Teaching Reasoning and Problem Solving to Higher Functioning Children

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Problem Solver

Enthusiastically attempt to solve.

Be careful.

Break the problem into parts.

Avoid guessing the answer.

Be active with the problem.
Active Listener

Check for accuracy.

Stay with the Problem Solver.

Catch mistakes.

Don’t give away the correct answer. Lead your partner to the information. Be like a teacher.

Use encouraging words to keep the problem solver thinking.
Problem 1

Gladys is a teacher, Sallay a truck driver, violet a crane operator, and Hannah a Hollywood stuntwoman. The truck driver is heavier than Hannah. The crane operator is lighter than the stuntwoman, Gladys is heavier than the truck driver. Which woman is heaviest and which woman is lightest.
Problem 2

A graph breaking down the cost of education for the state showed that the category labeled “operation, maintenance, and auxiliary agencies” took a greater proportion of the budget than “capital outlay.” The category labeled “instruction” had the highest portion of the budget, while “interest” had a smaller portion than “capital outlay” and “general control” had a smaller portion than “interest.” Show a diagram of the categories ordered according to their portion of the budget.
Problem 3

In a different language *si gumba lo* means “not very sweet,” *ja lo* means “not brown,” *ba ja gumba* means “very brown coffee,” in this language. How would you say, “sweet coffee” in this language?

a. lo gumba  b. ja gumba  c. ba si  d. gumba ba  e. ja si
Problem 4

\( \leftrightarrow \bullet \longrightarrow \text{is to} \quad \leftrightarrow \bullet \longrightarrow \text{as} \quad \triangle \circ \downarrow \text{is to?} \)

(fig. 1) \hspace{1cm} (fig. 2) \hspace{1cm} (fig. 3)

\[ \begin{align*}
\triangle \circ \downarrow & \quad a. \\
\triangle \circ \downarrow & \quad b. \\
\triangle \circ \downarrow & \quad c. \\
\triangle \circ \downarrow & \quad d.
\end{align*} \]
Select a problem for which the learners have the prerequisite skills, including reading level, math skills, following along skills, etc.

Model both roles: Problem Solver and Active Listener.

Two adults who understand the process and who can speak at the level of the learner.

If 2nd adult not available, recruit a higher performing learner to serve as the problem solver (perhaps from another classroom).
Teaching TAPS to Children

Begin with playing, “What am I doing?”

Next play, “What did I miss?”

Play it for both Problem Solver and Active Listener roles.

Play until all missed items quickly caught.

Best if you have a teacher and at least two learners, can be played with more.
Suggested Resources

Get Your Hands on Problem Solving
   Author: Shirley Hoogeboom & Judy Goodnow
   Publisher: Ideal

Puzzles and Games for Reading and Math (Ages 6-8)
   By: Kaye Furlong & Nancy Casolaro
   Publisher: Lowell House Juvenile

Math, Book 2 (ages 4-6)
   Author: Martha Cheney
   Publisher: Lowell House Juvenile

Puzzles and Games for Critical and Creative Thinking
   Author: Martha Cheney & Diane Bockwoldt
   Publisher: Lowell House Juvenile

Thinkathon 1
   Author: Charlotte S. Jaffe & Barbara Roberts
   Publisher: Educations Impressions

Puzzles and Games for Reading and Math (Ages 4-6)
   Author: Susan Amerikaner & Kaye Furlong
   Publisher: Lowell House Juvenile

Venn Perplexors
   Author: Evelyn B. Christensen
   Publisher: Mindware

Scratch Your Brain Where it Itches
   Author: Linda Brumbaugh
   Publisher: Critical Thinking Books and Software

Math Brainteasers
   Author: April Blakely
   Publisher: Good Year Books

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Illustrated Math Dictionary: An Essential Student Resource
   Author: Judith de Klerk
   Publisher: Good Year Books

Thinking Through Math word Problems
   Author Whimbey, John Lochhead, & Paula Potter
   BDF Performance Systems

Problem Solving and Comprehension
   Author: Arthur Whimbey, Jack Lochhead, & Ronald Narode
   Publisher: Lawrence Erlbaum Assoc.

Beyond Problem Solving and Comprehension: An Exploration of Quantitative Reasoning
   Author: Arthur Whimbey and Jack Lochhead
   Publisher: Lawrence Erlbaum Assoc.

TAPS for Teachers
   Author: Joanne K. Robbins
   Publisher: jkrobbins@comcast.net
Answers:

Problem 1: Gladys is heaviest; Violet is lightest

Problem 2:
- Instruction
- Operations, maintenance, and auxiliary agencies
- Capital outlay
- Interesse
- General control

Problem 3: c. ba si

Problem 4: c.