

The Other 3Rs



Teacher's Manual

Prepared by the American Psychological Association.

Written by Jeanine C. Cogan, Ph.D. &

Russell G. Wright, Ed.D.,

in consultation with Rose Furr, Debra Roberts & others.

Copyright© 2004 by the American Psychological Association. All rights reserved.

Session 1

Session Objective: To introduce *The Other 3Rs* and practice using the *ABC...Problem Solving Model*.

Time allotted: 3 hours

Summary of Activities

1. Welcome participants and provide general information.
2. Introduce *the Other 3Rs* pilot study.
3. Introduce reasoning, resilience and responsibility.
4. Introduce the ABCs of Problem Solving and the Other 3Rs Model.
5. Understand when a problem is not a problem.
6. Use *the Other 3Rs Problem Solving Model* to understand the model.
7. Apply *the Other 3Rs Problem Solving Model* to a personal example.
8. Introducing *the Other 3Rs* to your students.

Background of the Other 3Rs Project

Improving academic achievement has been the primary goal of educators for decades. Attempts to improve achievement have focused on improving curriculum, developing innovative teaching strategies, and trying to better understand how students learn. National standards have been established in every subject area and millions of dollars have been spent on reforming education.

Has all this attention on improving academic achievement worked? In fact, student achievement has stagnated or fallen in most subjects since 1970. At least that is the verdict of the five most trusted sources of evidence: the National Assessment of Education Progress (NAEP), the International Evaluation of Education Achievement (IEA), the Young Adult Literacy Survey (YALS), the National Adult Literacy Survey (NALS), and the International Adult Literacy Survey (IALS).



A Plausible Solution

Perhaps another approach is needed. *The Other 3Rs* project evolved from an education initiative of the American Psychological Association that was sponsored by its past President Dr. Robert Sternberg. As part of that initiative, a team of experts identified responsibility, resilience, and reasoning as three life skills with great potential to raise student achievement.

Why Are the Other 3Rs Important?

Fundamental Research Underpinnings

The Other 3Rs project is based on two lines of research findings:

1. **Responsibility, resilience, and reasoning** can be learned. Although some people suggest that these three skills are innate human traits, the prevailing understanding among researchers is that they are skills that can be taught and learned.
2. Once they are learned, **responsibility, resilience, and reasoning** will lead to measurable increases in academic achievement. Research shows that these learnable attributes are associated with student success in academics and life.

Possible outcomes for students from learning the Other 3Rs include:

- ✓ Improved study skills,
- ✓ Improved attendance,
- ✓ Improved classroom climate,
- ✓ Improved relationships,
- ✓ Increased collaboration and
- ✓ Increased achievement.

Additionally, these attributes may also support teacher's ability to manage the classroom.

For example, when students take responsibility for their own and each other's learning they contribute to a classroom climate of collaboration.

The purpose of this 5-session workshop is to promote the understanding and application of these concepts so that:

- 1) You will benefit personally by incorporating the **Other 3Rs** into your own life in a meaningful way, and
- 2) Your students will benefit as you infuse the concepts into your lessons and teach students the **Other 3Rs**.

The goal is not a new curriculum to be squeezed between units on math and science. *The Other 3Rs* is a mindset. It is an approach to everything you do inside and outside of the school classroom.

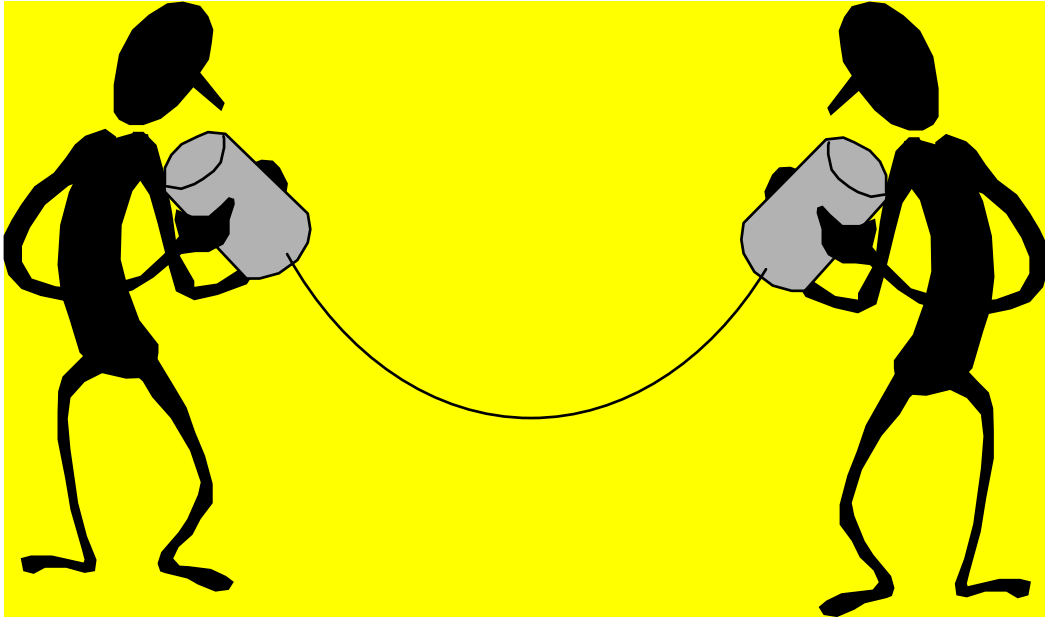


Being accountable for one's own actions and inactions and the consequences of those actions and inactions.

- ✓ **Personal responsibility**
 - "It's up to me to create what I want."
 - "It's up to me to make it happen."
 - "How I act matters."

- ✓ **Academic Responsibility**
 - " Good grades result from my efforts"
 - " If I want to learn it is up to me"
 - " If I don't understand, I have to ask."

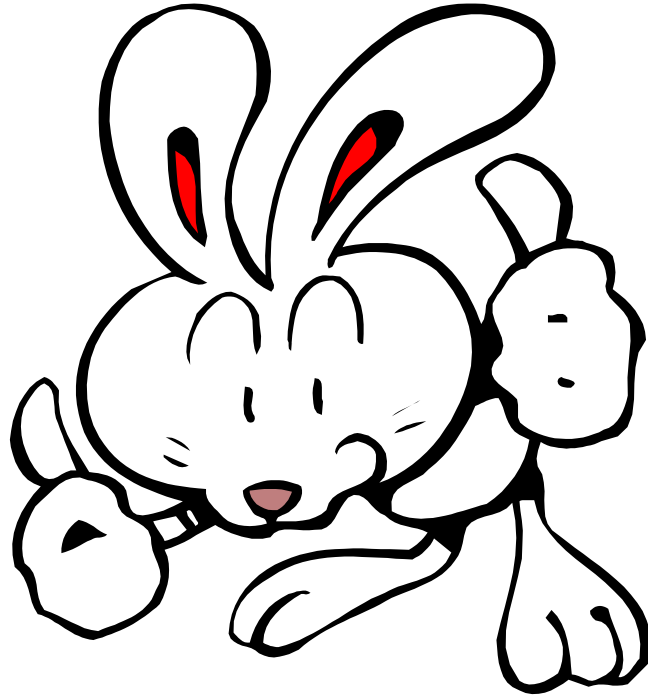
- ✓ **Social Responsibility**
 - **Considering other peoples' points of view.**
 - "I care about what you have to say"
 - **Concern for the common good.**
 - "I care about what is good for all of us, not just for me."
 - **Giving help and seeking help.**
 - "I will help you."
 - "I need help."



**I care about
what you have
to say!**



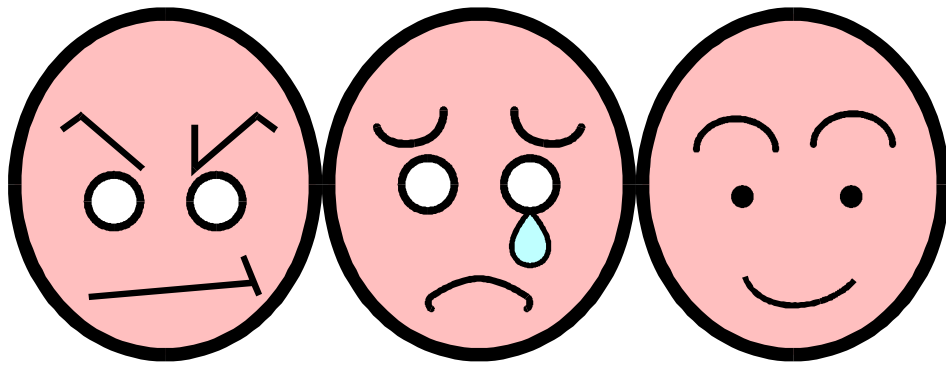
**I care about what
is good for
ALL of us,
not just for me!**



**Good grades
result from
my efforts!**



**It's up to me
to make it
happen!**



How I Act
matters!

Reasoning



Thinking that utilizes explicit and/or implicit rules.

Reasoning in the Other 3Rs program focuses on effective problem solving particularly with regard to academic challenges.

✓ **Rules**

“If I am going to think clearly about solving a problem (or reaching a goal) I need clear rules to follow.”

What strategies
will help me
solve this
problem?





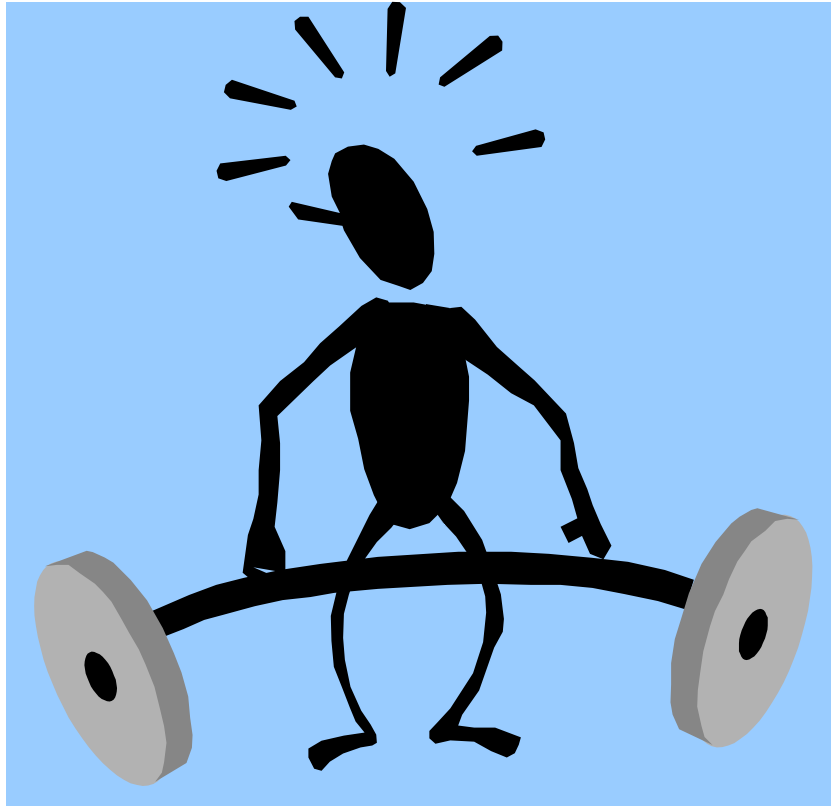
Competently surmounting challenges, both inside and outside of school.

- ✓ **Challenges & difficulties are a normal part of life:**
 - “Challenges are normal. We all have them.”

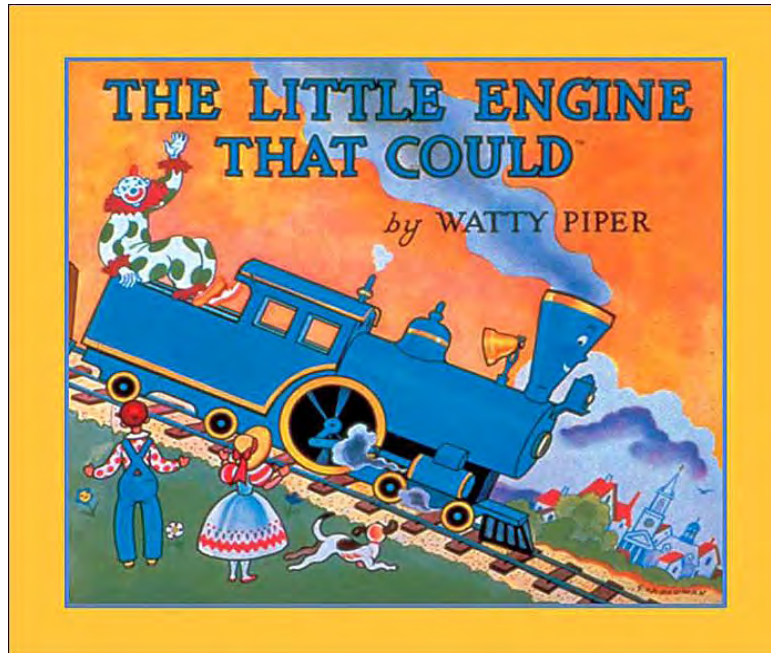
- ✓ **Persistence/Determination**
 - “If at first I don’t succeed I will try again.”

 - A cautionary note for this message is that people can take their determination to an extreme and become obsessive about reaching a goal. Encourage students to find a balance.

- ✓ **View obstacles as challenges to be overcome**
(approach challenges by keeping things in perspective and seeing them as opportunities for learning).
 - “What can I learn from this?”
 - “How can I approach this challenge?”



**Challenges are
normal.
We all have
them.**



*If at first I don't
succeed,*

I will try again!

Discussion Questions

Activity 1

Introducing Responsibility

- 1) What does responsibility mean to you?
- 2) How is responsibility taught in your school?
- 3) What examples of responsibility do you see in your classroom? How do you use it? How do your students use it?
- 4) Do you ever miss opportunities to point out and reinforce the concept of responsibility in your classroom? Explain.
- 5) *What would be the benefits of focusing on responsibility with your students?*

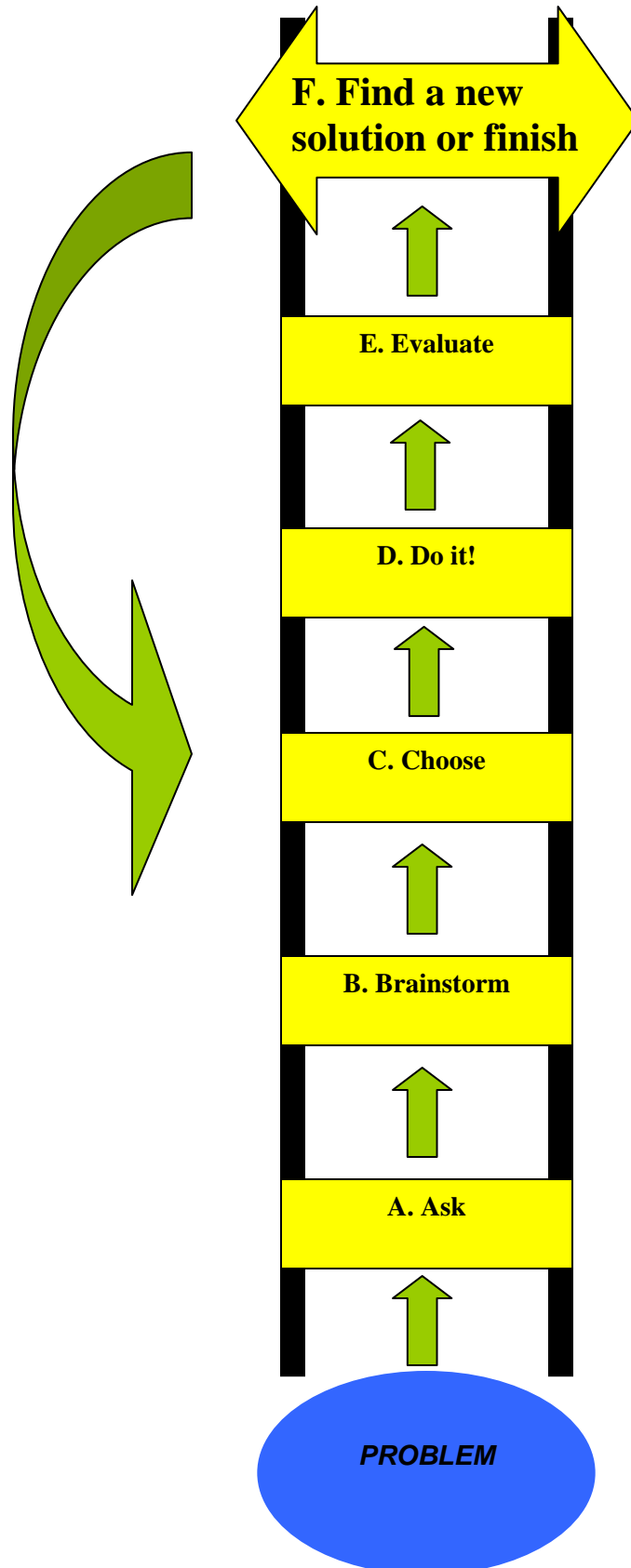
Introducing Resilience

- 1) What does resilience mean to you?
- 2) How is resilience taught in your school?
- 3) What examples of resilience do you see in your classroom? How do you use it? How do your students use it?
- 4) Do you ever miss opportunities to point out and reinforce the concept of resilience in your classroom? Explain.
- 5) What would be the benefits of focusing on resilience with your students?

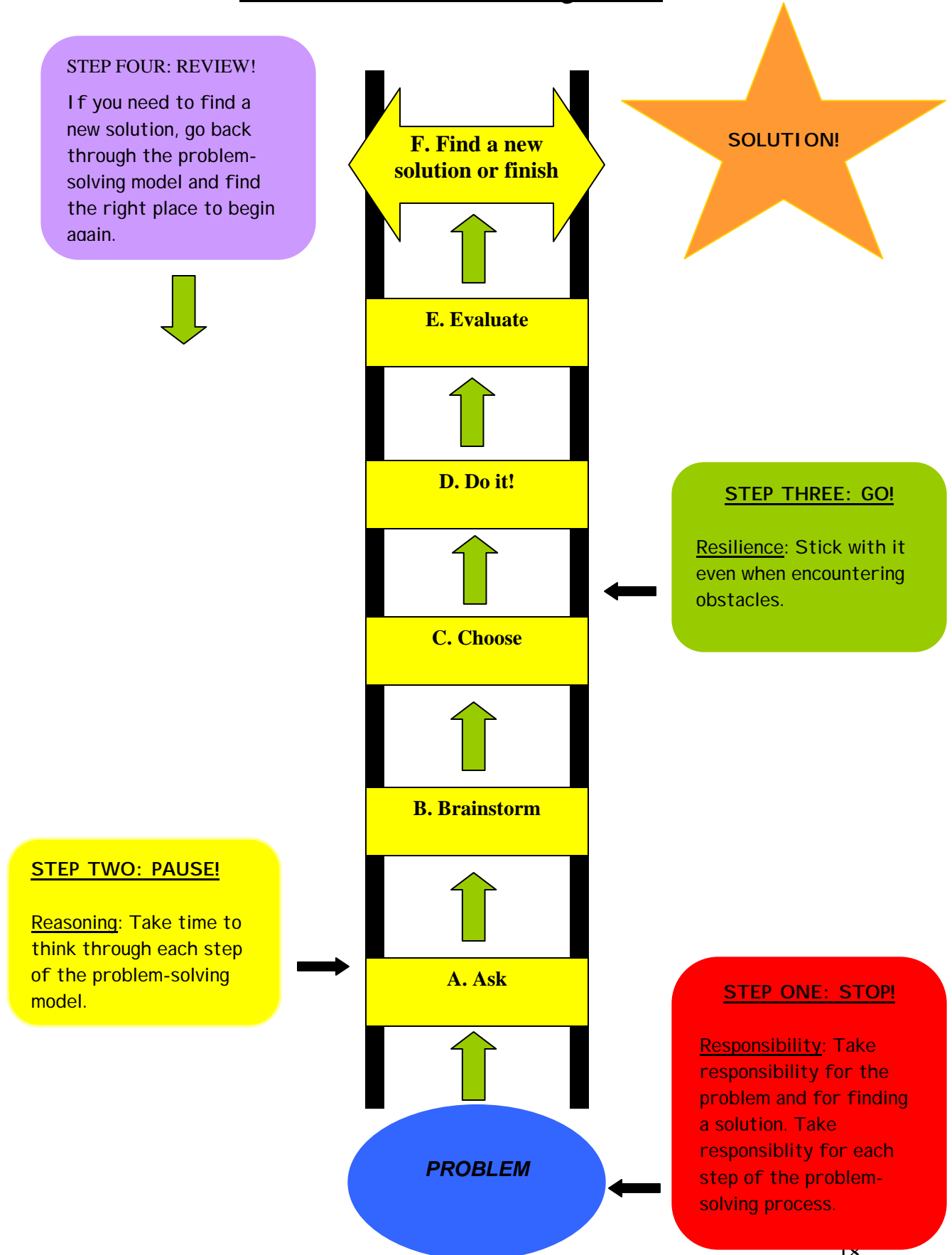
Introducing Reasoning

- 1) What does reasoning mean for you?
- 2) Note: While reasoning can be defined broadly, we are focusing on an important component of reasoning—problem solving.
- 3) How would you define problem solving?
- 4) How is problem solving taught in your school?
- 5) What examples of problem solving do you see in your classroom? How do you use it? How do your students use it?
- 6) Do you ever miss opportunities to point out and reinforce the concept of problem solving in your classroom? Explain.
- 7) What would be the benefits of focusing on problem solving with your students?

The ABCs of Problem Solving



Other 3Rs Problem Solving Model



When do you use the Other 3Rs Problem Solving Model?

Before you use the **Other 3Rs Problem Solving Model** you need to have a problem to solve. These problems can be real or fictional. Problems can also be uncertainties or obstacles that impede your progress toward reaching a goal.

1. Do I have a problem?

Before you can correctly use any problem-solving system, you need a problem. For our purposes:

A problem is a situation, circumstance, or individual that causes conflict or uncertainty, or an obstacle that interferes with reaching a goal.

According to this definition, the question—*What is the sum of $2 + 2$* — is **not** a problem **for most of us**. Once we have memorized the basic math facts, the task of adding $2 + 2$ presents neither **uncertainty** nor **obstacle**. **For most of us it is not a problem.**

Remember, a problem for you may not be a problem for someone else.

Is the question, “What should I wear today?” a problem for you?

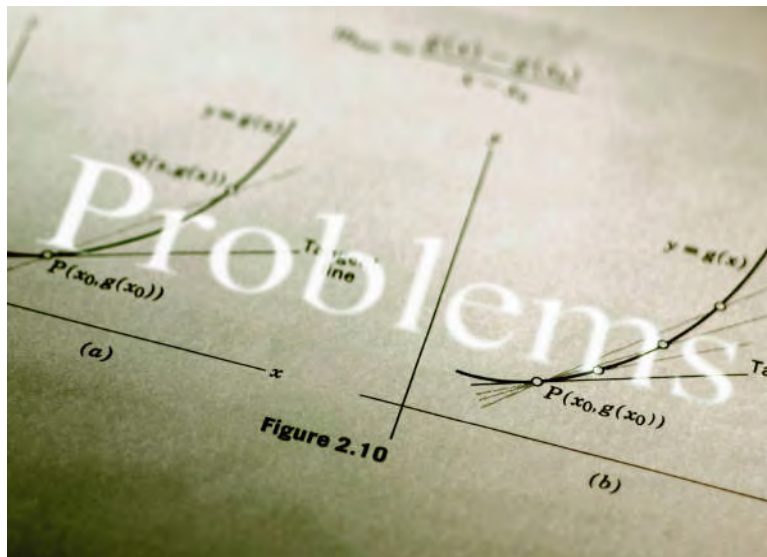
It depends on whether or not choosing what to wear causes **you conflict** or **uncertainty**. For some people there is no problem. They either wear a uniform or they dress like they selected today’s wardrobe with their eyes closed.

However, for most people there is at least a momentary pause to analyze what’s clean, which colors go together, or the relationship between weather and wardrobe. This fleeting pause represents a degree of **uncertainty** that makes choosing what to wear—at least for them—a problem.

Which of these questions are problems for you?

1. How can I create a science unit that engages my students in activities that are so exciting that they do not get bored or act out?
2. What should I cook for dinner?
3. How many feet of carpet should I buy to cover a rectangular room that is 15 feet wide and 21 feet long, if the carpet comes in rolls that are 12 feet wide?
4. $3 \times 4 = ?$
5. How can I get Henry to do his homework?

Once you know that you have a problem, you have a choice. You can either hope it will go away or you can seek a solution to the problem.



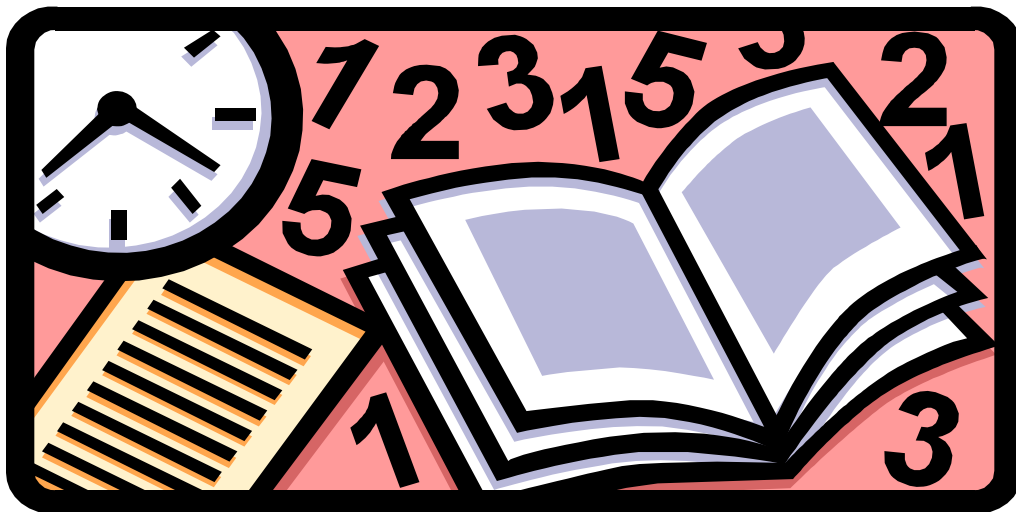
What exactly is a solution?

To most people, a solution is a statement that solves a problem. This definition presumes that some questions have obvious and simple answers. But our definition for *problem* does not allow for simple solutions. Once you have identified a real problem—a question that causes conflict or uncertainty for **you**, or a goal with an obstacle in the way—the only kind of solution that makes sense is one that provides a **strategy** for solving it or accomplishing it.

Because *real problems* and *complex goals* do not have obvious solutions, you will not know whether or not your strategy works until you try it. Even if it works you may end up thinking that another strategy may work even better.

So, as you use the *Other 3Rs Problem Solving Model*, make sure that the solution you seek is a **strategy** for action.

NOTE: Be careful when thinking about math problems. Math problems are examples of problems with two kinds of solutions. There is the correct answer, and there is the strategy for reaching the correct answer. As pointed out above, it is the **strategy** for reaching the correct answer that the *Other 3Rs Problem Solving Model* is focused on.



Reluctant Student

Sharon is a great student in every way but one. She does her homework, loves to read, participates in class activities, and has lots of friends. But, when she is put into a group with other students and given a task to do, she doesn't like it. She prefers to work alone.

The last time you gave a group assignment, Sharon rebelled. She sat by herself and worked only on the part of the assignment that she liked to do. She wouldn't discuss what she was doing with the other students in her group. And worst of all, she didn't even listen to what they were planning.



You are about to assign another group project—after all, everyone but Sharon loved the last one and did great work. What will you do with Sharon this time?

The ABCs of Problem Solving



A for Ask. “what is the problem?” Before you can proceed, the problem must be clearly defined. Ask yourself (and others as appropriate) questions to clarify the problem. Begin by asking: “What is the problem?” Other questions that may help you define the problem:

- “What question is being asked?”
- “What is not working?”
- “What can I do differently?”
- “What needs improvement?”
- “What needs to be accomplished?”
- “What is missing?”

Asking the right question involves **reasoning**. At times the process of defining the problem will be simple and straightforward. Other times there may be multiple problems embedded in one. If there is more than one problem then isolate individual problems by clearly defining each and then using the model to solve them one at a time.

Although this first step seems simple, if it isn’t done properly it can wreak havoc all along the problem-solving model. Be sure to take the time that is needed to clarify and define the problem. Also remember that if you know how to answer a question without any special strategies, there is no need to continue. For you, this question is not a problem.

Agreement on the problem.

When other people are involved, defining the problem can become more complicated. You may perceive the problem with a colleague as a lack of effective communication and proceed by making changes to your communication. What if after multiple attempts to communicate more effectively nothing changes? Perhaps it is because your colleague has defined the problem differently. Rather than a lack of communication he sees the problem as a lack of follow-through and follow-up. So he is approaching the situation with a completely different interpretation.

The key here is that when others are involved it is important to work together to define the problem. Engage in conversations asking questions like:

- “What is not working?”
- “What can I do differently?”
- “What needs improvement?”
- “What are we trying to accomplish?”
- “What is missing?”

How do you know if you have a problem?

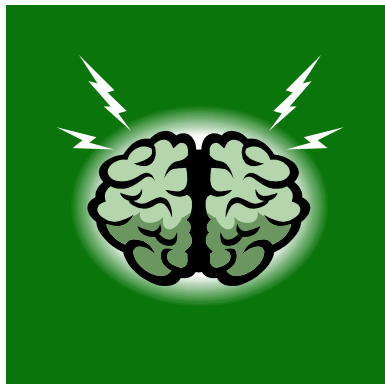
A key to identifying whether or not there is a problem is to look at the results. Are you getting the results you want? If not, how can you get better results? You may also want to improve a situation or build on success. With this perspective you can explore new possibilities that may lead to even better outcomes. That would be another opportunity for employing the **ABC... Model**.

B for Brainstorm possible strategies.

In this step it is important to develop a list that includes a wide range of options, even ones that you find implausible at first. For example: if the problem relates to difficulties that you are having with another teacher, articulating a hard-to-accept strategy like, “*I could quit my job,*” may encourage creative thinking and may allow you to come up with a strategy that you would otherwise not have considered.

Brainstorming is frequently underutilized in problem solving. People often come up with only one or two possible strategies before they choose one to implement. Without brainstorming we often choose the most readily available answer rather than a more creative or optimal one. People often will use a strategy that is comfortable even if they know that it did not work the last time it was used.

Try to come up with 3 or more strategies before moving to the **Choose** step.



Brainstorming Rules

Brainstorming is a common technique used with groups. These rules describe the typical group brainstorming process as well as one adapted for individual use.

Group Brainstorming

- 1.** Before brainstorming with the group, spend 2 minutes brainstorming alone.
- 2.** Share individual ideas.
- 3.** Allow as many ideas as possible from all participants.
- 4.** All ideas are welcome no matter how silly or far out they seem. Encourage creativity—the more ideas the better—at this point you don't know what might work.
- 5.** No discussion should take place during brainstorming. Talking about the ideas will take place after brainstorming is complete.
- 6.** No criticism or judgment should be allowed as ideas are generated – that includes groans, frowns, and laughter. All ideas are equally valid at this point.
- 7.** Encourage participants to build on the ideas of others. This is not cheating.
- 8.** Write all ideas on a flipchart or board so the whole group can easily see them.
- 9.** Set a time limit for the brainstorming.

Individual Brainstorming

- 1.** Come up with as many ideas as you possibly can.
- 2.** Write down everything. All ideas are welcome no matter how silly or far out they seem. Strive for creativity—the more ideas the better—at this point you don't know what might work..
- 3.** Use each idea to stimulate other ideas.
- 4.** Brainstorm for ten minutes then if possible take a break.
- 5.** Re-read your list and add any new ideas.

C for Choose the strategy that you think is most likely to solve the problem without creating undesirable side effects. With group problem solving the choice of a strategy should be a majority decision.

The **Choose** step requires **reasoning** in the form of forward thinking—the ability to anticipate outcomes that different approaches may bring. Anticipating possible negative consequences may save you from using a strategy that you may later regret.

For example, Coca-Cola Company introduced a new cola recipe and stopped producing the old favorite. Millions of people complained that their old favorite was no longer available and there was quite a bit of negative publicity. Eventually the old cola was reintroduced under the name of Classic Coke. If Coca-Cola had gone through a process of anticipating negative outcomes they may have avoided the result that occurred.

A procedure for choosing a strategy:

- **Pick** the 3 or 4 most popular strategies from your brainstorming list.
-
- **Possible outcomes** - next to each strategy record at least three possible outcomes.
 - Make sure that you record both positive and negative outcomes that can be reasonably anticipated. (In the process of anticipating outcomes allow yourself to think about successful and unsuccessful strategies that you have tried in the past. Be sure to distinguish between ones that worked well and those that are just familiar and comfortable. It is not unusual for people to gravitate towards strategies that are familiar even when they are not the best.)
-
- **Discard** - Possible negative outcomes may cause you to discard a strategy that
 - would otherwise appear to be a great idea.
-
- **Choose** – Lastly, choose the strategy that you will actually implement.

Possible Strategy

Anticipated Outcomes

1. _____

2. _____

3. _____

D for Do it. Carry out the strategy that you have chosen. Give it 100 percent of your effort.

Imagine that you are having a conflict with a colleague. You **ask** yourself what is the problem here? According to your assessment she misunderstood a point that you were making at a meeting and she is taking what you said personally. She feels as though you were criticizing her.

You **brainstorm** strategies for solving the problem.... You could ignore it. Yet upon reflection you decide that is avoidance behavior rather than a commitment to solving the problem. You worry that the problem could get worse if you ignore it.

A second strategy is to engage in a clarifying conversation with her in person. The anticipated outcomes of this are: 1) she could hear what you really meant to say and the misunderstanding would be eliminated, 2) she could perhaps express her anger and upset at you, and 3) since it is an in-person meeting you could totally chicken out and not say anything about the conflict once you were actually face to face.

A third option you consider is to engage in the clarifying conversation over the phone. This would offer the same possible outcomes as the in-person meeting except that you would be less anxious. Based on your forethought you choose the strategy of calling her at home after work rather than having a face-to-face conversation.

Now you **do** your strategy. You call your colleague and she is not home.

This is the point where some people may conclude that their strategy did not work. “I tried to talk to her but she wasn’t home when I called. At least I tried.” This is where both **responsibility** and **resilience** come in to play. You take responsibility to actually solving the problem until you decide that the problem is fully solved. You stay with the problem—perhaps using a number of different strategies—until the problem is indeed solved.

In this example, you would continue to call your colleague until you reached her and created the necessary conversation. Or you might change your approach and have the conversation with her in person if that makes her more accessible. This is carrying out the solution with 100% effort.

Doing it 100% often requires **resilience**.

E for Evaluate the strategy you tried.

If you are sure that you have carried out your plan fully, you need to evaluate the results. Was your strategy successful? Is the problem solved?

Sounds easy, doesn’t it?

Success can be relative and hard to measure. For example, a strategy that appears unsuccessful at first may become successful after repeated implementation of the strategy. Did you give your strategy a fair chance to work?

Alternatively, a strategy that appears successful may lose its effectiveness after the novelty of the strategy has worn off. Did you give your strategy a chance to fail?

On the other hand, perhaps your strategy worked but a better strategy may have produced an even better outcome. How do you know?

A fair evaluation is another step that requires **reasoning**.

F for Find another strategy. If, after you evaluate the effectiveness of your strategy, you conclude that the problem was not solved to your satisfaction, you need to show **resilience** and try again. You may not need to go back to the beginning. You need only go back as far as necessary to come up with a strategy that works.

Work your way through the **Model** from the bottom up until you find the appropriate entry point.

Evaluate - Review your evaluation. Be sure that your strategy really failed. Remember some strategies take time before they begin to work.

Do it - Did you follow through completely? Did you give your strategy 100% effort?

Choose - If you did everything correctly but it still didn't work, perhaps one of your other options would have worked better. Examine the other three options and select another one to try. Very often we learn something from a failed try that will help us make a better selection the second time around.

Brainstorm - Did you skip this step? Were there not enough options to choose from? Perhaps you need to add to your list and try again.

Ask - Did you ask the right question? If you did not ask the correct question, it's hard to get the right answer. Perhaps you learned something in the process of using the **Model** that will help you ask the correct question this time.

F for Finished!



Classroom Applications

These are your two Classroom Applications require them to do. Point out that worksheets are provided for both assignments.

1. Select a single problem in your own school or classroom and use the steps of *The Other 3Rs Problem Solving Model* to try to solve it. Complete the worksheet on the following page as you apply the **ABC... Model** to your own problem. Worksheets will be collected during the next session.
2. Choose one or two strategies for introducing the **Other 3Rs** to your students. Be prepared to report on what happened in your attempts to use the words **responsibility**, **resilience**, and **reasoning** with students. How well did your strategies work?

Session 1 – Classroom Applications

1. Select a single problem in your own school or classroom and use the steps of ***The Other 3Rs Problem Solving Model*** to try to solve it. Complete the following worksheet as you apply the **ABCs** to your own problem. Worksheets will be collected during the next session.

ABCs of Problem Solving Worksheet

Ask – What is the problem? (Clearly state the problem you are solving.)

Brainstorm - (List here all of the strategies that you can think of. Use the back of this form if you need extra space.)

Choose - (Select three of your favorite strategies and paraphrase them here. Next to each, list three possible consequences. Make sure to include possible negative consequences. Circle the strategy you select.)

1. _____	_____

2. _____	_____

3. _____

Do it - (Record here what you did to implement the strategy. Did you give 100% effort?) _____

Evaluate - (Did your strategy work? List here the evidence for its success or failure.) _____

Finished? (Are you satisfied? Explain whether or not you will go back to an earlier step and to which step you plan to return.) _____

As you were solving the problem, in what ways did you practice resilience and responsibility? _____

2. Choose one or two strategies for introducing the **Other 3Rs** to your students. Be prepared to report on what happened in your attempts to use the words **responsibility, resilience, and reasoning** with students. How well did your strategies work?

Describe the strategies you tried:

Which strategy(ies) worked?

How do you know that it (they) worked?

3. Describe any ways you have seen your students show an understanding or application of reasoning, resilience and responsibility.

**This is an excellent reading for grounding yourself in the research
and theory behind the Other 3Rs Project.**

**Chapter in R. Sternberg & R.F. Subotnik (2006). *Optimizing Student Success
in School with The Other 3Rs: Reasoning, Resilience and Responsibility.*
Greenwich, CT: Information Age.**

Written by
Rena F. Subotnik & Gregory White
American Psychological Association

Schools are under enormous pressure to boost student achievement. Under the No Child Left Behind legislation (2002), schools are faced with unprecedented demands to document improvements for all populations that make up their student bodies. Many schools may even be forced to close if annual yearly progress goals are not met, leaving their students to be dispersed to other institutions. With schools busy preparing their students to meet these mandated competencies, the idea of introducing additional variables for teachers and administrators to incorporate into the curriculum may seem counterproductive. The authors in this volume argue however, that “The Other Three Rs,” *reasoning*, *resilience*, and *responsibility*, when taught and modeled appropriately, can enhance student achievement and help to create an atmosphere in schools more conducive for learning. After school graduation, The Other 3 Rs (TOTR) can also provide the learning and interpersonal skills that are valued in the workplace. As stated in the federal report “21st Century Skills for 21st Century Jobs”: Future employees will require a portfolio of problem-solving, analytical and creative thinking skills, as well as interpersonal, communication, negotiation and self management skills (US Department of Commerce et al, 1999 as cited in Carnegie 2003, p.13).

Fostering TOTRs can create productive contexts for learning and improve students’ capacity to learn. For example, skills of *reasoning* can offer students a toolbox of strategies to solve problems; learning *resilience* can aid student motivation by focusing on overcoming learning obstacles rather than despairing over failure; integrating skills of

responsibility can help students to associate achievement with effort and good organization. The Other 3 Rs can also be instrumental to success in non-academic dimensions of life, not only during childhood, but also during employment, civic life, and in the course of human relationships.

Overcoming Obstacles to Student Achievement

Obstacles to student achievement can be found at home and at school. These obstacles lead to achievement gaps between students, and these gaps increase with each year of schooling. This volume argues that the TOTRs can promote achievement and the realization of full academic potential, especially for students who are labeled as underperformers.

Home Factors

Parental involvement in school and a home environment focused on academics are critical influences on academic achievement. Parental involvement in schools is not only related to higher academic achievement, but also to higher educational aspirations, higher motivation to achieve, lower rates of disciplinary problems, higher rates of extracurricular involvement, and higher rates of school completion (Child Trends, 2004; Epstein & Dauber, 1991; Henderson & Beria, 1994; Nord & West, 2001; Wentzel, 1999; and Zill & Nord, 1994 as cited in Barton, 2003). However, lower socio-economic status (SES) parents are less likely to be involved or feel welcomed in schools; therefore, schools need to conduct more directed outreach to low SES parents (Gerwertz, 2003 as cited in Barton, 2003). In a review of 29 experimental studies, efforts to promote an academically stimulating home environment by parents and teachers was more predictive of academic learning than was family SES. Positive attributes of a student's home environment include: homework supervision, discussion of school and current events, encouragement of reading, screening of television viewing and peer activities, delayed gratification and setting long term goals (Walberg, in press). In contrast, unstable homes, financial hardship, emotional or physical abuse, substance abuse or other family problems can create a distraction from learning and produce children at risk of school failure (Wang, Haertel, & Walberg, 1998).

Children living in poverty and who come from unstable homes start out behind academically in pre-school and learn at a slower rate compared to others, resulting in a

cumulative disadvantage over time (Walberg, in press). Further, factors such as poor health and nutrition, low birth weight, exposure to lead, and frequent relocation compound the risk for lower academic achievement (Barton, 2003). In addition, the effect of television on academic achievement deserves special mention. Eighth graders who watched more than 5 hours of television per night had the lowest average mathematics scores recorded on the Third International Mathematics and Science Study. The opportunity cost of lower achievement is evident for students who do not spend time doing homework, reading, or being involved in extra curricular activities (Child Trends, 2003 as cited in Barton, 2003; Walberg, in press).

School Factors

Along with home background factors, several school related factors influence student achievement. These factors include teacher quality, class size, school safety, peer group, school leadership, as well as how summer breaks are utilized (Mayer, Mullens, & Moore, 2000; Walberg, in press).

Teacher Quality. Among school factors, teacher quality is the most important influence on student achievement. The added value of good teaching for three consecutive years has been shown to improve student achievement dramatically. Conversely, poor teaching year after year not only impedes achievement but retards students' academic development (Rivkin, Hanushek, & Kain, 2002; Sanders & Rivers, 1996). Factors related to teaching quality include strong academic preparation, in-field teaching and years of experience (Mayer et al., 2000). Students learn more from teachers with strong academic abilities, and the field of teaching needs to attract more candidates with higher academic skills (Ballou, 1996; Ehrenberg & Brewer, 1994, 1995; Ferguson, 1991; Ferguson & Ladd, 1996; Gitamer, Latham, and Ziomek, 1999; Henke, Chen, & Geis, 2000; Henke, Geis, & Giambattista, 1996; Mosteller & Moynihan, 1972; Murnane et al. 1991; Vance & Schlechty, 1982 as cited in Mayer et al., 2000). Moreover, students learn more from teachers holding bachelors or masters degrees in the subjects that they teach, especially in mathematics and science (Darling-Hammond, 2000; Goldhaber & Brewer, 1997; Monk & King, 1994; as cited in Mayer et al., 2000). Instructional experience is also related to increases in student achievement, at least for the first five years of teaching, with the effect leveling off after five years (Darling-Hammond, 2000;

Murnane & Phillips, 1981; Rivkin, Hanushek, & Kain, 1998 as cited in Mayer et al., 2000).

Teacher quality varies across communities. Out of field teachers are employed more widely in high poverty schools and in schools with higher numbers of minority students (Jerald & Ingersol, 2002 as cited in Barton, 2003). In addition, low income, African American and Hispanic students are more likely to have less experienced teachers, greater teacher turnover, and higher rates of teacher absence (Mayer et al., 1998, 2000 as cited in Barton, 2003).

High Expectations. Holding high expectations also leads to high achievement. Data from the “High School and Beyond” longitudinal study show that academic achievement is closely related to a rigorous curriculum for all students (Bryk, Lee & Holland, 1993; Chubb & Moe, 1990; as cited in Mayer et al., 2000). Experimental and field studies show that setting specific, challenging goals leads to higher performance than setting easy goals, no goals, or simply encouraging students to do their best (Lock, Shaw, Saari & Lantham, 1981 as cited in Walberg, in press). The amount of homework that teachers require is also important (Betts & Costrell, 2001 as cited in Walberg, in press), as is increased instructional time for reading and mathematics (Education Trust, 2001 as cited in Walberg, in press). Although academic expectations have increased over the years, a 2001 Harris Interactive poll conducted with Walberg (2004) reveals that principals, teachers and students differ in their perceptions regarding academic expectations. When asked whether teachers have high expectations for their students, 56% of principals responded affirmatively compared to 39% of teachers and only 25% of students themselves. In addition, not every student who is capable or willing to pursue college preparatory coursework is able to do so, as white and Asian students enroll in rigorous academic courses at higher rates than other groups of students (Wirt et al, 2000 as cited in Mayer et al., 2000).

School Organization. In addition to teaching and learning factors, the organizational characteristics of schools such as class size, school safety and leadership have an effect on student success. Meta-analyses reveal gains in academic achievement in classes with an optimal class size of 13-20 students, especially for low

income and minority students. It must be noted, however, that it would be counterproductive to reduce class size by hiring lower quality teachers (Bohrnstedt & Stecher, 1999; Krueger, 1998; Mosteller, Light, & Sachs, 1996; and Robinson & Wittebols, 1986 as cited in Mayer et al., 2000).

A safe school with shared norms for learning is also important to foster student achievement. Research has concluded that a positive disciplinary environment is linked to higher achievement (Barton, Coley, & Wenglinsky, 1998; Bryk, Lee & Holland, 1993; and Chubb & Moe, 1990 as cited in Mayer et al., 2000). Elements of a safe environment include student respect for teachers, regular attendance, avoidance of substance use, and the absence of fighting/bullying and carrying weapons (Mayer et al., 2000). School leadership is also responsible for ensuring a stable professional community with shared high expectations, values and goals, as well as openness to new ideas (Louis, Kruse, & Marks, 1996 as cited in Mayer et al., 2000).

Peer Group Factors

Peer group attitudes toward school are related to academic grades, academic goals and perceived competence. Peers' influence can be negative and lead to anti-intellectual attitudes, higher dropout rates, higher pregnancy rates, gang involvement and substance abuse. Alternatively, having peers with high academic motivation can positively enhance the school experience for students at risk of academic failure (Wang, Haertel, & Walberg, 1998).

Optimizing Student Achievement with the Other 3Rs

Although negative family and school factors impact on achievement, the psychological attributes of learners themselves can mitigate these factors and lead to school success. Abilities, motivation, prior achievement, as well as attributions for success and failure all affect learning. The Other 3 Rs, *reasoning*, *resilience*, and *responsibility*, are skills for learning that engender the persistence and determination to achieve academic and life success that is not solely limited by innate ability or background. The Other 3 Rs promote a mindset of "what can be" rather than one of lowered expectations. The Other 3 Rs, especially as they interact with one another, provide powerful learning tools for all students to reach their academic potential. These

learning strategies provide skills for students to reason well and to develop as educationally resilient, self-directed learners.

Reasoning

Reasoning is the ability to draw conclusions from evidence (Sternberg, 2004). In an environment of increased testing and accountability, schools today are heavily focused on teaching and assessing analytical and memory skills (Sternberg, 2003a). However, according to Sternberg (1999), practical and creative skills are also important for success in school and in life. Halpern (in press) also affirms that critical thinking and problem solving are essential skills that help students to assess information, formulate inferences, and make decisions.

In addition to learning how to analyze information critically, creatively, and practically, students also need to harness problem-solving skills. Together, such analyses can be used to set and achieve desired goals, generate and answer difficult questions, and move through and overcome obstacles that are barriers to learning and achievement. Werner and Smith (1992) reveal that the development of problem-solving skills at age ten is associated with successful adaptation in adulthood (as cited in Benard, 2004). In addition, a longitudinal study by Claussen (1993) found that planful competence in adolescents predicted higher educational attainment and fewer life crises through age fifty (as cited in Benard, 2004).

Instruction and assessment can be tailored for students with different academic abilities to promote the development of advanced reasoning skills (Wang, 1992 as cited in Wang, Haertel & Walberg, 1998). With a foundation of such skills, and the opportunity to expand learning through teacher led activities that promote active inquiry and experimentation, students progress from novices to expert learners and problem solvers. Further, multiple methods of assessment such as special assignments, exhibitions, portfolios, performances, as well as multiple choice tests, may allow students with different abilities and prior knowledge to demonstrate their learning (McCombs & Whistler, 1997 as cited in Wang, Haertel and Walberg, 1998).

Resilience

Resilience can be defined as overcoming adversity to achieve good developmental outcomes. (Masten & Coatsworth, 1998). Wang, Haertel and Walberg (1998) reveal that

two of the most important characteristics of resilient children are a high level of engagement in activities and belief in self determination. Resilient children are also able to identify and engage relationships and environments that promote their growth, and have the ability to screen out negative messages. Other characteristics of resilient children include: healthy expectations, a clear sense of purpose, a sense of competence, resourcefulness, flexibility, even temper, openness to new experiences, humor and good interpersonal skills (Wang, Haertel and Walberg, 1998, pp. 11-12).

Educational resilience describes a child's ability to achieve academic and social success in the classroom despite early and ongoing personal vulnerabilities and adversities (Wang, Haertel, and Walberg, 1998). Schools can employ the following factors to cultivate resilience: (1) teacher expectations and actions that model caring but high expectations, (2) curriculum and instruction that builds on student knowledge and diversity, (3) school organization and climate that promotes active student participation and sense of small learning communities, and (4) peer learning programs, mentoring and extracurricular activities (Benard, 2004; Wang, Haertel, and Walberg, 1998). Results indicate that children in schools implementing resiliency-building strategies have higher standardized test scores in reading and mathematics, higher aspirations for academic learning and improved academic self-concepts (Wang & Oates, 1996 as cited in Wang, Haertel & Walberg, 1998).

Responsibility

Responsibility involves being accountable for one's actions and inactions. Responsibility entails understanding and having empathy for others' opinions as well as concern for the common good. Schools can develop a sense of responsibility that can be exercised in personal, civic and academic domains.

Personal responsibility is grounded in an individual sense of morality that is not influenced unduly by peer perspectives. Personal responsibility not only relates to being accountable for one's own actions, but also includes the wisdom to be responsible for others (Sternberg, 2003b). Personal responsibility can be developed by participation in leadership development activities that are challenging and engaging. Schools, families and communities can provide opportunities for students to develop and voice their opinions, make decisions, hold responsible positions, express creativity, work as part of a

team and help others. These opportunities help students to develop autonomy, a positive identity and self awareness (Benard, 2004).

Civic responsibility involves employing critical thinking and commitment of one's talents to solve community problems (Carnegie, 2003). Civic responsibility can be cultivated through student involvement in school governance as well as in depth service learning activities. Within schools, teachers can involve students in creating classroom rules, and schools can design disciplinary policies with student input aimed at restorative not punitive justice (i.e.: mediation, peace making circles, etc.) (Benard, 2004; Wang, Haertel, & Walberg, 1998) Policies can also encourage student bystanders to prevent bullying behavior in schools. (Slaby et al, 1994) In addition to classroom learning, service learning that is linked to the curriculum is also an effective way to develop civic responsibility in students (Carnegie, 2003).

Academic responsibility involves learners taking an active role in their academic success. Teachers can encourage *academic* responsibility in students by developing self-regulation skills and a sense of personal agency through strategies that allow students to become increasingly responsible for their own learning. Learners develop self-regulation skills by actively setting learning goals, managing their time wisely, identifying and organizing learning resources, seeking assistance when needed, accomplishing learning goals and assessing what they learn (Wang, Haertel & Walberg, 1998; Zimmerman & Martinez-Pons, 1988).

Motivation, perceived self-efficacy, and a sense of mastery are key psychological attributes necessary for the development of responsibility. Such initiative propels an individual to direct attention and energy toward a desired goal. (Larson, 2000; Werner & Smith, 1992 as cited in Benard, 2004). In academic learning, achievement motivation involves determination, persistence, goal direction and intention, and is linked to increased school completion, increased reading and math scores, as well as improved mental health and interpersonal skills (Ryan & Deci, 2000; Scales & Leffert, 1999 as cited in Benard, 2004). Self-efficacy, another dimension of responsibility, is the belief that one has the personal power and ability to succeed. Perceived self-efficacy may in fact be more important than innate ability. Experimental studies consistently show that perceived self-efficacy increases effort and persistence, and leads to higher achievement

(Bandura, 1995, 1997; Maddox, 2002; Multon, 1991; Shunk, 1989, 1991; Zimmerman, 1995 as cited in Benard, 2004).

Implications

Teacher preparation should incorporate knowledge of TOTRs, as well as their impact on student achievement and how they can be incorporated into practice. The Other 3 Rs are universal learning skills available to all students, and cultivating all three of these skills can boost student performance especially for underachievers. Although each of TOTRs is related to school and life success, they are most effective when they are used together. In the course problem solving, reasoning skills offer the ability to judge which strategies best address the needs of a particular situation. Responsibility provides understanding of the consequences (for oneself and others) of employing or not employing different problem solving strategies, and taking ownership of the results. And resilience produces the patience to work through the problem solving process, by capitalizing on lessons learned, until achieving desired outcomes.

The authors of this volume present in detail their evidence-based arguments for promoting TOTRs in schools as a way to optimize student success. As a result of this outstanding display of scholarship, we look forward to a burgeoning interest in the application of TOTRs to school curriculum and to teacher education.

References

- Barton, P.E. (2003). *Parsing the achievement gap: Baselines for tracking progress*. Princeton, NJ: Educational Testing Service.
- Bernard, B. (2004). *Resiliency: What we have learned*. San Francisco: WestEd.
- Carnegie Corporation of New York and CIRCLE (The Center for Information and Research on Civic Learning and Engagement). (2003). *The civic mission of schools*. Retrieved June, 6, 2004 from http://www.civicmissionofschoools.org/public_html/CivicMissionofSchools.pdf. p. 13.
- Halpern, D.F. (In press). The enhancement of critical thinking: With decades of converging evidence, meta-analyses with large effect sizes, and societal need, would you allow your

- child to be assigned to a control group? In H.J. Walberg & R.F. Subotnik. *The scientific basis of educational productivity*. Greenwich, CT: Information Age.
- Masten, A.S. & Coatsworth, J.D. (1998). The development of competence in favorable and unfavorable environments: Lessons from research on successful children. *American Psychologist*, 53(2), 205-220.
- Mayer, D.P., Mullens, J. E., and Moore, M.T. (2000). *Monitoring school quality: An indicators report*. Washington, DC: U.S. Department of Education. National Center for Education Statistics (NCES 2001-030).
- No Child Left Behind Act of 2001 (2002). (Public Law 107-110).
- Rivkin, S.G., Hanushek, E.A., & Kain, J.F. (2002). *Teachers, schools and academic achievement*. Washington, DC: National Bureau of Economic Research.
- Sanders, W.L. & Rivers, J.C. (1996). *Cumulative and residual effects of teachers on future academic achievement*. Knoxville, TN: University of Tennessee Value Added Research and Assessment Center.
- Slaby, R.G., Wilson-Brewer, R., & Dash, K. (1994). *Aggressors, victims, and bystanders: Thinking and acting to prevent violence*. Newton, MA: Education Development Center, Inc.
- Sternberg, R.J. (1999). The theory of successful intelligence. *Review of General Psychology*, 3(4), 292-316.
- Sternberg, R.J. (2003a). The Other 3 Rs: part two: reasoning. *Monitor*, 34 (4), p. 5.
- Sternberg, R.J. (2003b). Responsibility: One of The Other Three Rs. *Monitor*, 34 (3),p. 5.
- Sternberg, R.J. (2004). *Psychology 4E*. Belmont, CA: Thompson Learning, Inc.
- Walberg, H.J. (In press). Improving educational productivity: An assessment of extant research. In H.J. Walberg & R.F. Subotnik. *The scientific basis of educational productivity*. Greenwich, CT: Information Age.
- Wang, M.C., Haertel, G.D., & Walberg, H.J. (1998). *Building educational resilience*. Bloomington, IN: Phi Delta Kappa Educational Foundation.
- Zimmerman, B.J., & Martinez-Pons, M. (1988). Construct validation of a strategy model of student self-regulated learning. *Journal of Educational Psychology*, 80(3), 284-290.

Session 2

Lesson 2

Session Objective

To practice using the *Other 3Rs Problem Solving Model* with reading and mathematics problems.

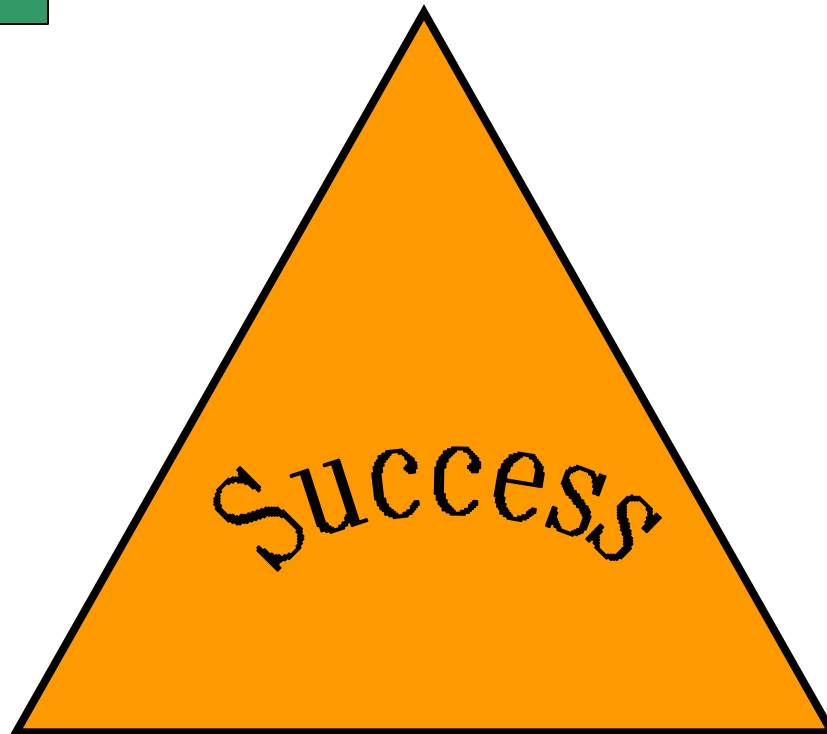
Summary of Activities

1. Introduce *the Other 3Rs* interactive bulletin board.
2. How to present *the Other 3Rs Problem Solving Model* to your students.
3. Practicing *the Other 3Rs Problem Solving Model* in reading, “The Problem at Shaker Grove School”
4. Practicing the *Other 3Rs Problem Solving Model* in math, “How Can I Estimate All These Smiles?”
5. Classroom applications

The Other 3Rs
Interactive Bulletin Board

Gerry
volunteered to
clean the guinea
pig cage.

Responsibility



Reasoning

Wanda came up with
many strategies for
getting her reading
assignment done.

Resilience

Ali did not give up
when he had trouble
doing his math
homework.

Student Handout

The ABCs of Solving Problems

A for Ask, “what is the problem?”

B for Brainstorming possible strategies.

Group Brainstorming

1. Spend 2 minutes brainstorming alone.
2. Share ideas with the group.
3. Allow as many ideas as possible.
4. All ideas are welcome no matter how silly or far out they seem.
5. Do not talk about the ideas during brainstorming.
6. No criticism is allowed.
7. Build on the ideas of others. This is not cheating.
8. Write down all ideas.
9. Set a time limit.

Individual Brainstorming

1. Come up with as many ideas as you can.
2. Write down all ideas no matter how silly they seem.
3. Let one idea lead to other ideas.
4. Brainstorm a few minutes then take a break.
5. Re-read your list and add any new ideas.

C for Choose the strategy that you think will solve the problem. The Choose step requires **reasoning**—thinking ahead of both good and bad things that might happen if you use this strategy.

A good way to choose a strategy:

- Pick the 3 or 4 most popular strategies.
- **Possible results** - next to each strategy write three things that might happen. Write down both good and bad things.
- **Discard** - A possible bad result may make you drop a strategy that looks good at first.
- **Choose** - Now choose the strategy that you will try.

Strategy

What Might Happen?

1. _____

2. _____

3. _____

4. _____

D for Do it. Try the strategy and see if the problem is solved. (Be sure to give it a 100 percent effort.)

E for Evaluate the strategy you tried. *Evaluate* means did the strategy work?

F for Find another strategy.

Or

F for Finished!

The Problem at Shaker Grove School



Shaker Grove is the name of a school. It got its name from the town of Shaker Grove in the southwest corner of Pennsylvania.



Shaker Grove School is sort of like your school but different. Your school has little kids in kindergarten and so does Shaker Grove School. Your school has big kids in 5th grade and so does Shaker Grove School. And your school has middle size

kids in the grades between kindergarten and 5th grade and so does Shaker Grove School.

But your school has teachers to teach each grade. And your school has a different room for each teacher.

At Shaker Grove School there is only one room and one teacher. Her name is Miss Kramer.



There are other differences too. Your school has a principal. At Shaker Grove School Miss Kramer is the principal.

And your school has a school nurse.

Guess who the school nurse is at Shaker Grove School?

You are right. It's Miss Kramer.

So, what is the problem at Shaker Grove School?

The problem is the raccoon.



At Shaker Grove School there is a very smart raccoon that lives in a hole under the building. That would not be a problem if the raccoon behaved himself. But the Shaker-Grove-School raccoon is just like other raccoons. It loves to cause trouble.

When Miss Kramer gets to school in the morning, the first thing she does is look for raccoon damage. This is a waste of Miss Kramer's time. It also puts her in a very bad mood.

Yesterday morning, Miss Kramer found the trash can empty and the brown bags from yesterday's lunches scattered all over the schoolyard.



The day before that, she found the bird feeder on the ground with the peanut butter gone.

The day before that, Miss Kramer found a hole in the wall next to her desk.

What should Miss Kramer do?



STOP READING HERE

Before you read the rest of the story, use the **ABC... Problem-Solving Model** to figure out what Miss Kramer should do.

Use the first three steps (A, B, and C) of the model.

Ask a question that states the problem.

Brainstorm possible strategies.

Choose the strategy that you believe will work best and do the least damage.

After you have made your choice, read the next part of the story and see what Miss Kramer has decided to do.

Miss Kramer knows that solving the raccoon problem is her responsibility.

The question she Asked was, "How can I get rid of the raccoon?"

Miss Kramer knows that raccoons are smart and she will have to use reasoning to outsmart this one.

She also knows that she cannot fail. Even if her first strategy does not work, she must keep trying. She must show resilience by trying other strategies.

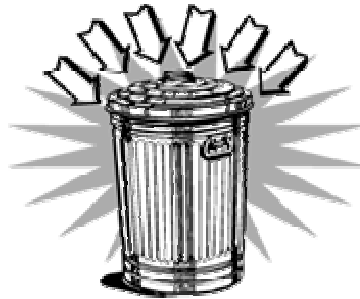
So, what strategy did Miss Kramer Choose? Is it the same strategy that you would choose? Did her strategy work?

When Miss Kramer Brainstormed she came up with four possible strategies:

Brainstorm List

1. Buy a trashcan with a tight lid.
2. Trap the raccoon and then turn it loose far away from Shaker Grove School.
3. Put poison near the raccoon's hole.
4. Hire an exterminator.

Since Miss Kramer didn't want to hurt the raccoon she decided to try the trashcan strategy first.



Miss Kramer went to the hardware store and bought a new trashcan—a good trashcan with a tight-fitting lid.

She placed the new trashcan right next to the raccoon's hole just outside the backdoor of Shaker Grove School.

After school, the kids helped Miss Kramer put all of the lunch bags and other trash into the new trashcan. They could hardly wait to see what happened.



STOP READING HERE

Before you read the rest of the story, discuss whether or not you think that Miss Kramer's strategy will work.

The next day, Miss Kramer hurried to the back of the school to check the trashcan.

Oh no! The new trashcan did not work!

What Miss Kramer found made her very angry. The trashcan was on its side. The lunch bags and other trash were scattered around. Raccoon tracks were everywhere.



"This raccoon is a pest!" Miss Kramer said in her angry voice.

Do you think that Miss Kramer gave up?

Of course not!

She had done everything she was supposed to do.

She Chose a solution.

She Did it.

She Evaluated the results.

So what if she found that her strategy did not work? Miss Kramer knew that she had to Find another solution.

She could not give up.

Back she went. Miss Kramer looked at her Brainstorm list again. She still did not want to hurt the raccoon so there was only one Choice left.

This time when Miss Kramer went to the hardware store, she bought a big trap. She put food in the trap and placed the trap near the raccoon's hole.

Again the kids at Shaker Grove School were excited. Again they could hardly wait.

When Miss Kramer got to school the next morning she saw the raccoon. It was asleep inside the trap.

This strategy worked!



Was this the end of the story?

No. Remember that the second strategy had another step. And Miss Kramer had to give her strategy a 100% effort. She still had to take the raccoon far away from Shaker Grove and let it go in the woods.

Not just any woods, it had to be the perfect home for raccoons.

Miss Kramer let her students solve this new problem. They used the Other 3Rs Problem Solving Model to find the best raccoon home they could possibly find.

After school that day Miss Kramer drove 20 miles to the place they selected—Blue Knob State Park. She opened the trap and let the raccoon scamper away. It ran quickly into the forest where it could live and be happy.



A week has passed and there has been no sign of the raccoon at Shaker Grove School.



Does that mean that the trap strategy worked?

It is too early to tell.

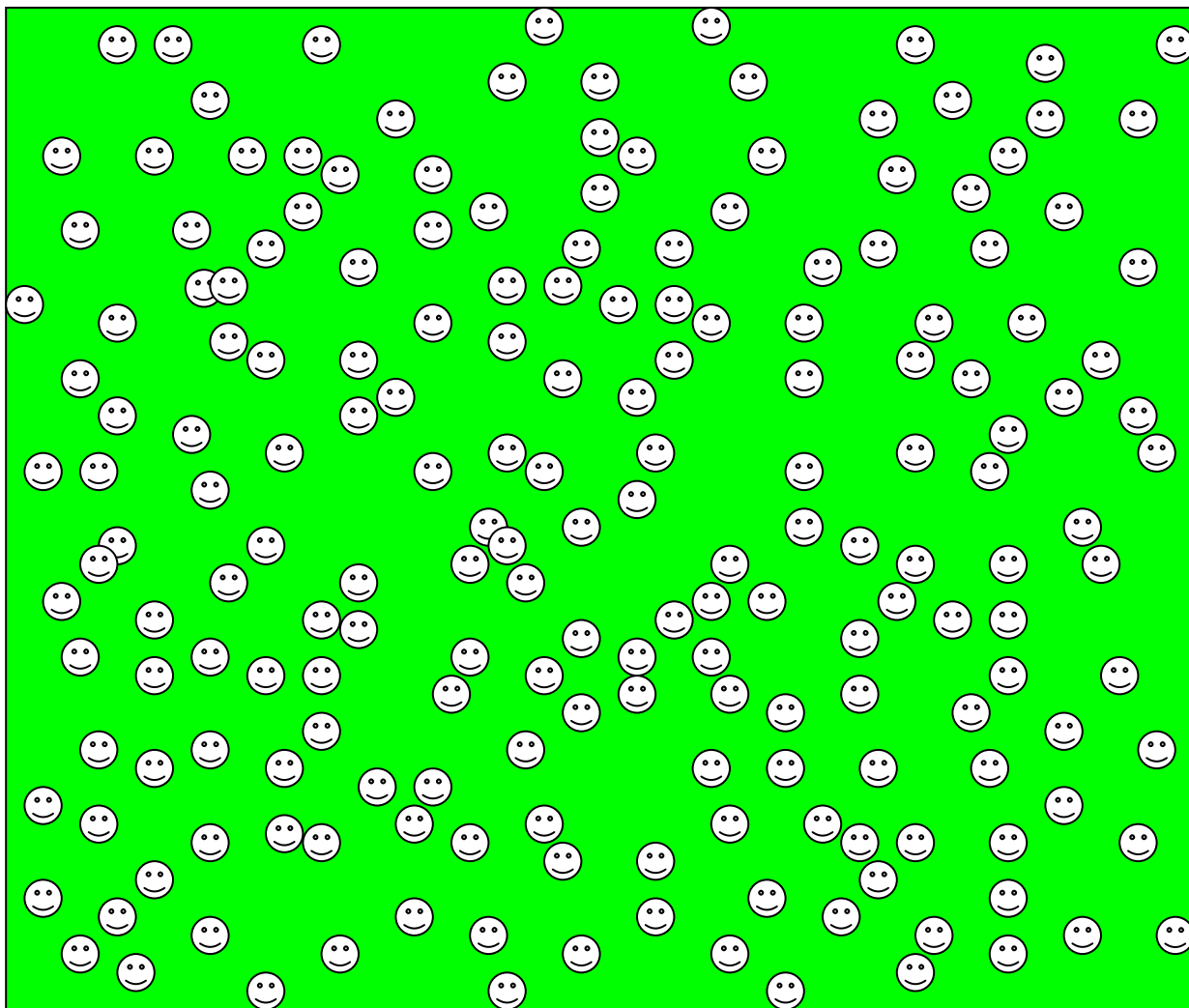
Miss Kramer thinks that she will wait at least a month before she declares victory.

In the meantime Miss Kramer bought a guinea pig. After all, a raccoon trap makes a perfect guinea pig cage. And that solves the other problem.

"What do I do with a used raccoon trap?"



How Can I Estimate All These Smiles?



Last night we had a joke-telling contest at the school. Everyone had a good time, but we forgot to count the people.

Now we need to know about how many people were there. Work with a partner to estimate the number of people in this picture.

Classroom Applications

- 1. Prepare an interactive bulletin board where you will honor students for demonstrating **responsibility, resilience, or reasoning***
- 2. Introduce your students to the **Other 3Rs Problem Solving Model**.*
- 3. Use **The Problem at Shaker Grove School** activity with your students to show them how to use the **ABC... Model** with reading.*
- 4. Use the **ABC... Model** with at least one other reading activity.*
- 5. Use the smiley-face estimation activity with your students to show them how to use the **ABC... Model** to solve difficult math problems.*

**Use the appropriate forms to record everything you do and report what happens*

Session 2 – Classroom Applications

- 1) Prepare an interactive bulletin board where you will honor students for demonstrating **responsibility, resilience, or reasoning**

Describe (or insert a picture of) the bulletin board design you tried:

How many students were you able to recognize? What did they do to deserve recognition?

Did the bulletin board strategy work? _____ How do you know that it worked?

2) Introduce your students to the **ABC... Problem-Solving Model**.

Describe the strategy you used:

Did your students understand the steps?

How do you know?

Describe how you explained the relationship between the **Model** and the **Other 3Rs** .

How do you know that your students understood?

3. Use *The Problem at Shaker Grove School* activity with your students to show them how to use the **ABC... Model** with reading.

Did *The Problem at Shaker Grove School* help your students understand the **ABC... Problem-Solving Model**?

How do you know?

Did you change anything to help your students understand the **Model** better?

4. Use the **ABC... Model** with at least one other reading activity.

Describe how you used the **Other 3Rs Problem Solving Model** with other reading activities?

Describe any adaptations that you made?

Describe ways that you were able to stress **responsibility, reasoning, and resilience** during reading activities.

5. Use the smiley-face activity with your students to show them how to use the **ABC... Model** when they solve a difficult math problem.

Explain how your students used the steps in the **Problem Solving Model** as they approached the problem?

Describe any difficulties students had in focusing on finding a strategy rather than on finding the answer.

Describe how you addressed those difficulties

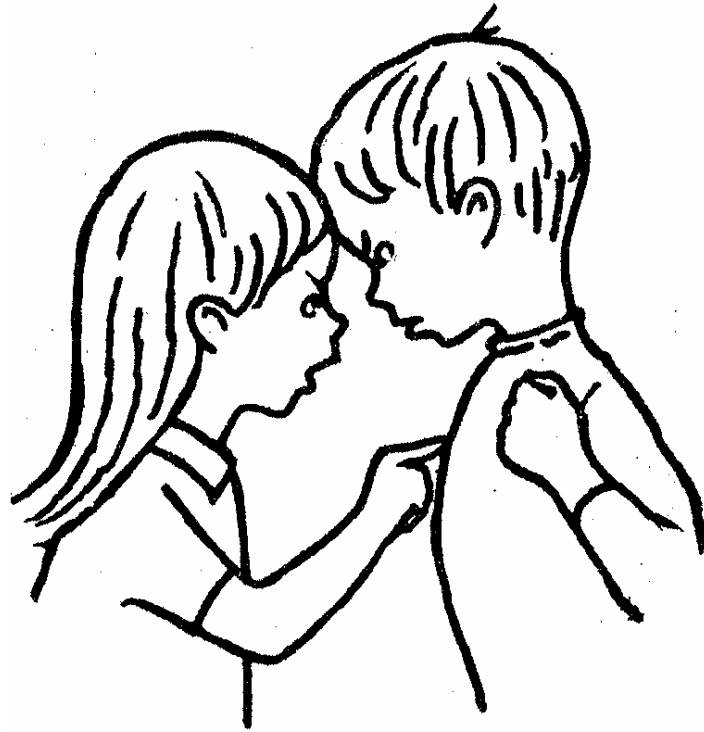
6. Describe any ways you have seen your students show an understanding or application of reasoning, resilience and responsibility.

Lesson 3

Practice using the *Other 3Rs Problem Solving Model*
by solving problems in

- 1) Interpersonal relationships, “I can’t stand you”
- 2) mathematics, “Lollipop Cookies”

I can't stand you!



Do you get along with everyone in your class?
Do you ever get angry with anyone?
What annoys you?

Sally is annoyed.

Billy bugs Sally and she is getting mad.

Every day at recess Billy listens to Sally talk to her friends. Then he copies her words. He says them the same way. He even tries to copy her accent.

What should Sally do?
What should Billy do?

Responsibility

Being accountable for one's own actions and inactions and the consequences of those actions and inactions.

✓ **Personal responsibility**

- "It's up to me to create what I want."
- "It's up to me to make it happen."
- "How I act matters."

✓ **Social Responsibility**

- Considering other peoples' points of view.
 "I care about what you have to say"
- Concern for the common good.
 "I care about what is good for all of us, not just for me."
- Giving help and seeking help
 "I will help you."
 "I need help."

Creating Social Responsibility in the Classroom

Responsibility includes the wisdom to be responsible for others as well as oneself—seeking common good outcomes rather than maximizing those of certain people. There are a number of strategies that can be used in schools to foster social responsibility.

Listed are a few:

- Lessons can be taught that place an increased emphasis on critical, creative, and practical thinking to produce “good ends” that benefit not only the individual but others as well.
- Students can be encouraged to understand other people’s points of view, whether or not they agree with them. You can weave this conversation into reading stories and asking students questions like “How could this character behave in a way that is good for everyone? How do you think that would make the story different?”
- Students can be encouraged in nearly all areas of their study to think about how that area might be used for better or worse ends in order to gain the understanding that the ends to which knowledge is put *do* matter. For example, when explaining a discovery in science, teachers can ask their students how this discovery could help and/or hurt others. How could they change the invention to help others?
- Another strategy used by numerous schools to cultivate responsibility is service learning, where student participation in community service activities is integrated into the curriculum to connect academic learning with real-life practical application. Studies of these programs in several states have found that students participating in service learning have higher standardized test scores and better grades. These kinds of programs might include, for example, preparing care packages for children in a homeless shelter while learning about homelessness in the classroom, or working to restore a wetland habitat in the context of an environmental science class. What projects would work in your classroom?

How do we develop responsibility in students? One important factor is what type of attributions your students make for their academic performance.

How do your students interpret their failures and successes? Often they may take credit for their successes and attribute their failures to external factors. What is important in how students interpret their efforts is whether they perceive they have control over the outcome or not. Research shows that the most helpful attributions for students to assume academic responsibility are when students attribute their success or failures to the strategy, technique, or method of learning they use. Attributions to effort also can have a

positive effect. Attributions to the difficulty of task or innate talent decrease a sense of responsibility.

Teachers' feedback is key in teaching students how to make effective attributions. They can model how to make attributions that increase a student's sense of personal responsibility for their achievement. They can model making attributions to the strategy used when providing feedback. This reinforces students' search for suitable strategies and in turn may increase a student's sense of personal responsibility for their achievement.

Teachers can also capitalize on error analysis. After a test teachers ask students to look at their answers and examine their errors. What can they learn from them? For example, perhaps the student used the same incorrect strategy for a number of answers. Thus they are using one mistaken strategy multiple times versus making many individual errors. This helps the student learn about strategies as well as have an increased sense of self-efficacy.

Beliefs about Intelligence Influence Effort

A second factor important in developing academic responsibility in students is the way in which intelligence is viewed. There are two theories of intelligence:

1. The entity theory posits that intelligence is a fixed entity, a deep-seated personal quality that cannot be changed.
2. The incremental theory posits that intelligence is an attribute that can be developed through one's intellectual efforts.

Do you believe that intelligence is inherited and fixed or learned and a result of effort? If you believe intelligence is a result of effort than you will try harder, enjoy learning, and not get overly discouraged when you fail. Observe your students and which one's think their performance is due to effort. What do you notice? How can you model for them that intelligence is developed through their efforts?

One way is to teach the importance of effort through the feedback you give your students. When students are praised for their efforts they tend to thrive. So rather than saying, "you are smart" (which implies that the success is due to the child's innate intelligence), you could say "you put a lot of work into that project" or "you picked a successful strategy for solving that problem."



Lollipop Cookies

Last year for *Grandma's Bake Sale* you made 3-dozen lollipop cookies to sell. They sold so fast that this year you plan to make 9-dozen.

Lollipop Cookies

1 1/2 Cup sugar
3/4 Cup (1-1/2 sticks) margarine
2 eggs
1 1/2 teaspoons vanilla
3 Cup flour
1 teaspoon baking powder
1/2 teaspoon salt
wooden sticks



Beat sugar and margarine together until fluffy. Add eggs and vanilla. Add combined dry ingredients and mix well. Divide dough in half. Tint one half of the dough with food coloring. Refrigerate all dough for several hours or overnight. Heat oven to 375 degrees F. Roll half of the tinted dough to 1/4-inch thick 8-inch square on lightly floured wax paper. Repeat with half of the un-tinted dough. Place a tinted dough square on top of a non-tinted square; roll up. Cut dough into 1/2-inch slices. Press and flatten each slice into 2-1/2-inch circles. Place on an ungreased cookie sheet. Slide a stick into each cookie to the center; gently press dough around stick. Bake 8 to 10 minutes. Cool slightly; remove from cookie sheet. Cool. Repeat with remaining dough. Makes 3 dozen lollipop cookies.

1 dozen = 12 cookies

based on recipe by Sonya Whitaker

To make 9-dozen cookies you will need to change the recipe. The directions will not change. Only the amount of each ingredient needs to be changed.

Decide how much of each ingredient you will need to make 9-dozen cookies.

How much will the bake sale make if they sell your cookies for 25 ¢ each?

Furr's Famous Brownies

The people who are running *Grandma's Bake Sale* also want you to bake 4-dozen brownies. The brownies should be squares that are about 2 inches by 2 inches.

Furr's Famous Brownies

4 squares unsweetened chocolate
1/2 Cup butter or margarine
4 eggs
1/4 teaspoon salt
2 Cup sugar
1 Cup flour (sifted)
1 teaspoon vanilla
1 Cup nuts



Melt chocolate and butter; set aside to cool. Beat eggs and salt until light. Add sugar gradually. Beat until light and creamy. Fold in melted chocolate mixture. Add vanilla and gradually add flour. Beat until smooth. Add nuts if desired.

Bake at 350 degrees for about 30 minutes in a 9" x 13" greased and floured pan. Brownies are done when a toothpick inserted in the middle comes out clean!

Recipe makes 2 dozen brownies that are 2 by 2 inches square.

This Recipe comes from Rose Furr.

1 dozen = 12 brownies

To make 4-dozen brownies you will need to change the recipe. The directions will not change. Only the amount of each ingredient needs to be changed.

Decide how much of each ingredient you will need to make 4-dozen brownies.

Now decide how much the bake sale should charge for each brownie.

Role Playing

Scene - Sally and two other kids stand together in a small group while Billy stands several feet away.

Sally - Stands facing two kids with her back toward Billy. She speaks with a southern accent as she says:

“Yen, I am so excited. I have a peanut butter sandwich in my lunch box. I just love peanut butter.”

Billy - Standing three feet away from Sally strains to hear what she is saying. After Sally speaks, Billy tries to copy every word with the same pacing and accent.

“Yen, I am so excited. I have a peanut butter sandwich in my lunch box. I just love peanut butter.”

Sally - With her back still toward Billy, she tries to ignore him. She looks down at the floor then looks up and says:

“Shayna, did you watch the movie on TV last night?”

Billy - Is straining even harder to hear what she is saying. Again, Billy copies every word with the same pacing and accent.

“Shayna, did you watch the movie on TV last night?”

Sally - Quickly turns to face Billy, points her finger at his chest and screams:

“Billy, you’re such a jerk... I can’t stand you!”

A Case for the Benefits of Problem-Solving

Teaching Kids How To Use Their Heads Instead of Their Fists

The path to world peace may begin in preschool, when children learn how to think their way through interpersonal challenges.

Findings

Why are some children more violent than others, and what can a parent or teacher do to make them more peaceful? In the 1980's, developmental psychologists Myrna Shure and George Spivack looked for answers to both of these questions. They suspected that children behave violently because they lack interpersonal cognitive problem-solving (ICPS) skills, such as how to brainstorm a variety of strategies to a problem, how to predict the consequences of one's own actions, and how to link causes to effects in interpersonal interactions. Without these skills, the researchers reasoned, children are more likely to have frustrating social encounters. This frustration, in turn, leads children to misbehave, therefore feeding into the cycle of unpleasant social interactions, hurt feelings, frustration, and bad behavior.

Shure and Spivack did not view this cycle as unbreakable, however. Instead, they thought that children could learn problem-solving skills, just like math or grammar. To test this idea, they conducted a two-year-long study with nursery school and kindergarten students. For the first three months, half of these children would play games and practice dialogues about solving problems and expressing their feelings. The researchers did not tell children exactly how to solve their problems, but rather taught the children how to generate possible strategies and how to consider their consequences. The other half of the children were not taught these problem-solving skills.

Shure and Spivack found that teaching problem-solving skills improved children's impulsive behavior and social adjustment, relative to children in the control condition. They saw these improvements in both nursery school and kindergarten children for one full year after the intervention. Moreover, well-adjusted children who learned the skills in nursery school were less likely to develop behavioral difficulties over the 2-year period than were well-adjusted children who did not learn these skills.

In addition, a 5-year longitudinal study showed that children trained by teachers in kindergarten and first grade showed these same improvements compared to children in the control condition at the end of grade 4. Also, children of parents who best learned to apply the problem solving approach when real problems came up had children whose cognitive and behavioral gains were strongest.

Significance

This research showed that early intervention teaching children problem solving skills can have large and long-lasting effects on children's behavior and interpersonal relationships.

Cited Research

Shure, M.B. & Spivack, G. (1980). Interpersonal problem solving as a mediator of behavioral adjustment in preschool and kindergarten children. *Journal of Applied Developmental Psychology*, 1, 29-44.

Shure, M.B. & Spivack, G. (1982). Interpersonal problem-solving in young children: A cognitive approach to prevention. *American Journal of Community Psychology*, 10, 341-356.

Additional Sources

Shure, M.B. (1992). *I Can Problem Solve (ICPS): An interpersonal cognitive problem-solving program: Intermediate elementary grades*. Champaign, IL: Research Press.

Shure, M.B. (1992). *I Can Problem Solve (ICPS): An interpersonal cognitive problem-solving program: Preschool*. Champaign, IL: Research Press.

Shure, M.B. (1992). *I Can Problem Solve (ICPS): An interpersonal cognitive problem-solving program: Kindergarten/Primary grades*. Champaign, IL: Research Press.

Shure, M.B. (1996). *Raising a thinking child: Help your young child learn to resolve everyday conflicts and get along with others*. New York: Pocket Books.

Shure, M.B. (2000). *Raising a thinking child workbook*. Champaign, IL: Research Press.

Shure, M.B. (2001). *Raising a thinking preteen: The I Can Problem Solve program for eight-to-twelve-year-olds*. New York: Owl/Holt.

(Reprinted from APA On Line: <http://www.psychologymatters.org/shure.html>)

Classroom Applications.

1. Use the ***I can't stand you*** activity with your students to show them how to use the ***ABC... Model*** to solve interpersonal problems. Be sure to emphasize that the ***Model*** is for solving their interpersonal problems too.
2. Emphasize the words ***responsibility, resilience, and reasoning*** as often as you can during reading and all other activities.
3. Use the ***Lollipop Cookies*** activity with your students as you continue practicing the ***ABC... Model*** with math activities.
4. Continue to use the interactive ***Other 3Rs*** bulletin board that you created.

*Complete the homework sheets answering the questions about each assignment so that when we meet again you will be able to tell us what happened.

Session 3 - Classroom Applications

1. Use the *I can't stand you* activity with your students to show them how to use the **ABC... Model** to solve interpersonal problems. Be sure to emphasize that the **Model** is for solving their problems too.

Did your students correctly apply the **Model** to the problem between Sally and Billy?

Whose problem did they think it was? _____ Why?

If you had an opportunity to use the **Model** with a real interpersonal problem between students in your class, describe the incident here and discuss how the **Model** was used and what the outcome was.

Did you observe any of your students using the **Model** to solve their own interpersonal problems?

3. Emphasize the words **responsibility**, **resilience**, and **reasoning** as often as you can during reading and all other activities.

List reading and other learning activities where you found examples of **responsibility**, **resilience**, and **reasoning** to point out to your students.

Would you say that your students are becoming more focused on the **Other 3Rs** ? _____ Give examples here:

4. Use the **Lollipop Cookies** activity with your students as you continue practicing the **ABC... Model** with math activities.

What strategies did your students use as they tried to solve the **Lollipop Cookie** activity?

How were **responsibility**, **reasoning**, and **resilience** demonstrated in this activity?

5. Continue to use the interactive **Other 3Rs** bulletin board that you created.

As you continued to use the interactive bulletin board, what examples of the **Other 3Rs** were you able to recognize?

The content of this training is built into the standards for mathematics.

The Five Strands of Math Proficiency **National Research Council**

1. **Understanding:** Comprehending mathematical concepts, operations, and relations – knowing what mathematical symbols, diagrams, and procedures mean.
2. **Computing:** Carrying out mathematical procedures, such as adding, subtracting, multiplying, and dividing numbers flexibly, accurately, efficiently, and appropriately.
3. **Applying:** Being able to formulate problems mathematically and to devise strategies for solving them using concepts and procedures appropriately.
4. **Reasoning:** Using logic to explain and justify a strategy to a problem or to extend from something known to something not yet known.
5. **Engaging:** Seeing mathematics as sensible, useful and doable – if you work at it – and being willing to do the work.

Lesson 4

To practice using the *Other 3Rs Problem Solving Model* to solve problems in

- 1) science, “The Quicker Picker Upper”.
- 2) mathematics, “Zelda’s Zanny Zoo”.

The Quicker Picker Upper

Have you ever seen an ad for paper towels?



Each ad says that its brand is better in some way. One brand is tougher. One brand is bigger. One brand is softer. One brand holds more liquid.

Your teacher wants you to help her decide which brand really holds more liquid.

She has a lot of things for you to use. You do not have to use everything, but make sure that any test you try is fair.

Supplies: four different brands of paper towel, water, rulers, scissors, balances, measuring cylinders, measuring spoons, medicine droppers

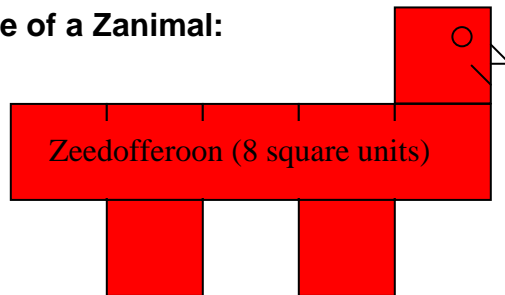
Zelda's Zany Zoo

Zelda is a famous zookeeper. Her Zany Zoo has more Zanimals than any other zoo. A Zanimal is a special kind of animal. It can be tall or short, or fat or thin. But a Zanimal must have a perimeter of exactly 18 units.

Zelda has hired you as the zookeeper at her Zany Zoo. She wants you to add more Zanimals.

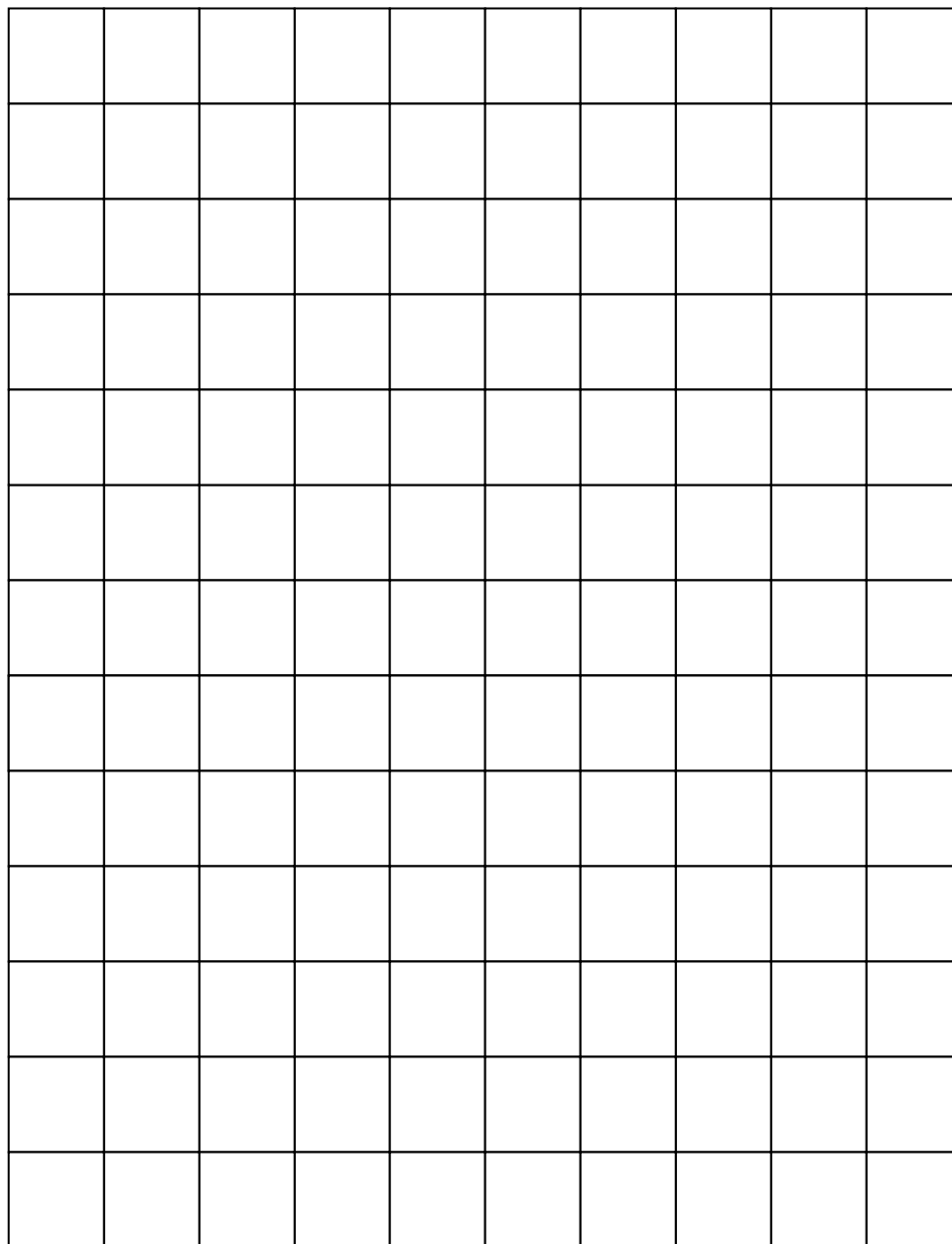
Work with a partner to set up a display with 4 Zanimals in it.

Example of a Zanimal:



1. Use Zany Zoo Graph Paper to make 4 different Zanimals.
2. Use scissors to cut them out.
3. Use construction paper and glue to display them.
4. Give each Zanimal a name that begins with the letter Z.
5. Measure its AREA in square units and write the name and the area on the front of the Zanimal. Just like in the example.
6. Add eyes, a mouth, and a nose to your Zanimals too. (The nose does not count as part of the area.)
7. If you want to, you can also add stripes, spots, fur, or other features.

Zany Zoo Graph Paper



Area -

A surface enclosed within a boundary. To find the area of a Zanimal, add up the number of squares that make up its body.

Perimeter -

The length of the boundary that surrounds an area. To find the perimeter of a Zanimal, count all of the sides and add them together.

Classroom Applications.

1. Use the *Quicker Picker Upper* activity with your students to show them how to use the *ABC... Model* in science.
2. Use the *ABC... Model* with a standard science activity.
3. Emphasize the words **responsibility, resilience, and reasoning** as often as you can during all subject area activities as well as with everything else you do.
4. Use the *Zelda's Zany Zoo* activity with your students as you continue practicing the use of the *ABC... Model* in math.
5. Continue to use the interactive *Other 3Rs* bulletin board that you created.

Complete the homework reporting sheets. Take notes on everything so that you will be able to tell us what happened.

Session 4 - Classroom Applications

- 1) Use the **Quicker Picker Upper** activity with your students to show them how to use the **ABC... Model** in science.

Did your students correctly apply the **Model** this problem?

How do you know?

- 2) Use the **ABC... Model** with a standard science activity.

Describe another science activity for which you used the **Other 3Rs Problem Solving Model**.

How difficult was it to adapt the activity for use with the model?

What problem(s) did you or your students encounter?

How were you able to solve the problem(s)?

- 3) Emphasize the words **responsibility**, **resilience**, and **reasoning** as often as you can during all subject area activities as well as with everything else you do.

Describe the examples of **responsibility**, **resilience**, and **reasoning** that you found in your daily science lessons.

- 1) Use the **Zelda's Zany Zoo** activity with your students.

Remember that the **Other 3Rs Problem Solving Model** is only needed if there is a problem. How many of your students needed the **Model** to come up with strategies?

Describe adaptations that you made.

Describe other ways that you were able to stress **responsibility, reasoning,** and **resilience** during reading activities.

2) Continue to use the interactive **Other 3Rs** bulletin board that you created.

As you continued to use the interactive bulletin board, what examples of the **Other 3Rs** were you able to recognize?

Describe any evidence that your students are seeking opportunities to demonstrate the **Other 3Rs** .

Lesson 5

To practice using the *Other 3Rs Problem Solving Model* to solve problems in

- 1) social studies, “A Walking Community”
- 2) mathematics, “Mr. Isaac’s Ice Cream Party”

A Walking Community

Where you live matters! If you live in a city, exercise is part of your day and you are probably fit and healthy. If you live in the suburbs you are probably not as fit or as healthy as you wish you were. Why is that?



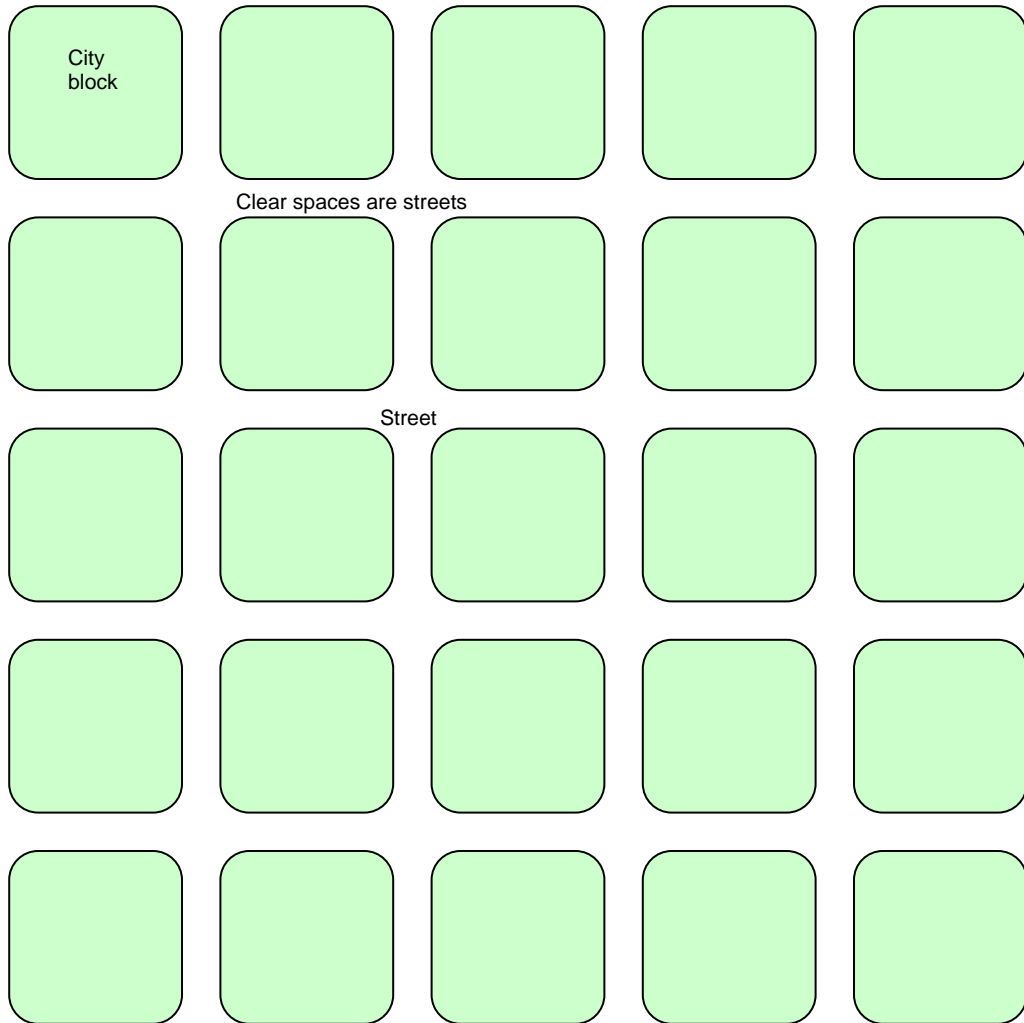
The reason is cars. People who live in cities can walk to everything. They can walk to school. They can walk to the grocery store. They can walk to the park. Grownups can even walk to work.

In the suburbs everything is far away. Most people who live in suburbs ride everywhere. They ride the bus to school. They drive to the grocery store. They even drive to fitness centers to jog on a treadmill.

Did you know that the more time people spend riding in cars the less fit they tend to be?

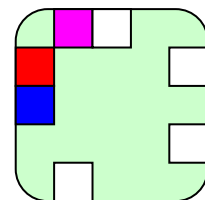
Work with a partner to plan a community where walking is easy and natural.

A Walking Community Map



1. List all the different kinds of places that people go to very often. (Don't forget a place to live.)
2. Make a symbol for each of these different kinds of places.
3. Make a legend that explains your symbols.
4. Place symbols on your neighborhood map.
5. Make sure that everyone can meet all of his or her needs by walking four blocks or less.
6. Give your neighborhood a name that shows that it is a place where healthy living happens.

Example of one city block:



Legend

- grocery store
- toy store
- apartment building

Mr. Isaac's Ice Cream Party

Mr. Isaac teaches third grade and he has a problem.

His problem is not a bad problem. It is a good problem. He has money he wants to spend on a party.



After putting new carpet in his classroom Mr. Isaac has \$75 left over. He wants to use the money for an ice cream party. But he doesn't know what flavors to buy.

Mr. Isaac wants to buy four flavors. He will buy the boys' two favorite flavors. And he will buy the girls' two favorite flavors. But he wants the party to be a surprise.

Mr. Isaac needs your help. What are the favorite flavors for the boys in your class? What are the favorite flavors for the girls?

He wants the results in a double-bar graph.

Now you need a strategy for gathering and presenting the data.

One more thing... the ice cream shop only has 7 flavors this month: vanilla, strawberry, chocolate, bubble gum, cookies 'n cream, chocolate chip cookie dough, and butter pecan.

Session 5 –Classroom Application

1. Use the **Walking Community** activity with your students to show them how to use the **ABC... Model** in social studies.

Did your students correctly apply the **Model** this problem?

How do you know?

2. Use the **ABC... Model** with a standard social studies activity.

Describe another social studies activity for which you used the **Other 3Rs Problem Solving Model**.

How difficult was it to adapt the activity for use with the model?

What problem(s) did you or your students encounter?

How were you able to solve the problem(s)?

3. Emphasize the words **responsibility**, **resilience**, and **reasoning** as often as you can during all subject area activities as well as with everything else you do.

Describe the examples of **responsibility**, **resilience**, and **reasoning** that you found in your daily science lessons.

4. Use the **Ice Cream Party** activity with your students.

How did it work?

Describe adaptations that you made.

5. Describe other ways that you were able to stress **responsibility, reasoning,** and **resilience** during reading activities.

6. As you continued to use the interactive bulletin board, what examples of the **Other 3Rs** were you able to recognize?

Final Reflections

1. How did your students respond to the concepts of **reasoning, resilience and responsibility**?

2. How did your students respond to the **Problem-Solving Model**?

3. Have you noticed any changes in your students or your classroom as a result of this training? If so please describe.

4. Has participating in this training offered you any positive gains in the classroom? If so please describe.

5. If you had designed this training what would you do differently next time?
