

Building Positive Dispositions: Nurturing Perseverance

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www.qualityteacherdevelopment.com

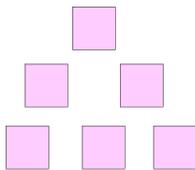
@SueOConnellMath

What can we do to nurture perseverance?

1. Give them practice with problems that require perseverance.
2. Help them understand what perseverance means and develop strategies for persevering.
3. Help our students develop a positive disposition about solving problems (confidence, decreased anxiety).
4. Improve their problem-solving skills.
5. Praise efforts related to perseverance.

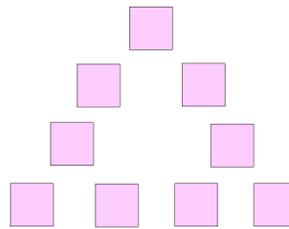
9 Puzzle

Arrange the digits 1-6 so that the sum of each side is 9.



17 Puzzle

Arrange the digits 1-9 so that the sum of each side is 17.



What would students need to know and do to solve this problem?

Molly wanted to buy a snack at the school carnival. What are all of the possible ways Molly could have paid for a cookie with exact change?

cookies 25¢

cupcakes 35¢

Exact change only!

Finding Tasks that Promote Perseverance

Illustrative Mathematics

<https://www.illustrativemathematics.org>

Graham Fletcher's 3 Act Tasks

<https://gfletchy.com/3-act-lessons>

Open Middle Tasks

www.openmiddle.com

Supporting Students

- Encourage collaboration with partners/groups
- Have class time outs

- Do gallery walks to see others' strategies
- Modify problems to allow for gradual complexity
- Help them experience success
 - To see it's possible to find the solution
 - To discuss/reflect on what they did to get there

Acknowledge Feelings of Anxiety

Turn and Share followed by a Class Discussion

- Did anyone get frustrated and want to quit? When?
- How did you get yourself going again?
- How did you feel when you found a solution?
- What advice would you give someone else who is getting started on this task?

What matters to you?

- Speed?
- Correct answer on the first try?
- Attempting the problem?
- Adjusting the approach when needed?
- Trying again when the solution isn't evident?
- How will your students know what matters to you?

Teacher Questioning

<p>Then</p> <ul style="list-style-type: none"> • What's the answer? (1st hand up answers the question) 	<p>Now</p> <ul style="list-style-type: none"> • How did you get started? Were you able to find the solution with that approach? • Did you get stuck at any point? • How did you get unstuck? • How did you end up finding the solution? • What would you do next time if you got stuck?
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Teacher Comments

Show students that you value perseverance.

<p>Then</p> <ul style="list-style-type: none"> • Correct! • You were the first one done! 	<p>Now</p> <ul style="list-style-type: none"> • That wasn't what you were thinking in the beginning, was it? I like the way you changed your mind after you noticed... • You did a great job adjusting your approach! When you realized you couldn't fold the paper any more, you recorded the data instead of giving up and it led you to the answer!
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Ideas to Try:

Ask students not to erase work, but to circle it or put it in brackets if they change their minds. Praise their redirection when it's appropriate.

Pose journal prompts like the following

- What was easy/hard about this problem?
- What was confusing? How did you figure it out?
- Where did you get stuck? How did you get unstuck?

Discuss the Meaning of Perseverance and Develop Strategies for Persevering

The Little Engine That Could by Watty Piper

The Most Magnificent Thing by Ashley Spires

- Retell the main events in the story.
- Why did she get mad? What happened when she got mad?
- What did she do when she got very frustrated? Was that a good idea? Why or why not?

- Some parts that she first thought were not quite right seemed quite right after her walk. Why do you think that was the case?
- When in the story did she show perseverance? Give examples.

Getting Unstuck

- With your team, brainstorm ways you might get unstuck when you are having trouble with a problem.
- Create a poster with your ideas.
- Be ready to share.
- Copy a few ideas you like into your math journal.

Create a class anchor chart with strategies for persevering.

Fear of Failure

- Are students afraid to make mistakes?
- How do we react to their mistakes?
- Do we have class discussions about making mistakes?

Read and discuss *The Girl Who Never Made Mistakes* by Mark Pett and Gary Rubinstein

Improve Students' Problem-solving Skills

What might cause students to give up?

Karl's rectangular vegetable garden is 20 feet by 45 feet, and Makenna's is 25 feet by 40 feet. Whose garden is larger in area? How much larger?

From Illustrative Math, Grade 4

Supporting Students Through Our Questions

Retell the story in your own words. What are we trying to find out?

How will we know which garden has a larger area? Do we have what we need?

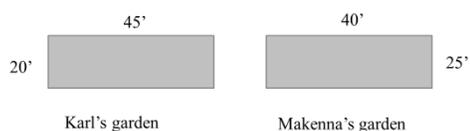
Can you visualize the problem? How?

How could we get started?

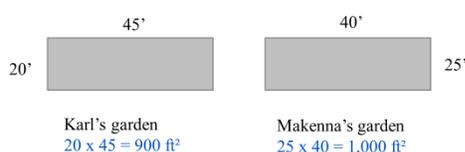
What do we know now? What else do we need to know?

How will we know when we are done?

Picture It!



How could we figure out which garden is larger?



Improving Students' Problem-solving Skills

- Comprehend/visualize the problem
- Choose an appropriate operation
- Know when and how to apply their computational skills

Do students have a repertoire of problem-solving strategies?

Can they organize and visualize their ideas to more clearly see data and problem situations?

- Making a Chart/Table

- Making an Organized List
- Drawing a Diagram

What can we do?

Observe and determine why they are shutting down.

Guide/observe problem-solving in parts

- What is the problem asking? Retell it.
- What data would we need to solve it? Why?
- What could we try? Why do you think that might work?

Watch/listen as students explore One step to two-step to multi-step problems.

Ideas to Try:

Solve some problems together to build problem-solving skills, having students frequently turn and share and contribute to the solution process.

When appropriate, use a think-aloud technique to share your thoughts.

Scaffold problem-solving experiences and differentiate problem tasks.

If tasks are too difficult for students, we increase their anxiety.

More Than One Way

Add or subtract, using each number once, to equal the target number 100.

50 70 80

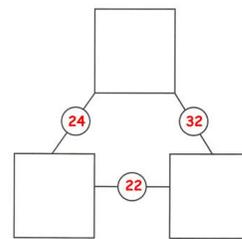
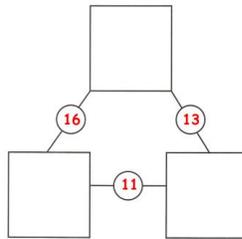
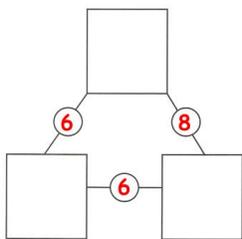
Target # of 150 with 75, 95, 130?

Target # of 20 with 8, 2, 14

From Marilyn Burns, *Using Math Menus*, Educational Leadership, Oct. 2016

Differentiating Tasks

Fill in each box with a number so the correct sums appear in the circles.



The Complexity of Perseverance

- Do they know what perseverance means? Do they know that we value perseverance?
- Do they have strategies for persevering? Do they have the math skills to allow them to persevere?
- Do they have confidence in their abilities?

Have a Class Mantra

- Mistakes help me get closer to the solution.
- I'll keep trying.
- This may take some time.
- I'll try a different strategy.
- I'm on the right track.
- I can do this!
- It's okay to not know, but it's not okay to not try.

Teacher Resource Books by Sue O'Connell

Published by Heinemann (www.heinemann.com)

***Math in Practice* (www.mathinpractice.com)**

This series is filled with lesson ideas, instructional strategies, practice tasks, and numerous online printable resources to make teaching K-5 math more meaningful. There is a book for each grade level K-5 that contains a wealth of grade-specific activities, as well as a *Guide for Teachers* filled with instructional strategies and an *Administrator's Guide*. Visit www.heinemann.com/mathinpractice to preview the materials. And join the *Math in Practice* facebook page to chat about teaching K-5 math!

Putting the Practices into Action - Implementing the Common Core Standards for Mathematical Practice K-8

with John SanGiovanni

The Standards for Math Practice are the heart and soul of the Common Core State Standards. This book explains each standard in teacher-friendly terms and highlights practical activities to make the standards come alive in classrooms. It contains PLC study group questions and online resources.

Mastering the Basic Math Facts for Addition and Subtraction

Mastering the Basic Math Facts for Multiplication and Division

with John SanGiovanni

Through investigations, discussions, visual models, children's literature, and hands-on explorations, students explore the math operations, and through engaging, interactive practice achieve fluency with basic facts. A teacher-friendly CD filled with customizable activities, templates, recording sheets, and teacher tools simplifies your planning and preparation. Over 450 pages of reproducible forms are included in English and Spanish translation.

The Math Process Standards Series

Each book in this series is a practical guide for helping students refine their skills in the highlighted math process (problem solving, communication, reasoning, representations, connections). You will find specific teaching strategies and tips to help all students strengthen their skills. Included with each book is a CD filled with teacher tools and customizable student activities to allow you to change names, data, or spacing for a quick way to differentiate instruction within your classroom.

Introduction to Problem Solving

Introduction to Communication

Introduction to Representation

Introduction to Reasoning and Proof

Introduction to Connections

All books in this series are available for Grades PK-2, Grades 3-5, and Grades 6-8.

Now I Get It: Strategies for Building Confident and Competent Mathematicians, K-6

Good teaching is the critical factor that helps students "get" math. This book is a practical handbook for the teaching of mathematics, with chapters addressing the teaching of problem solving, the use of manipulatives, differentiating instruction, effective teacher questioning, increasing math talk, and much more. The book includes a CD with over 100 pages of resources to support teachers including manipulative templates, math facts game templates, a bibliography of math-related literature, center ideas, math websites, problem-solving and writing tasks, and a variety of other practical resources.

For additional resources, visit Sue's website at www.qualityteacherdevelopment.com

Follow Sue on Twitter @SueOConnellMath

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