Building Problem Solving Strategies

by Leanne Luttrell

Do you want to inspire your students to love problem-solving? Have you been searching for a way to improve problem-solving skills but are overwhelmed by the materials and choices available? This set includes 18 problems that are designed to be used with other types of problems to create a year-long program for your students! We will be discussing the other types of materials to use and how to implement all of these most effectively in my blog.

These problems are challenging and introduce a variety of problem-solving strategies. Each level includes 18 problems and an answer key. Levels C, D, and E are aligned by strategy, which makes it much easier to differentiate! For example, the focus strategy of the second problem in each set is finding patterns, and the focus strategy of the 17th problem is working backwards. Read the questions and answers on the next few pages and download the free sample to decide which set is best for you!

Building Problem Solving Strategies

What problem solving strategies are emphasized?

A chart with the focus strategies is included in this introduction. Although one problem may be solved using a variety of strategies, these are the strategies you will see listed as 'focus strategies':

- Find a pattern (or predict continuing patterns)
- Work Backwards
- Use a picture to find an algebraic pattern (or make a table)
- Use a Venn diagram
- Draw a picture
- Use bar modeling (algebraic model)

There is also one example of a visual/spatial puzzle in each set. Visit amazing-minds.com to find suggestions for places to find additional visual/spatial puzzles.

Why is 'guess and check' not included?

Guess and check is typically used as a strategy in elementary school when students that age do not have the knowledge to write and apply algebraic equations.

Have you used bar modeling? It is also called 'Singapore Method of Problem Solving'. This strategy is a visual representation of algebra, and it is amazing! Although it can (and I believe it should) be introduced in elementary school, it should definitely be used in middle school. *(If you want more instruction on how to use this model, look for videos on amazing-minds.com!)*

When students understand this, 'guess and check' is no longer necessary.

My students used to do a 'No More Guess and Check' dance every time they used this strategy! Your students will love it!

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Why is 'find a simpler problem' not included?
This strategy is definitely included, but it is not listed as a focus strategy. There are several problems where taking a smaller part of the problem or using different (easier) numbers is effective and helpful! However, because this is done in addition to other strategies, the other strategies are listed as the focus. 'Find a simpler problem' might be the only focus in some application problems, but those are not included here.

What level should I purchase?
Students can start level C as early as third grade. If you are a third grade teacher, level C is my recommendation! In that level, there are two options for the first problem. One is for students who have had experience in second grade with these types of strategies, and the other is for those who have not. (Levels A and B for younger students will be available soon!)

If you teach fourth grade or above, the set that is most appropriate should be determined by the experience of your students. Level E, for example, builds on the strategies from levels C and D. The levels allow students to learn and develop true problem-solving strategies, and the challenges increase in difficulty and build on prior knowledge as students move through the levels. Fifth grade students who have not had a lot of experience or exposure to problem-solving strategies would be frustrated with level E. For fifth grade students without much exposure, I would recommend level C or D. Sixth grade could use level E problems, but for older students, I have other suggestions. You will find those in my blog! The samples included should help you determine which level is best for your students. You can always use more than one level and differentiate!

More than one strategy may be used, but the detailed solutions show these strategies.

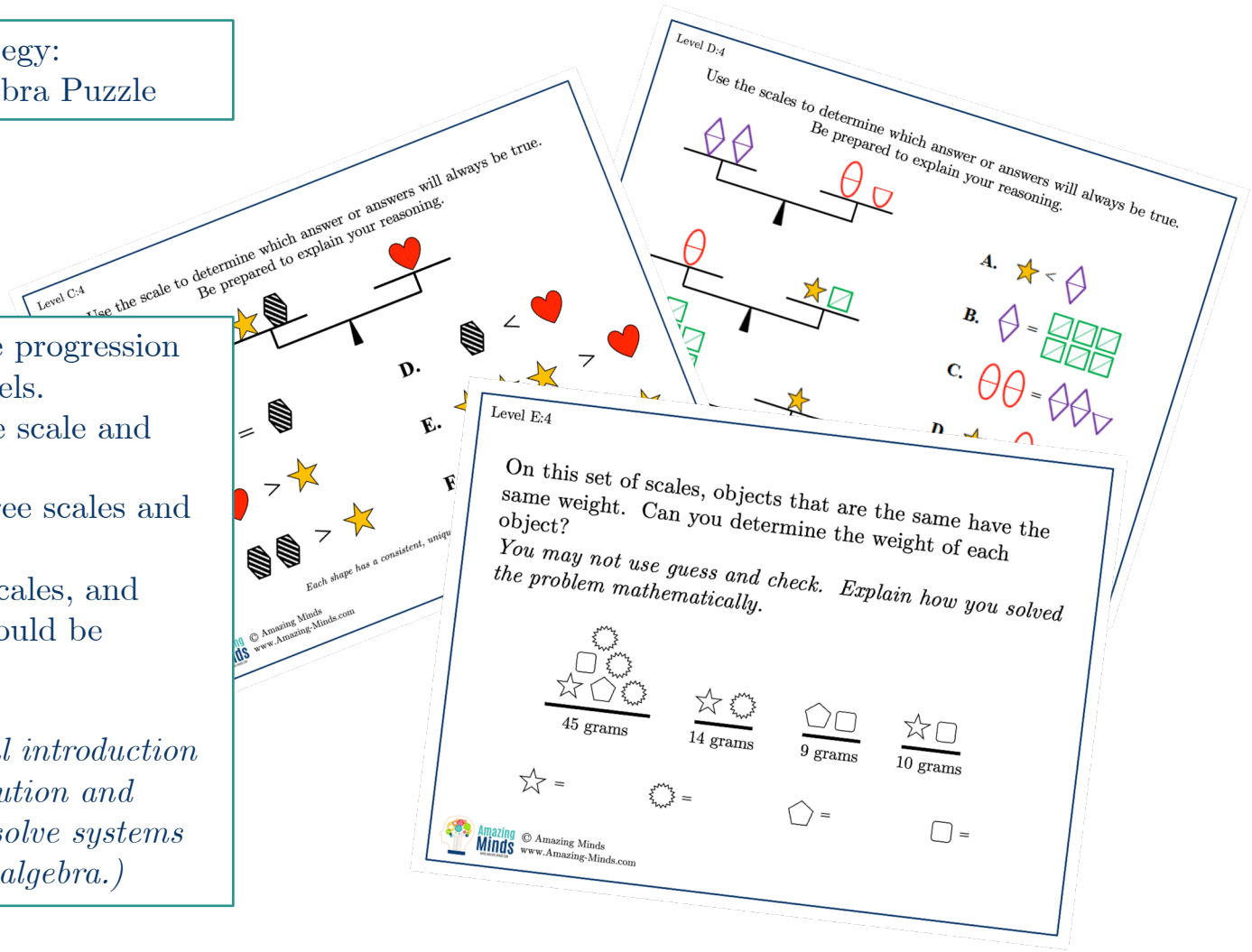
	Strategy
1	Using pictures to find patterns (or make a table); *Finding a maximum or minimum is helpful!*
2	Finding Patterns (focus on strategies moving to algebraic patterns)
3	Working Backwards (B,C); Bar Models: Algebraic Box Drawings (D,E)
4	Visual Algebra Puzzle
5	Venn Diagram
6	Draw a picture
7	Bar Models: (algebraic box models)
8	Predicting continuing patterns (C, D); Using patterns to find solutions (E)
9	Visual Puzzles
10	Bar Models to understand difference (algebraic box models)
11	Draw a Picture; Level E could also create a table
12	Visual Algebra Puzzle
13	Use pictures to find algebraic patterns (or make a table)
14	Bar Models: (algebraic box models); *Level E: fraction bar model*
15	Venn Diagram
16	Draw a Picture (for Understanding)
17	Work Backwards
18	Drawing a Picture

Challenge 4 from level C, D, and E

Strategy:
Visual Algebra Puzzle

You can see the progression through the levels.
Level C has one scale and options.
Level D has three scales and given options.
Level E has 4 scales, and exact values should be determined.

(This is a visual introduction to using substitution and elimination to solve systems of equations in algebra.)



Challenge 7 from level C, D, and E

Strategy:
Bar Models

You can see the progression through the levels.
Level C has three variables (items) with no constants.
Level D has four variables (people) with one positive constant.
Level E has four variable (people) with both positive and negative constants.

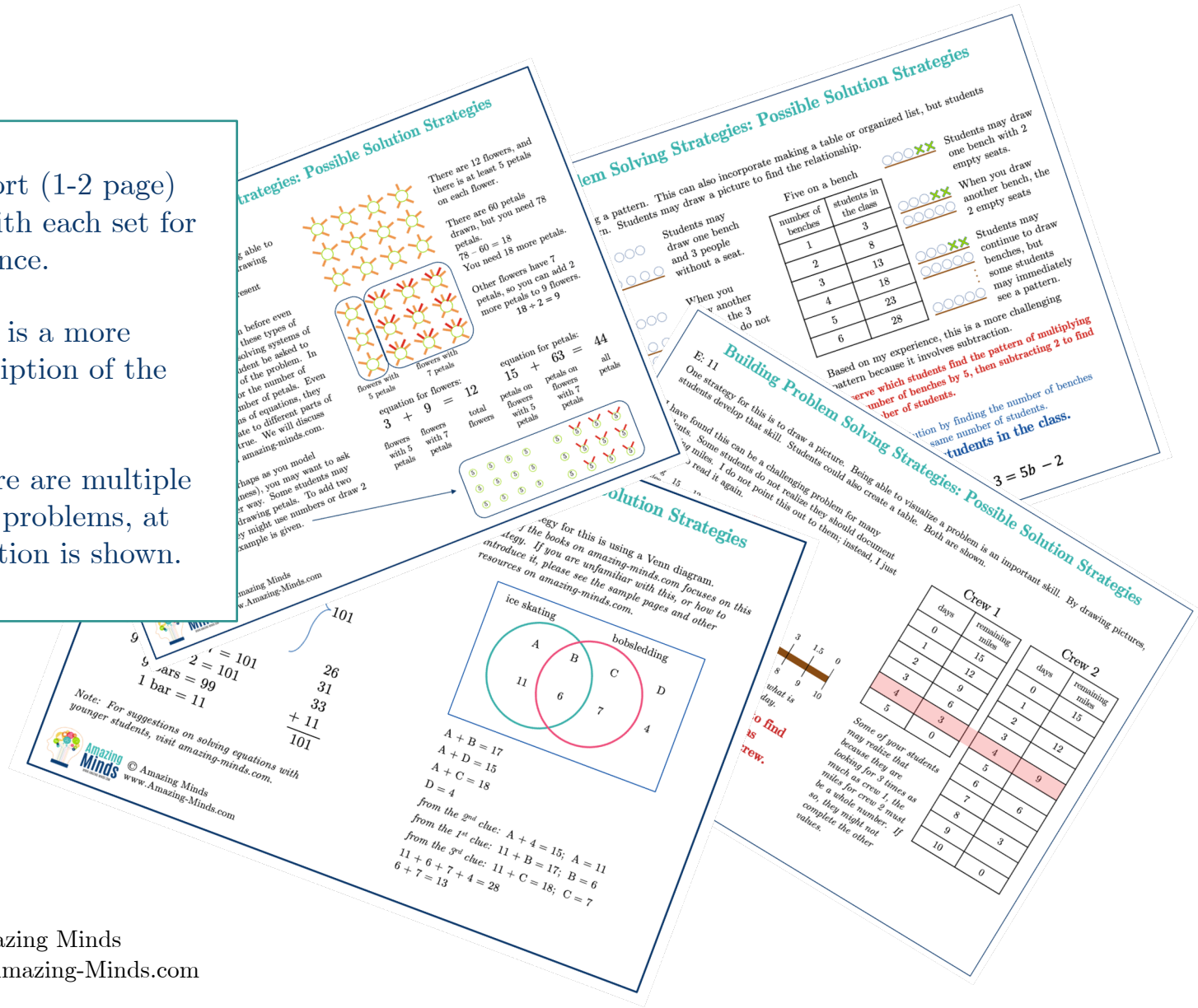
(For elementary students, the negative is introduced as subtraction. Students at that age may or may not use variables, depending on their knowledge at that time.)

Solutions

There is a short (1-2 page) answer key with each set for a quick reference.

Also included is a more detailed description of the solution.

Although there are multiple ways to solve problems, at least one solution is shown.



Would you prefer a digital format?

When you purchase the PDF, there will be a link that allows you to copy a google slide presentation. The google slides will have all of the problems to make it easy for you to share them with your students digitally!
* Please note that the introduction and the solutions are only in the PDF.