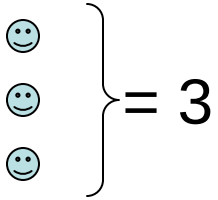
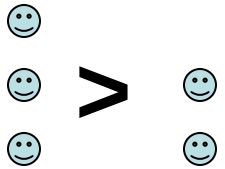
Big Ideas in Algebraic Thinking

Topic	Big Ideas	Examples
Sets	• **Attributes** can be used to **sort** collections into sets. • The same collection can be **sorted** in different ways. • Sets can be **compared** and **ordered**.	• Color, size, shape, type of object, etc. • Red bears vs. blue bears; big bears vs. little bears • *There are more red bears than blue bears* (compare); small red bears—medium red bears—large red bears (order)
Pattern and Regularity	• Patterns are **sequences (repeating or growing)** governed by a **rule** and they exist both in the world and in mathematics. • Identifying a pattern brings predictability and allows one to make **generalizations**. • The same pattern can be found in many **different forms.**	• Dots on a ladybug; posts of a fence; adding 1 to a number gives you the next number • *After lunch comes recess; If we keep counting people's feet, it will always be 2 more.* • Big block, little block; big block, little block; big block, little block; snap, clap; snap, clap; snap, clap
Representation and Symbolism 	• Mathematical ideas about **quantities** and **relationships** can be represented by **symbols**. • Mathematical problems can be more easily understood and solved through the use of **mathematical modeling**. • **Change** can be represented mathematically–both **qualitatively** and **quantitatively**.	• Symbols can be objects, drawings, or written symbols like numbers and words. • *Marcus had 1 block and Felicia gave him 1* can be modeled with counters on a plate or as 1 + 1 = 2. • *Today is colder than yesterday* (qualitative) vs. *Today is 4^o colder than yesterday* (quantitative)
Relationships and Functions 	• **Quantitative comparisons** can be represented mathematically through **equations** and **inequalities.** • The **equal sign** means quantities on either side of it are **the same as** one another – it does not mean "solve this problem" or "put the answer here." • A **function** is a special relationship in which two sets are linked by a **rule.**	• *The 7 inch tower is 2 inches taller than the 5 inch tower* or 7 > 5; *If I give Sam 1 more he'll have 3 just like me* or 2 + 1 = 3. • *Robbie has 3 bears and Jayden has 3 bears, so they have the same number of bears* or 3 = 3. • The cost of train tickets is a function of the number of tickets: 1 ticket is $2; 2 tickets are $4; 3 tickets are $6 and so on. (n x $2 = cost)

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