

Lesson 5: Comparing Numbers

Getting Started

? Big Ideas

- Why do we compare numbers?
- How can we compare numbers?
- What is the language of math?



Facts and Definitions

- **Symbol:** an image or picture that stands for words
- $>$: symbol meaning "greater than"
- $<$: symbol meaning "less than"
- $=$: symbol meaning "equal to"

⊙ Skills

- Reason abstractly and quantitatively
- Model with mathematics
- Construct viable arguments and critique the reasoning of others
- Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate

✂ Materials

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|---|--|
| ✓ <i>More or Less</i> by Stuart J. Murphy | ✓ colored pencils or markers |
| ✓ computer keyboard | ✓ construction paper (kit) |
| ✓ glue or glue stick | ✓ index cards (kit) |
| ✓ Interactive Notebook (kit) | ✓ newspaper: weather or sports section |
| ✓ number cards (kit) | ✓ scissors |

Introduction

This lesson focuses on using mathematical language (greater than, less than, equal to) and symbols ($>$, $<$, $=$) to compare numbers. To begin, ask your child to name some numbers that are bigger than 10. Now, ask, "What about some numbers that are smaller than 20?" and "What about some numbers that are bigger than 10 AND smaller than 20?"

Now, give your child a random selection of 12 number cards 1-100, and tell her to put them in order from least to greatest.

Activities

Activity 1: Would You Rather?

Pose the following questions. Ask your child to explain his answer to each one:

- Would you rather have 10 dollars or 5 dollars?
- Would you rather have 20 friends or 12 friends?
- Would you rather have 18 cookies or 32 cookies?
- Would you rather have 10 pieces of broccoli or 7 pieces of broccoli?

Allow your child to ask you similar questions, and explain your responses. Be sure to use the language "less than" and "greater than" in your explanations. For example, you might say, "I would rather have 10 dollars than 5 dollars because 10

is greater than 5."

Reading and Questions

Read *More or Less* by Stuart J. Murphy. Pose the given questions as you read. After you've read the book once and have gone through the questions with your child, reread it, and ask your child to provide more possible questions that Eddie could have asked in order to guess people's ages. For example, what else could he have asked on p. 13 about the woman's age?

1. Stop at the bottom of p. 8 and ask your child, "What question would you ask next? Why?"

- Answers will vary

2. After reading page 12, ask, "Why was Eddie smart to start at 42?"

- because he knew she was a grown up and he was using a grown up's age

3. At the bottom of page 18, ask, "What should Eddie ask now? Why?"

- Answers will vary

4. After reading the last page, ask, "What questions do you think Eddie should have asked Mr. Shaw? Why would those have been good questions?"

- Answers will vary

5. When you've finished reading the book, look back at p. 7 where it says Eddie was "lucky." Ask your child if he thinks Eddie is lucky. Why or why not?

- Answers will vary

6. How is Eddie able to guess ages? What does he know about numbers that helps him guess the ages correctly? What tricks is he using?

- He's using what he knows about the order of numbers to guess ages

Activity 2: Guess the Number

Your child will play the "Guess the Number" game at the following web link. There are 3 possible levels. Select "Medium," but feel free to adjust to ensure that he is both challenged and successful. Allow him to play several times and then ask him to explain his strategy for guessing the number. For example, you might ask, "How are you deciding what your first guess should be?" and "What do you think is the best way to narrow down the possible numbers?"

Guess the Number

www.movingbeyondthepage.com/link/5227

This game gives your child 7 chances to guess a number between 1 and 100 by providing hints about the number using "greater than" and "less than" as he makes guesses. NOTE: The games on this site are free to play on computers (PCs/Macs) but require a paid subscription to play on mobile devices.

http://www.abcya.com/guess_the_number.htm

When your child is ready to stop the game, play "Guess My Number" with one another. Take turns thinking of a number between 1 and 100 and guessing what the number is by providing possible numbers and receiving clues. Like in the interactive game, provide clues using less than and greater than until the correct number is guessed. For example, if Player 1 is thinking of the number 56, Player 2 might start by guessing 20. Then, Player 1 should say "greater than that." Player 2 might then select 70, and Player 1 should say "less than that." Play continues with Player 2 guessing numbers based on Player 1's instructions until the correct number is guessed.

Activity 3: The Language of Math: $>$ $<$ $=$

On the "Playing with the Language of Math" sheet, ask your child to write out in words "eight is greater than seven." Point out that writing it out that way took time and space. Pose the following: "I wonder if there might be a shorter way to write that eight is greater than seven?" Invite him to come up with shorter ways to write the same sentence on the sheet.

Explain that math has its own language and that you've already looked at it before. For a quick review, write $1 + 10 = 11$ on an index card, and ask, "What is this number sentence saying?" Allow your child to phrase the number sentence in 2 or 3 different ways (for example, "When you add 10 to 1, you get 11," "1 plus 10 more is 11," "When you count by 10 from 1, you get to 11").

Look at a computer keyboard and ask your child to point to keys that might relate to math. Ask your child to explain his thinking while he points to different keys. Ask: What might these keys mean?

Show $8 > 7$ on another index card. Ask: "What do you think this number sentence is saying?" (8 is greater than 7) "How do you know? How about this one?" Show $7 < 8$ on another index card. (7 is less than 8) Place the index cards next to each other and ask your child to talk about the differences between the two number sentences. He might note that the numbers are in a different order and that the shape in between them is flipped.

While pointing to $>$ and $<$, say: "These are both mathematical symbols. A **symbol** is something that stands for words. What words do you think $>$ stands for? What do you think $<$ stands for?" Be sure that your child knows that $>$ means "greater than" and $<$ means "less than." Ask him how we might remember this. Draw $>$ on a sheet of paper and add teeth to it. Tell your child to pretend that it is an alligator that wants to eat as much as it can. It will want to eat the largest numbers it can, so the open mouth always points to the numbers that are greater. (You may want to point out the illustration of the alligator on the front of the Interactive Notebook.)

Using the "Math Symbols" sheet, your child will cut out, color, and glue $>$ and $<$ onto a piece of construction paper. Ask him to color each symbol with a green marker or colored pencil, leaving the teeth and eyes uncolored. Then he will cut and paste "greater than" and "less than" below the corresponding symbol. Ask him to write two number sentences that use $>$ and $<$ correctly at the bottom of the paper. He can store this paper in his Interactive Notebook for future use as needed.

Show the number sentences on the top of the "Using $>$ and $<$ " sheet, and ask your child to read them aloud:

- $20 > 10$ (He should say, "20 is greater than 10.")
- $10 < 20$ ("10 is less than 20.")
- $35 > 34$ ("35 is greater than 34.")
- $14 < 15$ ("14 is less than 15.")
- $100 > 90$ ("100 is greater than 90.")
- $90 < 100$ ("90 is less than 100.")

Now, read the number sentences on the bottom of the "Using $>$ and $<$ " sheet, and ask him to write them in mathematical language:

- 12 is greater than 8 (He should write $12 > 8$.)
- 4 is less than 9 ($4 < 9$.)
- 20 is less than 30 ($20 < 30$.)
- 30 is greater than 20 ($30 > 20$.)

Ask your child what symbol we use when numbers are the same. Show $=$, and ask him to use it in a number sentence.

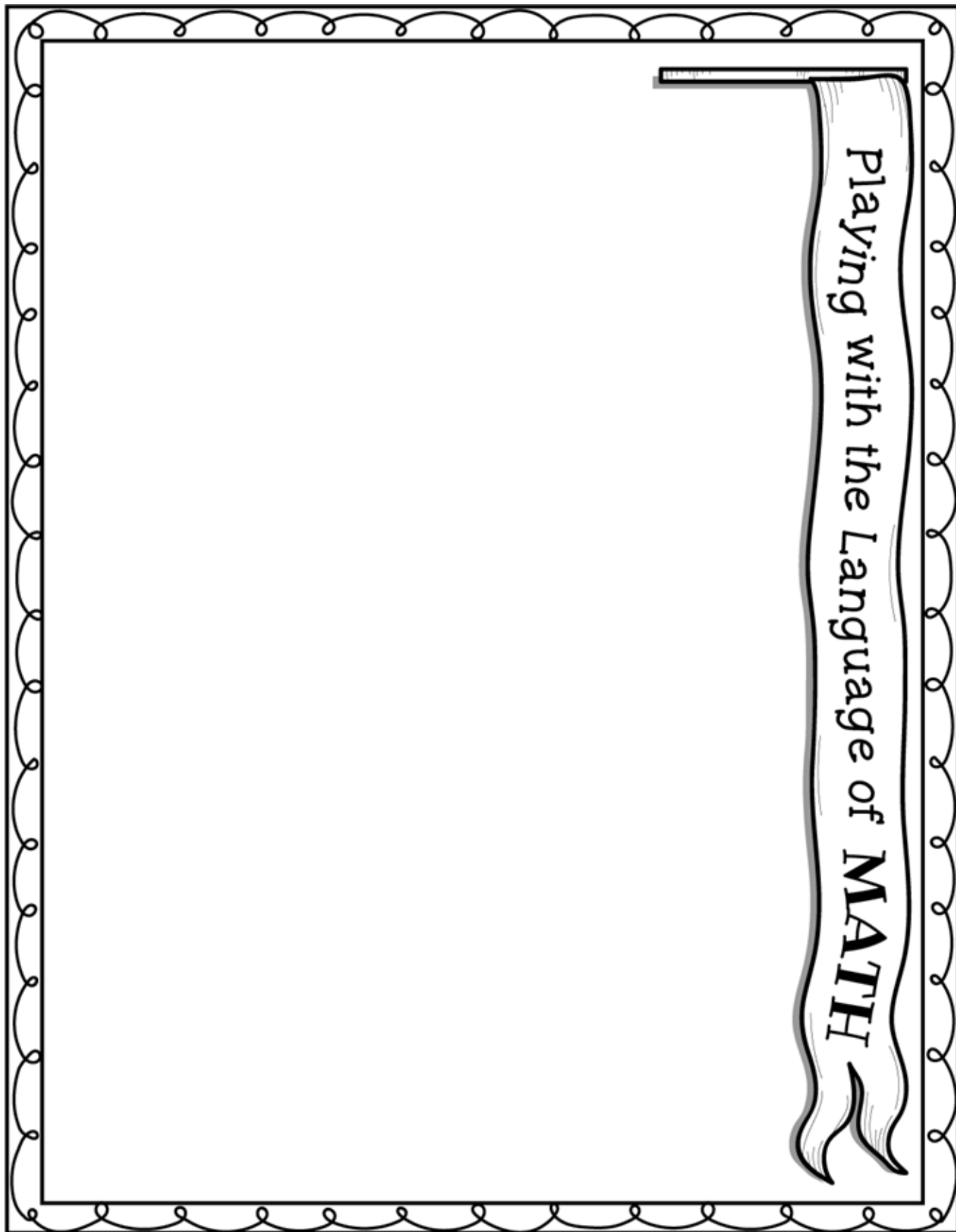
Activity 4: News-y Number Sentences

Look at information about weather in a newspaper or watch for it on TV. Ask your child to create greater-than and less-than number sentences based on weather numbers. For example, looking at 2 cities in your state, which has the higher (greater) temperature? Your child could also explore numbers related to sports to create number sentences. For example, which of 2 football or baseball teams has the most wins? Which 2 teams have the same number of wins? How can we compare these numbers using the language of math?

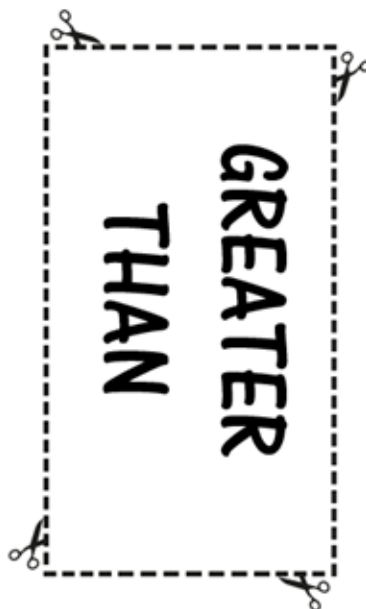
Invite your child to act out a short news broadcast using signs on construction paper that show his number sentences. Model for him what a broadcast might sound like: "It was hot day today in many places in Texas. Temperatures in Dallas hit 90 degrees while Houston saw temperatures even higher than that with 94 degrees." Then, show a sign on construction paper that reads $94 > 90$.

Wrapping Up

Ask your child to explain how he plans to remember which way the "greater than" and "less than" symbols should be facing in number sentences that compare numbers.



Math Symbols



Using $>$ and $<$

What do these say?

$$20 > 10$$

$$10 < 20$$

$$35 > 34$$

$$14 < 15$$

$$100 > 90$$

$$90 < 100$$

How do we write these in math language?
(Remember the alligator!)

12 is greater than 8 _____

4 is less than 9 _____

20 is less than 30 _____

30 is greater than 20 _____

