Life of Fred
Ice Cream

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A Note Before We Begin
Life of Fred: Ice Cream

Grades, diplomas, trophies, degrees, money, pats on the head, extra time watching television, memberships in honor societies, math ribbons, valedictorian, applause, student of the week, the "I can do all the honey cards in less than 57 seconds" button, the Fields Medal,* assistant professor, associate professor, full professor, finishing a three-unit course in British literature—these are all ***performance goals***.

Mastering the multiplication tables, figuring out how to compute $\sum_{i=1}^{6} i$, understanding the differences between a formal letter and a personal letter, learning where Cypress is on a map of the Mediterranean Sea or which two countries make up the Iberian Peninsula, or how to count back change**—these are all ***learning goals***.

There is a world of difference between ***performance goals*** and ***learning goals***.

The only way that they are alike is that they are both pleasurable.

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* You can't get a Nobel prize in mathematics. Alfred Nobel, who lived in the 1800s, made his fortune in explosives. He was a practical sort of fellow. In his will, he established annual prizes in five areas: Physics, Chemistry, Medicine, Literature, and Peace. One story says that Nobel didn't think math was a practical subject—something you would ever use in everyday life.

It is an established fact that Alfred Nobel never read any of the Life of Fred series in which Fred experiences situations in his everyday life which require mathematics. Instead of Alfred Nobel prizes, there should be Fred Nobel prizes.

The Fields Medal isn't awarded annually, but quadrennially (a word you will encounter several times in this book). It is sometimes called "the Nobel Prize of Mathematics." On one side of the medal is a picture of Archimedes and his words: *Transire suum pectus mundoque potiri.* This is slightly weird since Archimedes didn't speak Latin. If your knowledge of Latin is like that of Archimedes, I will translate: *Rise above yourself and grasp the world.* Mathematics does a lot of world-grasping.

** These are all covered in *Life of Fred: Ice Cream.*

Performance Goals

If you have just been hired at Harry's Hamburgers, all day long you will flip hamburgers, and you will ask customers, "Would you like fries with that?" You put in the hours, and they offer you the rewards of salary (10¢/hour), raises (11¢/hour), and titles (Junior Associate Team Leader).

Many math curricula operate the same way. All day long you do routine problems, and you get the gold stars, a diploma, and the grade.

Learning Goals

You learn for the joy of learning. That's why kids play with toys. They don't do it to earn stuff. No one needs to get external encouragement to go play on the swings and slides.

WHAT DO YOU WANT FOR YOUR CHILD?

Is the whole point to get through the book? This is the classic performance goal. Does your praise revolve around how many were answered correctly or how fast the pages were turned? Do you offer a "paycheck" in the form of treats? If so, when they grow up they will be good little workers at Harry's Hamburgers.

Or is the whole point that the book goes through them? Do you encourage discussion of the things that are being learned? Is learning where the joy is?

Kids with ***performance goals*** want easy successes. If they encounter non-routine problems, they want to cry or quit. Working hard means that they are dumb.

For kids with ***learning goals,*** exertion is positive. They don't blame anything when they hit a problem that takes 15 minutes to figure out. It's part of the road to mastery. You have seen it when kids are playing with little plastic blocks. They will spend hours fiddling with them.

Mathematics is not easy but neither is water skiing or backpacking. The whole point is to enjoy the difficulties and challenges—not to say that you have done it.

At the dinner table, talk about what Fred is doing, not about how many lessons were finished.

Contents

Chapter 1 Sunshine. 13
- sweet-smelling sleeping bag
- counting by fours
- remembering six times eight
- *stationary* vs. *stationery*
- the big question in arithmetic
- two-digit multiplication
- why a pound of hamburger weighs more than a pound of gold

Chapter 2 Trimmed Down Table. 19
- learning up to 30 × 30
- roosters and egg-laying
- easy way to learn 7 × 8
- a clean desktop
- sigma notation

Chapter 3 On His Desk. 25
- pronouncing French words that end in *t*
- subtracting ounces from pounds
- forestland in the United States
- what five-year-olds think is funny vs. what twenty-five-year olds think is funny
- what isn't news
- hyperbole isn't lying

Chapter 4 Mail. 31
- bar graphs
- letter openers for nine-month-olds
- writing formal letters
- capitalization in closing salutations
- personal letters
- elements of a set

Chapter 5 An Opportunity. 37
special delivery emails
why Stan couldn't fly to Kansas
elapsed time
ordered pairs, first and second coordinates
numbers vs. numerals

Chapter 6 Ties & Shoes. 43
a ways to do one thing and *b* ways to do a second imply *ab* ways to do both.
why the times sign (×) is not used in algebra
how to polish leather shoes
subtracting minutes from hours

Chapter 7 A Map. 49
artists looking at a map
war historians looking at a map
mathematicians looking at a map
lovers of cheese looking at a map
historians of literature looking at a map
the promised land vs. Wisconsin
easy way to remember 6 × 9
agitating one's endoplasmic reticulum
figuring out what "the land of milk and honey" might really have meant
subtracting inches from feet

Chapter 8 Sand Castles in Cypress. 55
where Cypress is located on a map
Betty's attempt to get Fred to eat something
87 flavors and 6 kinds of cones
the cardinality of the set of all ice cream flavors beginning with the Greek letter alpha (α)

Chapter 9 The Right Machine. 61
explicit vs. implicit
Iberian Peninsula
where to find an ibex
two inches ≈ 5 centimeters
selecting an ice cream maker—six questions
seconds, minutes, and hours in the metric system

Chapter 10 Ingredients. 67
how to find one-half of a large number
how to get ice in the summer in Kansas in 1843
drops, teaspoons, tablespoons, ounces, cups, quarts

Chapter 11 Seat Belts. 73
where *not* to ride if you can't fit in the car
graphing ordered pairs
why you shouldn't park on the sidewalk
subtracting ounces from gallons

Chapter 12 PieOne. 79
perimeter of a building when not all the dimensions are given
why math was created
area of a rectangle
a poor way to teach ice cream eating

Chapter 13 Before Four. 85
why Stanthony thought Chico Marx was Italian
division by two-digit numbers
speaking ironically
Hooke's law
slope of a line

Chapter 14 Starting the Machine. 91
different scales on a graph
given (40, 3) and (280, 21) and estimating (800, ?)
domain and codomain
how many digits should be in a serial number

Chapter 15 Booths at the Conference. 97
uses for pizza buttons
counting back change
definition of liberty (it doesn't mean just freedom)
$\cup$ is commutative

Chapter 16 Fast Freeze. 103
inequalities: < and >
how to eat pizza after eating a quart of ice cream
homogenized milk
why we use soap
cryogenics
the difference between liquid and superfluid
graph paper for those with lots of casual cash

Chapter 17 Joe and Ice Cream. 109
what protein and calcium are good for
subtracting ounces from quarts
expressing remainders as fractions
nothing physical is infinite

Chapter 18 Fred Orders a Pizza. 115
changing ounces to pounds and ounces
a pizza without calories
changing seconds into minutes and seconds

Chapter 19 Sugar. 121
to be jealous and to covet
five gallons of Sluice each day
making estimates using graphing

Index. 125

Chapter One
Sunshine

Fred's sleeping bag smelled good. Hanging it out on a tree in the Kansas air and sunshine was a good thing. Fred never knew that you were supposed to do something with a sleeping bag besides just sleep in it.

Fred owned an 85-year calendar. Since he was five years old, that calendar would last until he was 90. At that point, he imagined he would buy another calendar.

$$\begin{array}{r} 85 \\ +\ \ 5 \\ \hline 90 \end{array}$$

He had owned his sleeping bag for four years. Airing out his sleeping bag every four years seemed like a great idea. He was now five years old. He would air it out when he was 9. Then we he was 13. Then 17, 21, 25, 29, 33, etc.

He wrote "air out sleeping bag" on every fourth year of his 85-year calendar. Then he wouldn't forget.

Fred flossed his teeth every evening, so that was easy to remember. He also easily remembered, "Six times eight is 48, and that is

really great." (One use of poetry is to help people remember things. "In fourteen ninty-two, Columbus sailed the ocean blue.")

But when something happens only once every four years, the safest thing to do is write it down so you won't forget it.

Fred had read a lot of books. He knew a lot about math, history, poetry, science, art, geography, vexillology (the study of flags), Shakespeare, the Bible, economics, and beekeeping. But he had never read a book about sleeping bags.

Fred Didn't Know . . .

1. He might not fit into his three-foot sleeping bag when he turned 13.
2. If you sleep in the same sleeping bag every night for twenty or thirty years, it just might wear out.
3. Kids' sweat and adults' sweat are different.* Many adults air out their sleeping bags every morning rather than quadrennially (quad-DREN-knee-al-lee—once every four years).

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* This is covered in more detail in *Life of Fred: Pre-Algebra 1 with Biology*

An 85-year calendar is hard to find in most stationery stores.* (An understatement.) One reason is that if you sell 85-year calendars, you will probably never have repeat customers.

Another reason is that 85-year calendars are pretty thick. They might be hard to hang on the wall.

How thick? How many months would be in an 85-year calendar.** There are 12 months in a year. Do we add, subtract, multiply, or divide? That's always **the big question in arithmetic**.

> **If you don't know whether to add, subtract, multiply or divide, first restate the problem with really simple numbers.**

Using really simple numbers—suppose there are 4 months in a year and we have a two-year calendar. Even without thinking, we know that would be 8 months. How did we get that? We multiplied.

So with an 85-year calendar and 12 months in a year, we need to multiply.

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* *Stationery* (with an *e*) means writing paper and envelopes.
Stationary (with an *a*) means not moving.
How can you remember which is which? One way is to remember that **e**nvelopes are station**e**ry.

** You may have also noticed that *calendar* is spelled *calendAr*. English is strange. The way I remember that it is . . . I can't remember how I remember that. I just do.

$$\begin{array}{r} 85 \\ \times\ 12 \\ \hline \end{array}$$

We've never done this before. It is multiplying by a two-digit number.

$12 = 10 + 2$

It is multiplying by 2 and multiplying by 10.

Here's how it's done . . .

$$\begin{array}{r} {\scriptstyle 1}85 \\ \times\ 12 \\ \hline 170 \end{array}$$

First, you multiply by 2. That we have seen before.

$$\begin{array}{r} 85 \\ \times\ 12 \\ \hline 170 \\ 85 \end{array}$$

Next, we multiply by the 1. (Since it's really 10, and not 1, we move the answer over one space to the left.)

And then just total things up.

$$\begin{array}{r} 85 \\ \times\ 12 \\ \hline 170 \\ 85 \\ \hline 1020 \end{array}$$

There are 1,020 months in an 85-year calendar.
There are 1,020 pages in an 85-year calendar.

One thousand, twenty pages!

Your Turn to Play

1. I buy my paper by the ream. One ream = 500 sheets. How many sheets would be in two reams of paper?

2. A ream of paper is about 5 cm thick. (I just measured it.) How thick would 2 reams be?

3. A ream of paper is about 2 inches thick. (I just measured it with the other side of my ruler.) How thick would 2 reams be?

More people in the world understand 5 cm than understand 2 inches.

Centimeters (cm) are part of the metric system. In the metric system (meters, liters, grams) everything is done by tens. For example, a centimeter is one-hundredth of a meter.

In the imperial system (feet, gallons, pounds) nothing is predictable.

36 inches = 3 feet = 1 yard
8 pints = 4 quarts = 1 gallon
16 ounces = 1 pound
12 troy ounces = 1 troy pound

(Gold is measured in troy ounces.)

A pound of hamburger weighs more than a pound of gold.

. . . . . ANSWERS . . . . . .

1. There are two ways you could have done this problem.

By addition:

$$\begin{array}{r} 500 \\ +\ 500 \\ \hline 1000 \end{array}$$

By multiplication:

$$\begin{array}{r} 500 \\ \times\ \ 2 \\ \hline 1000 \end{array}$$

There are 1,000 sheets of paper in two reams.

2. By addition:

$$\begin{array}{r} 5 \\ +\ 5 \\ \hline 10 \end{array}$$

By multiplication:

$$\begin{array}{r} 5 \\ \times 2 \\ \hline 10 \end{array}$$

3. Two reams would be four inches.

A Row of Practice. *Do the whole row before you look at the answers.*

48	748	78	47
+ 75	− 9	× 2	× 13
123	739	156	141 + 47 = 611

"But, but, but . . ." she sputtered.

[It looks like we have run out of room. This is where the index of the book is supposed to start. We'll continue, I promise, right here in the next book.]

Index

85-year calendar 13
ABCDEFG 70, 71, 73
area of a rectangle . . . 83, 84, 113
bar graphs 31
bibelots 25
big question in arithmetic . . . 15, 42, 72, 76, 120
borrowing one in subtraction 26
brass braces 113
capitalization in closing salutations 34
cardinality of a set 59
category theory, linear functionals, homeomorphisms 86
changing the scale on a graph 93
Chico Marx 86
codomain 95
collinear points 90
commutative law of set union 101
converting ounces to pounds and ounces 115
converting seconds to minutes and seconds 119, 120
counting back the change 98-102, 113
counting possible combinations . . . 44, 47, 59, 64, 65, 116
covet—a definition.. 121
cryogenics 107
Cyprus on the map 56
division by two-digit numbers 120
domain 95
drops, teaspoons, tablespoon, ounces, cups, quarts, gallons 70
elapsed time . . 39, 41, 45, 47, 64
empty set 60
estimating answers 116
examples of infinite sets 111
explicit statements 61
exponents 41, 42
expressing remainders as fractions 110
first coordinate 40, 74
flavors of ice cream 56
forest resources in the U.S. . . . 26

formal letters 33, 34
getting ice in the summer in Kansas in 1843 69
graph paper 108
graphing an ordered pair 74, 75, 88, 93, 123
Greek alphabet 60
homogenized milk 106
Hooke's Law 89
hyperbole 28
Iberian Peninsula 62
ibex 62
ice cream eating taught poorly 84
imperial system 17
implicit statements 57
inequalities 103
Joe's stomach is not infinite 111
KKKKK 58, 59
liberty is not the same as freedom 101
literally true 52
m and cm don't require periods 78
maps and artists 49
maps and cheese lovers 50
maps and historians of literature 51
maps and mathematicians 50
maps and war historians 50
Marx Brothers' movie . . .86, 124
memory poem for 6 x 6 21
memory poem for 6 x 7 54
memory poem for 6 x 8 21
memory poem for 6 x 9 51
metric system 17, 66
Michelangelo 80
multiplying by a hundred . . . 114
multiplying by a two-digit number 16
numerals 42
ordered pairs 40, 74
parking on the sidewalk—why you shouldn't 76
peninsulas 62
perimeter when not all the dimesions are not on the map 82-84
personal letters 34, 35
Pizza Buttons. 97-100
plotting points 93
poetry to help remember things 14
polishing leather shoes 45
promised land vs. Wisconsin 51
pronouncing French words that end in t 25
quadrennially 14
ream = 500 sheets 17, 28
reverie 55
samplers 75, 76
seat belts 73, 74
second coordinate 40, 74
seconds, minutes, hours in the metric system 66
sigma notation . . . 23, 24, 30, 47, 53
slope of a line 89
Sluice-in-the-Home 122, 123
special delivery emails 37

Stanley Anthony—the story of his name 79, 80
subtracting centimeters from meters 77
subtracting feet from miles . . . 77
subtracting feet from yards . . 76, 77
subtracting inches from feet and inches 53
subtracting minutes from hours 48
subtracting ounces from gallons 77
subtracting ounces from pounds 26, 35, 77
subtracting ounces from quarts 110
superfluid is different than liquid 107
troy ounces 17
why math was invented . . .82, 83
why Stan couldn't fly 38
why the times sign is not used in algebra 44
why we use soap 106
x-coordinate 93
y-coordinate 93

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the Life of Fred series
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