

COUNTING ON FRANK



EA x Kids

Expert's Corner

Dear Parents,

As educators and parents, we all hold an enormous hope for our children and their chances for a successful future. All around us we see how technology is changing the way our children learn now and the types of occupations they will have in the future. Our children's knowledge and confidence in mathematics and their ability to utilize mathematical skills in their lives are becoming even more important to their ability to succeed.

As a result of world-wide recognition that increased achievement in mathematics is needed, there have been significant changes in our approach to mathematics education in recent years. In the United States the new approach is embodied by the NCTM (National Council of Teachers of Mathematics) standards. One of the major changes is the shift in emphasis from the teaching of basic computational skills such as addition and multiplication, though of course this remains essential, to the more complex reasoning needed to apply these skills to real world experiences. This provides both long-sought-after motivation to learn the basic skills and a better understanding of the math itself and how it can be a powerful tool in each child's life.

It has been a great pleasure for all of us at E-GEMS to play a part in the development of Counting on Frank. It blends the opportunities to develop and enhance real math skills while providing meaning and motivation for the math in a world kids will love. I am confident that your child, your child's teachers and you will all be delighted with this wonderful mathematics experience.

Dr. Maria Klawe

Director, Electronic Games for Education in Math and Science
Professor and Head, Department of Computer Science
The University of British Columbia, Vancouver, Canada

A WORD ABOUT OUR EDUCATIONAL TEAM

Electronic Games for Education in Math and Science (E-GEMS) is a large-scale collaborative research project by university researchers, teachers, and professional game designers centered at the University of British Columbia in Vancouver, Canada under the leadership of Dr. Maria Klawe.

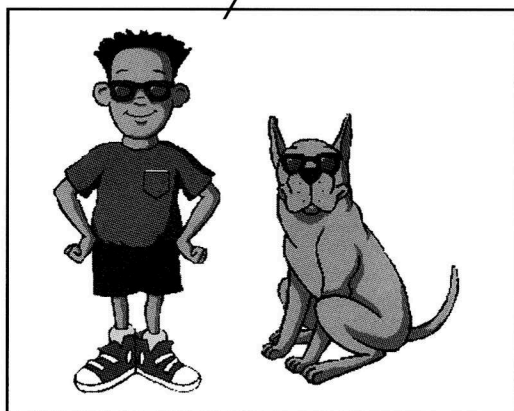
The goal of E-GEMS is to increase interest and achievement in mathematics and science by children in elementary and intermediate grades through the use of electronic games and supporting teaching materials. Counting on Frank is the first product developed as part of the E-GEMS project, and is designed to follow the NCTM (National Council of Teachers of Mathematics) standards for mathematics education in grades 3-7.

CONTENTS

Setting up to Play	2
Getting Around	4
The Note Pad	6
The Solution Tester	9
Games	10
Saving Your Adventure	15
Loading a Saved Adventure	15
How to do the Math	16
Fun Stuff to Do at Home	27
Credits	32



"I'm Henry. This is Frank."



Setting up to Play

Henry and Frank

Henry and Frank are a boy and his dog. Don't mix them up: Henry's the boy and Frank is the dog. Henry and Frank love a number of things, but most of all they love math. In *Counting on Frank*, you and Henry can count on Frank to accompany you through your math adventures in Henry's hometown. It looks like their latest adventure could land them in Hawaii! If they win the Jellybean Counting contest, that is...

The Jellybean Counting Contest

Mrs. Sherman is the owner of Sherman's General Store, near the park in Henry and Frank's hometown. She's having a jellybean counting contest. Guess the total number of jellybeans in her jar and win a trip to Hawaii!



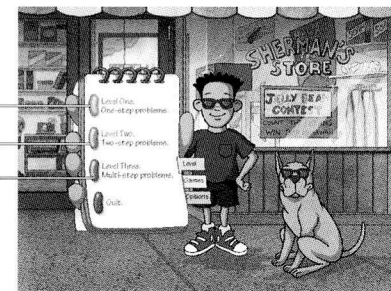
To win, you and Henry need to collect the clues hidden all over town. Each clue will help you narrow down the possible answers. To find out how many jellybeans are in the jar, explore and collect clues by solving math problems. As Henry's Dad says: "You have a brain. Use it!"

Starting

If you need instructions about how to insert the CD and startup, please see the Reference card that came in your package.

Once you're in the game, click on a jellybean in Henry's Note Pad. Each item on the Note Pad is a level of difficulty. Click the one you'd like to play.

Challenging
More Challenging
MOST Challenging



All the problems in *Counting on Frank* are word problems.

- On **Level One** you'll work through basic one-step problems using addition, subtraction, and multiplication.
- On **Level Two** you'll work through one- and two-step problems that combine basic arithmetic operations, fractions and percentages.
- On **Level Three** you'll work through multi-step problems that combine basic arithmetic operations, fractions and percentages.


For help, see the section in this manual called *How To Do the Math*.


Getting Around


There are lots of different ways to get around. You can travel from scene to scene by entering and exiting through doors or walking down paths. You can also jump from scene to scene using Henry's Note Pad. See the *Note Pad* section for details.


Your Mouse Cursor


Your mouse cursor (pointer) sometimes changes as you move it around the screen.


 When your cursor looks like an arrow, you can click on things in a scene (like a rubber ducky, a lawn, or a person). Click around and see what happens!

 When your cursor looks like a pointing hand, it's telling you that you can leave the scene by walking that direction. Click to go that direction.

 You must be close to Henry's shirt-pocket! That's where he keeps his Note Pad. When your cursor turns into a Note Pad, click to bring up Henry's Note Pad.

 A clue! Click on the jellybean cursor to get a math problem from Henry. If you solve it correctly, you'll get a clue to the number of jellybeans in Mrs. Sherman's store.

 A game! When your cursor turns into a die, click to play a math game. For more information about how to play the games see *Games*.

 The Solution Tester! You must be in the tree house with Ginger. Ginger, Henry's friend, carries the Solution Tester in her shirt-pocket. See *The Solution Tester* section for more information.



You'll see this cursor when you're ready to name the number of jellybeans at Mrs. Sherman's store!

Moving



Click near an exit to move to the next scene



To move from scene to scene, move the cursor to an entrance or an exit (like a door or footpath). The cursor turns into a hand to show you the way out (there may be more than one way out). When the cursor turns into a hand, click.

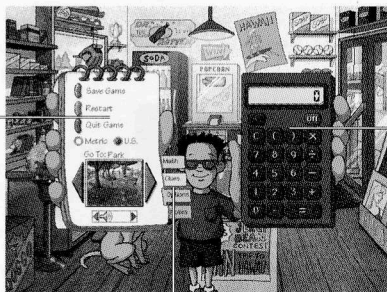
SHORT CUT: You can also jump to any scene using Henry's Note Pad.

To jump to a scene:

1. Click on Henry's shirt pocket. The Note Pad appears.
2. Click the OPTIONS tab. The Options page appears.
3. Click the right and left arrows on either side of the scene pictured near the bottom of the page to flip through the scenes.
4. When you find a scene you like, click the picture to go there.

The Note Pad

Note Pad



Calculator

Click on tab to flip to a section in the Note Pad

Henry's Note Pad is the key to getting to special options and jumping to places in the program. When you first start the game some options won't be available in the Note Pad. Keep reading to see how the different options work.

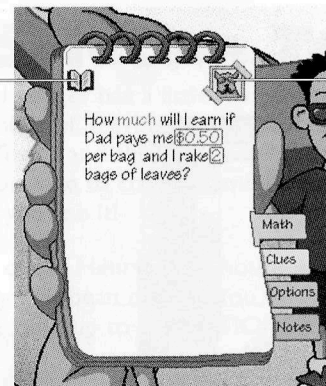
- To get to the Note Pad, click on Henry's shirt-pocket.

Math

The first tab in the Note Pad is the Math page. When you get a jellybean cursor (a clue) and click, the Note Pad appears turned to the Math page with an interactive math problem to solve. When you don't have a math problem to solve, this page has some interesting math facts to consider.

- On the MATH page, solve the math problem given to you.

Listen to the Question Again



Math Page

Get Help with the Problem

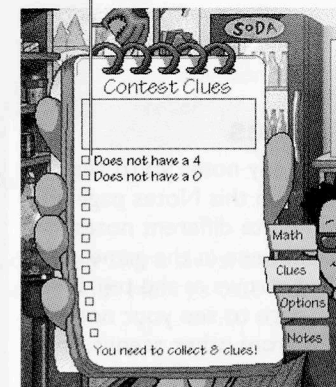


Clues

Check out the list of clues you've accumulated so far. Your Note Pad can only carry twelve clues at a time.

- To place a clue in your list, click a box on the page.
- To remove a clue, click its box, then close the Note Pad by clicking the OFF button on the calculator.
- To see the full version of a clue already in your list, click its box.

Click one of these little boxes to save your clue.



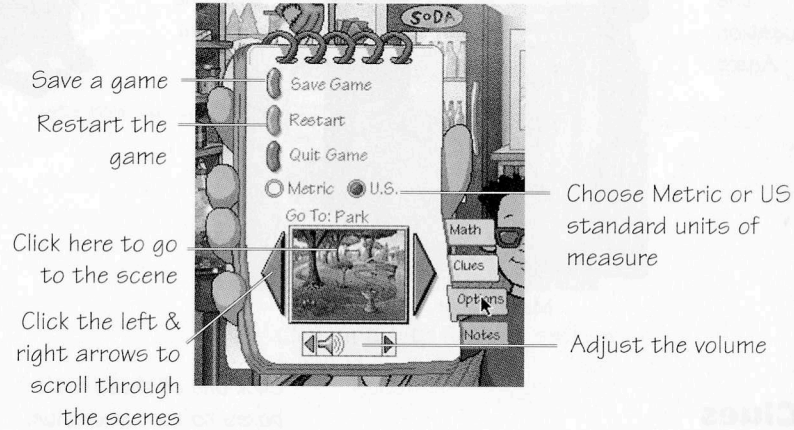
IMPORTANT! Remember, if you want to keep clues, be sure to click an empty box on the page.

The jellybean contest clues, and answers change with every new game.



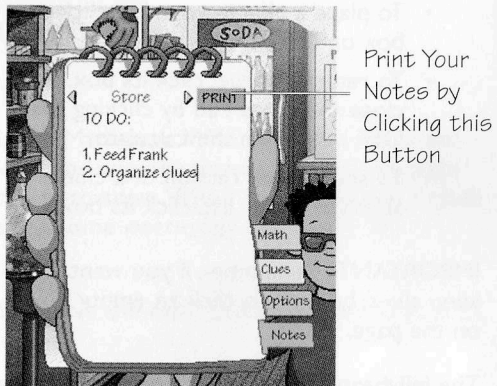
Options

Change the game options on this Options page.



Notes

Type any notes you'd like to keep on this Notes page. You can write different notes for each scene in the game. Click the arrows at the top of the page to see your notes from other scenes. These notes will be saved when you save your game.

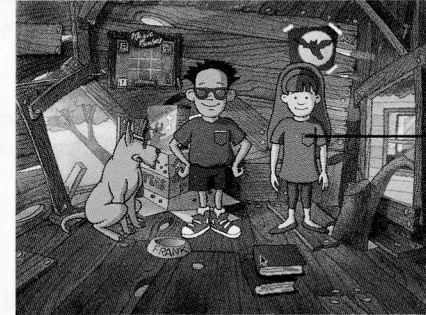


The Solution Tester

Henry's friend Ginger has a little item that will help you pinpoint the number of jellybeans in Mrs. Sherman's jar. It's called the Solution Tester, and she'll let you use it whenever you like. Remember, you have to collect some clues to put into the tester before you use it!

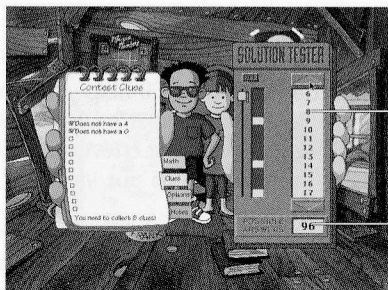


Ginger hangs out in Henry's tree house where she works on her own guesses for the jellybean contest. You can get to the tree house using Henry's Note Pad. Flip to the OPTIONS page and click the tree house.



To use the Solution Tester:

1. Click on Ginger's shirt-pocket. She and Henry share clues, and in a moment the Solution Tester appears along with Henry's clue list.



Number Line

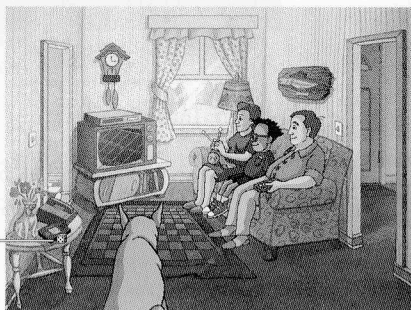
Total Number
of Possible
Answers

2. Click a clue in Henry's list to try it in the Solution Tester. Numbers that are definitely NOT the answer turn black on the number line. All valid answers remain red.

On level one, you can put as many clues as you like into the Solution Tester. On level two and level three the Solution Tester only accepts four clues at a time.

Games

Throughout your adventures with Henry and Frank, you'll find games in some of the rooms. You know your cursor is on a game when it turns into a single die.



Bingo! Here's a game!



In some games, you can play against a friend. Your opponents can be lots of different players (Henry's friends) or any Frank character. The pictures of Frank vary from easy (a picture of Frank in a diaper) to hard (a picture of an old Frank with glasses). If you play against a Frank character, you're playing against the computer. If you're playing against one of Henry's friends, you're playing a two-player game.

- To choose a new character, click the picture of the character you want to change.

Magic Numbers



Special Die

Grid

Help

Quit

Difficulty Level Operation

The object of Magic Numbers is to get to a certain number without going over it by adding or multiplying the numbers on the grid. The number you're shooting for is in the title of the specific grid you're on. In **Nine or Bust**, shoot for nine. In **Twelve or Bust**, shoot for twelve.

To win Magic Numbers:

1. When it's your turn, click the Special die. It rolls and lands on a number.

2. Move your mouse cursor to the grid. You'll see a glowing blue box wherever your cursor is.
3. Click a space on the board to put your number there.
4. Add or multiply the lines of numbers to reach your goal number (2 in Two or Bust, 9 in Nine or Bust, 12 in Twelve or Bust).
 - In Two or Bust, add or multiply four numbers in a row.
 - In Nine or Bust, add or multiply three numbers in a row.
 - In Twelve or Bust, add or multiply four numbers in a row.

Geometron



The object of Geometron is to complete more shapes (also called polygons) than your opponent. Take turns clicking lines with your opponent. When you close up one shape, you get another click. Choose your edges wisely!

To play by yourself or with two players:

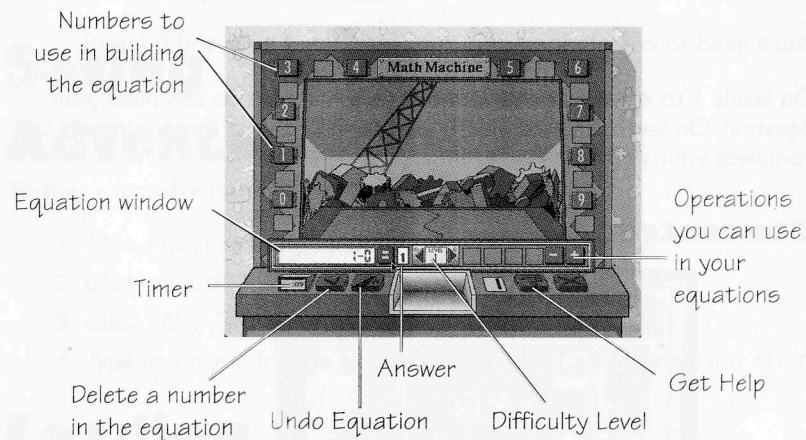
1. Click any line. Your opponent clicks a line.
2. When all edges of a shape are clicked except one, click the last edge to complete the shape. Keep your eyes open;



sometimes completing one shape creates another opportunity to score!

If you have trouble seeing where your opponent placed their line, look for the white dots that mark the endpoints of the last line completed.

Math Machine



The object of the Math Machine is to use the numbers around the edge of the machine to make equations that equal the answer displayed on the right of the equation window. You can use the numbers around the edge of the screen only a certain number of times. The small yellow lights on either side of each number tell you how many times you can use it. You can use any operation to get the result.



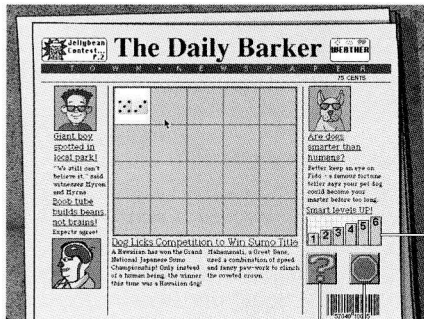
For example, when the Math Machine starts, it wants you to get the answer 1. There are many ways you can get the answer 1, but for now:

1. Start the game, click an arrow to select a level.
2. Click the 5
3. Click the subtraction (-) symbol
4. Click the 4. The equation looks like this so far: $5-4$.
5. Click the equal sign (=), and you're done! $5-4=1$!

You'll need to complete equations for numbers 1 to 9, and 0 (zero).

On levels 1 to 4, you can use two or more numbers to complete your equation. On levels 5 and 6, you'll need to use at least three numbers to complete your equation. For example, $5 + 6 - 4 = 7$

Concentration



Levels of Difficulty

Help Quit

The object of Concentration is to flip over two tiles that equal the same number. Continue flipping over matching tiles until the whole picture is revealed.



To play Concentration:

1. Choose a level of difficulty by clicking a number in the bar graph. 1 is the least challenging, 6 is the most challenging. The tiles appear face up, then flip face down.
2. Click a tile to flip it over.
3. Click another tile. If the two tiles don't match, they flip face down. Try again. If the two tiles match, both tiles disappear to reveal part of a picture. Keep clicking matching pairs of tiles until the whole picture is revealed.



Saving Your Adventure

To save your adventure:

1. Click Henry's shirt-pocket to bring up the Note Pad.
2. Click the OPTIONS tab. The Options page appears.
3. Click SAVE GAME. The Save Game dialog appears.
4. Type in a name for the game and click OK. Your adventure is saved.

Loading a Saved Adventure

To load a previously saved game:

1. Start up (or restart) the Program. Henry's Note Pad appears.
2. Click the OPTIONS tab. The Options page appears.
3. Click LOAD GAME. The Load Game dialog box appears.
4. Click the name of the game you want to load, then click OK. The adventure loads.

How to do the Math

This section gives you step-by-step instructions for solving the math problems in Counting On Frank. The numbers are a little different than the ones you'll find in the program (that way we're not giving away any answers), but the steps for solving the problems are the same.

When you're doing a math problem, you can change a problem by clicking on the red numbers surrounded by a box. Each time you change a problem and solve it, you'll get a new clue. If you think you have the right answer, click the equal (=) key on the calculator.

Level One

Sherman's General Store

If I spend **\$11** on dog food, how much change will I get from \$20?

This is a subtraction problem. That's because we're trying to figure out the difference between the money Henry has to start with and the money he spends. To figure out how much change Henry will get in the store, subtract the amount he spends from the amount he has to start with.

$$\$20 - \$11 = \$9$$

The Park

If I am 4.5 feet tall now, how much more would I have to grow to be **10** feet tall?

This is also a subtraction problem, because we want to know the difference between how tall Henry wants to be and how tall he is now.

If it's hard to think about the " $\frac{1}{2}$ " or the ".5", you can always forget about it for a while and think about it later. As long as you

take away the " $\frac{1}{2}$ " or ".5" eventually, you'll get the right answer. So, one way of solving the problem is to drop the " $\frac{1}{2}$ " or ".5" at first:

$$10 \text{ feet} - 4 \text{ feet} = 6 \text{ feet}$$

then take the " $\frac{1}{2}$ " or the ".5" away from the 6:

$$6 - \frac{1}{2} = 5 \frac{1}{2} \text{ feet.}$$

The Front Yard

How much will I earn if Dad pays me **\$0.50** per bag and I rake **4** bags of leaves?

This is a multiplication problem. To figure out how much Henry will earn, multiply the amount he gets paid per bag by the number of bags he rakes. \$0.50 is the same as 50 cents. So,

$$\$0.50 \text{ per bag} \times 4 \text{ bags} = \$2.00$$

You can also think of it this way:

$$50 \text{ cents} \times 4 = 200 \text{ cents} = \text{two dollars}$$

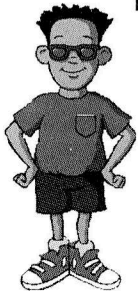
We don't say "200 cents" even though there are 200 cents or pennies in two dollars. We change 200 cents to \$2.00.

The Living Room

How much time would we spend watching TV if there were **27** channels and we watched each channel for **2** hours?

There are also two ways to figure out the Living Room. You could multiply...

$$27 \text{ channels} \times 2 \text{ hours} = 54 \text{ hours}$$



Or you could add...

$$\begin{array}{r} 27 \text{ channels for one hour} \\ + 27 \text{ channels for another hour} \\ \hline 54 \text{ hours} \end{array}$$

After 54 hours of TV it would be pretty hard to figure anything out!

The Bathroom

How much water would be in the tub if I ran the taps for $\boxed{4}$ minutes and the water ran at $\boxed{15}$ gallons a minute?

The Bathroom problem is like the Living Room problem. One way to figure it out is to multiply the amount of water that comes out each minute by the number of minutes the water is running. Can you figure out another way?

The Kitchen

If I knocked $\boxed{4}$ peas off my plate tonight and another $\boxed{9}$ peas off tomorrow night, how many would Frank have to eat?

To figure out the total number of peas Henry knocks off his plate, just add them all up.

$$4 \text{ peas} + 9 \text{ peas} = 13 \text{ peas.}$$

Of course, since Frank really doesn't like peas, there's no telling how many of those he'll actually eat.

The Bedroom

I weigh 69 pounds. How heavy would I be if I put on $\boxed{2}$ extra pounds of my clothes?

Use addition to solve this problem the same way as the kitchen.

Don't let the word "extra" confuse you. In this problem, Henry is telling you he weighs 69 pounds without any clothes on. His shoes and his shorts account for those other 2 pounds. Now just add them up!



Level two

Sherman's General Store

Dog food costs $\boxed{\$0.69}$ per can. If I buy $\boxed{5}$ cans of dog food, how much change will I get from \$20?



This is a two-step problem. Start by separating out the steps. First figure out how much Henry has to pay for the dog food. He spends $\$0.69$ per can \times 5 cans.

$$\$0.69 \times 5 \text{ cans} = \$3.45 \text{ Or}$$

$$\$0.69 + \$0.69 + \$0.69 + \$0.69 + \$0.69 \text{ cans} = \$3.45$$

Now subtract that from the amount he has to start with.

$$\$20.00 - \$3.45 = \$16.55$$

The whole thing looks like this:

$$\$20.00 - (\$0.69 \times 5) = \$16.55$$

It also looks like Frank is going to be one well-fed pooch!

The Park

If I was 1.5 feet tall when I was born and am now $\boxed{\text{twice}}$ as tall, how tall would I be if I grew another $\boxed{19}$ feet?

To figure out how tall Henry would be, first figure out how tall he is now, then add that to the extra amount he grows. The two steps are:

$$1.5 \text{ feet} \times 2 = 3 \text{ feet Or}$$

$$1.5 \text{ feet} + 1.5 \text{ feet} = 3 \text{ feet}$$

Then,

$$3 \text{ feet} + 19 \text{ feet} = 22 \text{ feet}$$

The whole thing looks like this:

$$(1.5 \text{ feet} \times 2) + 19 \text{ feet} = 22 \text{ feet.}$$

That's one tall kid!

The Front Yard

How much will I earn if Dad pays me $\$0.90$ per bag and I rake 2 bags of leaves and get a bonus of $\$5$?

The Front Yard problem is almost exactly the same as the Park problem. First figure out how much Henry earns for the bags he rakes, then add on his bonus. The final equation looks like this:

$$(\$0.90 \times 2) + \$5.00 = \$6.80$$

The Living Room

How much time would we spend watching TV if we watched 24 cartoon channels for 2 hours each, and 11 news channels for 4 hours each?

This is like two multiplication problems added together. First figure out how many hours of cartoons he watches:

$$\begin{aligned} 24 \text{ cartoon channels} \times 2 \text{ hours per channel} &= \\ 48 \text{ hours of cartoons} & \end{aligned}$$

Next figure out how many hours of news Henry watches:

$$\begin{aligned} 11 \text{ news channels} \times 4 \text{ hours per channel} &= \\ 44 \text{ hours of news} & \end{aligned}$$

Now add the two:

$$48 + 44 = 92 \text{ hours of TV}$$

The whole thing looks like this:

$$(24 \times 2) + (11 \times 4) = 92$$

The Kitchen

If I knocked 9 peas off my plate every night for a week except Tuesday, and 13 peas on Tuesday, how many peas would Frank have to eat in a week?



To figure out how many peas Frank would have to eat, add up the number of peas Henry knocks off his plate each night. Since Henry knocks the same number of peas off his plate on 6 of the 7 nights of the week, you can multiply the number of peas per night by the number of nights, then add the ones he knocks off on Tuesday.

$$\begin{aligned} (9 \text{ peas per night} \times 6 \text{ nights}) + 13 \text{ peas} &= \\ 67 \text{ peas.} & \end{aligned}$$

That's the same as

$$9 + 9 + 9 + 9 + 9 + 9 + 13 = 67$$

The Bathroom

How much water would I use in 15 minutes if one tap runs at 13 gallons a minute and I turned on both taps?

To figure out how much water Henry would use, multiply the number of minutes he runs each tap by the amount of water that comes out each minute.

$$15 \times 13 = 195$$

Then multiply that by the number of taps he runs at once. The problem says he's running "both" taps, so that means there are two.

$$195 \times 2 = 390 \text{ gallons}$$

You can write the whole thing out as one long multiplication:

$$15 \times 13 \times 2 = 390$$

The Bedroom

I'm $4\frac{1}{2}$ feet tall. How much taller would I be if I put on $\frac{1}{2}$ of my clothes, and wearing all my clothes makes me 9.5 feet tall?

The trick to this problem is noticing that Henry wants to know how much taller he'll be (not how tall). To figure out how much taller Henry would be, first figure out how much taller Henry is wearing all his clothes. Do that by subtracting his normal height from his overdressed height.

Remember, $\frac{1}{2}$ is the same as .5.

9.5 feet tall overdressed - 4.5 feet tall normally =
5 feet taller wearing all his clothes

Since he's asked about putting on half his clothes, multiply by half, or 0.5.
That's the fraction of his clothes he talks about wearing.

Half x (5 feet taller) = 2.5 feet taller

Using all the numbers together you get

$$\frac{1}{2} \times (9.5 - 4.5) = 2.5 \text{ feet taller}$$

OR $0.5 \times (9.5 - 4.5) = 2.5$

See what answer you get by using your own height instead of Henry's.

Level Three

Sherman's General Store

I have \$20, and I want to save \$2 to buy candy for Ginger and me. If a can of dog food costs \$0.80 how many cans can I buy?

Start this problem by figuring out how much money Henry has available to spend on Doggo dog food.

$$\$20 \text{ to start with} - \$2 \text{ for candy} = \$18 \text{ for Doggo}$$

Now that you know how much Henry has to spend, you need to find out what he can buy with it. How many piles of \$0.80 can you divide \$18.00 into? Use the calculator to find out:

$$\$18.00 / \$0.80 = 26.5 \text{ cans}$$

Mrs. Sherman can't sell him half (.5) of a can, so it looks like Henry can buy 26 cans, with a little money left over. Another way to think of it is

$$1800¢ / 80¢ = 26 \text{ cans with } 40¢ \text{ left over}$$

Henry can't buy any Doggo with the 40¢ (\$0.40) left over, so he can buy exactly 26 cans. Putting it all together we get

$$(\$20 - \$2) / \$0.80 =$$

$$26 \text{ cans and } \$0.40 \text{ change}$$



The Park

If I was 1.5 feet tall when I was born, and grew 2 feet every year until I was 6 years old, then grew 3 feet every year after that, how tall would I be when I reached 14 years old?



To figure out how tall Henry would be at age 14, start by figuring out how tall Henry was at age 6.

$$1.5 \text{ feet} + (2 \text{ feet} \times 6 \text{ years}) = 13.5 \text{ feet}$$

Henry was 13.5 ($13\frac{1}{2}$) feet tall at age 6. Now figure out how tall Henry will grow between age 6 and 14:

$$(14 \text{ years} - 6 \text{ years}) \times 3 \text{ feet} =$$

$$8 \text{ years} \times 3 \text{ feet} = 24 \text{ feet}$$

Now add Henry's first growth spurt to his second growth spurt to find out how tall he will be at age 14:

$$13.5 \text{ feet} + 24 \text{ feet} = 37.5 \text{ feet!}$$

The whole equation looks like this:

$$1.5 + (2 \times 6) + (3 \times (14 - 6)) = 37.5$$

Henry would be 37.5 feet tall at 14 years old. He's going to need some new clothes.

The Front Yard

How much will I earn if Dad pays me \$0.75 for the first three bags and \$1.25 for each bag after that and I rake 7 bags?

This problem is a lot like The Park problem above because you'll want to figure out the two parts of it separately, then add the two parts together. First figure out how much Henry will earn for the first three bags.

$$\$0.75 \times 3 \text{ bags} = \$2.25$$

Henry's raking a total of 7 bags, so

$$7 \text{ bags} - 3 \text{ bags} = 4 \text{ bags}$$

Now figure out how much Henry will earn for the next 4 bags at \$1.25 each:

$$\$1.25 \times 4 \text{ bags} = \$5.00$$

Now add the two totals together to find out how much Henry will earn altogether:

$$\$2.25 + \$5.00 = \$7.25$$

The whole equation looks like this:

$$(\$0.75 \times 3) + ((7-3) \times \$1.25) = \$7.25$$

The Living Room

How much time would we spend watching TV if we had 7 sports channels, 2 news channels and 16 cartoon channels, and we watched each channel for 2 hours?

To find out how much total time Henry spends watching TV, first figure out how much time he spends watching each kind of channel:

$$7 \text{ sports channels} \times 2 \text{ hours} = 14 \text{ hours}$$

$$2 \text{ news channels} \times 2 \text{ hours} = 4 \text{ hours}$$

$$16 \text{ cartoon channels} \times 2 \text{ hours} = 32 \text{ hours}$$

Now add up the total times to find out how much TV Henry watches:

$$14 \text{ hours} + 4 \text{ hours} + 32 \text{ hours} = 50 \text{ hours}$$

That's a lot of couch time.

There are lots of other ways to calculate Henry's TV time. Here's one:

$$(7 \text{ sports} + 2 \text{ news} + 16 \text{ cartoon}) \times 2 \text{ hours} = 50 \text{ hours}$$

The Kitchen

If I knocked 107 peas off my plate every night, and Frank ate 20 of them once a week, how many peas would be on the floor after 3 years?



To do this problem you need to know that there are 365 days in a year and 52 weeks in a year.

First figure out how many peas Henry drops in one year. Do that by multiplying the number of peas he drops every night by the number of nights in a year.

$$107 \text{ peas} \times 365 \text{ nights} = 39055 \text{ peas in 1 year}$$

Now figure out how many of those peas Frank eats in a year.

Since he eats them only once a week, multiply the amount he eats per week by the number of weeks in a year.

$$20 \text{ peas per week} \times 52 \text{ weeks} = 1040 \text{ peas per year}$$

Now subtract to figure out how many peas are left on the floor after one year...

$$39055 \text{ peas dropped} - 1040 \text{ peas eaten} = 38015 \text{ peas on the floor after 1 year}$$

Finally, since we want to know how many peas there are after 3 years, multiply that number by 3:

$$38015 \text{ peas} \times 3 \text{ years} = 114045 \text{ peas after 3 years}$$

Putting it all together we get...

$$((107 \times 365) - (20 \times 52)) \times 3 = 114045$$

The Bathroom

The bathroom holds 34,200 liters of water. If one tap runs at 57 liters a minute, how many taps would it take to make the room 15% full in 5 minutes?

First figure out how much water you need to make the room 15% full. 15% is the same as 0.15. So multiply:

$$15\% \text{ full} \times 34200 \text{ liters} = 5130 \text{ liters}$$

You know how much water the room will have to contain to be 15% full. Now figure out how much water one tap (faucet) can pour into the room in 5 minutes.

$$5 \text{ minutes} \times 57 \text{ liters per minute} = 285 \text{ liters}$$

If one tap can pour 285 liters, how many taps can pour 5130 liters? Divide to find the answer:

$$5130 \text{ liters} / 285 \text{ liters per tap} = 18 \text{ taps}$$

Now to check your work:

$$18 \text{ taps} \times 57 \text{ liters} \times 5 \text{ minutes} = 5130 \text{ liters}$$

To figure out the complete equation, remember that you're dividing the amount of water you need by the amount you can pour in the time you have:

$$(34200 \times 0.15) / (57 \times 5) = 18$$

The Bedroom

I'm 145 centimeters tall. With 25% of my clothes on, I end up being 35 centimeters taller. How tall would I be if I put on half of my clothes?

If Henry wears 25% of his clothes he gets to be 35 centimeters (cm) taller. Henry wants to wear half, or 50% of his clothes. How do you get from 25% to 50%? Think of it this way: how many 25% are there in 50%?

$$50\% / 25\% = 2$$

In other words, to get from 25% to 50% multiply by 2. So if Henry is 35 cm taller wearing 25% of his clothes, he must be

$$2 \times 35 \text{ cm} = 70 \text{ cm taller}$$

wearing 50% of his clothes. Now just add his original height to figure out how tall Henry would be wearing 50% of his clothes.

$$145 \text{ cm tall} + 70 \text{ cm of clothes} = 215 \text{ cm tall}$$

The whole equation is

$$145 + (35 \times (0.50 / 0.25)) = 215 \text{ Or}$$

$$145 + (35 \times 2) = 215$$



Fun Stuff to Do at Home



NOTE: Get an adult's help!

Water Wonder

Fill several different containers with water. You can use a sink, a bathtub, a bucket, even a fish tank. Use waterproof tape or bandages to estimate $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ full. What are the percentages of those fractions? With the cold tap on all the way, how long does it take to reach each mark? How long does it take to fill the container completely? How much time does it take to fill each container to $\frac{1}{4}$ of the way full? $\frac{1}{2}$? $\frac{3}{4}$?

Put new marks at the points reached at the time you estimated. Figure out why some containers were harder to estimate than others. Try filling each container with two taps on all the way, and time how long it takes to get to each of the marks. Compare with the results for one tap. Did things work out the way you expected? Now try some other amounts ($\frac{1}{3}$, $\frac{1}{5}$, $\frac{2}{3}$...). Use a calculator to work out the expected amount of time for some of the fractions.

Concentration Complication

Make up your own set of cards for a concentration game. Use sets of pictures, equations, words, numbers, whatever you can think of. See if you can make up a concentration game for two or more players.

Tessellation Avocation

A tessellation is a repeating geometric pattern that covers a surface completely, like the patterns in the Geometron. Make up your own tessellations and play the tiling game on it. Can you make tessellations using two or more different polygons together? How about one with curved lines? Why are some shapes harder to make into tessellations than others?

Jellybean Dream

Fill a small jar with jellybeans (or pennies or dried beans). Get all members of your family to estimate how many objects are in the jar. Divide the objects into various piles of equal numbers. Try piles with 2 objects, 3 objects, 5, 6, 7, 11. How many are left over? How are these remainders and the piles related to each other?

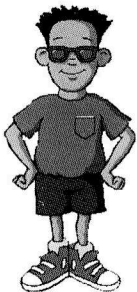
Take a different jar and mark off fractions ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$) on the jar. Fill the jar $\frac{1}{8}$ th full and count how many objects it takes to fill it to the mark. Use the numbers you figure out to estimate the total number of objects it would take to fill the jar. Fill the entire jar and count how many objects it actually took. How good was your guess? How could you make it better? Try dividing the objects into even piles, as above. Can you use the remainder information to make a set of clues that can help someone figure out the exact answer? How many clues does it take to be sure you can figure out the exact answer?

Find a gallon or larger container and begin collecting pennies in it. Estimate how much it will weigh and how much it will be worth when it's full. Periodically write down your actual measurements.

Math Recipes

Food recipes can often satisfy the healthiest of math appetites. They're chock-full of measuring units, fractions, multiples, etc. For example, here's Henry's favorite Snickerdoodle cookie recipe:

1 cup butter
1 $\frac{1}{2}$ cups sugar
2 eggs
2 $\frac{3}{4}$ cups flour
2 teaspoons cream of tartar
1 teaspoon baking soda
 $\frac{1}{4}$ teaspoon salt
2 tablespoons sugar
2 teaspoons cinnamon



Preheat the oven to 400°. Mix together the butter and sugar until light and fluffy. Add the eggs and continue mixing. Sift the flour, cream of tartar, soda and salt into the batter and mix.

In a small bowl mix together the 2 tablespoons sugar and 2 teaspoons cinnamon.

Make a ball of dough—about the size of a small walnut—by rolling the dough around in your hands. Then, roll the ball of dough around in the cinnamon sugar mixture until it is completely coated. Place the dough balls 2" apart on ungreased cookie sheets. Bake at 400° for 8 to 10 minutes—until slightly browned, but still soft. (These cookies puff up at first, then flatten out.)

This recipe makes 60 cookies.

While measuring and mixing, pay attention to all the different measurements involved—from teaspoons and tablespoons to ounces and cups. How many teaspoons make up one tablespoon? How many ounces in a cup?

Also, think about how this recipe might change if you wanted to whip up a bigger batch. How much sugar and flour and butter would you need if you wanted to make twice or three times as many cookies? How about if you wanted to make cookies for everyone in your school?

Growth spurts

How fast are you growing? How tall do you think you're going to be when you get older? It's fun to estimate by having someone measure your height every couple of months or so. It's also easy, especially if Mom or Dad can regularly mark your progress with a pencil mark on the back of a closet door.

If you were to grow a half a centimeter after one month, how many centimeters would you expect to chalk up by the end of the year? How tall



would you be if you were to continue growing at this rate for 5, 10, or 20 years? Tall enough to see Hawaii?

TV Add-icts

How much TV do you watch a year? Think about how much TV you watch every week. Write down your guess right now, then multiply by the number of weeks in a year. Does it seem like a lot?

Now figure out how much TV you really watch. Put a notebook or a notepad near the TV and write down every time you watch for a week. Everything counts, even the news! At the end of the week, compare your guess with your records. How close were you? Did you leave anything out when you made your guess? Just think how much less TV you could watch if you spent more time playing with Henry, Frank, and Ginger!

Gas it Up

Estimate how much it will cost to fill your gas tank. Use the fuel gauge to determine what percent of the tank is full. Then find out how many gallons your tank holds (look in the car's instruction manual for this). Multiply your estimate by the price of gas per gallon. How much will it cost to fill the tank? Watch next time Mom or Dad visits the gas station to see how accurate you were.

Travel Log

Estimate how much you travel by car in a week. Then calculate the exact number by checking the odometer readings at the beginning and end of the week. How close were you? How much time did you spend in the car during the week? Calculate your average speed for the week.



Save the Earth

The average person produces more than one-half ton of trash each year. That's more than 1000 pounds, nearly 500 kilograms! All together the U.S. produces more than 180 million tons of trash per year. How much trash is this per person per day? Weigh the things you throw out for one day and see how you stack up. Are you a better conservationist than Henry's dad?



Electrical Estimation

Look at your family's electric bill. How much do you pay for electricity per kilowatt hour? A kilowatt-hour is the amount of power used by a 1000 watt light bulb in one hour. Most people don't have 1000 watt light bulbs, but they have lots of 100 watt bulbs. How long does it take to use up a kilowatt hour with a 100 watt bulb? How much does it cost to leave a 100 watt light on for a week?

Measure Your House

How many square feet is the room you're in right now? How far is it all the way around the room (this is called the perimeter)? How much water do you think it would take to fill the room? This is easier to figure out if you calculate the room's size in metric units. Why? Because we know that one milliliter of water takes up one cubic centimeter of space.

Chart it!

Keep daily or weekly records of one of the things above, like how much TV you watch, how far you drive or how much you grow. Make a chart with this information. Over time you might see patterns in your chart. How can you explain these patterns? What do you think would happen to your TV chart if your favorite show went off the air?

Credits

This product is Based on the book "Counting on Frank" by Rod Clement.

Interactive Scripts: Laurie Bauman Arnold, Annie Fox, Jim Colbert

AT ELECTRONIC ARTS:

Producer: Jonathan Denholtz

Associate Producer: Jon Mandel

Assistant Producer: Michael Margolis

Product Manager: Hunter Smith

Documentation: Andrea Smith, Marti McKenna

Administrative Support: Maryann Duringer

Testing Supervisor: Darren Atherton

Testers: Terry Cussen, Matt Fishbach, Jeff McDonald, Melinda Morales,
Josh Noble, Geoff Rantala, Heidi Schulman, John Murphy

Technical Director: David Walker

Package Art Direction: Nancy Fong

Cover Illustration: Jackie Pittman

Package Design: E.J. Sarraille

Documentation Layout: Brian Conery

Quality Assurance: Jonathan Harris, Walter Ianneo

Special thanks to: Linda Koelling at Kid Connection in San Mateo,
Angela Gyetvan, Gib Biddle, Stewart Bonn

AT MOTION WORKS:

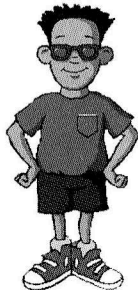
Creative Producer: Kelly Chapman

Technical Producer: Daryl Spitzer

Art and Animation: Scott Paterson, Jan Seger, Greg Zbitnew, Grant
Chiasson, Wanda Johnson, Jackie Ritchie, Alexander Mark,
Lee Steg, Hamo Djouboulian

Traditional Cel Animation by Reel Wonders: Norman Roen,
Andy Bartlett, John "Moose" Pagan, Craig MacKenzie,
Gerry Fournier

Backgrounds: Jan Seger



Macintosh Programming: Daryl Spitzer, Steve Israelson,
Rajiv Aggarwal

Windows Programming: Chris Large, Donald Chan,
Benny Au-Young, Selwyn Wan

Macintosh Integration: Steve Leroux, Kevin MacDonald,
John Loomis

Windows Integration: Gilbert Yee, Michael Hamilton

Administrative Support: Barbara Talbot, Michelle Froats

Focus Testing: Anne Fournon, Creston Froats

Special Thanks to: Randy McCallum, David McCullough, Garth Goddard

Sound by Airwaves Sound Studio: Ewan Deane, Bob Smart

Voices:

Kyle Labine, Henry

Phil Hayes, Frank/Incidentals

Terry Klassen, Dad/Incidentals

Terryl Rothery, Mom

Kathleen Barr, Mrs. Sherman

Maggie O'Hara, Ginger

Ian Corlett, Incidentals

Tony Ail, Boy 1

Crystaline O'Bray, Girl 1

Jesse Moss, Boy 2



Educational Content Design: Electronic Games for Education in Math
and Science (E-GEMS): Maria Klawe, Rena Upitis, Ann Anderson, Richard
Dearden, Kori Inkpen, David Mould

Educational Content Review: Mary McDermott

SMILES GUARANTEED!

If you are not completely satisfied with this product, EA*Kids will happily
refund your money. Simply return the full product, your dated receipt
with the store name and location, and an explanation for the return, within
30 days. Limit 1 per household. Dealers, wholesalers and their families
are not eligible.

Technical Support

If you have questions about the program, our Technical Support Department can help. If your question isn't urgent, please write to us at:

Electronic Arts Technical Support
P.O. Box 7578
San Mateo, CA 94403-7578

Please be sure to include the following information in your letter:

- Product name
- Model, memory, and configuration of your computer
- Any additional system information (like type and make of monitor, video card, printer, etc.)
- System version number and type
- Description of the problem you're having

If you need to talk to someone immediately, call us at (415) 572-ARTS Monday through Friday between 8:30 am and 4:30 pm, Pacific Time. Please have the above information ready when you call. This will help us answer your question in the shortest possible time.

If you live outside of the United States, you can contact one of our other offices.

In the United Kingdom, contact:

Electronic Arts Ltd.
P.O. Box 835 Slough SL3 8XU, UK, Phone (753) 546465.

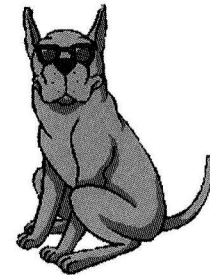
In Australia and New Zealand, contact:

Electronic Arts Pty. Ltd.
P.O. Box 432 Southport Qld 4215 Australia
Within Australia: Phone: (075) 711 811
Within New Zealand: Phone: +61 75 711 811
between 9am-5pm Eastern Standard Time



Limited Warranty

Electronic Arts ("EA") warrants to the original purchaser of the computer software product, for a period of ninety (90) days from the date of original purchase (the "Warranty Period"), that under normal use, the optical media and the user documentation are free from defects in materials and workmanship.



Warranty Claims

To make a warranty claim under this limited warranty, please return the product to the point of purchase, accompanied by proof of purchase, your name, your return address, and a statement of the defect. **OR** send the disk(s) to us at the above address within 90 days of purchase. Include a copy of the dated purchase receipt, your name, your return address, and a statement of the defect. EA or its authorized dealer will, at our option, repair or replace the product and return it to you (postage prepaid) or issue you with a credit equal to the purchase price.

To replace defective media **after** the 90-day warranty period has expired, send the original disk(s) to the above address. Enclose a statement of the defect, your name, your return address, and a check or money order for \$7.50.

The foregoing states the purchaser's sole and exclusive remedy for any breach of warranty with respect to the software product.

Limitations

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES AND NO OTHER REPRESENTATIONS OR CLAIMS OF ANY NATURE SHALL BE BINDING ON OR OBLIGATE ELECTRONIC ARTS. ANY IMPLIED WARRANTIES APPLICABLE TO THIS SOFTWARE PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE NINETY (90) DAY PERIOD DESCRIBED ABOVE. IN NO EVENT WILL ELECTRONIC ARTS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSE-

SEQUENTIAL DAMAGES RESULTING FROM POSSESSION, USE, OR MALFUNCTION OF THIS ELECTRONIC ARTS SOFTWARE PRODUCT.

Some states do not allow limitations as to how long an implied warranty lasts and/or exclusions or limitations of incidental or consequential damages so the above limitations and/or exclusions of liability may not apply to you. This warranty gives you specific rights, and you may also have other rights which vary from state to state.

NOTICE

ELECTRONIC ARTS RESERVES THE RIGHT TO MAKE IMPROVEMENTS IN THE PRODUCT DESCRIBED IN THIS MANUAL AT ANY TIME AND WITHOUT NOTICE.

THIS MANUAL AND THE SOFTWARE DESCRIBED IN THIS MANUAL ARE COPYRIGHTED. ALL RIGHTS ARE RESERVED. NO PART OF THIS MANUAL OR THE DESCRIBED SOFTWARE MAY BE COPIED, REPRODUCED, TRANSLATED, OR REDUCED TO ANY ELECTRONIC MEDIUM OR MACHINE-READABLE FORM WITHOUT THE PRIOR WRITTEN CONSENT OF ELECTRONIC ARTS, P. O. BOX 7578, SAN MATEO, CALIFORNIA 94403-7578, ATTN: CUSTOMER SUPPORT.

REGARDING THE APPLE SOFTWARE

ELECTRONIC ARTS' LICENSOR(S) MAKES NO WARRANTIES, EXPRESS OR WITHOUT LIMITATION THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE, REGARDLESS OF THE SOFTWARE IN TERMS OF ITS LIABILITY, CURRENTNESS OR OTHERWISE. ELECTRONIC ARTS' LICENSOR(S) DOES NOT WARRANT ANY REPRESENTATIONS REGARDING THE RESULTS AND PERFORMANCE OF THE SOFTWARE IS ASSUMED BY YOU. THE EXCLUSION OF IMPLIED WARRANTIES IS NOT PERMITTED BY SOME JURISDICTIONS. THE ABOVE EXCLUSION MAY NOT APPLY TO YOU.

IN NO EVENT WILL ELECTRONIC ARTS' LICENSOR(S), AND THEIR DIRECTORS, OFFICERS, EMPLOYEES OR AGENTS (COLLECTIVELY



ELECTRONIC ARTS' LICENSOR) BE LIABLE TO YOU FOR ANY CONSEQUENTIAL, INCIDENTAL OR INDIRECT DAMAGES (INCLUDING DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, AND THE LIKE) ARISING OUT OF THE USE OR INABILITY TO USE THE SOFTWARE EVEN IF ELECTRONIC ARTS' LICENSOR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. BECAUSE SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF THE LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. ELECTRONIC ARTS' LICENSOR'S LIABILITY TO YOU FOR ACTUAL DAMAGES FROM ANY CAUSE WHATSOEVER, AND REGARDLESS OF THE FORM OF THE ACTION (WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), PRODUCT LIABILITY OR OTHERWISE), WILL BE LIMITED TO \$50.



Counting on Frank™ is licensed by Gareth Stevens Childrens Books, Milwaukee, WI., and is used by permission. The game *Counting on Frank*™ is based on the book *Counting on Frank*™, text and illustrations ©1990 by Rod Clement, first published in Australia by William Collins Pty. Ltd., Sydney, in Association with Ann Ingram Books, and first published in North America by Gareth Stevens, Inc. End Matter ©1992 by Gareth Stevens, Inc.

SOFTWARE DOCUMENTATION © 1994 ELECTRONIC ARTS.
ALL RIGHTS RESERVED.

EA*Kids and the EA*Kids logo are trademarks of Electronic Arts
Macintosh is a registered trademark of Apple Computer, Inc.
Apple software © 1989-1994 Apple Computer, Inc. All Rights Reserved.
QuickTime and the QuickTime Logo are trademarks of Apple Computer, Inc. used under license.



ELECTRONIC ARTS®

P.O. Box 7578, San Mateo, CA 94403-7578