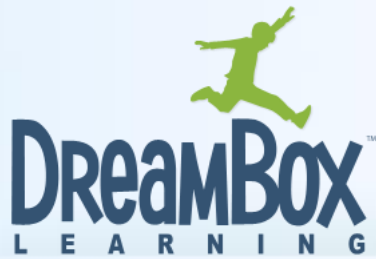




Using Virtual Manipulatives to Support the Development of Number Sense

DreamBox Learning
www.dreambox.com



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*National Board
Certified Teacher*

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Agenda

- Virtual Manipulatives – where to begin?
- DreamBox Virtual Manipulatives
 - Mathrack
 - Tenframe
- Evaluating Virtual Manipulatives
- More DreamBox Virtual Manipulatives
 - Decades and Hundreds Charts
 - Open Number Line
 - Snap Blocks™
 - Match-n-Make

The DreamBox **Vision:**

**Serious learning
that's seriously fun!**

At school.



At home.

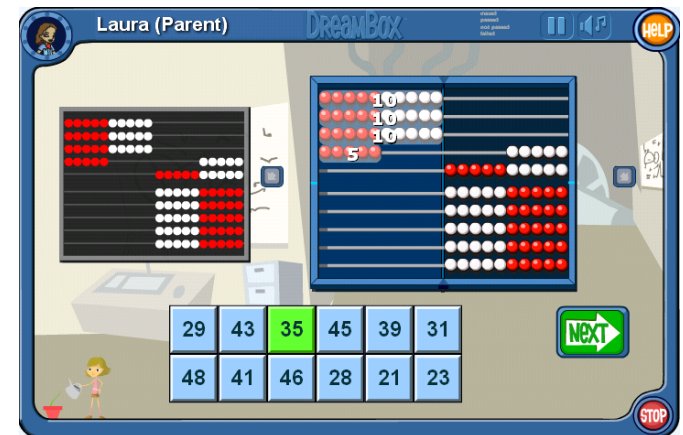
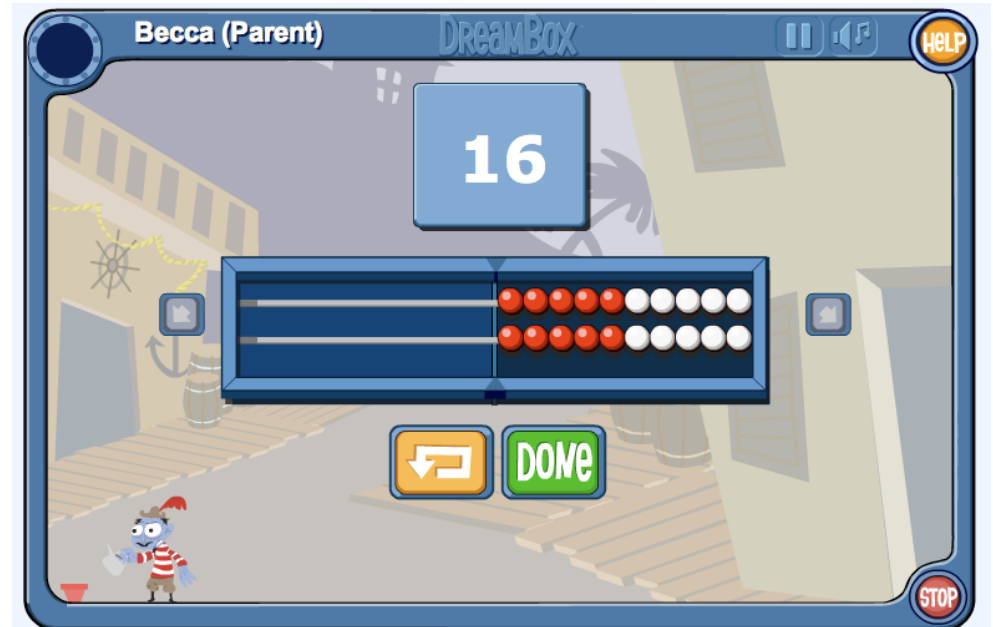


Virtual Manipulatives to Teach Math

- Research shows manipulatives are great;
Research also shows both haptic and virtual manipulatives are better!
- DreamBox Virtual Manipulatives
 - Created, tested, refined
 - Over a dozen created and more coming
- Key Advisors:
 - Dr. Catharine Fosnot
 - Leading math education researcher
 - Landscape of Learning
 - Dr. Francis (Skip) Fennell
 - Past president of NCTM
 - “Big Ideas”: NCTM Focal Points

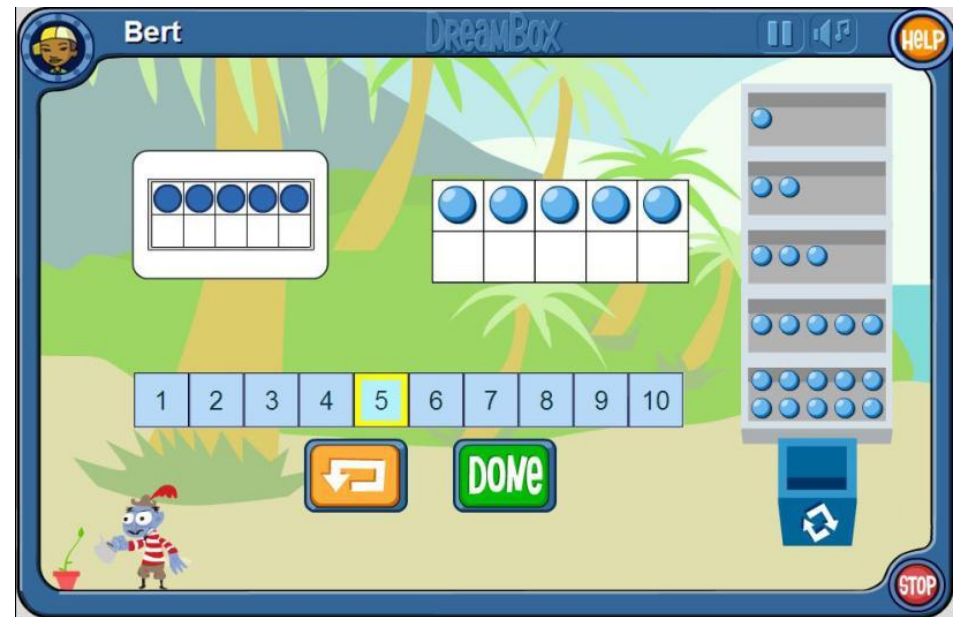
The Mathrack

- 1-, 2-, 10-wire
- Numbers 0-100
- Question types vary
- Optimal building
- Quick images
- Show correct uses “chunking”
- Usability – fun, logical



The Tenframe

- UI and features similar to tenframe
- Buckets use subitizable amounts (1, 2, & 3) and landmark numbers (5, 10)



Adaptation Visuals

Becca (Parent) DreamBox

18

Becca (Parent) DreamBox

18

10
8

↩ DOME

Becca (Parent) DreamBox

Becca (Parent) DreamBox

1 2 3 4 5 6 7 8 9 10

DOME

becca (TWB) DreamBox DP Scale=0.96 Mem 41

7

DOME

Evaluating Virtual Manipulatives

- Does research shows it is meaningful?
- Does it teach? Allow for practice?
- How does the tool scaffold learning? What do hints look like?
- Does it provide control and flexibility to the user?
- Does tool assess strategy and report on student progress?
- Is the tool fun? Intuitive?

Virtual Manipulatives + Adaptation = Individualized Instruction

- Adjust difficulty to find “zone of proximal development” (Vygotsky 1962)
- Identifies and adjusts to student strategy
- Feedback is helpful
- Feedback feels right
- Fun!

Decades and Hundreds Charts

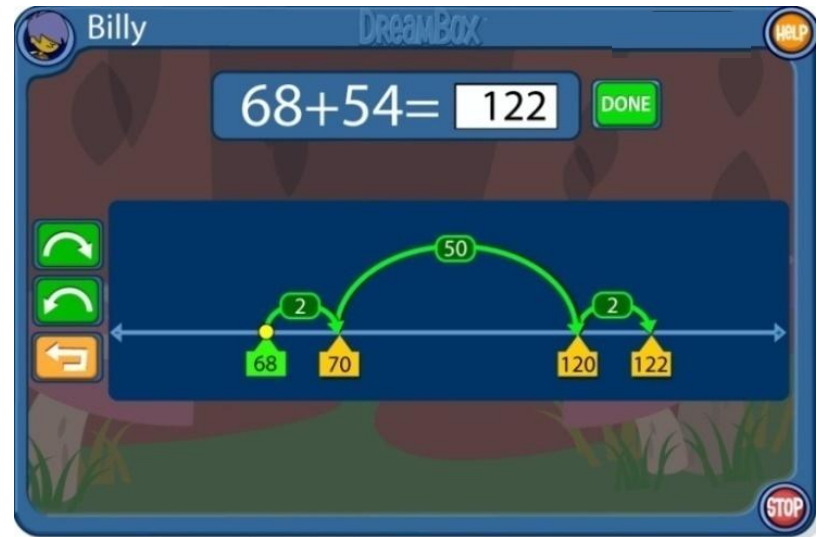
- Addressing Misconceptions



Open Number Line

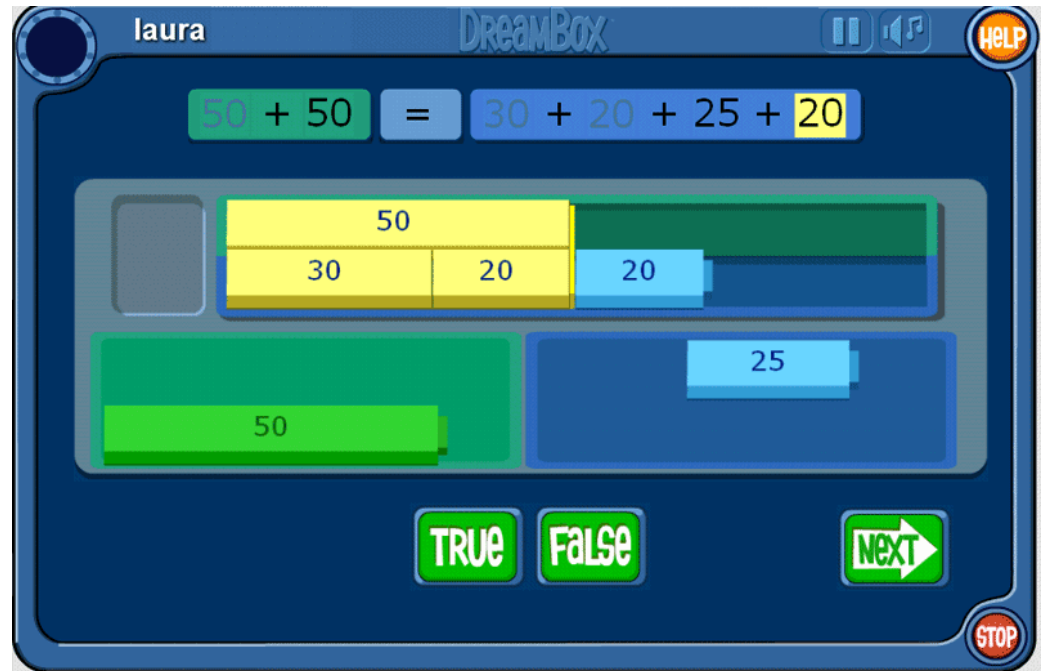
- Misconceptions
- Mathematical Modeling*
 - Model of the situation
 - Model of students' strategies
 - Model as tool for thinking
- Scaling
- Immediate feedback

* Cathy Fosnot



Snap Blocks

- Combination of Cuisenaire Rods and Unifix Cubes
- Combats misconceptions about the concept of “equal”
- Extensive scaffolding/hints



The screenshot shows the DreamBox Learning interface for a user named 'laura'. At the top, the name 'laura' and the 'DreamBox' logo are visible, along with a pause button, a speaker icon, and a 'HELP' button. The main display area shows the equation $50 + 50 = 30 + 20 + 25 + 20$. Below the equation, there are two rows of snap blocks. The top row consists of a yellow block labeled '50', a green block, a blue block labeled '20', and a dark blue block. The bottom row consists of a green block labeled '50' and a blue block labeled '25'. At the bottom of the interface, there are three buttons: 'TRUE', 'FALSE', and 'NEXT'. A 'STOP' button is located in the bottom right corner.

Match – N - Make

- Builds fluency with landmark numbers
- Fun!



Launched January 2009 to Wide Acclaim

The New York Times



THE WALL STREET JOURNAL



The Washington Times

TECH & LEARNING

FamilyFun



The Best Stuff in the World

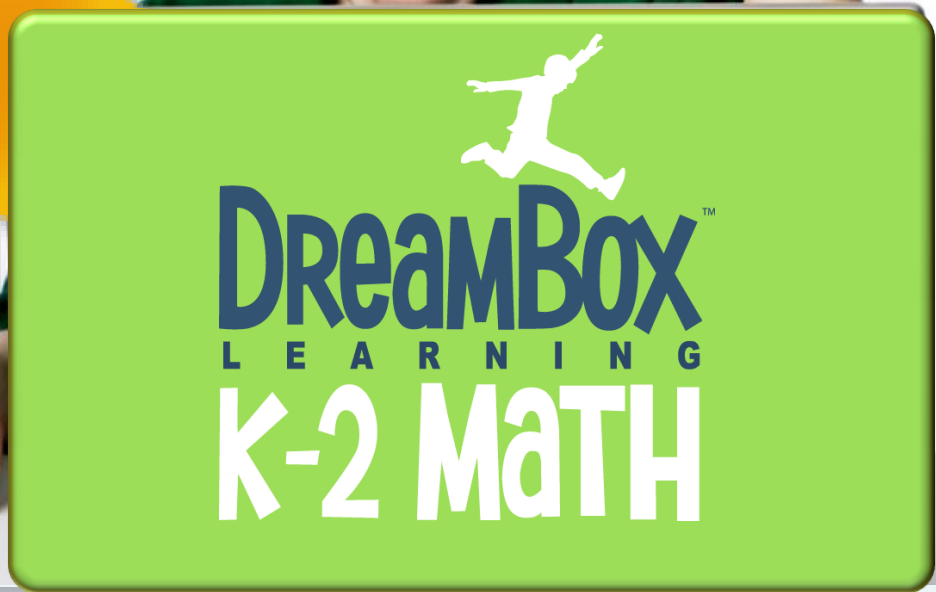




Try it in
your classroom

FREE

*for 30
days!*



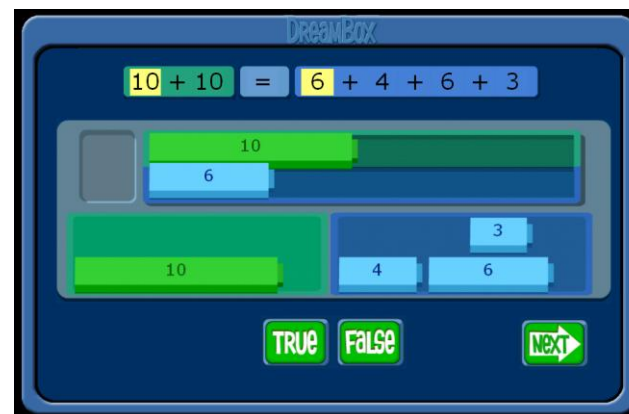
www.dreambox.com/teachers/free_trial

Free DreamBox Teacher Tools

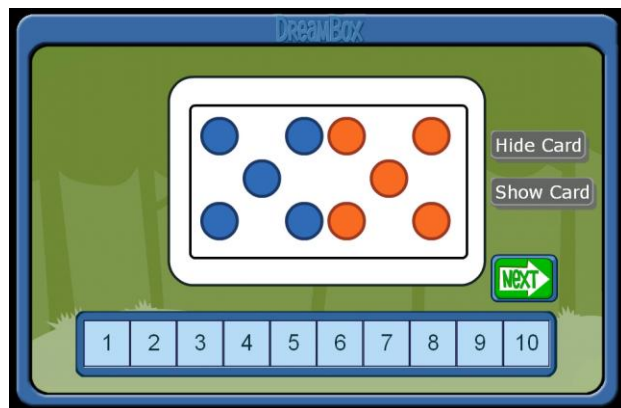
Open Number Line: Developing Number Sense™



Snap Blocks: Determining Equality™



Quick Images: Identifying Amounts™



Match-n-Make: Identifying Pairs™



Play Sample Lessons

Kindergarten lessons



Counting
6 – 10



Building a
Decade of a
Hundreds
Chart



Doubles and
Near Doubles

1st grade lessons



Building
Numbers in
Different
Ways (11-20)



Comparisons
with More
and Less
Symbols



Number
Strings

2nd grade lessons



Building Equal
Expressions
with Snap
Blocks



Addition using
Compensation
Buckets



Adding and
Subtracting using
the Function
Machine and
T-Charts

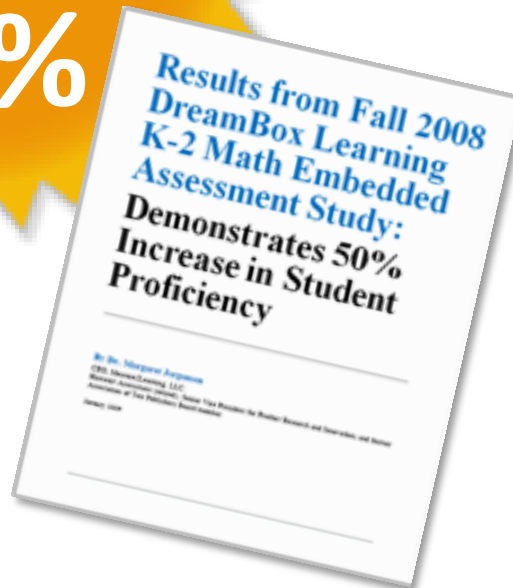


Adding using
the Open
Number Line

Conceptual and Procedural Fluency

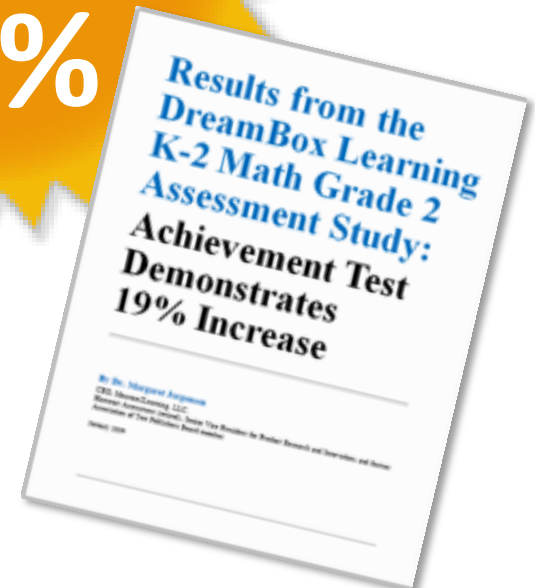
After 2 months
with DreamBox,
369 students aged 4-8
increased proficiency by

50%



After just 2 weeks
with DreamBox,
2nd grade achievement
scores increased by

19%



Resources

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Thank you!

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