warm ups, awarding of prizes and certificates
Incentives to return
Distribution of home extension activities packet
Description of Activities and Preparation for Session Events

Set-up of Room

The room in which you hold Community Math Olympics 2002 should be a large, open space such as the school gymnasium or cafeteria. You will need tables around the perimeter of the room for the Warm Up activities at the beginning of the evening. You will want a table near the door for Registration and Nametags. You may also want a refreshment table if you plan to break after the team competitive events and before the closure activities.

You will also need chairs for the participants. Initially, they will be used in the balloon relay. Later, set these up in front of the overhead projector. Also provide tables and chairs for participants to use while the solving “Hare’s House Hunt” problem. An open area free of any obstacles will be needed for the team competitions that require physical movement.

You may want to place baskets or boxes on each table to hold the materials needed for the evening’s activities. Organize your materials to eliminate having to wait while supplies are distributed.

Warm Ups

(The Warm Ups take longer the first night as participants get used to the routine.)

Nametags

Make or purchase nametags for each week so that everyone participating (leaders, children, and parents) has his or her name visible for others to see.

Make a sign for the Nametag Table that encourages people to sign in each week. Make a Sign-In Sheet, if desired, to keep track of attendance.

As the parents and children arrive the first night, have one leader greet them and direct them to the Nametag Table. Have markers available for the participants to write their names on the nametags.
After they sign in, encourage families to move to the other stations to begin exploring the warm up activities.

**Estimation Stations (to change each week)**

Each week, two or three activities will be featured. For example, during week 1, participants will estimate: the time it takes for a bag of ice cubes to melt at room temperature (72°F), the number of beans in a bowl, and the percent of blue M&M’s in a glass jar.

Make signs with instructions for the “Estimation Stations” to be used each week at the warm up stations. Color code these instructions to match the papers participants will use at each estimation station.

For each station, calculate the answer prior to the night of the event, write the answer on a piece of paper, place the answer in an envelope, and tape the envelope to the back of the sign for the estimation station.

Place pencils and pieces of colored papers (color coded to the instructions) near the item to be estimated so that participants can write their estimates and name. Place a basket nearby where participants can place their estimates.

**The Story of the Olympics**

Set up an area with tables and chairs where participants can complete the mathematical cloze activity about the history of the Olympics.

The correct answers can be given at the end of the evening during the warm up review or the story can be enlarged, mounted on poster board, and the answers covered with lift-up flaps. If you choose to reveal the answers during the closing review make a transparency and elicit participants’ input as you write in the answers.

**Meet the Mascots: Hare Today, Gone Tomorrow**

Duplicate the information about the Salt Lake City Olympic mascots and make a display board that also includes instructions on how to proceed with the activity. Provide scissors and copies of “Hare Today, Gone Tomorrow.”

**Utah Scramble**
Cut out and laminate several sets of the letters A, H, T, and U. Make a display board with information about Salt Lake City and instructions for this station.

**Olympic Rings Stack**
Place a rocking stack toy with five rings of different sizes and colors next to two free-standing empty cones. Post the instructions for this station.

**Introductions**

**Welcome and Introduction of Leaders**
Gather participants to the chairs centered in front of the overhead projector. Welcome them enthusiastically and introduce all leaders involved in the program.

**Overview of the Program**
Explain that the mathematical experiences they will enjoy over the next four weeks are framed around the Salt Lake City Winter Olympics 2002. Also explain that the purpose of the next four weeks is to afford families an opportunity to experience mathematics in a hands-on, fun way. Tell participants that they will compete in teams using their mathematical understanding to solve problems and to become aware of the everyday applications of mathematics.

**Team Competitions**
Count the number of participants and organize them into teams of 6 - 8. Prior to the session, choose at least 8 team names that are geared to the Winter Olympics (e.g. Lugers, Skaters, Skiers)
You may want to assign the team names or you may opt to let each team pick one of the names out of a bag.

**Triathlon**
- Balloon Relay - 30 points maximum
- Hare’s House Hunt - 30 points maximum
- What’s My Name? Game - 40 points maximum

**Balloon Relay**
Explain that the object of this event is to be the first team to solve a series of problems. Assign a teacher-leader to each team. The teacher-leaders should arrange each team so that they are seated in chairs in a row. The leader places a marker and a pack of sticky notes on the floor next to the last person seated in the team’s row.

At the signal for all teams to begin, the teacher-leader hands a balloon to the participant in the first seat. The balloon has a problem taped to it. Each participant passes the balloon over his head to the person behind him. This continues until the balloon reaches the last person on the team. That person uses the marker to write his solution on a sticky note which he then attaches to the balloon and passes forward until it reaches the first person in the row, who gives the balloon to the teacher-leader.

If the solution is incorrect, the teacher-leader gives the balloon back to the team to correct. The balloon is handed to the first person and passed back as before. At this point, team members may help, but the solution must be written by the person in the last seat.

If the balloon breaks the team-leader gives another balloon with the same problem to the team.

If the solution is correct, the teacher-leader tells the team, and the first person in the row now moves to the last seat. The teacher-leader hands the new first person another balloon with a different problem taped on it.

Play continues in this way until all 10 questions have been correctly solved by one team. All teams are then scored by the number of correct responses they have when the game is called. Each correct response is worth 3 points.

**Hare’s House Hunt**

Display the overhead transparency of the zip code for San Antonio,
Texas, and explain that each digit 0 through 9 is represented by 5 bars.

Explain that the entire code begins and ends with an additional long bar, called a framing bar. The 5-digit zip code is contained between the framing bars that begin and end the code. Show how to decode the postal number.

Display on overhead and read aloud Mr. MacGregor’s letter to Ms. Hare. Show the transparency of one of the postcards and show how to affix the city label.

Distribute pencils and “Hare’s House Hunt” packet to each participant. Tell them their task is to match the city to the right postcard.

Scoring:
The first team to solve this problem will receive 30 points).
The second team to solve it will receive 20 points).
The third team to solve it will receive 10 points).

What’s My Name? Game

Have each team sit in a circle on the floor (accommodations can be made for those in need) as far from other teams as space permits. Distribute one pencil and a “What’s My Name?” Game packet to each team. Tell each team to write its name on each of the 5 sheets in the packet.

Explain that the object of this event is to use the least number of clues to identify the number or term described in the clues given.

Explain that you will pause briefly after each clue is read and team members can collaborate to answer the question. Teams can tear off their answer sheet and hand in their solution to their team-leader at any time before the next clue is read. Only one answer
per team is permitted.

Circle the clue at which the team submitted their solution and score correct solutions according to the number of clues it takes a team to give the solution.

- A correct answer after the 1st clue receives 8 points.
- A correct solution after the 2nd clue receives 6 points.
- A correct solution after the 3rd clue receives 4 points.
- A correct solution after the 4th clue receives 2 points.

**Closure**

Review each of the warm ups.

**Estimation Stations:** (During the evening have one leader sort through the estimation responses and select the closest one or two estimates.) Engage participants in a discussion of strategies they employed to arrive at their estimations. Announce the winners and give them a prize (such as an “I Love Math” button, math pencil, etc.). Remind participants that the estimation activities will be a part of each session during the Community Math Olympics 2002.

**The Story of the Olympics:** Ask participants to share their insights into this activity. Did any participants change their initial responses? If so, why? Discuss what number sense means.

**Meet the Mascots:** Hare Today, Gone Tomorrow: Ask how many hares were on the uncut strip. How many hares after the top two pieces were switched? What did they notice? How do they think that happens?

**Utah Scramble**: Ask participants to explain their strategies for solving this problem. Show a shorter word, such as AT, where both the A and the T can be the first or the second letter. Explain that mathematically this is: $2 \times 1 = 2$ arrangements. So, UTAH = $4 \times 3 \times 2 \times 1$.

**Olympic Rings Stack**: Ask about participants’ findings: What was the least number of moves required? What if there were more than 5 rings? What if there were fewer?

**Award Team Certificates**: During the review of the warm ups, a leader should tally the scores from the team competitions and prepare the certificates. Announce the three top teams and their scores, beginning with the third-place (“Bronze Medal”) team and working up to the first-place
winners ("Gold Medal"). Present each team member with a certificate.

**Incentives to Return:** Ask participants if they have enjoyed the evening. Talk about some of the topics you will explore in upcoming sessions. Thank them for coming and encourage them to return for more fun next week.

**Distribute Home Extension Activity Packets:** Distribute the packets to each family and explain that some of the activities that they experienced tonight are also in the packet so they can revisit them during the week. In addition, there are new activities for them to explore. Review the contents and answer any questions they may have. Explain that we will share homework results at next week’s session.

**Packet Contents:**
- Pattern Warm Ups
- The Story of the Olympics
- Meet the Mascots: Hare Today, Gone Tomorrow
- The Salt Lake City 2002 Story
- Bear’s Boating Dilemma

**THINGS TO DO BEFORE SESSION TWO**

**Supplies to Gather or Purchase**
Things to Make

Signs for stations (Nametags, Estimation, What’s My Worth?, Coyote’s Count Ability, Shapes Steeplechase, Mascots’ Marvelous Memory, and Mini-Metric Pentathlon

Papers to be copied for use DURING Session 2

What’s My Worth?
What’s My Name? Coyote’s Count Ability
Shapes Steeplechase mats
Mascots’ Marvelous Memory
Mini-Metric Pentathlon recording sheets
What’s My Name? Game answer sheets
Certificates

Packet Contents to be copied for use at Home

Title Page
Warm Ups
Coal’s Cube
Polygon Paths
Olympic Proportions
Symmetry Sports
Mascots’ Marvelous Memory

_Overhead Transparencies to make for use DURING Session 2_
Home extension activities from session 1
Coyote’s Count Ability

√ Letters to Families

about
Dear Parent/Guardian:

We are pleased to offer a Community Math Olympics 2002 Program for sixth, seventh, and eighth graders and their parents or guardians. Community Math Olympics 2002 offers adults and their children the opportunity to work together on hands-on, fun activities that explore
mathematics.

The program consists of four sessions to be held on __________ from ________ to ________, beginning ______________ and ending ______________. Each session will focus on a different topic.

If you would like to attend the Community Math Olympics Program at ________________ School, please return the slip below to _________________. Due to space limitations, we will only be able to accept 30 families, so we will honor those who respond first.

We hope to see you there!

Sincerely,

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Student’s Name _____________________ Parent/Guardian ____________
Teacher ______________________ Home Phone Number ______________

We plan to attend all four nights of the Community math Olympics 2002 beginning on ________, ____________ and running through ________, ____________.

Community Math Olympics 2002

__________, 2001

Dear ________________ and ________________,

This is a reminder to you about the Community Math Olympics 2002 sessions coming up ________ and ________. We are looking forward to
Dear ________________ and ________________,

This is a reminder to you about the Community Math Olympics 2002 sessions coming up _______ and _______. We are looking forward to seeing you there!

Sincerely,

___________________

Community Math Olympics 2002

_______, 2001

Session One
The Story of the Olympics

Directions: Use the numbers below to complete the story.

The first Olympic Games were held in Greece
over _____ years ago. They began in _____ B.C. and had only _____ event - a footrace. Later boxing, wrestling, chariot racing, and the pentathlon (which consists of _____ different events) were added. The Olympic Games were held every _____ years for more than _____ years, or _____ centuries. In _____ A.D. the Games were prohibited by the Roman emperor. The modern Olympic Games were begun through the efforts of a Frenchman named Baron Pierre de Coubertin. In _____, 312 athletes from _____ countries competed in _____ sports.
Coal
The American Black Bear

Powder
The Snowshoe Hare

Copper
The Coyote
Meet the Mascots

The Olympic motto of *Citius, Altius, Fortius* - meaning Swifter, Higher, Stronger - is represented by the 2002 Salt Lake City Olympic mascots. Meet Coal, the American Black Bear; Powder, the Snowshoe Hare; and Copper, the Coyote.

According to a Utah legend told by Native Americans once long ago the sun was burning up the earth. The hare ran swiftly to the top of a mountain, shot her arrow at the sun, and caused the sun to drop lower in the sky, thereby cooling the land.

When the world turned dark and frozen, the coyote climbed the highest mountain and stole fire from the flame of the fire people. Thus, he brought warmth back to the earth.

Long ago, the bravest hunters left their villages to hunt the mighty bear. But the bear was too strong and outlasted the hunters. To this day, the sons of those hunters continue to chase the bear - in the night sky.
Hare Today, Gone Tomorrow

How many hares are on the strip below?

Carefully cut the strip apart along the vertical and horizontal center lines.

Switch the top two pieces.

Now count the hares again. What do you notice? How do you think this happens?
Utah Scramble

Utah is named for the Ute Indians and is known as the Beehive State. Salt Lake City, Utah, is the host city for the 2002 Olympic and Paralympic Winter Games. The world’s best athletes will showcase their talents and skills during snow and ice competitions in the largest urban area in history to host these events.

In how many distinct ways can the letters of “Utah” be arranged?
Olympic Rings Stack

The Olympic symbol of five interlocking rings (blue, yellow, black, green, and red) represents the union of the five continents (Asia, Africa, the Americas, Europe, and Australia) and the meeting of the athletes of the world at the Olympic Games.

Can you move the rings over to the third cone while keeping them in size order? What is the least number of moves it can be done in?

• You may move only one ring at a time.
• You may not put a larger ring on top of a smaller ring.
**Solutions Key:**

**The Story of the Olympics**

The first Olympic Games were held in Greece over 2,500 years ago. They began in 776 B.C. and had only 1 event - a footrace. Later boxing, wrestling, chariot racing, and the pentathlon (which consists of 5 different events) were added. The Olympic Games were held every 4 years for more than 1,000 years, or 10 centuries. In 393 A.D. the Games were prohibited by the Roman emperor. The modern Olympic games were begun through the efforts of a Frenchman named Baron Pierre de Coubertin. In 1896, 312 athletes from 13 countries competed in 9 sports.

**Hare Today, Gone Tomorrow**

There are fourteen hares on the uncut strip. After the two top pieces are switched there are only thirteen hares. Study the hare reading the book to see why this happens.

**Utah Scramble**

UTAH = 24 ways

**Olympic Rings Stack**

The least number of moves for five rings is 31. The formula for any number of rings is two to the nth power minus one, where n equals the number of rings.
Balloon Relay

1) 25
2) 100 billion
3) X
4) 3 coins (2 quarters, 1 dime or 1 half dollar, 2 nickels)
5) 21
6) True
7) 60
8) $18 + 3 = 21$
9) 1
10) one thousand

Hare’s House Hunt

Cottontail Cottages
Yuma, AZ 85364
Flopsy, Mopsy, and Cottontail Associates
Mesa, AZ 85275

Hoppy Trails To You Realty
Gila Bend, AZ 85337
Peter’s Prime Properties
Tempe, AZ 85285

Tail Or Made Homes
Red Rock, AZ 85245
MacGregor’s Gardenview Homes
Sun City, AZ 85375

Hop-and-Stop Real Estate
Scottsdale, AZ 85255

What’s My Name? Game

1) 35
2) odd numbers
3) Roman numerals
The Story of the Olympics

The first Olympic Games were held in Greece over _____ years ago. They began in _____ B.C. and had only _____ event - a footrace. Later boxing, wrestling, chariot racing, and the pentathlon (which consists of _____ different events) were added. The Olympic Games were held every _____ years for more than _____ years, or _____ centuries. In _____ A.D. the Games were prohibited by the Roman emperor. The modern Olympic Games were begun through the efforts of a Frenchman named Baron Pierre de
Coubertin. In _____, 312 athletes from _____ countries competed in _____ sports.

THE OLYMPIC 2002 MASCOTS

Coal
The American Black Bear

Powder
The Snowshoe Hare
Copper
The Coyote

Hare Today, Gone Tomorrow

How many hares are on the strip below?

Carefully cut the strip apart along the vertical and horizontal center lines.

Switch the top two pieces.

Now count the hares again. What do you notice? How do you think this happens?
What’s My Name? Game Questions

**Question #1:** The category is whole numbers.
Clue #1: I am a two-digit odd number divisible by 5 and by 7.
Clue #2: The sum of my digits is 8.
Clue #3: The product of my digits is 15.
Clue #4: My ones digit is 2 greater than my tens digit.
What’s My Name?

**Question #2:** The category is whole numbers.
Clue #1: I am never a pair.
Clue #2: When I’m put into equal-sized groups, there’s always one thing remaining.
Clue #3: I am not divisible by 2.
Clue #4: I always have a 1, 3, 5, 7, or 9 in my ones place.
What’s My Name?

**Question #3:** The category is number systems.
Clue #1: My symbols are still used today.
Clue #2: I do not use place value.
Clue #3: I use addition and subtraction.
Clue #4: You’ll find me on clocks, buildings, and outlines.
What’s My Name?

**Question #4:** The category is mixed numbers.
Clue #1: I am greater than 99 but less than 105.
Clue #2: I am made up of four odd digits.
Clue #3: All of my digits are the same.
Clue #4: I am equal to 100.
What’s My Name?

**Question #5:** The category is famous mathematicians.
Clue #1: I was born in Germany in 1879.
Clue #2: My teachers thought I was retarded.
Clue #3: I studied geometry, lines, infinity, and functions.
Clue #4: I’m probably best known for my Theory of Relativity.
What’s My Name?

What’s My Name? Game

**Team Name _____________________________________**

**Question # 1**

Clue # 1 2 3 4

What’s My Name?
Team Name ________________________________

Question #4

Clue # 1 2 3 4

What’s My Name?

What’s My Name? Game

Team Name ________________________________

Question #5

Clue # 1 2 3 4

What’s My Name?
Community Math Olympics 2002
Middle School Mathematics Fun for Families to Share
Home Extension Packet
Community Math Olympics 2002
Home Extension Activities

Pattern Warm Ups   Give the next three items in each series:

1, 1, 2, 3, 5, 8, 13, _____, _____, _____

M, T, W, T, _____, _____, _____
(Hope it doesn’t take you days to figure this one out!)

J, F, M, A, _____, _____, _____

O, T, T, F, F, _____, _____, _____
A, E, F, H, K, L, M, _____, _____, _____

(Count to ten before you give up on this one!)

(If you get this one straightened out, go to the head of the line!)

The Salt Lake City 2002 Story

Use the numbers in the box to complete the story.

Salt Lake City, Utah, is the host for the _____ Olympic Winter games which will take place from February _____ through February _____, 2002, with an estimated _____ athletes and officials from _____ countries participating in _____ events. The

<table>
<thead>
<tr>
<th>7</th>
<th>8</th>
<th>16</th>
<th>24</th>
<th>35</th>
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<td>VIII</td>
<td>XIX</td>
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<td>78</td>
<td>8</td>
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</table>
Paralympic Games, which feature athletes with physical or visual impairments competing in ice sled hockey, alpine skiing, Nordic skiing, biathlon, and short track racing, will be held from March _____ through March _____, 2002. Over _____ athletes and officials from _____ countries are expected to participate in _____ events.

**Bear’s Boating Dilemma**

Coal, seven of his bear relatives, and two of their cubs need to cross a river. A small boat is available that can hold either

a) one adult bear     b) one cub     or     c) two cubs

Everyone can row the boat.

How many one-way trips does it take for them to all get across the river?

**Coyote’s Coin Flip**

Coyote enjoys playing this game.

Place a penny, a nickel, a dime, and a quarter in the circles below, from left to right. The object is to reverse their order, that is, to get them in the sequence quarter, dime, nickel, penny in the fewest possible turns.

In each turn, move a coin only one circle to the left or right. You may move a coin only onto an empty circle or onto an adjacent coin of higher value. For example, a penny may move onto a nickel, but not the reverse. Only the top coin of a stack may move. What’s the smallest number of turns necessary to make the switch?
My Office
Lunchtime, Any Day

Dear Ms. Hare,

You recently expressed an interest in moving to
our beautiful state. Currently, we have houses available in seven cities. If you are interested in visiting our model homes in any of these locations, kindly return the enclosed postcards. For your convenience, we have included self-addressed adhesive labels which can be affixed to each postcard.

Relishing the prospect of your arrival,

Sincerely,

F. MacGregor
Balloon Relay Questions

1) Figure out the pattern and write the next number in this series:
   1, 4, 9, 16, _____

2) Circle the smaller number:
   10 trillion or 100 billion
3) Figure out the pattern and write the next letter in this series:
   A, Z, B, Y, C, _____

4) Using an ODD number of coins, what’s the fewest you’d need to total sixty cents: _____

5) Figure out the pattern and write the next number in this series:
   1, 3, 6, 10, 15 _____

6) True or False:
   The denominator of a true fraction can’t be zero.

7) If a bowl contains 17 apples, 13 bananas, 5 worms, 22 grapes, and 8 pears, how many pieces of fruit are there?

8) Locate two addends and their sum in this set of numbers:
   7, 21, 17, 3, 6, 18, 36
   _____ + _____ = _____

9) One divided by itself equals _____

10) What is the first whole number that has the letter a in it
when you spell out its name?