

#19341 Daily Routines for Building Number Sense

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Number sense: "...a person's general understanding of number and operations along with the ability to use this understanding in flexible ways to make mathematical judgments and to develop useful strategies for solving complex problems" (Burton, 1993; Reys, 1991)

—from NCTM's Illuminations website

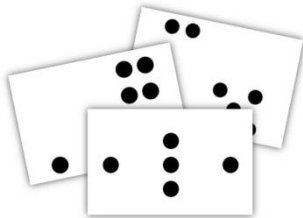
Subitizing

- ☞ "...that ability to 'just see it' without counting is called *subitizing*." (Van de Walle, 2013, p 129)
- ☞ "Subitizing is a fundamental skill in the development of students' understanding of number." (Baroody, 1987, p 115)
- ☞ "Subitizing is an important component of computation at the lower grades." (Parrish, 2010, p 39)

Composing and Decomposing Numbers

- ☞ "Focusing on a quantity in terms of its parts has important implications for developing number sense." (Van de Walle, 2013, p 139)
- ☞ "If basic facts are to be foundational, they must be based on an understanding of the composition and decomposition of numbers. When children know the parts of numbers through 10, they automatically know the basic facts." (Richardson, 2012, p 43)
- ☞ "Fluency is knowing how a number can be composed and decomposed and using that information to be flexible and efficient with solving problems." (Parrish, 2010, p 38)

Dot Cards



"Incorporating dot images into classroom number talks provides opportunities to work on counting, seeing numbers in a variety of ways, subitizing, and learning combinations." (Parrish, 2012, p 41)

- ☞ Use paper plates, large index cards, or half-sheets of cardstock and colored dot labels to make dot cards
- ☞ Make multiple configurations for each number
- ☞ Use two colors to support composing/decomposing skills
- ☞ Use both random patterns and ten-frames

Dot Card Routines

- ☞ Develop and practice procedures for dot card routines. Avoid having students shout out answers.
- ☞ Be sure to ask not only *what* number they see, but also *how* they see it.
- ☞ "Did anyone see it a different way?"
- ☞ Start with smaller numbers and build to larger numbers that use combinations of the smaller numbers.

- ☞ 5- and 10-frames anchor to the critical benchmarks of 5 and 10.
- ☞ The process is the same as with random dot cards, but questioning can include the relationship of the number shown to 5 or 10.
- ☞ Use two colors to support composing/decomposing skills and development of basic facts.
- ☞ Make Mine—Give students counters. Quickly flash a number and have students use the counters to build what they saw. Show again for students to check their work.
- ☞ Connect the visual to the symbolic by writing number sentences for the combinations students see.

Online Dot Card Resources

- ☞ NCTM Illuminations
<http://illuminations.nctm.org/ActivityDetail.aspx?ID=74>, five-frame tool
<http://illuminations.nctm.org/ActivityDetail.aspx?ID=75>, ten-frame tool
- ☞ Fuel the Brain, Interactives, # Flash
<http://www.fuelthebrain.com/Interactives/app.php?ID=29>
- ☞ DreamBox Teacher Tools, <http://www.dreambox.com/teachertools>

Number Bracelets



- ☞ Use chenille stems (cut off about 2") and pony beads to make bracelets. Use a single color for the beads. Use mailing labels for the number tag. Put the number tag over the twisted ends.
- ☞ Two ways to store: a large plastic bag with enough bracelets of each number for all students to have one or each student can have a bag with bracelets for all numbers

Number Bracelet Routines

- ☞ Students manipulate the beads and make all the combinations for a given target number
- ☞ Students can record their number combinations in a math journal to connect the concrete with the abstract (symbolic)
- ☞ Partner activity—one partner hides some beads and the other partner has to figure out how many are hidden
- ☞ Number bracelets are great for the "hiding assessment"
- ☞ Differentiate by having students work with their own target number
- ☞ Have children act out story problems using the beads

Rekenreks

Rekenrek translates loosely to calculation rack or arithmetic rack, and it was designed by a Dutch mathematician. The rekenrek is a great visual model for developing a strong sense of 5 and 10, and it supports a strategy-based approach for learning calculations.



- ☞ Cut foam sheets into 4 x 6 rectangles
- ☞ Cut 2" off the ends of the chenille stems
- ☞ Poke the ends of the chenille stems into left side of the foam rectangle, about an inch apart
- ☞ Thread 5 red beads and 5 white beads on each stem
- ☞ Poke the other ends of the stems through the foam and twist the ends together on the back

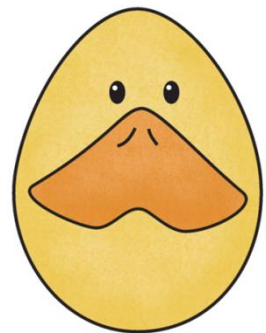
Rekenrek Routines

- ☞ Introduce the rekenrek and allow students to make observations.
- ☞ Teach the conventions of starting with the beads on the right and move beads in groups, rather than one by one.
- ☞ Call a number and have students show the number in one move.
 - Begin with numbers less than 5, then progress.
 - Use both the top and bottom rows and two moves.
 - Have students describe how they knew what to move. Look for connections to 5, 10, doubles, etc.
- ☞ Practice making five, using first only the top row and then both rows.
- ☞ Practice making ten, using one or both rows.
- ☞ Build a Number—partners share a rekenrek and build a number using the top and bottom rows
- ☞ Quick Flash—quickly flash a number and have students tell you the number they saw. Always ask how students saw the number.

Online Rekenrek Resources

- ☞ Professor Garfield
<http://www.professorgarfield.org/yourfuture/math.html>
- ☞ DreamBox Teacher Tools, <http://www.dreambox.com/teachertools>

Quack Attack Shake and Spill



Shake and Spill

- ☞ Works with any simple graphic.
- ☞ A target number of counters is spilled onto the mat. Count the number on the graphic and off.
- ☞ Record combinations.
- ☞ Differentiate based on student needs

References

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