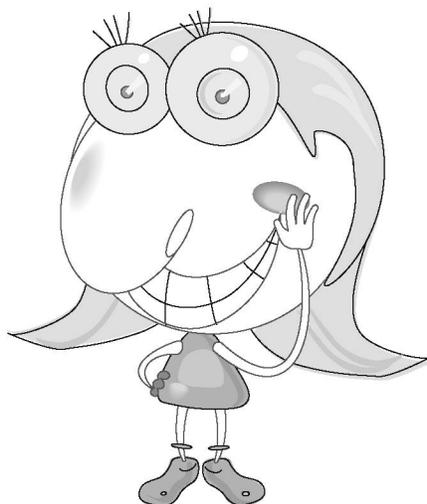


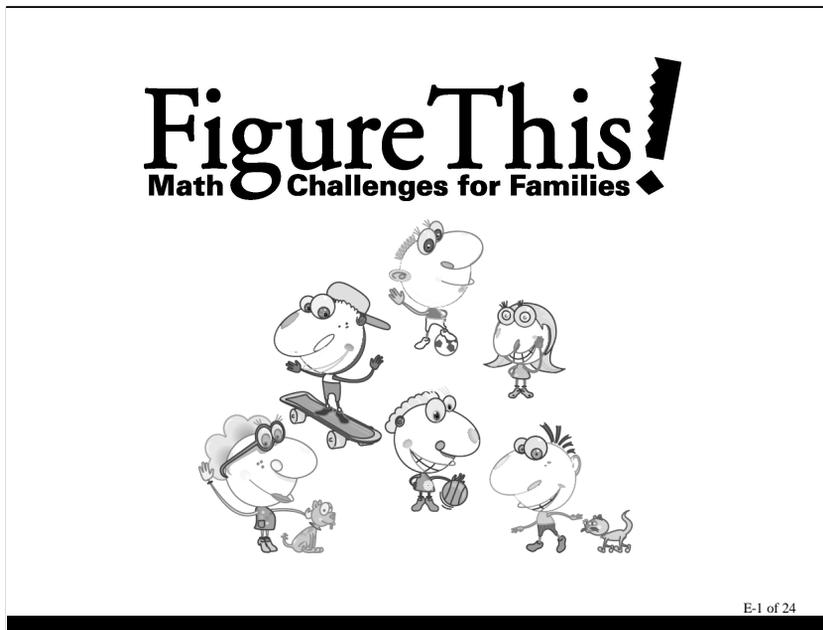
Figure This!

Math Challenges for Families

Presentation Notes

pages F1-24



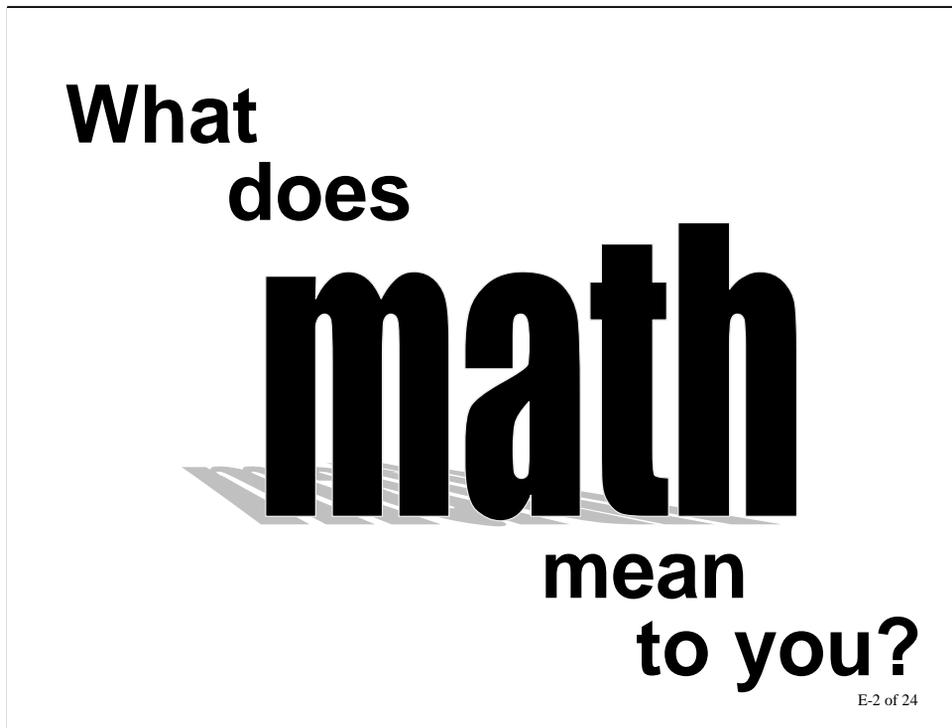


In preparation for the session, we recommend:

- Visiting the www.figurethis.org Web site to become acquainted with the Figure This! campaign and Web site features
- 🕒 Duplicating the family support materials
- 🕒 Duplicating the challenge(s) to be used during the workshop
- 🕒 Duplicating the sample challenges to be sent home
- 🕒 Obtaining an overhead projector (if using transparencies instead of PowerPoint)
- 🕒 Obtaining a television and VCR (for the video)
- 🕒 Obtaining a computer and LCD panel (if using the PowerPoint presentation from the CD)
- 🕒 Obtaining an Internet connection to demonstrate the Figure This! Web site and how families can use the site at home.

Sample speaker remarks and descriptors for the presentation (such as what to do and when) are given on the Notes Pages of this presentation. [NOTE: On the CD-ROM, the Notes Pages show speaker remarks in blue type and descriptors in black type.]

Begin PowerPoint presentation. The Figure This! logo should be displayed on the screen as people walk into the room to reinforce the discussion topic and engage interest.



Ask the audience, “[What does math mean to you?](#)”

Give attendees 1-2 minutes to talk to neighbors seated close to them. Next give attendees 2-3 minutes to voluntarily share their thoughts with the whole group. Move the discussion along, rather than focusing on negative stories.

**What
do you think
math
means to
your children?**

E-3 of 24

Ask, “[What does math mean to your kids?](#)”

Give attendees 1-2 minutes to talk to neighbors seated close to them. Next give attendees 1-2 minutes to voluntarily share their thoughts with the whole group. If you are a teacher, you might wish to collect some responses from your own students to share with this audience.

What does
math
mean
to
their
future?

E-4 of 24

Ask, “[What does math mean to their future?](#)”

Pause for effect but do not answer the question.
Quickly go to the next slide.

Everything!

E-5 of 24

Everything!

Math is important. Careers ranging from auto mechanics to electricians to architects to doctors to pilots require a sound background in math. Advances in technology are changing the workplace, and these changes mean that students need to know more math in order to adapt to these new environments.

Math is critical in making decisions about health care treatments, travel routes, “best buys,” and payment options.

Believe it or not, math can be fun! From puzzles to games to solving problems, math stretches our imaginations and allows us to reach logical conclusions.

Family Involvement Is Important

You can make a difference!

→ Studies show when there is a high level of family involvement students do better in school.

Get involved!

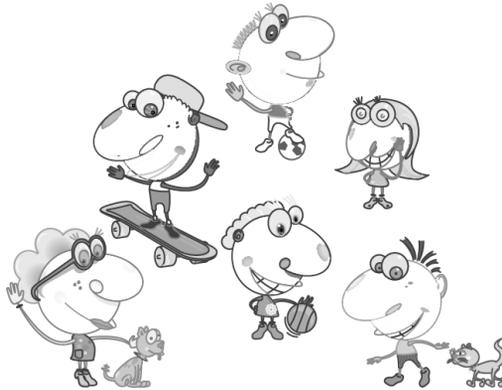
E-6 of 24

You can make a difference. Studies show that when there is a high level of parent involvement, students do better in school.

No matter what your own experiences are with math, you can be a positive influence on your child.

Figure This!

Math Challenges for Families



E-7 of 24

Today, I'd like to show you a family-friendly way to:

- encourage your child's interest in math, and
- explore math as a family.

Figure This! math challenges provide stimulating problems that are fun to do together and that help children appreciate math.

Goals

- ◆ Engage families in math activities and efforts to improve math education
- ◆ Build public awareness of the importance of high-quality mathematics
- ◆ Illustrate high-quality middle-school mathematics



E-8 of 24

The goals of Figure This! are to:

- Engage families in math activities that support their child's middle school math program
- Build awareness of the importance of mathematics
- Show families the high-quality math that middle school students should experience.

Materials

Provide families of middle-school students with:

- ◆ Math challenges to work on at home
- ◆ Support materials to boost family involvement



E-9 of 24

Figure This! includes 80 math challenges that reinforce the math middle school students do in school.

Family support materials are also available to help you recognize the many ways you can work with your child—all in the comfort of your own home.

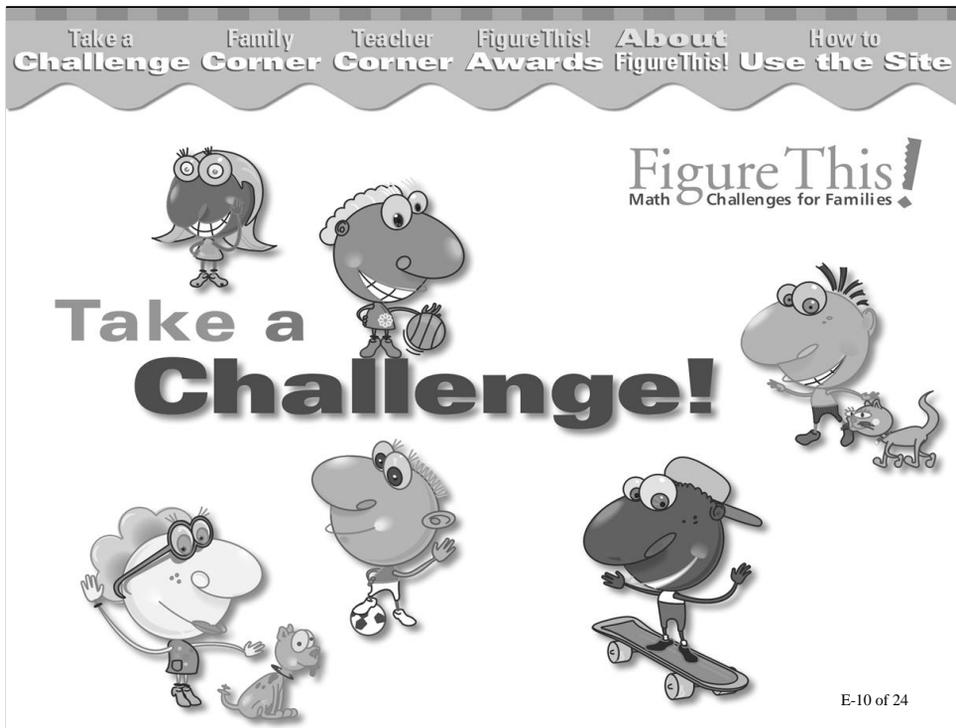


Figure This! math challenges and family support materials are on the Figure This! Web site at www.figurethis.org.

Introduce the video. For example, you could say:
“Let’s watch this video about Figure This!”

Then turn on the video—it is approximately 6 minutes long.

Math Challenge
#2
BEATING HEART

Figure This!
Math Challenges for Families

How **fast** does your heart beat? **??**
How long does it take for your heart to beat 1000 times?

Figure This! If you started counting your heartbeats at midnight on January 1, 2000, when would you count the millionth beat? What about the billionth beat?

Hint: Estimate your heart rate in beats per minute, per hour, and per day.

Estimating and understanding large numbers are useful mathematical skills. Without these skills, it is difficult to comprehend the size of the national debt, for example, or how many miles it is to Mars.

bah boom, bah boom, bah boom

For more math challenges and the solutions check us out online at www.figurethis.org

Answer: It takes about 15 minutes for a heart to beat 1,000 times. On January 10, 2000, your heart would have beat about 1 million times. 27 years later your heart would reach about 1 billion beats.

E-11 of 24

Put a challenge up on the screen.

[NOTE: Three challenges are provided in this presentation; choose the one with which you feel most comfortable.]

Ask participants to work on the challenge in teams. Allow 10-15 minutes. Use the “Getting Started” comments found in each challenge if people are having difficulty.

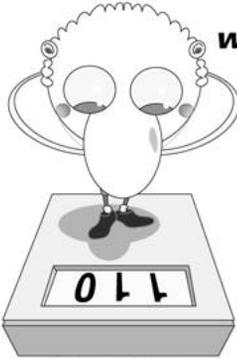
Discuss the solutions or strategies used.

Distribute a copy of the complete challenge with all components. [NOTE: These are in your handouts.] Ask the participants to discuss how “Try This” might be used in their homes, or brainstorm as a group about some of the “Things to Think About.”



Figure This!

Math Challenges for Families



what's your INDEX???

Figure This! Some doctors use body-mass index as an indicator of health risk. According to *The Old Farmer's Almanac 2000*, body-mass index (BMI) can be found using the formula:

$$BMI = \frac{(W \times 705) \div H}{H}$$

where H is height in inches and W is weight in pounds. According to the *Almanac*, an index greater than 27 or less than 19 indicates an increased risk for health problems. Helix is 5 feet, 2 inches tall and weighs 110 pounds.

Is his health at risk?

Hint: Convert Helix's height to inches, then use the formula.

Using and understanding formulas is a critical skill in almost every field, including science, engineering, business, and aviation. Spreadsheets and many computer programs require formulas to analyze situations and predict patterns.

For more math challenges and the solutions check us out online at

➡ www.figurethis.org

←

Answer: Based solely on body-mass index, Helix's health is not at risk.

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[Challenge option 2]



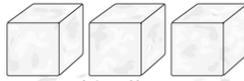
FigureThis!
Math Challenges for Families

When should you buy or *Crushed* **block ice** ice?

Figure This! Which typically melts faster, a single block of ice or the same block cut into three cubes?



Block of Ice



Cubes of Ice

Hint: Compare the exposed areas.

Surface area is a critical factor in heating and cooling. Architects, interior decorators, chemists, and environmental engineers use surface area and volume in their work.

For more math challenges and the solutions check us out online at
➡ www.figurethis.org

Answer:
The three cubes will melt faster.

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[Challenge option 3]

Math Content & Skills

Algebra						
Compare representations	Double or Not (7)	Play Ball (11)	What's Your Index (21)	Salaries (29)	Number Tricks (60)	
Constant rate of change	Double or Not (7)	Salaries (29)	Access Ramps (33)			
Contrast functions	Double or Not (7)	Animal Ages (50)				
Graphs of lines	Stamps (8)	Animal Ages (50)				
Modeling problems	Line Up (2)	Salaries (29)	Rose Bowl (42)	Table for 19 (44)	Movie Money (77)	Gifts Galore (80)
Represent patterns	Stamps (8)	Play Ball (11)	Gifts Galore (80)			
Solve linear equations	Stamps (8)	Smiles (30)	Gone Fishing (58)			
Solve problems using symbols	Body Mass (21)	Smiles (30)	Number Tricks (60)	Gone Fishing (58)		
Variable	Body Mass (21)	Number Tricks (60)	Glide Ratio (75)			

Each Figure This! math challenge supports one or more standards, as presented in the NCTM *Principles and Standards for School Mathematics*.

E-14 of 24

Show the Figure This! content grid. This illustrates how the challenges support NCTM's *Principles and Standards for School Mathematics*. The grid covers Algebra, Geometry, Number, Measurement, and Statistics & Probability on separate slides. A complete copy of the content grid is included in the handout materials.

You could say: [The Figure This! challenges support important math topics such as Algebra, Geometry, Number, Measurement, and Statistics & Probability. These math topics are detailed in *Principles and Standards for School Mathematics*, developed by the National Council of Teachers of Mathematics.](#)

Personalize the content grid to highlight the challenges and topic areas that relate to your classroom content so families see them as a part of their children's school experience.

Math Content & Skills

Geometry						
Connections to other disciplines	Don't Fall In (4)	Upside Down (5)	Map Coloring (37)			
Coordinate geometry	Morphing(79)					
Geometric models of algebraic concepts	Fractals (23)	Three Squares (45)	Cut the Cake (54)			
Induction/ deduction	Don't Fall In (4)	Basketball Picks (20)				
Networks	Which Way? (6)					
Properties of 2- and 3-D figures	Popcorn (3)	Don't Fall In (4)	Fire Hydrant (35)	Cut the Cake (54)	Decorating Boxes (55)	Visualizing (76)
Scale drawing	Statue of Liberty (61)					
Similarity/ congruence	Japanese Floors (59)	Statue of Liberty (61)				

Each Figure This! math challenge supports one or more standards, as presented in the NCTM *Principles and Standards for School Mathematics*.

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Geometry chart

Personalize the content grid to highlight the challenges and topic areas that relate to your classroom content so families see them as a part of their children's school experience.

Math Content & Skills

Measurement					
Estimate measurements	Popcorn (3)	What's My Angle (10)	Big Trees (15)	Time Zones (46)	
Formulas for area, circumference	Big Trees (15)	Fractals (23)	Windshield Wipers (32)	Patios (39)	Cut the Cake (54)
Measure angles, length	Mirror, Mirror (9)	What's My Angle (10)	Patios (39)	Putt-Putt (40)	Airport Runways (66)
Metric and customary units	Faster (34)	When in Rome (67)	Drip Drops (56)		
Rates, velocity, density	Line Up (1)	Beating Heart (2)	Turn Tern (18)	Gasoline Tanks (24)	The Race (74)
Relationship among units	What's My Angle? (10)	Faster (34)	When in Rome (67)		
Scale factors	Fractals (23)	Statue of Liberty (61)			
Surface area and volume	Popcorn (3)	Chocolate (12)	Keeping Cool (62)		
Use appropriate units	Popcorn (3)	Big Trees (15)	Faster (34)	The Race (74)	

Each Figure This! math challenge supports one or more standards, as presented in the NCTM *Principles and Standards for School Mathematics*.

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Measurement

Personalize the content grid to highlight the challenges and topic areas that relate to your classroom content so families see them as a part of their children's school experience.

Math Content & Skills

Number							
Compare and order fractions, decimals, and percents	Battling Averages (14)	Perplexing Percentages (17)	Gasoline Tanks (24)	Grape Juice Jungle (25)	Majority Vote (36)	Glide Ratios (75)	
Factors	Combination Locks (22)	Tournaments (31)	Monday's Child (38)	Seeing Stars (43)			
Integers	Which Way (6)	Thirteen! Oh No! (13)	Beanie Babies (16)	Time Zones (46)			
Large Numbers and notation	Beating Heart (2)	Double or Not (7)	Play Ball (11)	Tern Turn (18)	Pigeonholes (28)		
Percents > 100 and < 1	Perplexing Percentages (17)	Majority Vote (36)					
Ratio and proportions	Battling Averages (14)	Gasoline Tanks (24)	Grape Juice Jungle (25)	Access Ramps (33)	VCR (47)	Tan-Don't Burn (65)	TV Ratings (72)
Solve problems with decimals, fractions, percents	Battling Averages (14)	Big Trees (15)	VCR (47)	Working Hours (48)	Archeology (71)	Movie Money (77)	
Uses of numbers	I Win (26)	Radar Bills (41)	Bar Codes (51)				

Each Figure This! math challenge supports one or more standards, as presented in the NCTM *Principles and Standards for School Mathematics*.

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Number

Personalize the content grid to highlight the challenges and topic areas that relate to your classroom content so families see them as a part of their children's school experience.

Math Content & Skills

Data Analysis and Probability					
Apply probability	Two Points! (19)	I Win! (26)	Capture Re-Capture (52)	Matching Birthdays (63)	Misaddressed (69)
Collect data	I Win! (26)	Salaries (29)	Wheel of Fortune (64)		
Complementary and mutually exclusive events	Majority Vote (36)	Matching Birthdays (63)	Bones (68)		
Formulate questions	Two Points! (19)	Salaries (29)	Majority Vote (63)		
Graphical representations of data	Basketball Picks (20)	Working Hours (48)	Census (53)	Wheel of Fortune (64)	Soda (70)
Make conjectures about differences	Life Expectancy (27)	Salaries (29)	Archeology (71)		
Make conjectures about relationships	Life Expectancy (27)	Salaries (29)	Bones (68)		
Measure of center and spread	Battling Average (14)	Majority Vote (36)	Bowl 'Em Over (78)		

Each Figure This! math challenge supports one or more standards, as presented in the NCTM *Principles and Standards for School Mathematics*.

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Data Analysis and Probability

Personalize the content grid to highlight the challenges and topic areas that relate to your classroom content so families see them as a part of their children's school experience.

Family Support Materials

◆ Brochures to help families

- Helping with Homework
- Working with Schools
- Getting Support
- Finding Math in Literature
- Understanding Changes in the Math Students Need to Know



E-19 of 24

The most important part of Figure This! is the family.

There are two ways to get involved. One, you can work on the challenges with your child at home. Two, you can use the family support brochures for tips on how to get more involved in your child's math education. There are family support materials for:

- Helping with Homework
- Working with Schools
- Getting Support
- Finding Math in Literature
- Understanding Changes in the Math Students Need to Know

Be Positive

- ◆ My daughter is growing up with a “can do” attitude toward math. Her skills are more advanced than mine, and I let her know I’m proud of her.
- ◆ Maybe you weren’t good at math, but your kid doesn’t have to know that. Have a good attitude and he will, too.

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Distribute family brochures and support materials [NOTE: One copy of these materials is included in this kit. Duplicate as many as you need. Materials also may be downloaded from the Figure This! Web site at www.figurethis.org.]

The Families and Support brochure has quotes by parents divided into specific headings. [These quotes are contained in slides 21-23.] Discuss parents’ quotes under the heading “Be positive about math.”

Then refer to the Math and Literature brochure and discuss ways in which reading books that highlight math can be a positive family experience.

Communicate with Your Child

- ◆ It may be only a few minutes a day, but I'll sit down with my grandson and ask him what math he's working on. Sometimes by explaining it to me, it becomes clearer to him.
- ◆ From talking with my daughter, I've begun to see math in an entirely new way. She likes taking the lead, and I'm sure that teaching me helps reinforce what she's learned.

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Discuss parents' quotes under the heading "Communicate with Your Child." Then refer to the Families and Homework brochure and discuss ways that families can become actively involved in their child's math homework. This may take the form of knowing the right questions to ask a child about what took place in the class, as well as knowing where and how to get additional help.

Have High Expectations

- ◆ I quit taking math after algebra. What a mistake! I'll urge my stepson to take all the math he can get.
- ◆ I guess I'm pretty tough. From day one, I tell my son that not passing math is not an option. But I also let him know I'm there for him every step of the way.

E-22 of 24

Discuss parents' quotes under the heading "Have High Expectations." Then refer to the Families and Math and Families and School brochures and discuss ways that families can get involved in shaping their children's math education.

**You Can
Make a
Difference!**



E-23 of 24

Conclusion:

There are many ways that you and other family members can become an active part of your child's mathematics education. Working with your child can provide the essential support and encouragement he or she needs.



Figure This!

Math Challenges for Families

www.figurethis.org

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Figure This! math challenges and family support materials can help. Log on to www.figurethis.org. You'll enjoy the math challenges and the family time you spend together!

Allow time for questions.