

Alberta Revised K-9 Mathematics Program

Implications for Change

New Math

A red apple is positioned on top of a stack of three books. The books have blue and white covers. The background is a light, neutral color.

- <http://www.youtube.com/watch?v=I8aW4YuFSiY&feature=related>

When?

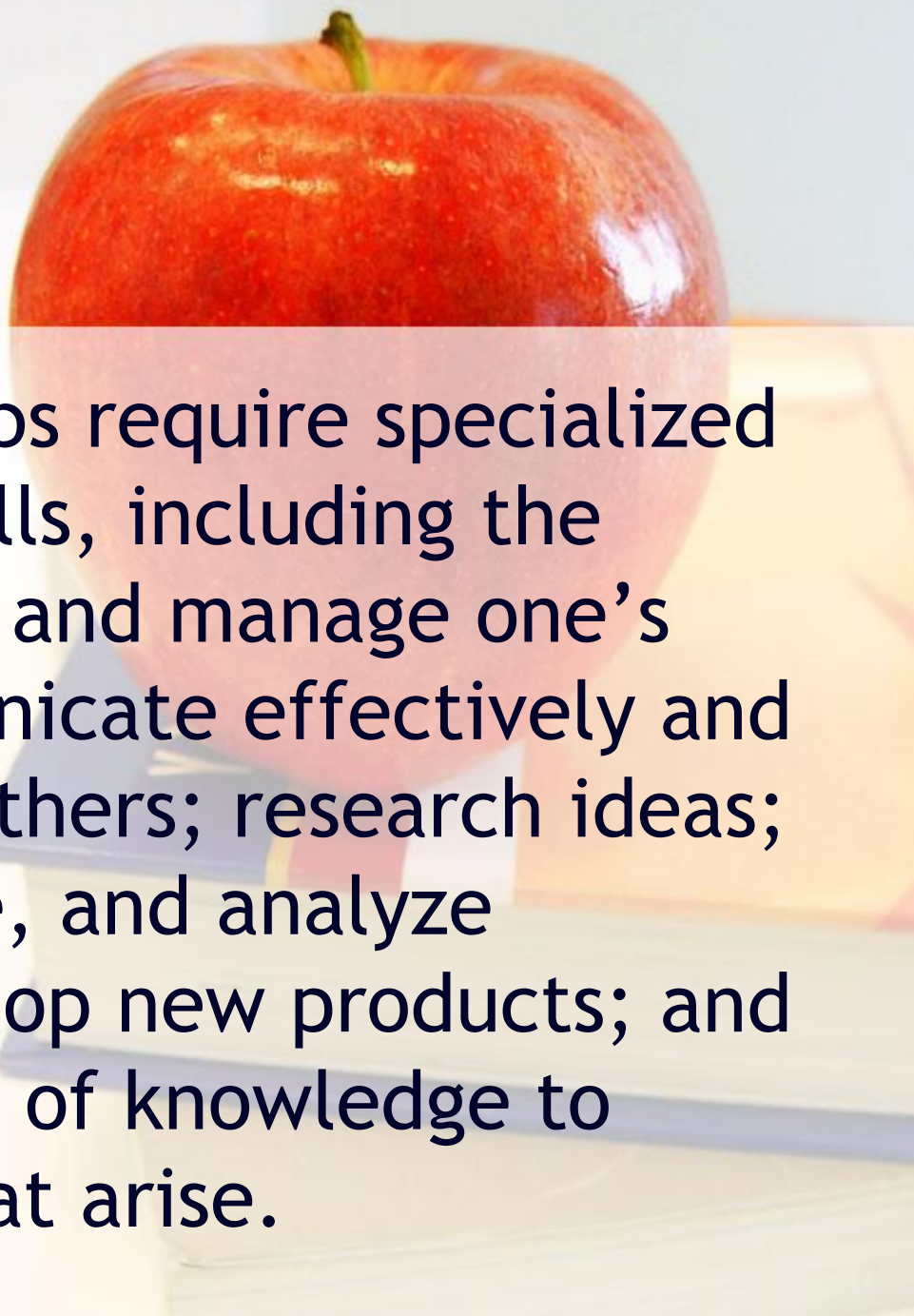
A red apple is positioned on top of a stack of several books. The apple is the central focus, with its stem pointing upwards. The books are stacked horizontally, with their spines visible. The background is a soft, out-of-focus light blue and white.

- **Fall 2010**
 - Mandatory for Grades 3, 6, 9 and 10
- **Fall 2009**
 - Mandatory for Grades 2, 5, and 8
- **Fall 2008**
 - Mandatory for K. Grades 1, 4 and 7

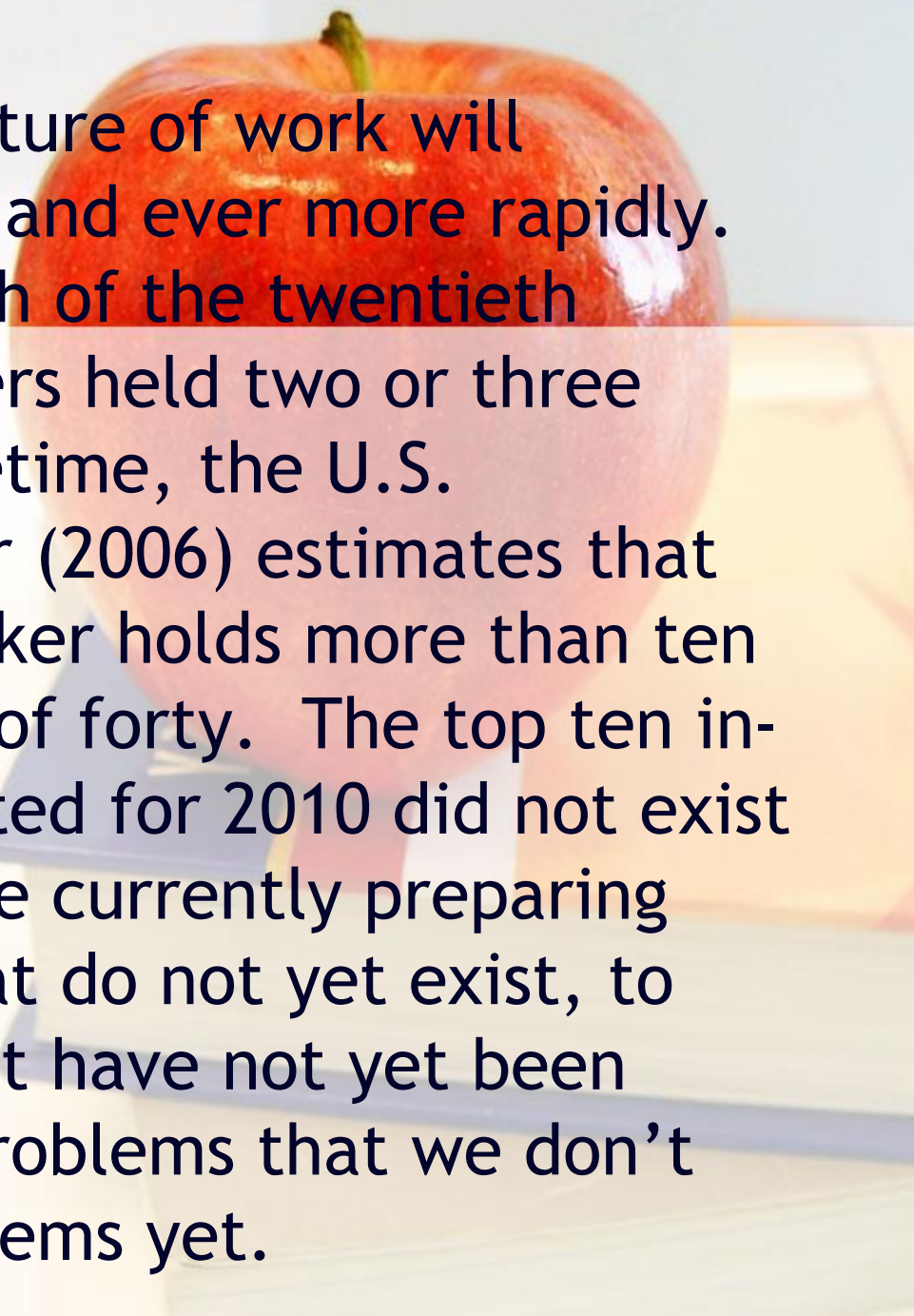
A red apple is positioned in the upper right quadrant of the slide, resting on a light-colored wooden surface. The apple is bright red with some yellow highlights and a small green stem. The background is a soft, out-of-focus light blue and white.

Why Change?

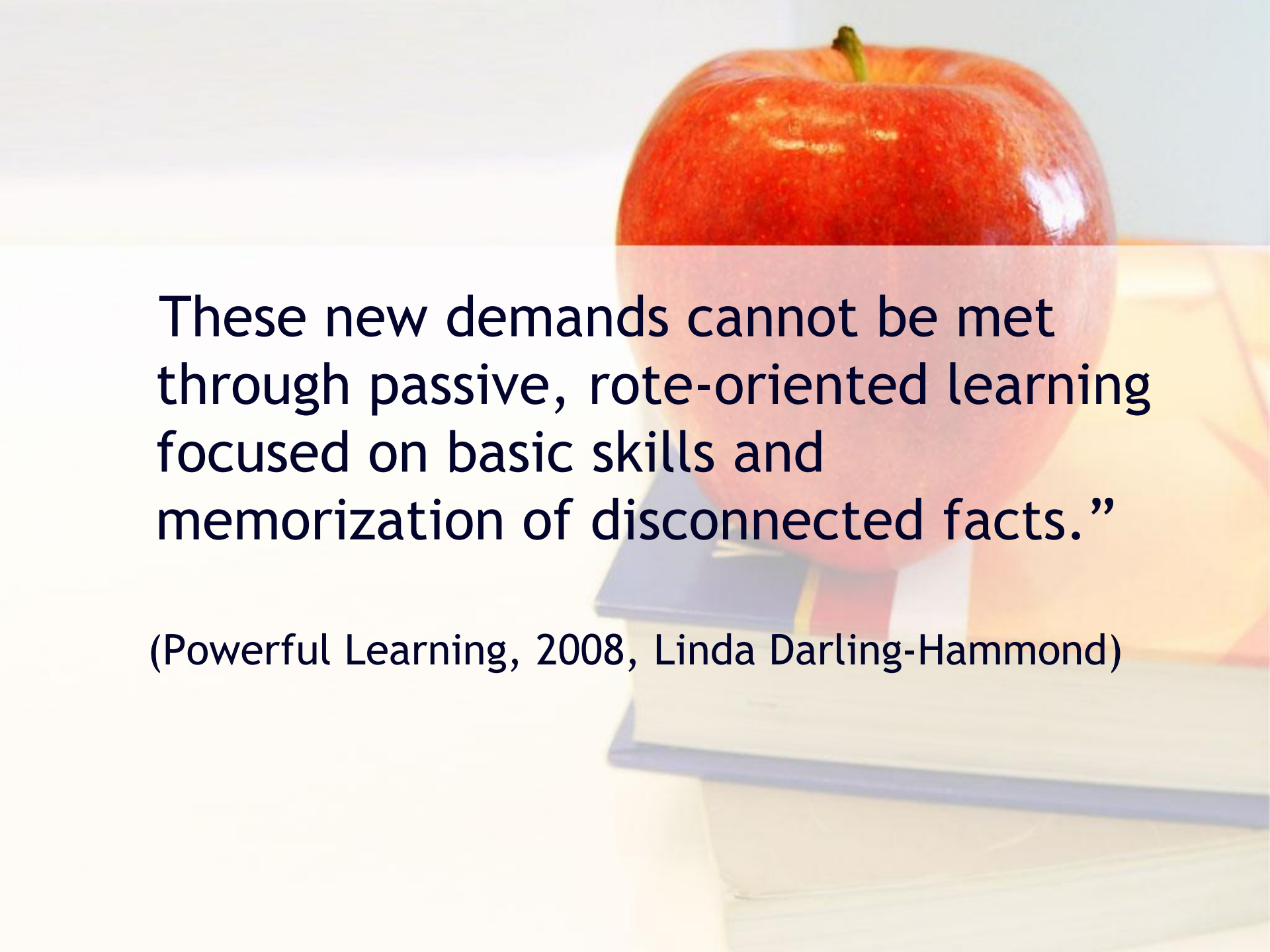
- “Since *A Nation at Risk* (1983) was published a quarter of a century ago, mountains of reports have been written about the need for more powerful learning focused on the demands of life and work in the twenty-first century. Whereas 95% of jobs in 1900 were low-skilled and required just the ability to follow basic procedures designed by others, today such jobs make up only about 10% of the US economy.

A photograph of a single, bright red apple with a small green stem, resting on a stack of several books. The books are of various colors, including blue, yellow, and white. The background is a soft, out-of-focus light blue and white. The text is overlaid on the left side of the image, partially covering the apple and books.

Most of today's jobs require specialized knowledge and skills, including the capacity to design and manage one's own work; communicate effectively and collaborate with others; research ideas; collect, synthesize, and analyze information; develop new products; and apply many bodies of knowledge to novel problems that arise.

A large, vibrant red apple with a small green stem sits on a light-colored wooden surface. The apple is the central focus of the image, with its surface reflecting light. The background is a soft, out-of-focus light blue and white.

Furthermore, the nature of work will continue to change, and ever more rapidly. Whereas during much of the twentieth century, most workers held two or three jobs during their lifetime, the U.S. Department of Labor (2006) estimates that today's average worker holds more than ten jobs before the age of forty. The top ten in-demand jobs projected for 2010 did not exist in 2004. Thus we are currently preparing students for jobs that do not yet exist, to use technologies that have not yet been invented, to solve problems that we don't even know are problems yet.

A photograph of a bright red apple with a small green stem, resting on a stack of several books. The books have light-colored covers, and the scene is set against a soft, out-of-focus background. The text is overlaid on the left side of the image.

These new demands cannot be met through passive, rote-oriented learning focused on basic skills and memorization of disconnected facts.”

(Powerful Learning, 2008, Linda Darling-Hammond)

A red apple is positioned in the upper right quadrant of the image, resting on a stack of books. The books are stacked vertically, with the top one having a blue cover. The background is a soft, out-of-focus light blue and white. The text is overlaid on the image, with the top line in black and the rest in green.

Goal of the Revised Program

Conceptual Understanding
vs.
Procedural Fluency

Algorithms

$$\frac{3}{4} \div \frac{2}{5}$$

To divide fractions:

1. Find the LCM of the numerator and denominator of the divisor.
2. Multiply the numerator and the denominator of the dividend by the LCM and write the equivalent fraction. This fraction is your new dividend.
3. Divide the numerator of the new dividend by the numerator of the divisor.
4. Divide the denominator of the new dividend by the denominator of the divisor.
5. Reduce and simplify if necessary.

Now answer these questions:

A red apple is the central focus, resting on a wooden surface. In the background, a pencil and a notebook are visible, suggesting a classroom or study environment. The lighting is soft, highlighting the texture of the apple's skin.

- What is the answer telling us? What does the solution represent?
- Why does this process work? Will it always work? Are there other ways to divide fractions? Easier ways?
- Will you ever get a remainder? If so, what does that mean?
- Why is the answer larger? Will the answer to a fraction division always be larger? How do you know? Is the answer to other kinds of division questions also larger?
- How will you divide fractions if one of them is a whole number or a mixed number?
- Write a problem scenario that could be solved by dividing fractions.

A red apple is positioned in the upper right quadrant of the image, resting on a stack of books. The books are stacked vertically, with the top book having a blue cover. The background is a soft, out-of-focus light blue and white. The text is overlaid on the image, with the top line in black and the rest in green.

Goal of the Revised Program

Conceptual Understanding
vs.
Procedural Fluency

Instructional Focus

A red apple is positioned in the upper right quadrant of the slide, resting on a wooden surface. In the background, a stack of books is visible, with the top book having a light-colored cover. The overall scene is brightly lit, creating soft shadows.

- Integration of the mathematical processes.
- Decreased emphasis on rote calculation.
- Concepts developed concretely, pictorially, and symbolically.
- Use of personal strategies encouraged.

Mathematical Processes

A red apple is positioned on top of a stack of three books. The books have blue, white, and light blue covers. The background is a soft, out-of-focus light blue and white.

- Connections
- Communication
- Mental Math and Estimation
- Problem Solving
- Reasoning
- Technology
- Visualization

Incorporating the Process Skills

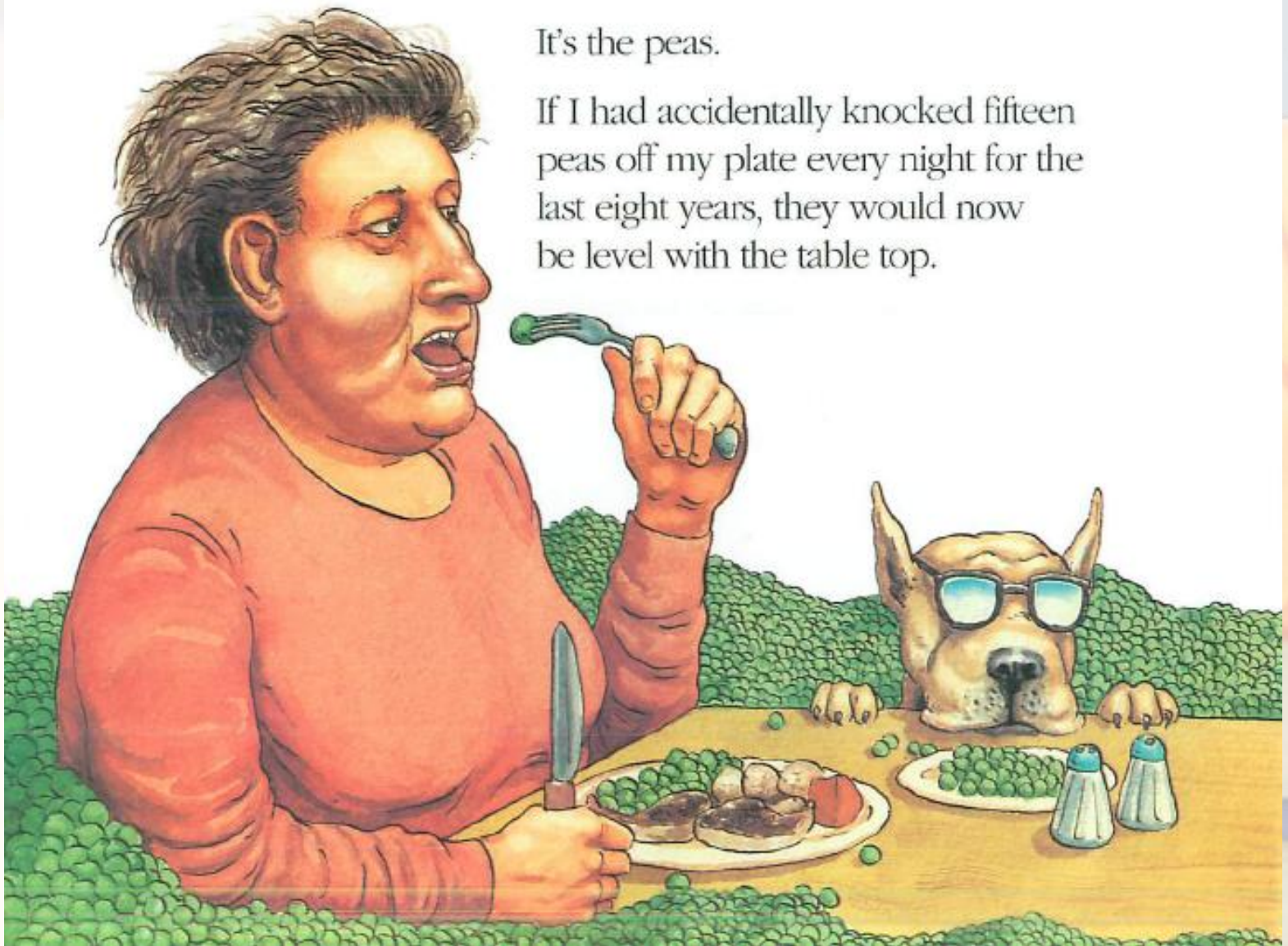
A red apple is positioned in the upper right quadrant of the slide, resting on a stack of books. The apple is bright red with a small green stem. The books below it have various colored spines, including blue, red, and yellow. The background is a light, neutral color.

- Full of Peas
- Read through the following page of Rod Clement's book "*Counting on Frank*" and decide if the author's description is accurate.
- Write a letter to Mr. Clement explaining your findings.

I enjoy dinner, not because of the delicious chops Mom cooks every night or the conversation. . . .

It's the peas.

If I had accidentally knocked fifteen peas off my plate every night for the last eight years, they would now be level with the table top.



No more drill and kill!

- By decreasing emphasis on rote calculation, drill and practice, and the size of numbers used in paper and pencil calculations, more time is available for concept development.
- No more timed facts.
- Basic skill acquisition is still important, but is attained through conceptual understanding, rather than memorization - reinforced through practice via engaging activities (games, problem solving, projects).

Working with Manipulatives

A red apple is positioned on top of a stack of three books. The books have blue and white covers. The background is a light, neutral color.

- Concepts should be introduced using manipulatives and be developed concretely, pictorially and symbolically.

Comparing Fractions

A large, vibrant red apple with a small green stem is positioned on the right side of the slide. It sits on a light-colored wooden surface, possibly a table. The background is a soft, out-of-focus light blue and white, suggesting an indoor setting with natural light.

- Mom and Jenny ordered a pizza for supper. Mom ate $\frac{1}{3}$ of the pizza. Jenny ate $\frac{1}{4}$.
 - Who ate more?
 - How much did Mom and Jenny eat all together?
 - How much pizza is left for Dad?
 - Will Dad have enough to eat or will he still be hungry?

Personal Strategies

A red apple is positioned on top of a stack of three books. The books have blue and white covers. The background is a light, neutral color.

- Add $48 + 57$

Mathematical Tug-of-War



Your job in this mathematical contest is to decide who will win the final tug-of-war. The first two rounds give you the information you need.

The First Round

On one side there are four acrobats who have come down to the ground during the off-season for this special event. They have well-developed arm muscles because of all the swinging they do, and have proven themselves to be of equal strength. Remember that fact.

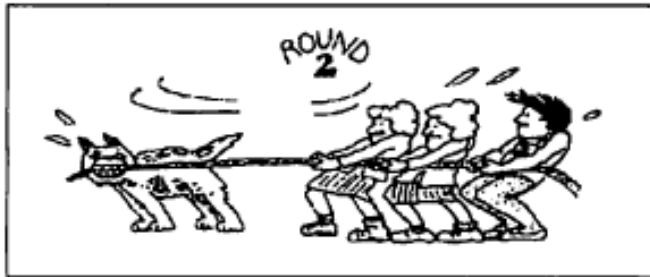
On the other side are five neighbourhood grandmas, a tugging team that has practiced together for many, many years. They, too, are all equal in strength. Remember that fact also.



In the contest between these two teams, the result is dead even. Neither team can out-tug the other. Remember that too!

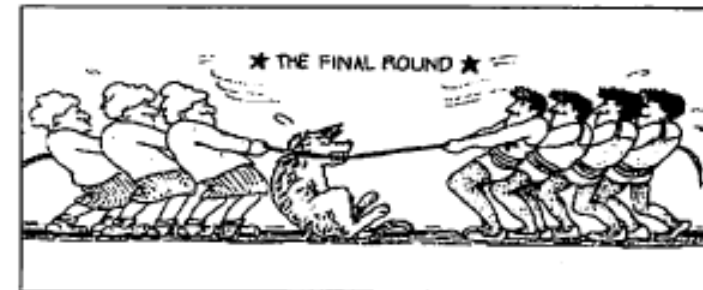
Round Two

One team is Ivan, the specially trained dog that got his start as a pup when he was taken out for a walk by his owner. Ivan gets pitted against a team made up of two Grandmas and once acrobat. Again, it's a draw – an equal pull. Remember that fact.



Final Tug

It's the final tug that you must figure out. It will be between these two teams: Ivan and three of the Grandmas on one side, the four acrobats on the other. Can you figure out who will win this tug of war?



A red apple is positioned in the upper right quadrant of the slide, resting on a stack of several books. The books are stacked vertically, with the top one being a light blue cover. The background is a soft, out-of-focus light blue and white. The text 'Less is More!' is centered in the upper half of the slide, overlaid on the apple and the top of the books.

Less is More!

- Less is More! The amount of content has been reduced to allow TIME for students to
 - make connections between concrete, pictorial, and symbolic representations of mathematics
 - build conceptual understanding
 - develop personal strategies and number sense
 - build vocabulary and communication skills
 - develop critical thinking and problem solving skills

Thinkers as opposed to Doers!

How can you help?



- Don't show your children the “easy algorithms” that you were taught to complete calculations.
- Ask your children to explain why.
- Talk about numbers, play fun games together.
- Look for and describe patterns.
- Include your child in daily activities that require math (shopping for groceries, cooking from a recipe, measuring a window for curtains).
- Don't say “I wasn't good at math either.”

For More Information

A red apple is positioned in the upper right quadrant of the slide, resting on a stack of books. The apple is bright red with some yellow highlights, and its stem is visible at the top. The books below it are stacked, with a blue cover visible on the top one. The background is a soft, out-of-focus light blue and white.

- Email bonnie.layton@sapdc.ca
- SAPDC Website
 - Parent Newsletters
 - Click the **MATH** link on the left menu bar

<http://people.uleth.ca/~sapdc>