

Introduction

A conclusion is the place where you got tired thinking. Martin Fischer, scientist

We love this quote because it reminds us of who we *used* to be as thinkers. We'd say things like "I'm so tired of thinking, my brain hurts" or "Wake me up when the thinking part is over." Fortunately, it's been years since we awakened and smelled the delicious aroma of freshly-brewed thinking . . . aggressive, pungent and strong with a confusing mix of other unidentified sensations.

For nearly 30 years we've been entrenched in the research on thinking, cognition and problem solving, and we're still as enthusiastic as ever about making every therapy session and every classroom a hotbed of teaching thinking. One of our grandchildren recently completed kindergarten with a teacher so amazing in her ability to draw out students' thoughts that this author just had to spend time in her classroom. To this author's surprise, this gifted teacher was using higher-order questioning, meant for children much older, with most of the students. If a student made the observation that a caterpillar should be able to walk more quickly because of all of its legs, she asked, "Why do you think so?" or "What do you see about its body that might give you a clue that it can't?" Obviously this teacher never felt restricted by the language or vocabulary that she used and never underestimated how youngsters could think. Even the lowest-functioning student in that kindergarten class could answer questions above the third level of Bloom's Taxonomy, Application.

Tasks Of Problem Solving – Adolescent is a rich compendium of situations in which adolescents find themselves. Each unit works on a specific skill and incorporates other thinking skills as well. These are the units:

- Sequencing
- Asking and Answering Questions
- Comparing and Contrasting
- Identifying Problems
- Detecting Key Information
- Making Inferences
- Expressing Consequences
- Determining Solutions
- Justifying Opinions
- Interpreting Perspectives
- Transferring Insights
- Integrating Thinking Skills

Within these units, you'll see the other skills embedded in associated tasks.

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Discovery consists of looking at the same thing as everyone else and thinking something different.

Albert Szent-Gyorgyi, biochemist

The work of Richard Paul, 2004, shows 35 higher-order thinking skills that are divided into three areas:

- affective strategies
- cognitive strategies – macroabilities
- cognitive strategies – microskills

These areas and their strategies are listed on pages 6-8.

■ **Affective Strategies**

thinking independently

having one's own thoughts

developing insights into egocentricity or sociocentricity

understanding that one's thoughts may be self-motivated or motivated by societal influences

exercising fairmindedness

seeing all sides of issues and understanding them fully before judging

exploring thoughts underlying feelings and feelings underlying thoughts

separating emotion from fact and vice versa

developing intellectual humility and suspending judgment

waiting to form an opinion until one knows all the facts

developing intellectual courage

having the strength to put off judgment in the face of pressure from others

developing intellectual good faith or integrity

the courage and ability to be honest and faithful in the pursuit of truthfulness

developing intellectual perseverance

continuing to consider and reconsider issues over time to gain insight, despite confusion or frustration

developing confidence in reason

trusting that others will reach logical conclusions if they are free to reason

■ **Cognitive Strategies — Macroabilities**

refining generalizations and avoiding oversimplifications

drilling down through overstatement and adding relevant detail

comparing analogous situations: transferring insights into new contexts

one's ability to apply what's been learned to a new situation

developing one's perspective: creating or exploring beliefs, arguments or theories

one's ability to compare perspectives with others for validation and truthfulness

clarifying issues, conclusions or beliefs

one's ability to develop and articulate thoughts clearly to others

clarifying and analyzing the meanings of words or phrases

knowing words and phrases that are "loaded" with offensive thinking

developing criteria for evaluation: clarifying values and standards

knowing how to prepare documents to verify beliefs

evaluating the credibility of sources of information

understanding that a written or spoken opinion is not necessarily true

questioning deeply: raising and pursuing root or significant questions

one's ability to drill down questions to core issues

analyzing or evaluating arguments, interpretations, beliefs or theories

knowing how to question deeply

generating or assessing solutions

knowing how to prepare a set of results from which to choose

analyzing or evaluating actions or policies

one's ability to question authority, rules and other issues

reading critically: clarifying or critiquing texts

one's ability to never accept what's read as true until further investigation is done satisfactorily

listening critically: the art of silent dialogue

questioning and discussing internally as one listens

Introduction, *continued*

making interdisciplinary connections

understanding that learning a subject crosses subjects

practicing Socratic discussion: clarifying and questioning beliefs, theories or perspectives

asking open-ended questions to further discuss generalizations

reasoning dialogically: comparing perspectives, interpretations or theories

having dialogues with others about issues of thought

reasoning dialectically: evaluating perspectives, interpretations or theories

thinking about issues affected by societal input

■ **Cognitive Strategies — Microskills**

comparing and contrasting ideals with actual practice

listing the pros and cons of real-life decisions

thinking precisely about thinking

using critical vocabulary to think

noting significant similarities and differences

recording these for reference as issues take shape

examining or evaluating assumptions

recording assumptions and asking about their relevance

distinguishing relevant from irrelevant facts

sorting through what is and isn't germane

making plausible inferences, predictions or interpretations

one's ability to make only realistic choices, leaving others out

giving reasons and evaluating evidence and alleged facts

separating fact from fiction and providing evidence as support

recognizing contradictions

being able to articulate differences on an issue

exploring implications and consequences

investigating all of the realistic ideas and results of an issue

Introduction, *continued*

Paul (2004) summarizes the global concept of *thinking* as:

the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning or communication, as a guide to belief and action

The skills listed on pages 6-8, when woven into lessons on a very conscious level, can have tremendous impact on the gains students of all abilities make toward becoming better thinkers. You will find these skills throughout *Tasks Of Problem Solving – Adolescent*.

Don't overlook the importance of world-wide thinking. A country that keeps its eye on Tom, Dick and Harry is going to miss Pierre, Hans and Yoshio. Al Ries, author

In 2002, Arthur Costa, noted researcher in the area of critical thinking, wrote the article *Educating the Global Intellect*. In it he wrote that many societies formerly thought of as underdeveloping nations are showing great signs of applied intellect: *creativity, problem solving and reasoning skills in a climate of entrepreneurship, freedom and collaboration*.

Dr. Costa's early research still applies today. In 1991 he outlined 14 Intelligent Behaviors which were gratefully accepted by teachers around the world. Since then, he has perfected these behaviors into 16 attributes of Habits of Mind, which are listed on pages 9 and 10.

■ Habits of Mind

- 1 persisting – sticking to a task or thought until it is completed . . . and going at it again
- 2 managing impulsivity – thinking before acting . . . and thinking again
- 3 listening to others – listening with understanding and empathy by seeing and acknowledging the highest forms of communication, cues
- 4 thinking flexibly – the capacity to change one's mind as one receives additional data
- 5 thinking about our thinking – the ability to know what we know and recognize what we don't know
- 6 striving for accuracy and precision – taking time to check over one's product to achieve excellence

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- 7** questioning and posing problems – the ability to fill in the gaps between what is known and not known
- 8** applying past knowledge to new situations – learning from experience
- 9** thinking and communicating with clarity and precision – refining language so that communication is less ambiguous
- 10** gathering data through all senses – developing sensory sensitivity to information we receive through our five senses
- 11** creating, imagining and innovating – developing the capacity to generate something novel, original, clever or ingenious
- 12** responding with wonderment and awe – having a passion for what one does
- 13** taking responsible risks – accepting confusion, uncertainty and the high risk of failure as part of normal existence
- 14** finding humor – using laughter to liberate and provoke creativity
- 15** thinking interdependently – realizing that the sum of the parts is greater than a piece
- 16** learning continuously – never reaching the end of the learning curve

You will note some overlap between Paul’s and Costa’s work because most researchers agree about what constitutes higher-order thinking. You’ll find this overlap in this manual also.

Intuition will tell the thinking mind where to look next. Jonas Salk, microbiologist

Jean Piaget is known largely as a researcher in the area of early childhood development. He spent considerable time, however, studying the cognitive development of 7 to 12 year olds, and beyond. He divided his studies into two age groups: the group for 7 to 11 year olds is named the *Concrete Operational Stage* and the group for 11 year olds and up is named the *Formal Operational Stage*.

The Concrete Operational Stage is characterized by the use of more complex thinking. Children become focused on personal decision making in school and at home by questioning authority, using logical approaches to understand schoolwork and communicating their own thoughts on issues and concerns. During this stage, students begin to analyze their thoughts and behaviors more closely and begin to think about their individual identities.

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The Formal Operational Stage continues the growth of complex thought by focusing on future issues and goals. Students begin to make plans and to think long-term. They use systematic thinking with regard to their relationships with others and have more interest in global issues such as politics, justice, history and patriotism. At this stage you'll see high school debate teams take on serious issues, thus demonstrating that our youth are emerging into adult society.

If I look confused, it's because I'm thinking. Samuel Goldwyn, producer

Adolescents with language disorders show distinct behaviors that reflect their confusion about language use, including:

- failure to understand or pay attention to rules of social language
- difficulty using different language for different listeners or social situations
- incorrect grammar, usually with regard to future tense, conjunctions, compound sentences and modifiers
- poor or limited vocabulary
- difficulty asking for further information to help comprehension
- tendency to ask questions that are too general to gain helpful information
- tendency to agree rather than voice a different opinion
- difficulty interpreting indirect requests and ambiguous statements
- class clown behavior to distract from language difficulties
- excessive forgetfulness
- withdrawal or exclusion from peer group activities
- difficulty with word finding, abstract language, instructions, multiple meaning words, sequencing, organizing and expressing thoughts

Tasks Of Problem Solving – Adolescent will allow you to focus on your students as whole or complete language users because teaching language in the context of higher-order thinking treats youth as thinking, caring people. The therapy you provide with this manual will help your students develop language that adequately reflects their improved thinking skills.

We appreciate all you do,

Linda, Rosemary and Carolyn