PROBLEM SOLVING STRATEGIES FROM GEORGE POLYA

George Polya identified four principles that form the basis for any serious attempt at problem solving:

1. Understand the problem
2. Devise a plan
3. Carry out the plan
4. Look back (reflect)

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1. Understand the problem

- What are you asked to find out or show?
- Can you draw a picture or diagram to help you understand the problem?
- Can you restate the problem in your own words?
- Can you work out some numerical examples that would help make the problem more clear?

2. Devise a plan

A partial list of Problem Solving Strategies include:

Guess and check	*Solve a simpler problem*
Experiment	*Draw a picture or diagram*
Model the Situation	*Look for a pattern*
Work backwards	Use deduction
Make a table	Use a variable
Change your point of view	

3. Carry out the plan

- Carrying out the plan is usually easier than devising the plan
- Be patient – most problems are not solved quickly nor on the first attempt
- If a plan does not work immediately, be persistent
- Do not let yourself get discouraged
- If one strategy isn't working, try a different one

4. Look back (reflect)

- Does your answer make sense? Did you answer all of the questions?
- What did you learn by doing this?
- Could you have done this problem another way – maybe even an easier way?

Let's Practice!
Guess and Check

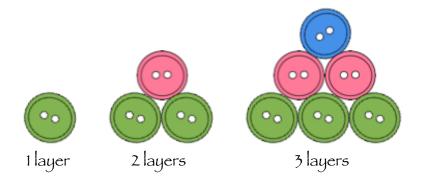Here is an example of a _Guess and Check_ problem:

> Ruby visited her Uncle Jerry's farm. There are cows and chickens on the farm. Ruby noticed that there were a total of 59 heads and 198 feet among them. How many cows and how many chickens did her Uncle Jerry have?

Guess No.	Number of Cows	Number of Chickens	Total number of heads	Total number of feet
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

Let's Practice!
Look for a Pattern

Here is an example of a _Look for a Pattern_ problem:

Edith arranged buttons in a triangular shape as shown.
How many buttons will there be in a triangle that has 12 rows?

1 layer   2 layers   3 layers

Row	Number of Buttons

Let's Practice!
Make a List or Table

Here is an example of a _Make a List or Table_ problem:

Beryl's car can travel at a top speed of 55 miles per hour on the highway. Her sister Sue's car can only travel 45 miles per hour on the highway. If the Sue leaves two hours early, how many hours will it take for Beryl to catch up to Sue?

CAR	1 hr	2 hrs	3 hrs	4 hrs	5 hrs	6 hrs	7 hrs	8 hrs	9 hrs	10 hrs
SLOW										
FAST										

Let's Practice!
Make a Drawing

Here is an example of a *Make a Drawing* problem:

A snail is climbing up the school's flagpole. Each day the snail climbs 11 feet. Unfortunately, it rains every night. When it rains, the snail slips back down 4 feet. How many days will it take the snail to reach the top of the flagpole, which is 55 feet high?

Let's Practice!
Modeling the Situation

Here is an example of a _Modeling the Situation_ problem:

Irene was given 48 stones. She wanted to arrange them into a rectangle in her garden. How many different rectangular arrangements are possible using 48 stones?

Let's Practice!
Solve a Simpler Problem

Here is an example of *Solve a Simpler Problem*:

> Bill is building a shed. He needs nails to put up the siding. Bill
> shops at Hill's Hardware where he can purchase nails by the scoop
> from a larger container. It costs $2.99 for ½ pound of nails. The
> salesperson gave him a scoop of nails that measured .62 pound.
> What should it cost to purchase the scoop of nails for the shed?