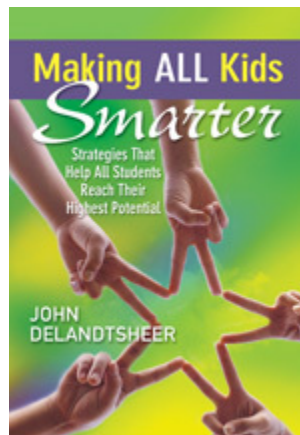# Making ALL Kids Smarter

A presentation at the
Indiana Association for the Gifted
2012
Indianapolis, Indiana

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The activities presented today are but a few of many described in John's book *Making ALL Kids Smarter* published by Corwin Press. Check it out online. John provides GATE Certification training to hundreds of teachers each year. He also provides training in brain-compatible teaching, classroom management techniques and active learning strategies.

For more information contact him at jdseminars.org

The Three Types of Analytical Thinking

We will look more closely at *analytical thinking* through assignments and activities teachers can use with students.

CLASSIFICATION ANALYSIS ACTIVITIES

- Asking students to sort their spelling words into three groups without telling them what sorting factors to use
- Creating a Venn diagram comparing and contrasting characters, authors, events, etc.
- Sorting anything into groups
- Asking students to describe the attributes of something
- Completing a *concept development lesson* (described later in this chapter)
- Completing a *word link* diagram (described later in this chapter)

Asking students to sort any content and telling them how to sort the content, i.e. sorting spelling words into groups according to the parts of speech, is a *comprehension* activity. However, when we *under-explain* the assignment by asking students to sort their spelling words without giving them any further explanation, then we have moved up to the *analysis level*. The more we specify what we want students to do, the less they have to think on their own. Having students create a Venn Diagram about three novels, three historical events, etc. is more beneficial than simply asking them to write a report which they might simply copy or paraphrase from a reference book or the Internet.

STRUCTURAL ANALYSIS ACTIVITIES

- Asking students to diagram a sentence
- Using graphic organizers
- Labeling the parts of something
- Drawing a diagram of something
- Creating a poster
- Building a model
- Taking something apart and labeling the parts
- Creating a web to describe a concept

There are a number of activities for students that involve *structural analysis*. Here are some suggestions:

- Building the circulatory system out of Legos
- Taking apart a flower and labeling its parts (far superior to a worksheet)
- Reconstructing the bones of a digested rodent from owl pellets
- Taking apart broken electrical appliances (be sure to cut off electrical cords first!) then drawing and labeling each part
- Drawing blueprints and scale drawings of familiar items or of their homes
- Building model airplanes, boats, cars, etc. from kits
- Assembling jigsaw puzzles
- Playing games such as Scrabble, Boggle, and Sudoku

OPERATION ANALYSIS ACTIVITIES

- Writing the steps or procedures for solving a math problem
- Outlining a chapter from the textbook
- Designing a flowchart to explain a procedure
- Creating a timeline
- Putting something in order (chronological, hierarchical, etc.)

Anytime we ask students to put something in order, we are asking to perform an *operation analysis*. Timelines are an excellent way to conceptualize history. Higher ability and older students can construct a two-tiered timeline.

For example, students create a timeline. Historical events, taken from content being studied, such as the explorers, can be placed above the line. (Henry Hudson explored eastern Canada; Vasco de Gama explored the Mississippi, etc.) Below the line, students could find other events in history that occurred around the same time.

| | | | 1700 | 1750 | 1800 | | |
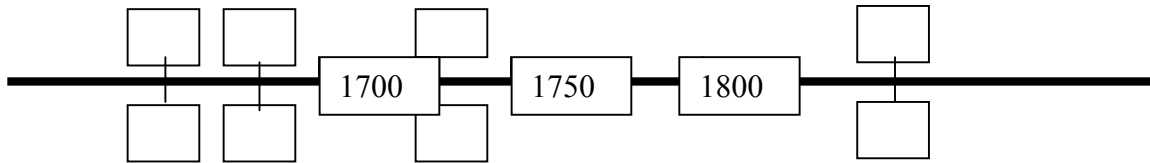
The events above the line correlate to the specific content of the curriculum. Events below the line might relate to a specific topic such as technology, music, art, science, everyday life, etc. Students might research the events on the bottom, draw a picture to represent them, or write a short explanation for the timeline. This kind of complex activity broadens thinking and allows students to see that not everything in the world happened in America. There are many sourcebooks for teachers and students to use for their timeline research which help provide a more global view of world events. One of my favorites is *The Timetables of History* by Bernard Grun.

Another activity for students using *operation analysis* is to have them write out the steps to the solution of a math problem. Tell them not to do the problem, just explain *how* to do the problem. Whenever we ask students to describe the steps or procedures for doing something, we are asking them to use *operation analysis*.
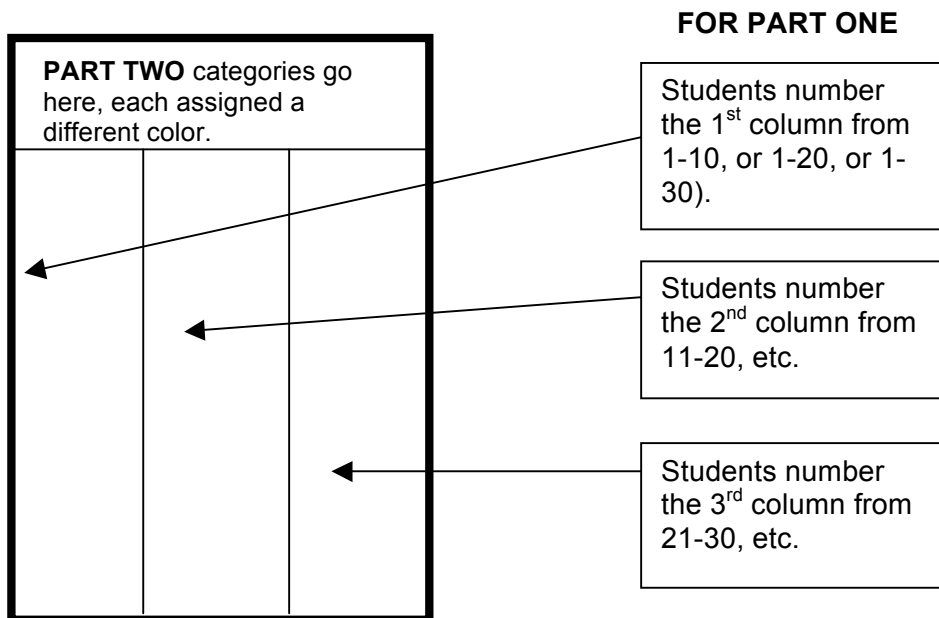
The Concept Development Model

Another strategy that incorporates both *depth* and *complexity* is *concept development*. This lesson model, created by educator Hilda Taba in 1966, is so associated with her that it also is called the *Taba Model*. I've adapted the *Taba Model* for use in my seminars, which is how it is presented here. Because she believed that students make generalizations only after data are organized, Taba's *Concept Development Model* contains three parts: brainstorming, sorting, and diagramming. This model can be used effectively at the beginning of a unit of study to find out what students already know about a topic, or at the end of a unit to determine what students have learned.

Steps in a Concept Development Lesson

In preparation for a lesson, students divide their paper into three columns as shown in the diagram below:

FOR PART ONE

> **PART TWO** categories go here, each assigned a different color.

Students number the 1st column from 1-10, or 1-20, or 1-30).

Students number the 2nd column from 11-20, etc.

Students number the 3rd column from 21-30, etc.

Part One: Brainstorming – *Emphasis on depth, knowledge/comprehension, and inductive reasoning*

Step 1:

Students may work as a whole class, in small groups or individually. They use a blank sheet of paper, dividing and numbering it as shown in the example above, according to the number of words to be used. (The number of words is dictated by the age of the students: about 10 words per column for primary, about 20 for sixth grade, and perhaps 30 for secondary students.) The teacher provides a topic and students compete, either individually or in groups, to think of words related to the topic and write them in the first column. (If working in groups, students should designate a recorder. This job might be passed from one person to another after each column is completed.) When a third of the class has completed the first column, the teacher calls *time* and everyone stops.

Step 2:
   Students are asked to come up with ten, twenty, or thirty *additional* words for the second column, associated with the same topic. They may not repeat any of the words already used in the first column.

Step 3:
   Between the first and third columns, students are allowed to share with each other to get some additional ideas. Students then complete the third column of words, either individually or in their groups, according to how the teacher has set up the activity. Once again, when a third of the students are done, the teacher calls *time*.

Part One of the lesson is designed to help students recall as much information as possible about a given topic. Students work very fast and furiously; when a third are done, move on. Below is an example of what a paper might look like after Part One is completed:

EXAMPLE: The topic is SPORTS

baseball	sailing	net
basketball	SCUBA diving	badminton
swimming	hot air balloon	flag football
track	goal	cleats
marathon	goalie	boxing
skiing	inning	wrestling
diving	bases	area
ping pong	pads	judge
weightlifting	helmets	tickets
tennis	knee guards	season
football	referee	golf
lacrosse	umpire	clubs
field hockey	fans	court
ice skating	stadium	bowling
ice dancing	Yankees	curling
snowboarding	Cardinals	bobsledding
skateboarding	Eagles	shuffleboard
surfing	Dodgers	arm wrestling
bungie jumping	Rams	gymnastics
soccer	Raiders	dressage

Part Two: Sorting – *Emphasis on Complexity, Analysis, and Deductive Reasoning*

Step 1:

Students examine their completed list of 30-90 words and determine three to five broad categories.

Step 2:

Students write these categories above the line at the top of the page and assign a different colored marking pen to each category. (*Miscellaneous* or *Other* can't be categories; all words must fit into a category. Some teachers excuse up to 5% of the words if they don't fit into a category.)

Step 3:

Students review their lists of words in the three columns and assign each word a colored dot which corresponds to the category at the top of the page. I created the colored dot method because words do not have to be rewritten under each category and it saves time.

Part Two of the lesson involves classification analysis because students classify their words by categories. Below is an example of what the top part of the paper might look like after categories have been determined.

> **NOTE:** The shaded dots shown here will be made with different colors of marking pens.

● Names of Sports   ○ Equipment   ● People

○ Sports Teams   ● Buildings

Part Three: Classifying and Diagramming – *Emphasis on Complexity, Analysis, and Deductive Reasoning*

Step 1:

Using a separate piece of paper, students choose one of the categories and look at all the words for that category (ones that have the same color dot.)
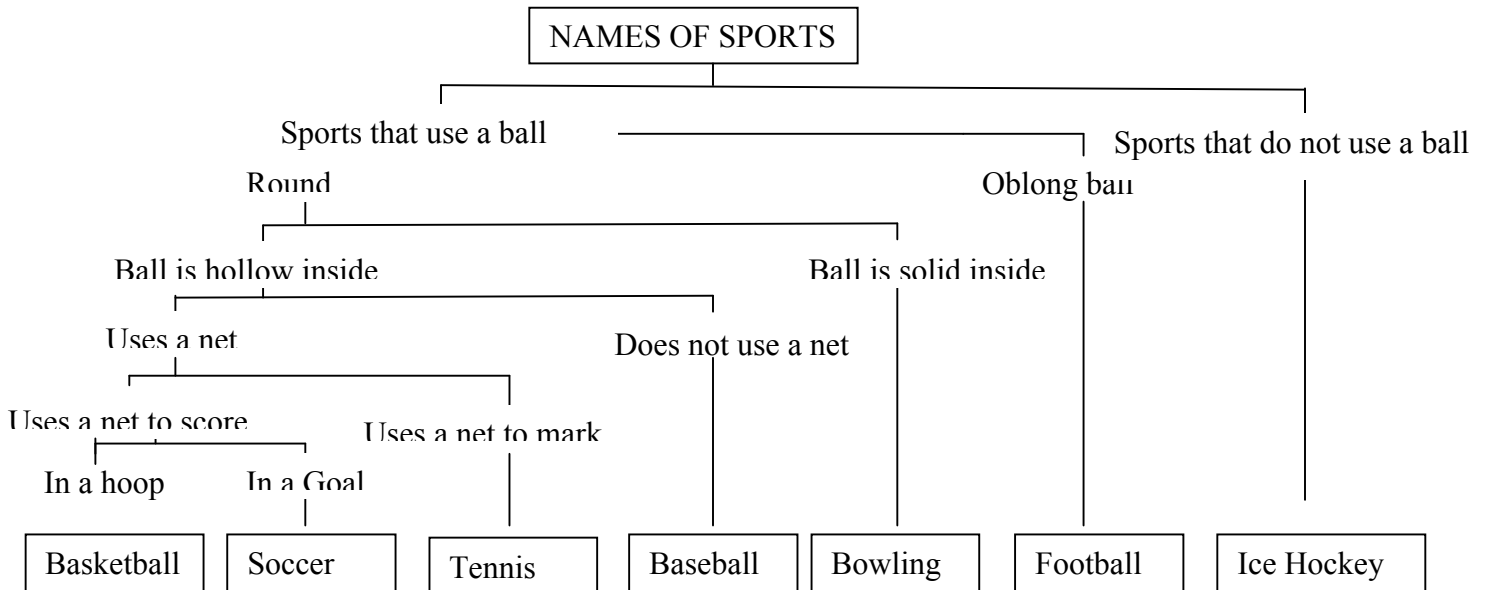
Step 2:

They select about 6 to 8 words to use in creating a classification diagram. This classification diagram will follow a logical line of reasoning for sorting the words, until there is only one box at the bottom where each of the 6-8 words is printed.
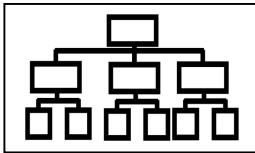
If you notice that the classification diagram that follows looks a lot like the Icon of *Rules* from the Icons of Depth and Complexity then you are right. Understanding how content relates logically is an example of *Rules*.

Here is an example of a classification diagram based upon seven words from the sub-category of *names of* sports:

Basketball   Soccer   Ice Hockey   Bowling   Tennis   Baseball   Football

NAMES OF SPORTS

Sports that use a ball   Sports that do not use a ball

Round   Oblong ball

Ball is hollow inside   Ball is solid inside

Uses a net   Does not use a net

Uses a net to score   Uses a net to mark

In a hoop   In a Goal

| Basketball | Soccer | Tennis | Baseball | Bowling | Football | Ice Hockey |

Students can sort according to the number of players on a team, what the playing field looks like (court, rink, or field), etc. The diagram will not look the same every time, depending upon how students sort or *classify* the information.

Modifying the Process

Sometimes teachers will give the students a set of eight words to sort instead of having them determine their own list from a broad topic. This modified lesson encourages analytical thinking but does not give students an opportunity to *drain their brain* of what they know about a topic. I suggest using both parts of the lesson for maximum learning. Sorting only seven or eight words at the end is simply an issue of time. More words could be sorted, but it takes quite awhile. Years ago, I had students create a classification diagram using about twenty of the words. This was a multi-day project and very rigorous.

Filling in a Blank Diagram:

Another modification of *Concept Development* is to provide students with the classification diagram *without* the words at the bottom. It is their job to place a word in the bottom box that fits the criteria of the diagram. For example, *tennis* is a sport that uses a net to mark sides and to score. It also uses a hollow ball that is round. Is there another sport that fits those criteria? How about *volleyball*? Is there another sport that uses a hollow, round ball but does not use a net? How about *kickball*? Now you try it. *Ice Hockey* doesn't use a ball in the game. Can you think of another sport that fits that criterion?

Some Final Thoughts

Both *Word-Links* and *Concept Development* relate to the four areas of differentiation, to Bloom's Taxonomy, and also the Icons of *depth and complexity*. The first part of each lesson relates to the icon of *Language of the Discipline*, while the second part of both lessons relates to the icon of R*ules.*
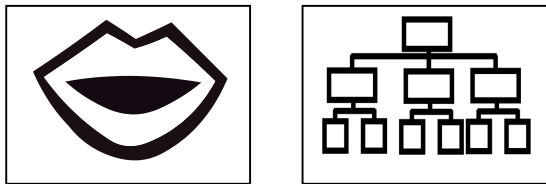
I share this with you because it is important to see the inter-connectedness of all of the instructional strategies presented in this book. Are you seeing the philosophy that forms the foundation of this book? Everything is related and connected. The brain is looking for patterns and relationships. It's the *Big Idea* of this book. I hope you are beginning to see it.