Mathematical Tale Winds Series:

SUBTRACTION (Take Away)

Meaning & Problem Solving

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Chapter 1

What?

Why?

How?

Click Me

Other Series

Purpose

WHO IS THIS BOOK FOR?

- ☑ Home-schooling parents who desire well-designed activities for teaching meaningful mathematics, with explanations.
- ☑ Parents who are concerned about their child's lack of enjoyment and success with mathematics.
- ☑ **Engagement-oriented** teachers looking for mathematics teaching resources that concern developing understanding and proficiency.

WHAT ARE THE LEARNING GOALS?

- ☑ To understand the meaning of subtraction as representing a **take away** action.
- ☑ To be able to detect subtraction in a problem scenario and to solve the problem.
- ☑ To gain power in problem solving involving an **arithmetic operation**. This is sometimes known as becoming competent with **social utility problem solving**.

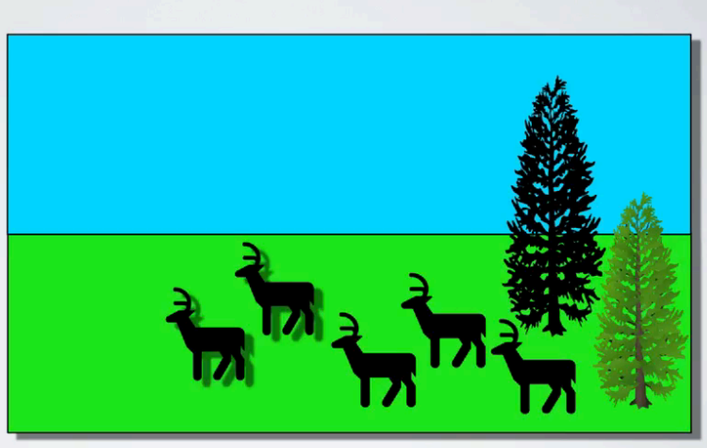
Mathematics Content

LESSON 1:

MEANING OF SUBTRACTION

The 'take away' meaning of subtraction is developed in lesson 1 and strengthened in lesson 2.

Tap/Click the movie.



Learning Readiness

SKILLS & CONCEPTS

- Understand the meaning of addition.
- Familiar with a number line and a 10-frame (for addition).
- Count a collection of at least 20 objects (**rational/real counting**).
- Count forwards and backwards by one more/less. [e.g.: What comes before 5? Response: 4.]
- Write the numbers from 0 to at least 20.
- Can do **parallel counting**.

Lesson 1: Overview

LESSON 1 ACTIVITIES

1. *Reading a story*
2. *Removing objects (counters)*
3. *Number line model*
4. *Practice (removing and number line)*
5. *10-frames*
6. *Assessment of teaching*

Time to complete:

About 80 minutes (10-20 minute sessions).

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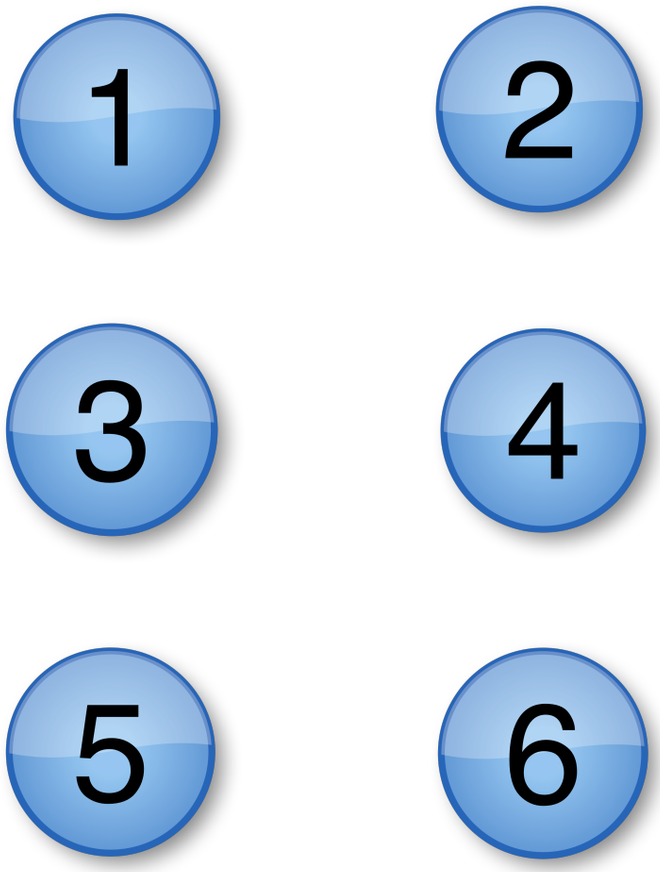


Lesson 1: Activity 1

Cookies and milk, slide down like silk.

Twelve on the plate, now only eight.

A sign is there for them to stare.

What does it mean?

What does it mean?

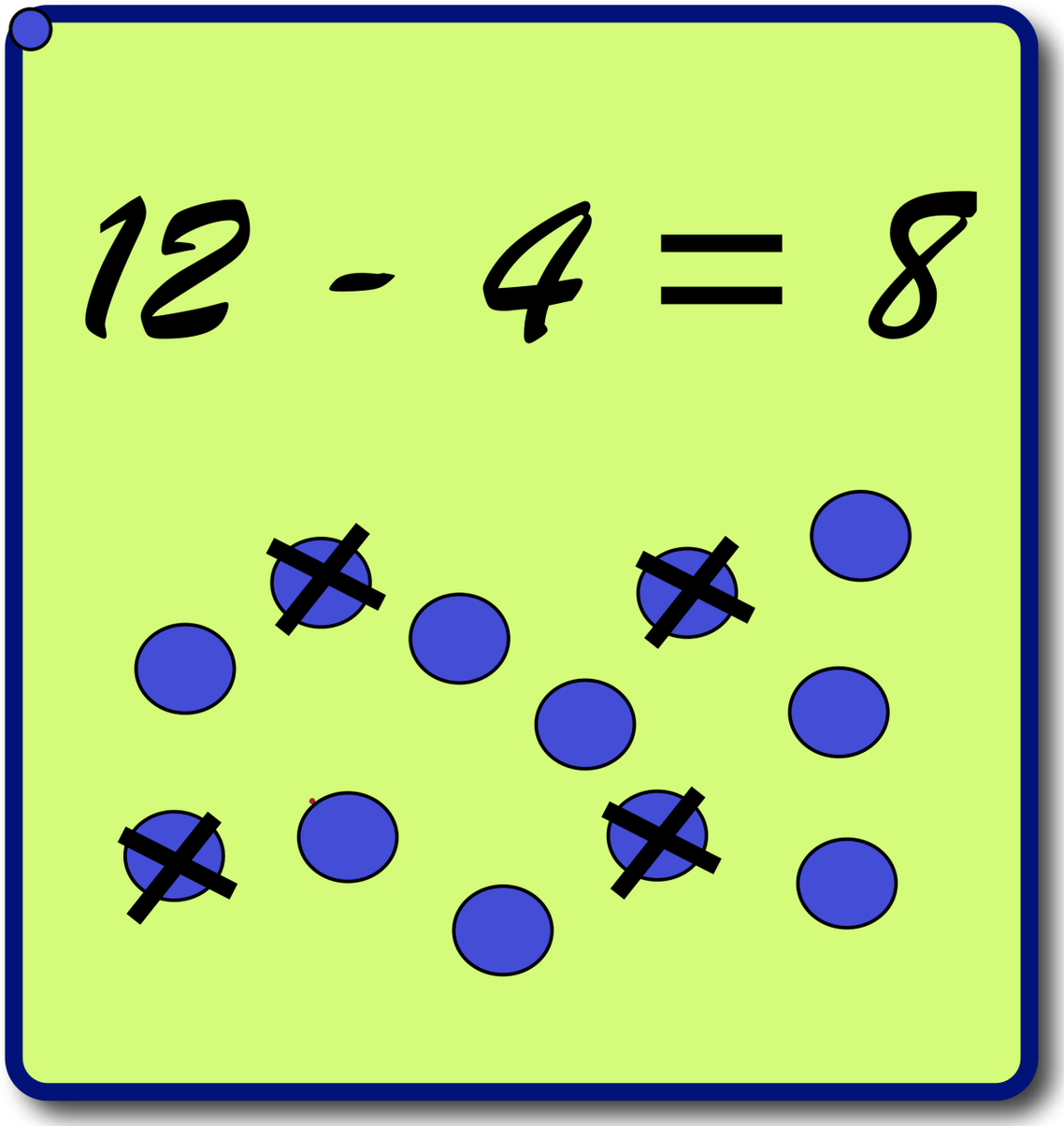
Oh dear! Oh dear!

Click Me

Time to go; time to go

Sister May is in the bay.

continued . . .

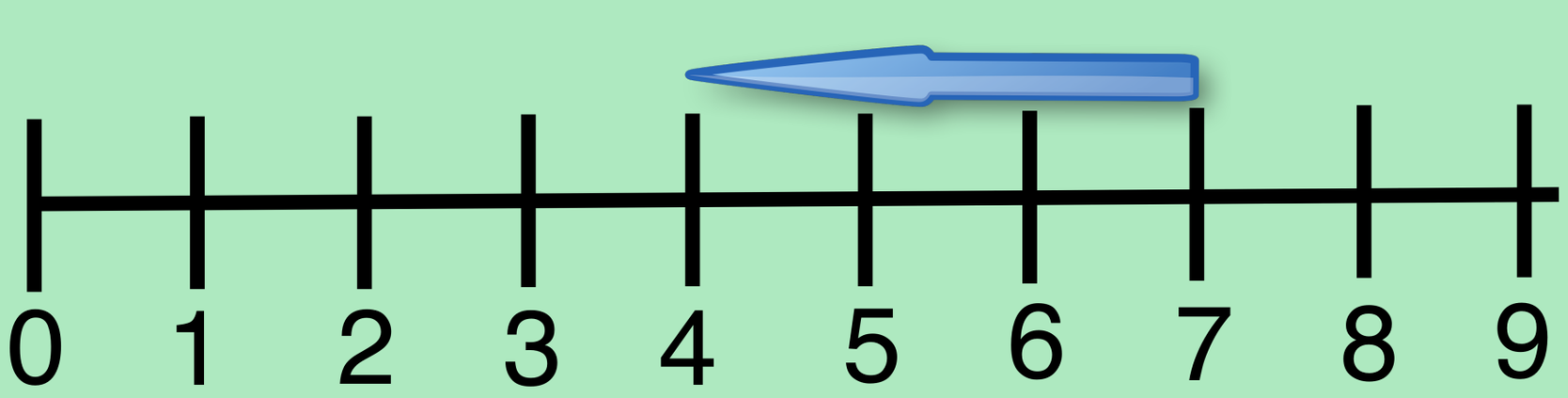


Lesson 1: Activity 3

NUMBER LINE MODEL

(a) Tell a simple story about walking on a number line (e.g. Skee started at 7 on a number line, then took 3 steps back. Now at 4.). Ask the student to show the story on the number line and to write the number sentence. [Expect 7 - 3 = 4.] Repeat for a different story.

(b) Show the number line model for '9 - 2 = 7'. Ask the student to write the number sentence shown by the number line and to tell a story for it. Repeat for a different number line model.



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Lesson 1: Activity 5

10-FRAMES

(a) Ask the student to tell a story about the number sentence ‘8 - 2 = 6.

(b) Provide a 10-frame. Ask the student to show the number sentence ‘8 - 2 = 6’ on it.

(c) Repeat part (a) and (b) for a different number sentence.

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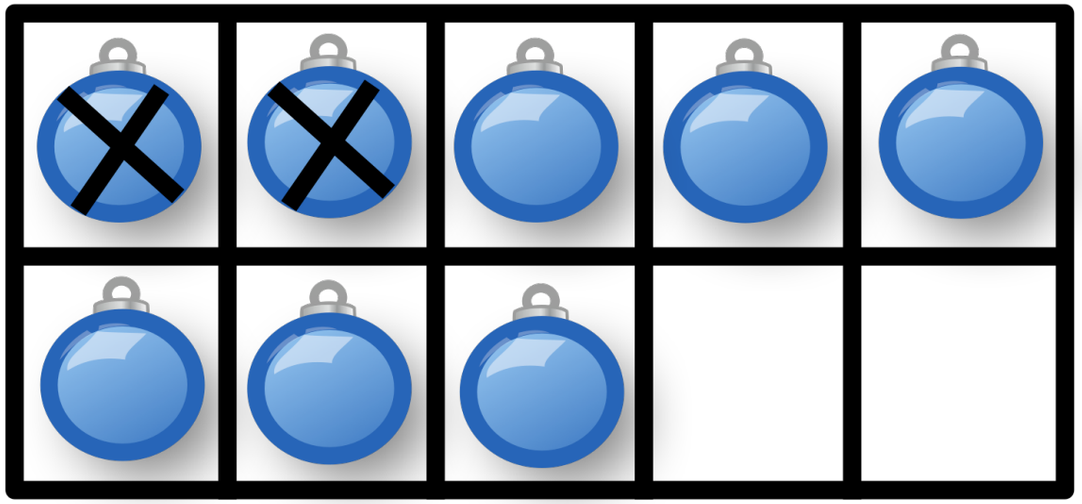

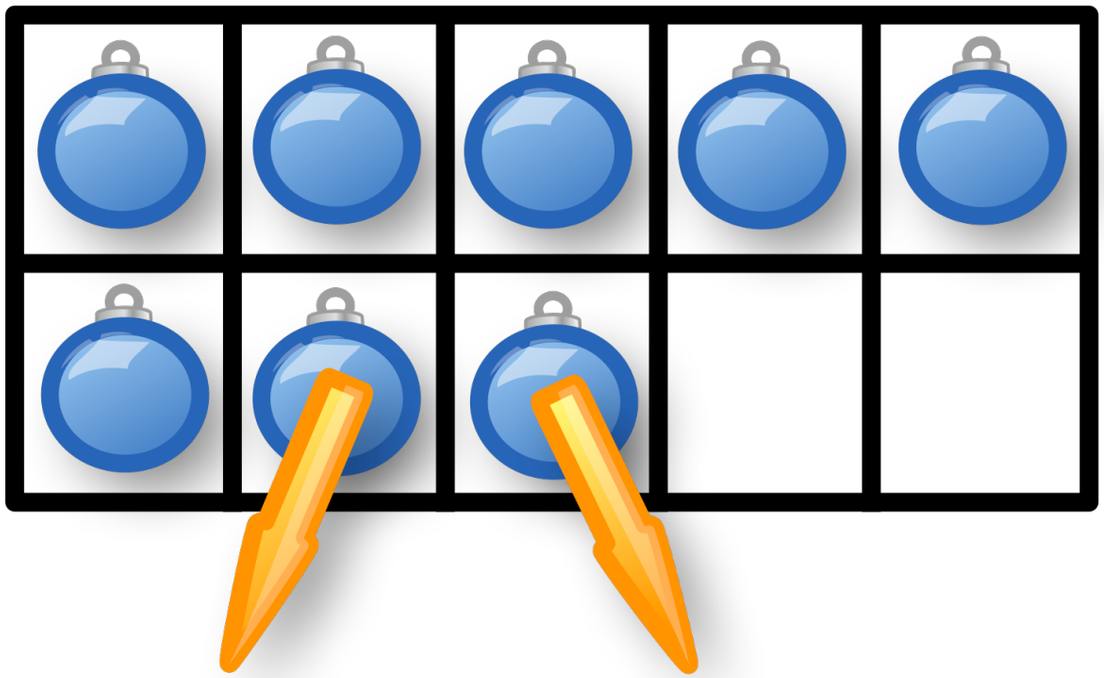

Lesson 1: Activity 6 (Assessment of Teaching)

ASSESSMENT OF TEACHING

Show the ‘take away’ diagram and the number line diagram found on this page.

[The diagrams are duplicated on the next page for the student.]

Ask the student to say/write the number sentence shown by each diagram and to tell a story about each number sentence.

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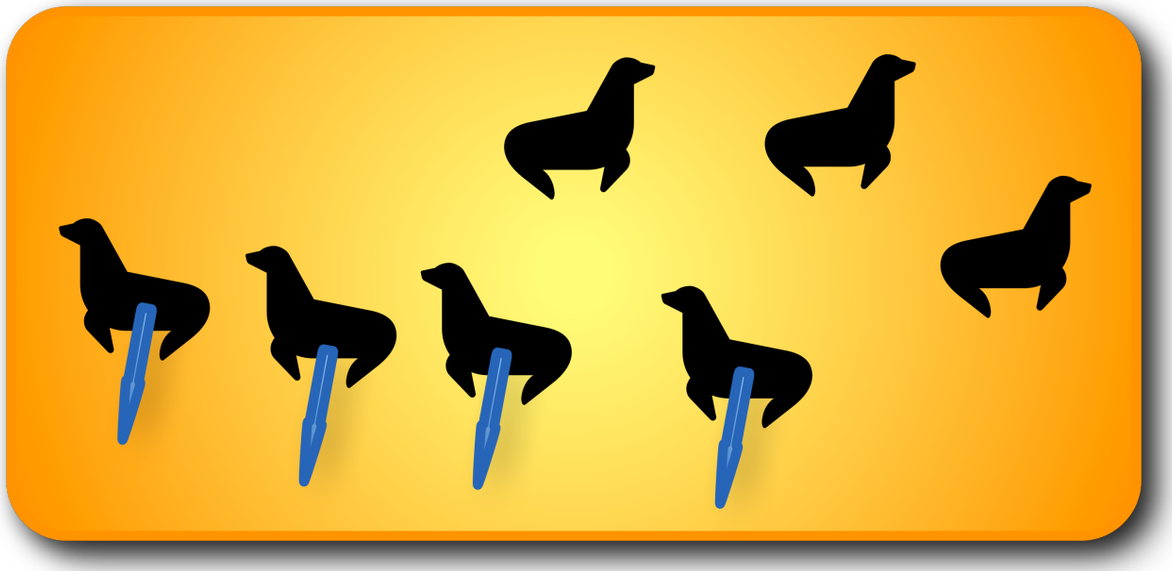
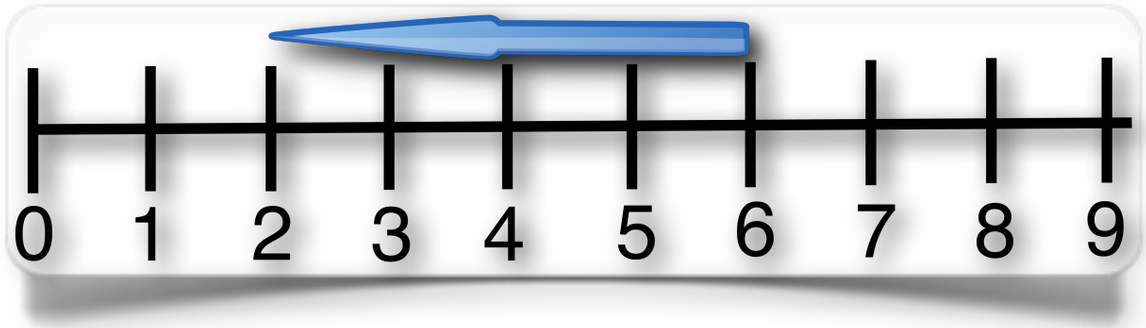




Chapter 3

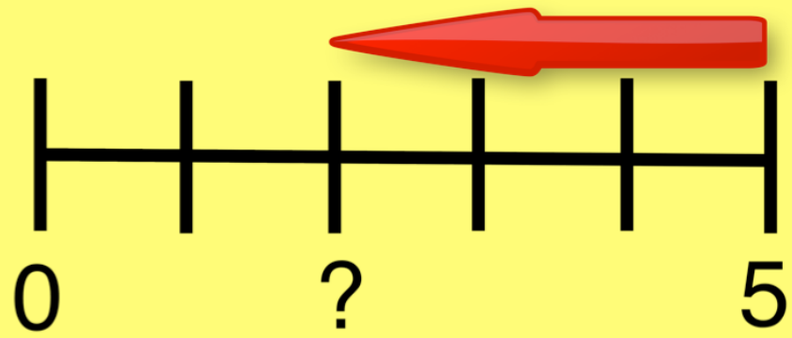
Lesson 2

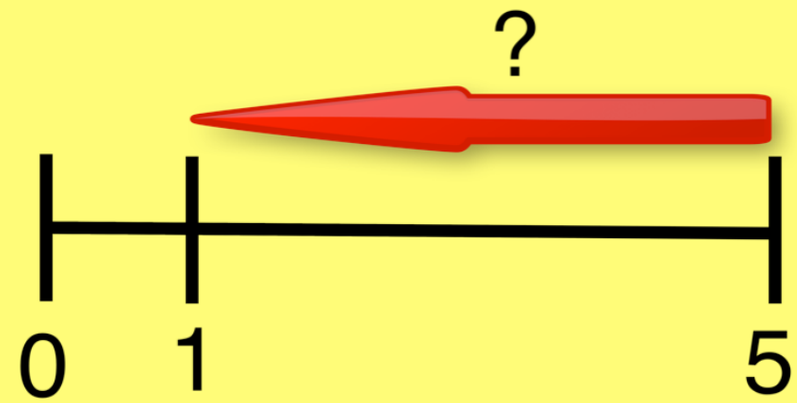
Develop problem solving for:

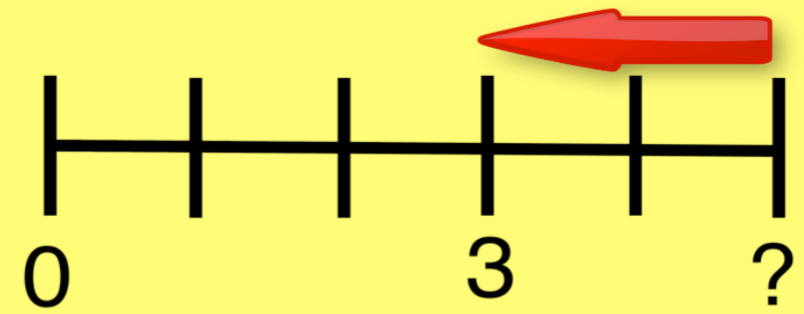
(1) a - b = ?

(2) a - ? = c

(3) ? - b = c







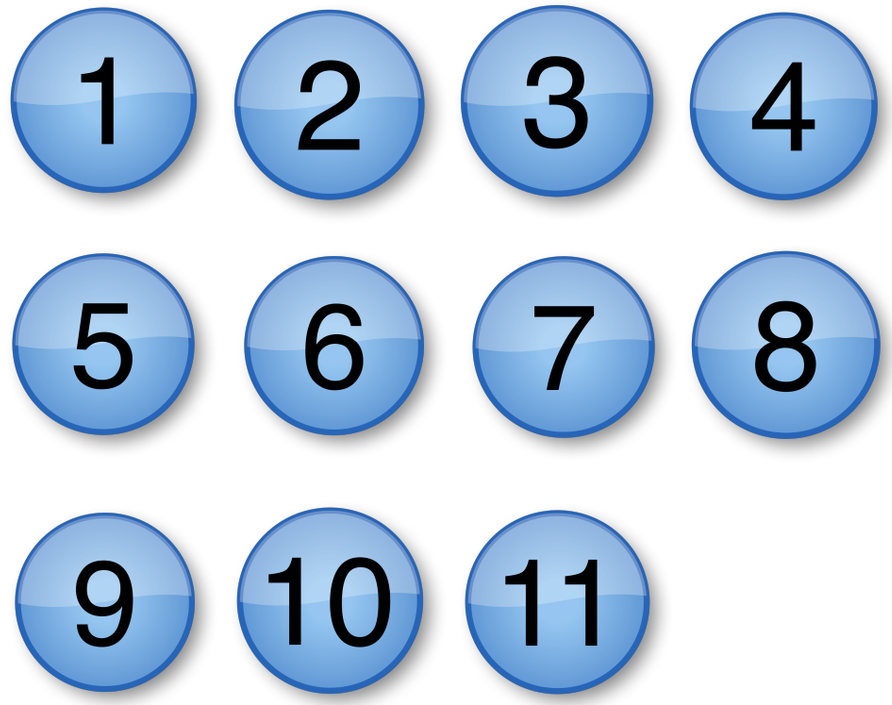
Lesson 2: Overview

LESSON 2 ACTIVITIES

1. *a - b = ___ Story problem*
2. *a - b = ___ Cover up counters*
3. *a - b = ___ Cover up 10-frames*
4. *a - ___ = c Story problem*
5. *a - ___ = c Cover up counters*
6. *a - ___ = c Number line*
7. *___ - b = c Story problem*
8. *___ - b = c Cover up counters*
9. *__ - b = c Number line*
10. *Practice: a - b = ___; a - ___ = c; ___ - b = c*
11. *Assessment of teaching*

Time to complete:
About 140 minutes (10-20 minute sessions).

Click/tap a Number



Lesson 2: Activity 1

'A - B = __' STORY PROBLEM

(a) Read the story problem.

(b) Ask the student to write the number sentence for the problem, using a blank to indicate the unknown. [Expect: 7 - 2 = ___]

(c) Ask the student to explain why the problem is about subtracting. [Expect some sense of take away in the explanation.]

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(d) Ask the student to use counters to solve the problem and to write the answer in the appropriate place (the blank) in the number sentence. [Ensure begins with 7, removes 2, then counts up what is left.]

Grandpa Moe is at the show.

Seven popcorn in the horn.

Two drop into a shoe.

How many in the horn?

How many in the horn?

Oh dear! Oh dear!

Lesson 2: Activity 2

A - B = __ (COVER UP COUNTERS)

In turn, present the student with three ‘a - b = __’ take away situations using a cover up technique (see movie for an example). Ask the student to:

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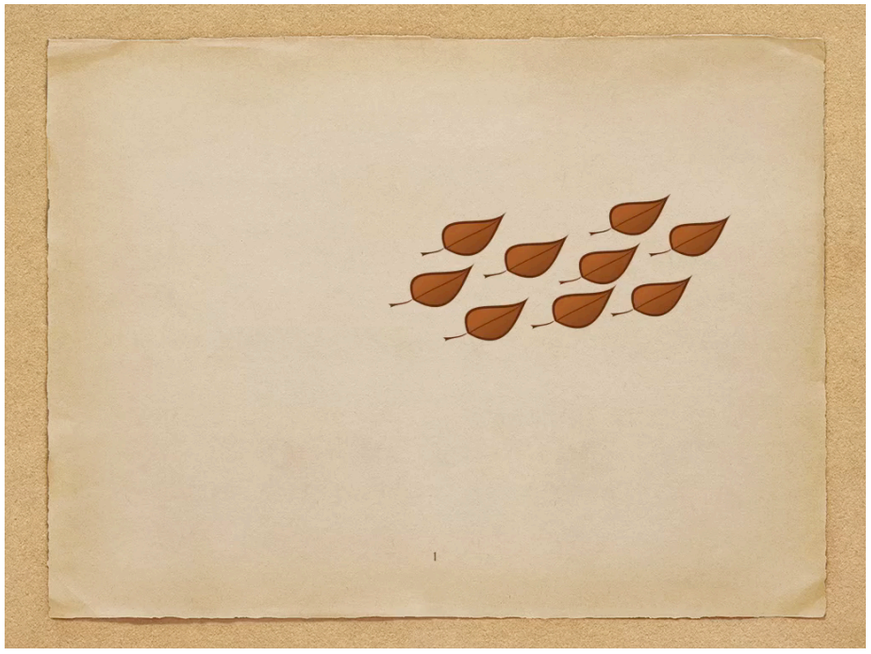
- tell a short story problem about the situation.
- write the number sentence.
- obtain the solution, by using counters.

Tap/Click the movie.



Lesson 2: Activity 10

PRACTICE

In turn, provide each of the following number sentences.

- 11 - 8 = ____
- 13 - ___ = 9
- ___ - 2 = 8

For each number sentence, ask the student to:

- tell a short story problem.
- obtain the solution by using the counters/10-frame.
- obtain the solution by using a number line.

A sample response for '___ - 2 = 8'

- I had some candies in my pocket. I ate 2. I have 8 candies left. How many did I have to begin with?
- Thinks in reverse. Places 2 counters and then 8 counters on the 10-frame. (or does this without using a 10-frame as an organizer).
- Draws a number line. Guesses the start is at 12, moves left 2 steps, ends at 10. Says "Oops". Tries again until finds that starting at 10, and moving left 2 ends up at 8.

Chapter 4

iPad Practice

Student Practice for:

(1) a - b = ?

(2) a - ? = c

(3) ? - b = c

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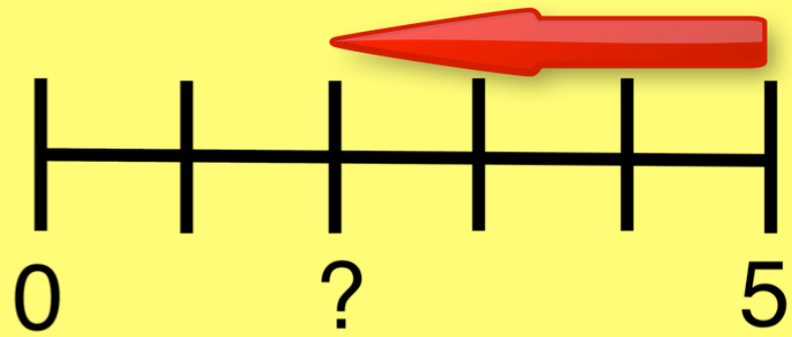
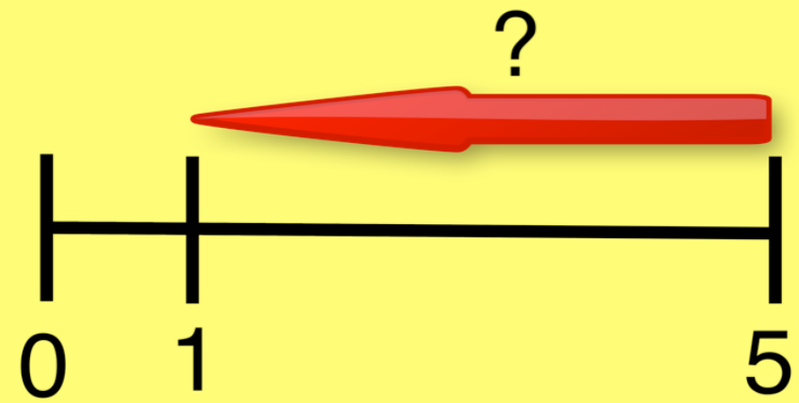
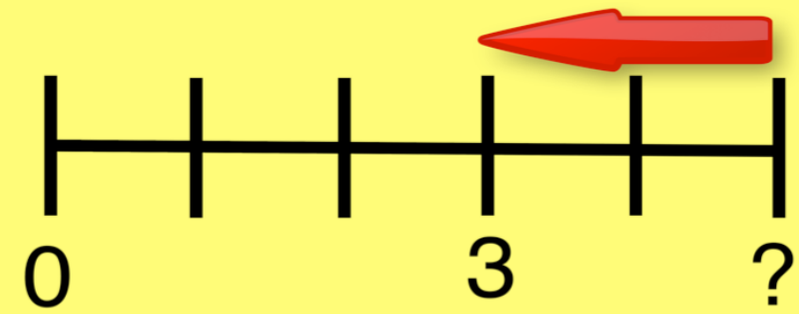






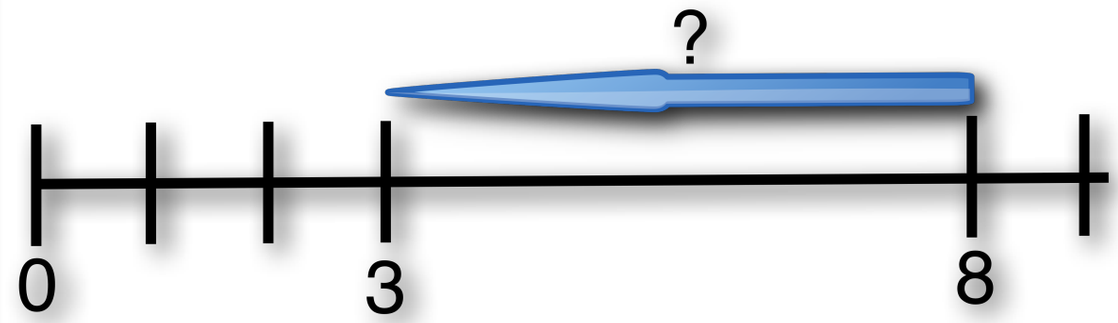
Student Practice

WHICH ME ?

ME ? 8 - ___ = 3

ME ? 8 - ___ = 5

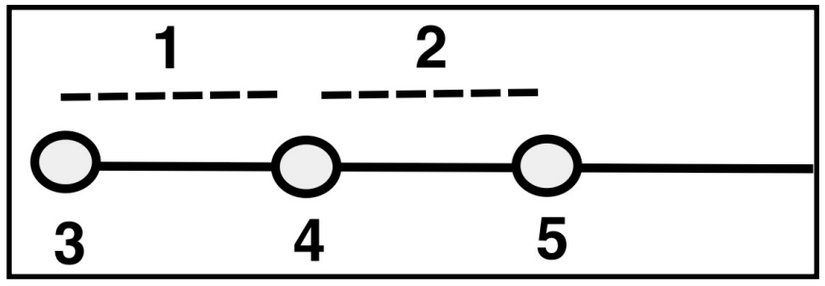
ME ? 7 - 5 = ___



Parallel counting

Being able to keep track of two counting chains (result chain and add on chain) at the same time and understanding that you start the add on chain at the next number.

For example, if you are at '3' and want to count two more, the result chain is 4, 5. The add on chain is 1, 2.



Not understanding this is sometimes referred to as the "Monopoly" oops. Imagine the milk bottle is at Park Place. The dice indicate to move 7 spaces forward. People who have the Monopoly oops will begin the count of 7 at Park Place rather than at the next square, Luxury Tax.

Related Glossary Terms

Nursery rhyme counting, Rational/real counting

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Chapter 1 - Learning Readiness

Social Utility problem solving

A social utility problem involves a real world situation that can be represented by an arithmetic operation(s). The first, and critical, step is deciding what arithmetic operation to use. The second step is doing the arithmetic in some way (mental arithmetic, paper & pencil arithmetic, calculator).

Related Glossary Terms

Arithmetic operation, Number sentence, Take away

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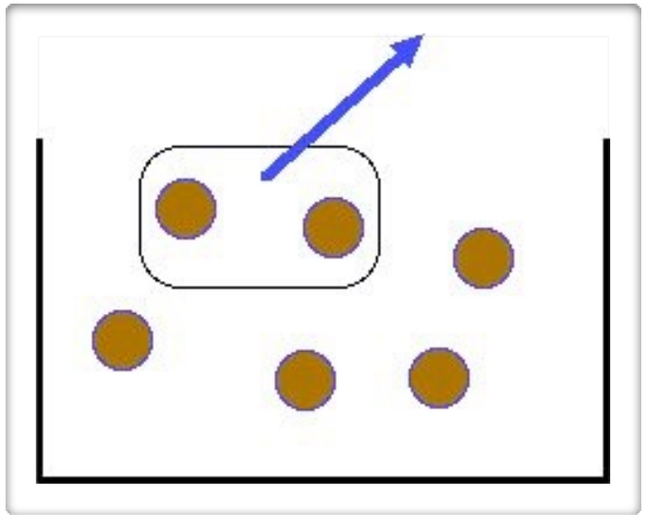
Chapter 1 - Purpose

Take away

Subtraction has three distinct meanings (contexts that can be represented by subtraction):

- Take away
- Comparison
- Change in



The ‘take away’ meaning is the fundamental meaning of subtraction. It involves an action of removing things from a “pot” and counting up what is left. The diagram shows this action for ‘6 – 2 = 4’.

The ‘comparison’ meaning of subtraction is developed in another iBook of the Mathematical Tale Wind series.

Related Glossary Terms

Arithmetic operation, Number sentence, Social Utility problem solving

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Chapter 1 - Purpose