When will we ever use this?

From Percentages to Algebra

Deborah Ferry
dferry@misd.net
Macomb ISD, Michigan
Marianne Srock
msrock@misd.net
Macomb ISD, Michigan

To show this poll

1

Install the app from
pollev.com/app

2

Start the presention

Still not working? Get help at pollev.com/app/help
or
Open poll in your web browser

To show this poll

1

Install the app from
pollev.com/app

2

Start the presention

Still not working? Get help at pollev.com/app/help
or
Open poll in your web browser

To show this poll

1

Install the app from
pollev.com/app

2

Start the presention

Still not working? Get help at pollev.com/app/help
or
Open poll in your web browser

To show this poll

1

Install the app from
pollev.com/app

2

Start the presention

Still not working? Get help at pollev.com/app/help
or
Open poll in your web browser

To show this poll

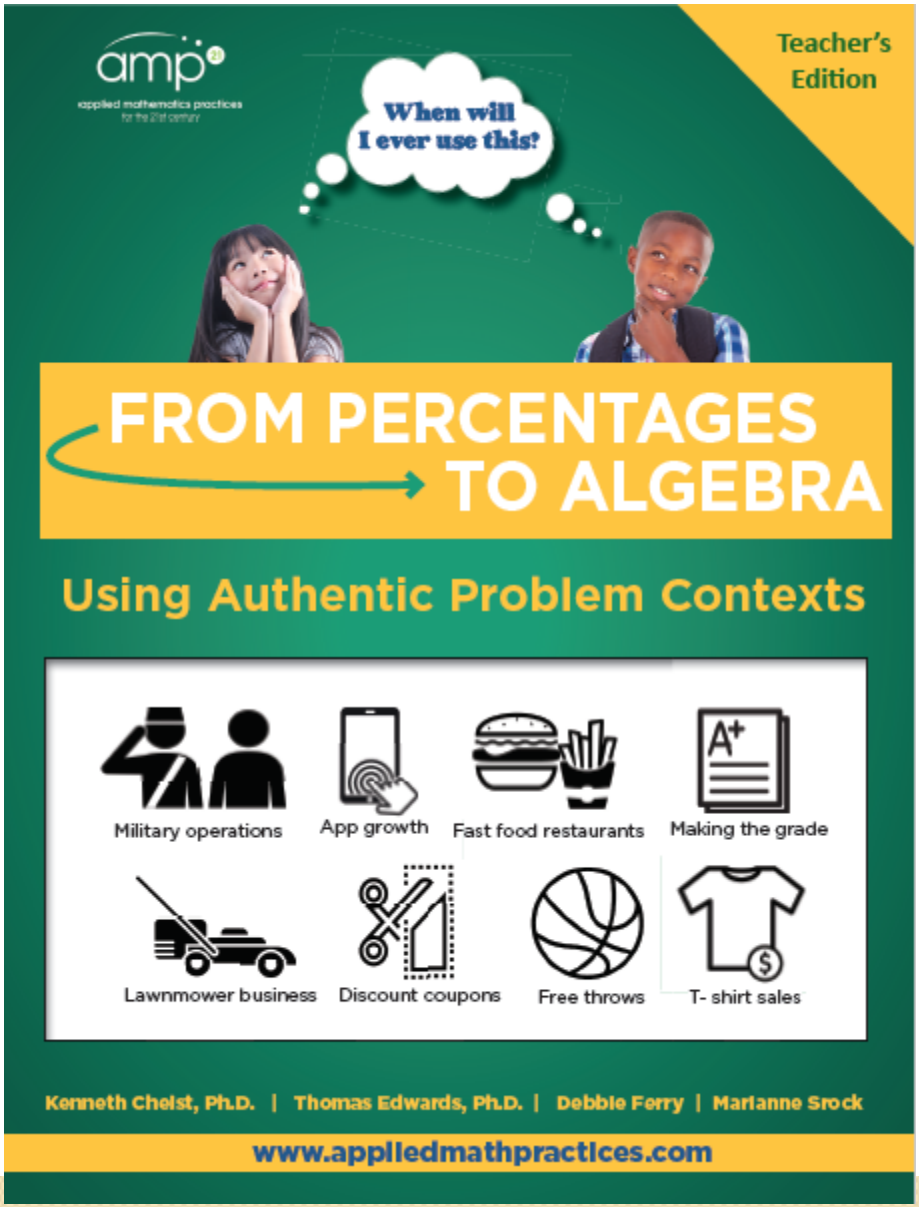
1

Install the app from
pollev.com/app

2

Start the presention

Still not working? Get help at pollev.com/app/help
or
Open poll in your web browser


amp
applied mathematics practices
for the 21st century
When will I ever use this?
Teacher's Edition
FROM PERCENTAGES TO ALGEBRA
Using Authentic Problem Contexts
Military operations
App growth
Fast food restaurants
Making the grade
Lawnmower business
Discount coupons
Free throws
T- shirt sales
Kenneth Cheist, Ph.D. | Thomas Edwards, Ph.D. | Debbie Ferry | Marianne Srock
www.appliedmathpractices.com

Equity, Authentic, Entrepreneur

Societal Consciousness

Today Specifically – Transition to Algebra

- Percentages everywhere
  - One of top 2000 words in use
- Algebra can flow naturally from meaningful examples in middle school math topics: percentages, rates, etc.
- First exposure to variables

Variables

What is x ?

$50 + \$15x$

What is x ?

$50 + \$15x = \$65$

- Algebraic Expression ➔ Algebraic Equation (Really a variable – question is unknown)
- The value changes as the value of the variable changes.

Mathematics Practice # 1

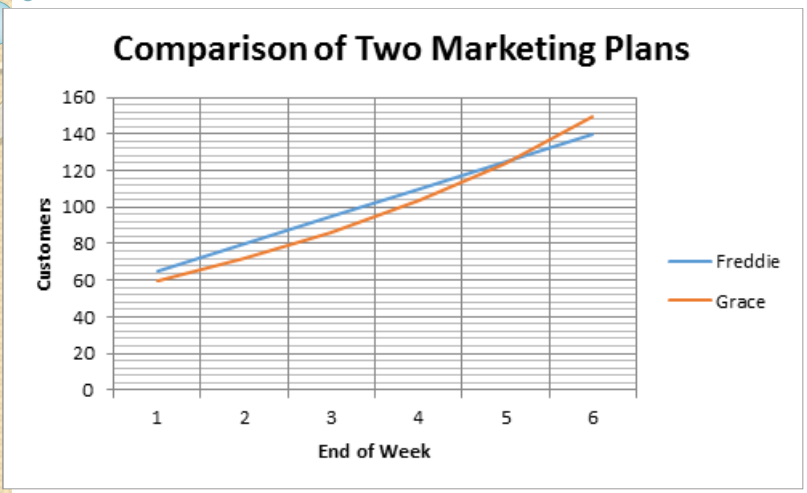
1. Make sense of problems and persevere in solving them.

Mathematical Practice #3

Construct viable arguments and critique the reasoning of others.

Can we do that with questions that take students two minutes to read and solve?

TABLES & GRAPHS



U.S. Department of Labor & Statistics – Unemployment Rates

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006	4.7	4.8	4.7	4.7	4.6	4.6	4.7	4.7	4.5	4.4	4.5	4.4
2007	4.6	4.5	4.4	4.5	4.4	4.6	4.7	4.6	4.7	4.7	4.7	5.0
2008	5.0	4.9	5.1	5.0	5.4	5.6	5.8	6.1	6.1	6.5	6.8	7.3
2009	7.8	8.3	8.7	9.0	9.4	9.5	9.5	9.6	9.8	10.0	9.9	9.9
2010	9.8	9.8	9.9	9.9	9.6	9.4	9.4	9.5	9.5	9.4	9.8	9.3
2011	9.1	9.0	9.0	9.1	9.0	9.1	9.0	9.0	9.0	8.8	8.6	8.5
2012	8.3	8.3	8.2	8.2	8.2	8.2	8.2	8.1	7.8	7.8	7.7	7.9
2013	8.0	7.7	7.5	7.6	7.5	7.5	7.3	7.3	7.3	7.2	6.9	6.7
2014	6.6	6.7	6.7	6.2	6.2	6.1	6.2	6.2	6.0	5.7	5.8	5.6
2015	5.7	5.5	5.5	5.4	5.5	5.3	5.3	5.1	5.1	5.0	5.0	5.0
2016	4.9	4.9	5.0	5.0	4.7	4.9	4.9	4.9	5.0			

Activity 6:
Growing a business
Page 109

Growing a business
Activity 6:
Page 111

Open to page 111 – Walk through the Number Talk silently by yourself.

Turn and Talk - What do you think might be one of the math concepts illustrated in this scenario?

Activity 6:

Growing a business

Pages 112-113

Open to page 112 – 113. Read through these two pages. You DO NOT have to answer the questions.

From a business sense, what's the KEY POINT here?

Activity 6:

Growing a business

Pages 114-115

Open to page 114 – 115. Read through these two pages up to the table. STOP.

Turn and Talk - One person explain Freddie's Plan. One person explain Grace's Plan.

Work problems 8, 9, 10, and 11.

Activity 6:

Growing a business

Pages 115-116

Continue reading on pages 115 – 116.

Work #12 on handout.

#13. If they use Freddie, how many customers will they have after 5 weeks?

#14. If they use Freddie, how many weeks will it take for them to at least double the number of customers?

	Freddie – Using a List				Grace – Using Word of Mouth		
End of Week	Start of Week	Add 30% of 50	End of Week		Start of Week	Add 20% of previous total	End of Week
1	50	15	65				
2	65	15	80				
3	80	15	95				
4	95	15	110				
5	110	15	125				
6	125	15	140				
In general "x"	50 + 15(1) 50 + 15(2) 50 + 15(3) 50 + 15x				In general "x"		

x stands for __Number of Weeks, 50 + 15x = total at end of week x

Vocabulary:

Activity 6:

Growing a business

Pages 117

Open to page 117. Continue reading and answer question #15.

Develop this formula with your students.

Activity 6:

Growing a business

Pages 117

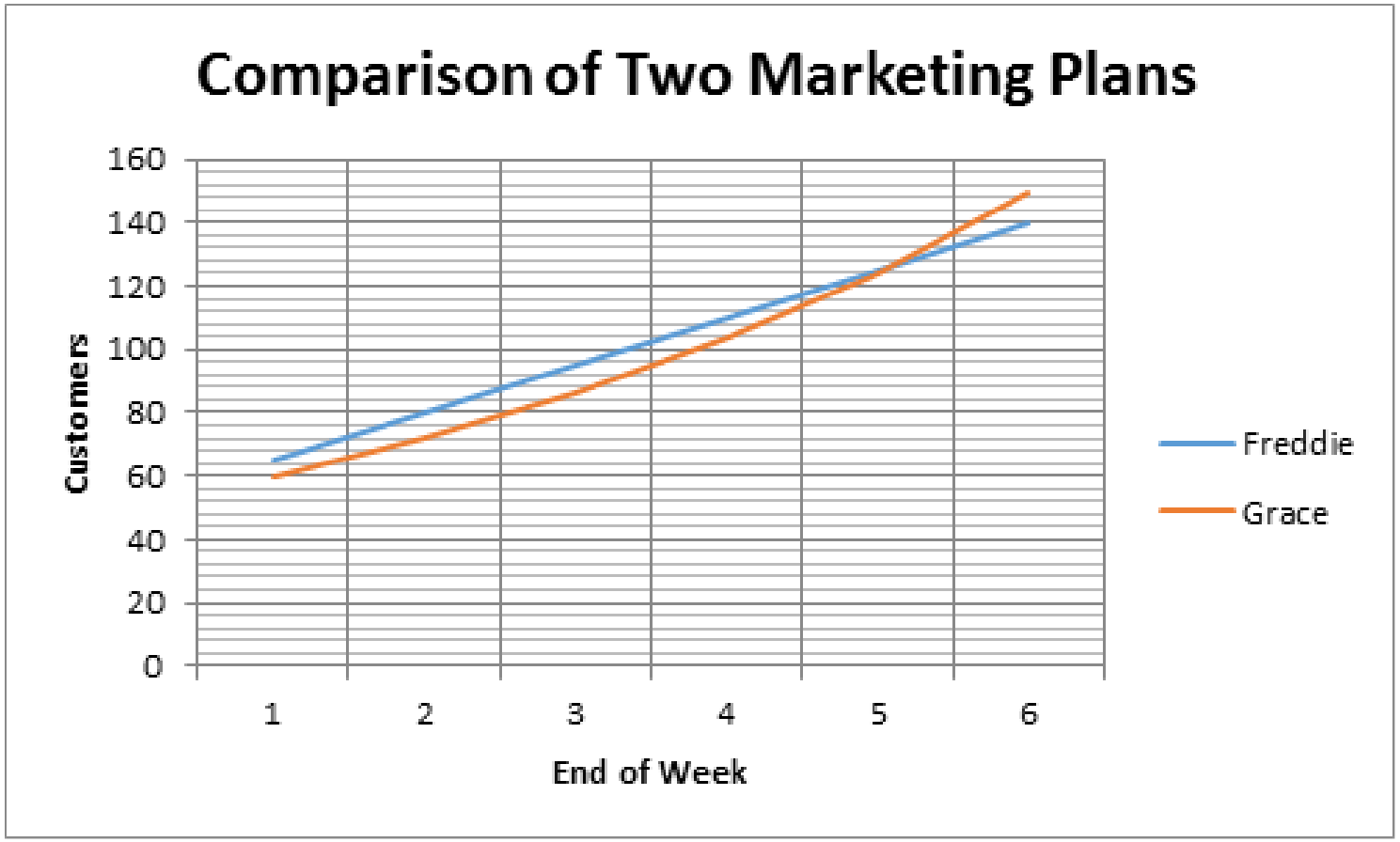
$50 + 0.2(50) = 60$

$50(1 + 0.2) = 60$ $\qquad$ $50(1.2) = 60$

Week 1	$50(1.2)$	$=50(1.2)^1$
Week 2	$[50(1.2)](1.2)$	$=50(1.2)^2$
Week 3	$[50(1.2)(1.2)](1.2)$	$=50(1.2)^3$

	Freddie – Using a List			Grace – Using Word of Mouth		
End of Week	Start of Week	Add 30% of 50	End of Week	Start of Week	Add 20% of previous total	End of Week
1	50	15	65	50	10	60
2	65	15	80	60	12	72
3	80	15	95	72	14.4	86.4
4	95	15	110	86.4	17.28	103.68
5	110	15	125	103.68	20.736	124.416
6	125	15	140	124.416	24.8832	149.2992
In general "x"	50 + 15(1) 50 + 15(2) 50 + 15(3) 50 + 15x			In general "x"	$50(1.2)^1$ $50(1.2)^2$ $50(1.2)^3$ $50\ (1.2)^x$	

$50 + 15x$ = total at end of week x, $50\ (1.2)^x$ = total at end of week x


Comparison of Two Marketing Plans
160
140
120
100
80
60
40
20
0
Customers
1
2
3
4
5
6
End of Week
Freddie
Grace

Activity 6:
Teachers' guide
Page 125

Teachers' Guide

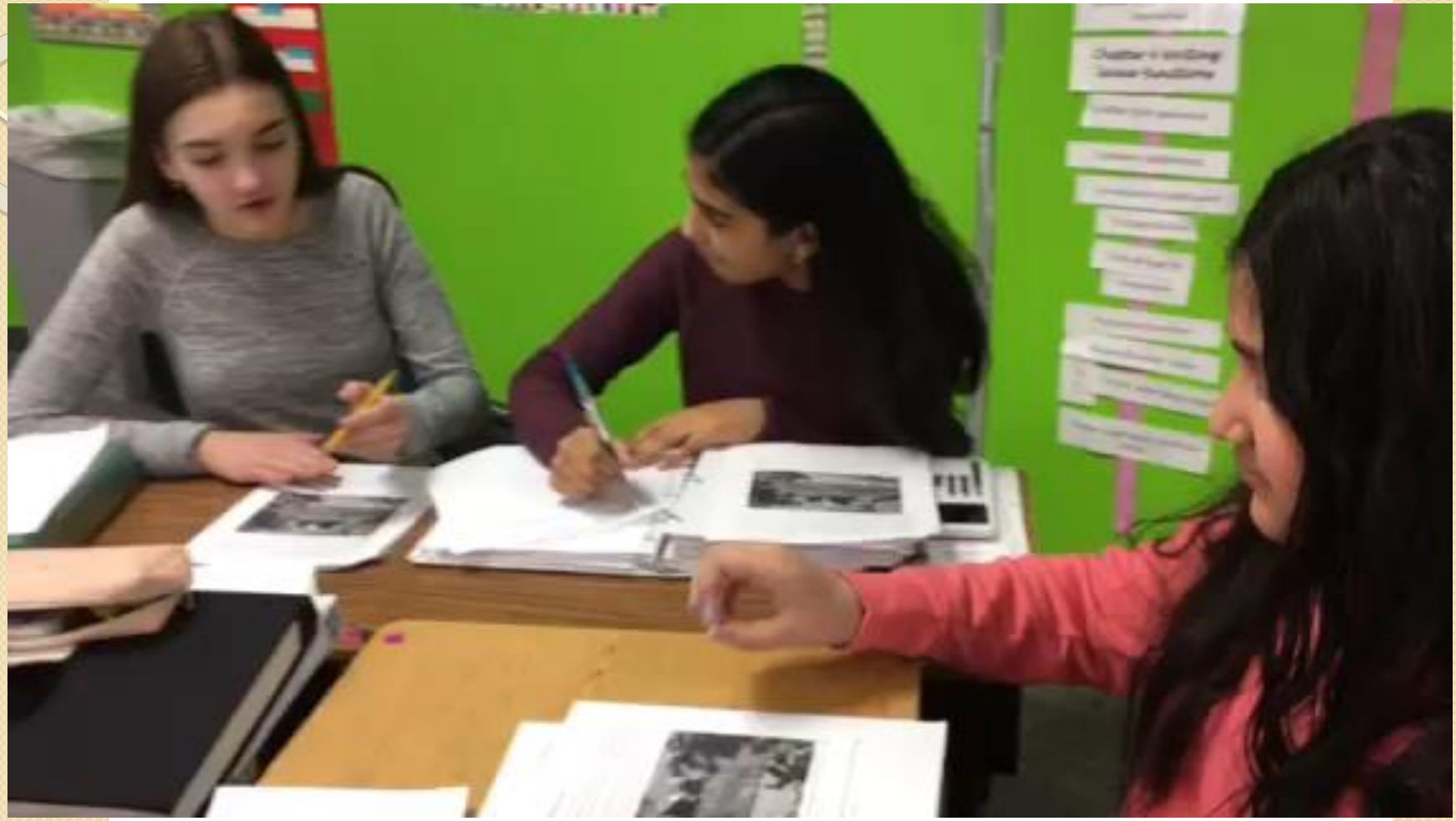
- Thinking Through a Lesson Protocol
  - Launch
  - Explore
  - Summarize
- Practice Problems
- Project Idea

Classroom Video – Growing a Business

- Dr. Yamamah Sawalha – A big THANKS
- Dearborn, Michigan
- 8th grade students in Algebra 1

LOOK FOR IN VIDEO CLIPS

- How does the context play a role in student understanding?
- Is there productive struggle?
- Are students supporting and helping each other to understand the mathematics?



kchelst@wayne.edu
msrock@misd.net
t.g.edwards@wayne.edu

kchelst@wayne.edu
msrock@misd.net
t.g.edwards@wayne.edu

From Percentages to Algebra

Using Authentic Problem Contexts

0	Introduction	Concepts	Table	Algebra	Graph Chart
1	Better deal	Compare percent and fixed value of coupons	Y	Solve Equation	N
2	Making the grade	Best is 100% - weighted scores	Y	Solve Equation	N
3	Free throw percentages	Best is only 90%	Y	N	N
4	Dropping out of high school	Best is 0 %	Y	N	N
5	Special operations	Order of percent change no impact	Y	Solve Equation	N
6	Growing lawn service	Compare percent and fixed value	Y	Solve Equation	N
7	McFadden restaurant	Fallacy of equal + and – percentage change	Y	N	Y
8	Managing by percentage	More than two percentages and non-whole number answers	Y	N	N
9	Ice cream	More than two percentages and non-whole number answers	Y	N	Y
10	Clothing sizes	Multiply two percentages and non-whole number answers	Y	N	Y
11	App growth	Compound percentages and financial analysis	Y	Set up Formula	Y
12	Homeless veterans	Compound percent vs fixed	Y	Set up Formula	Y
13	Grades	Weighted Scores - 3 values	Y	Solve Equation	N
14	Different sized Slushies	Weighted sum of percentages	Y	N	Y
15	Congressional districts	Combine geographies and their percentages	Y	N	Y

To show this poll

1

Install the app from
pollev.com/app

2

Start the presention

Still not working? Get help at pollev.com/app/help
or
Open poll in your web browser

dferry@misd.net msrock@misd.net