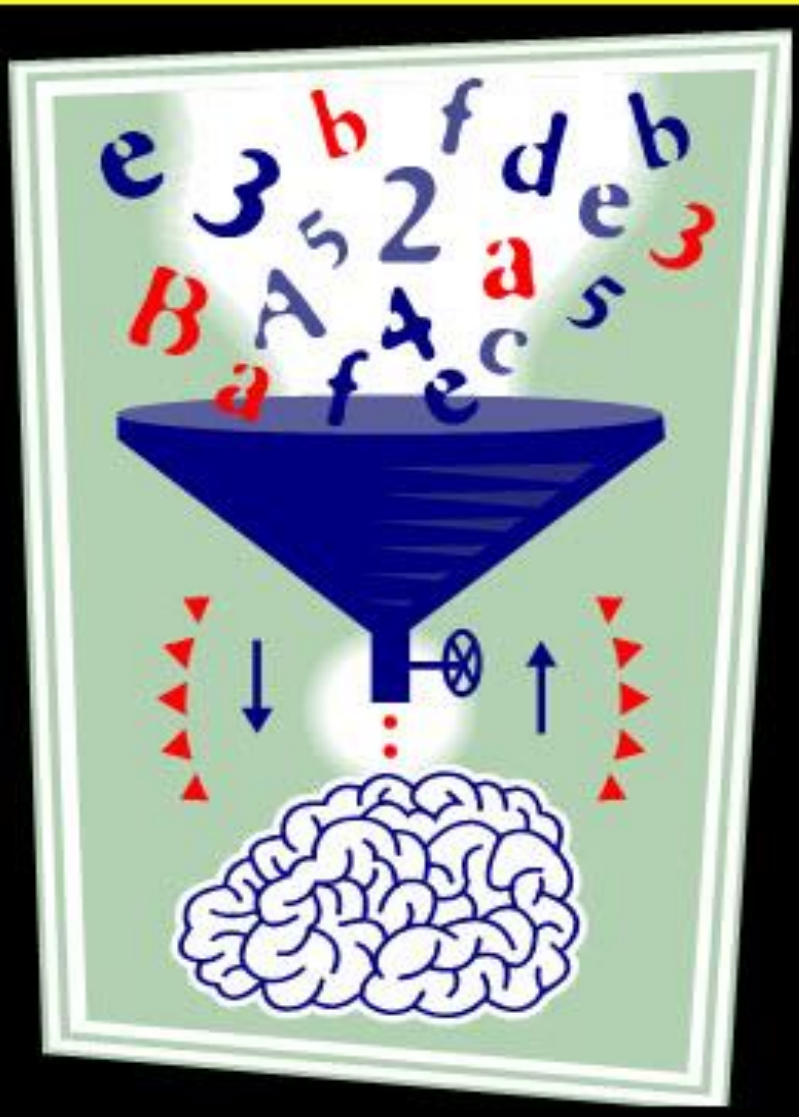


CHAPTER 3

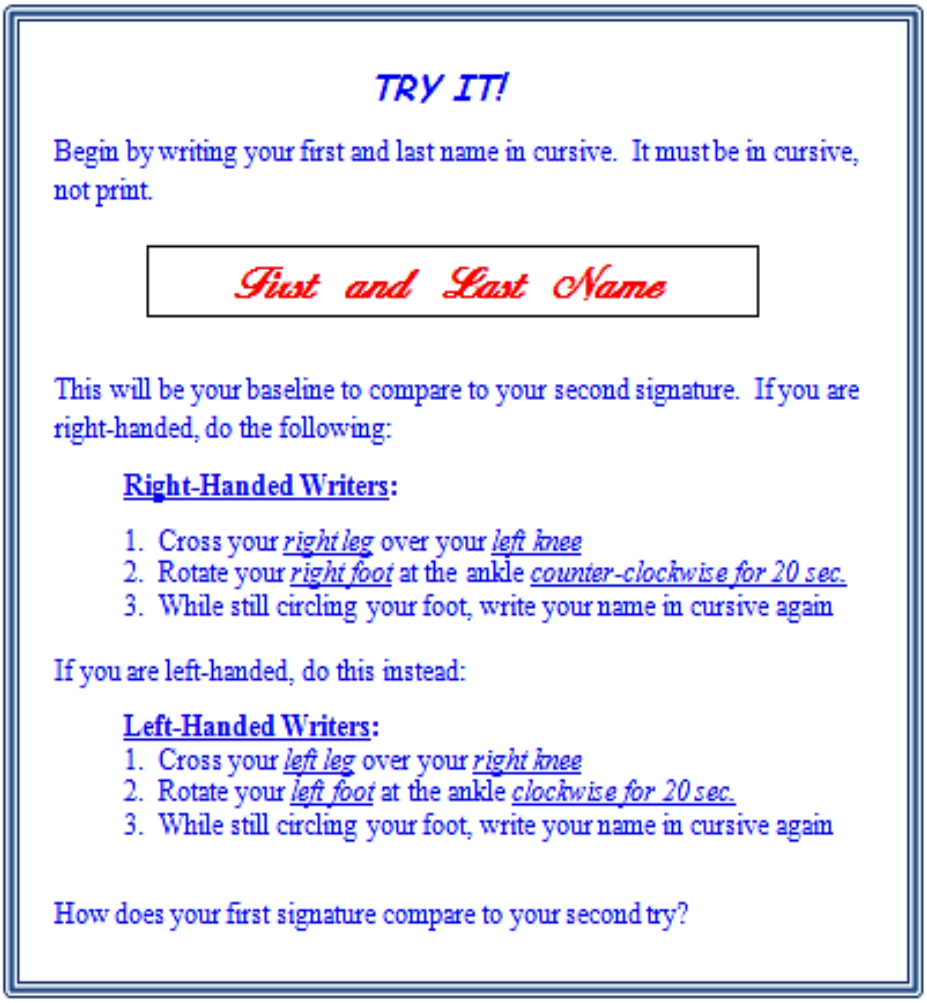
Brain Research & Teaching

CHAPTER 3: Brain Research and Teaching

We now have a complete picture of how young children learn. From Chapter One we have information about the typical learner and from Chapter Two, profiles of children with processing errors. This finishes the first D, **Development** and leads us to the second D, **Design**. This will allow us to complete the Neurological Framework and begin to use it. So, let's put these last components into place.

Understanding versus Expression

Knowing how to teach is very important, so important that we have spent two whole chapters covering the topic. But, knowing how to teach would fall short unless we knew what to teach, this is where the concept of Understanding versus Expression comes in.



TRY IT!

Begin by writing your first and last name in cursive. It must be in cursive, not print.

First and Last Name

This will be your baseline to compare to your second signature. If you are right-handed, do the following:

Right-Handed Writers:

1. Cross your *right leg* over your *left knee*
2. Rotate your *right foot* at the ankle *counter-clockwise for 20 sec.*
3. While still circling your foot, write your name in cursive again

If you are left-handed, do this instead:

Left-Handed Writers:

1. Cross your *left leg* over your *right knee*
2. Rotate your *left foot* at the ankle *clockwise for 20 sec.*
3. While still circling your foot, write your name in cursive again

How does your first signature compare to your second try?

Were you surprised by your result? Some of you may have managed the task to a degree, especially if you have experience playing sports or a musical instrument. Those activities strengthen your ability to complete tasks that cross hemispheres. But for most people, the brain processing conflict this task caused made it quite difficult to write your name again.

Let's reflect seriously on this for a minute. Here is a situation where we know for sure we **Understand** a skill. After all, we have signed your name thousands of times before. But for some strange reason, many of us are now having difficulty showing or **Expressing** this skill e know so well. This distinction is key to establishing our teaching framework. There is a difference between teaching a child who needs help Understanding how to do something versus a child who knows the skill but simply cannot Express it, but unfortunately we do not think of teaching in this manner. This inability to distinguish between the two is often at the root of situations where a child is not learning despite all our attempts at teaching.

For example, if you were a teacher observing a child struggling with writing their name in cursive, we would probably help them by "teaching" them the skill. We would develop fine motor strength and eventually teach them to form the letters. But, would that method have helped us during this exercise? No, of course this wouldn't have helped us in any way since we already know how to write our name. We understand how to write your name and do not need to learn the skill. Our problem was with expressing a skill we have already learned. We could have been put through the best "Teach Someone How to Write Their Name Properly" curriculum on the face of the earth, and still have had the same difficulty with the handwriting activity we just experienced.

This is the problem we face every day in the classroom. Sometimes children have difficulty learning basic skills and sometimes they have difficulty showing us what they have learned. Let's look at a couple of examples and see how Understanding problems and Expression problems can be observed in children.

Understanding Problem

One day a five-year-old was cutting corn off the cob as she and her family prepared dinner. As the child was cutting, she stopped suddenly and exclaimed, "Mom that looks like corn-in-the-can!" Perplexed, the mother started to respond but the child excitedly interrupted her saying, "I have it! The people in the factory cut the corn and cut the corn, and then they put it in a can. Corn-on-the-cob is corn-in-a-can...I wonder about green beans?"

This example shows us how easily young children can speak about concepts and use terms but still have an incomplete idea about what it really means. As we saw in this scenario, this child had been speaking about "corn-on-the-cob" and "corn-out-of-a-can" for much of her young life but had never connected the two. She was expressing, but she really didn't understand the concepts---a wonderful example of an Understanding problem.

Just as a child can often express concepts or skills they don't truly understand, they also may understand concepts they don't have the ability or desire to express. Let's look at a quick example of this problem.

Expression Problems

Situation #1 (Typical Learner): A six-year-old boy was reading a story about a panda on roller-skates. He followed the storyline about the panda attending a roller-skating party and doing the "Hokey-Pokey". During a short comprehension activity, the child missed every question. During follow-up exercises to assist children struggling with the activity it became clear that he DID understand and could recall every item in the story...in sequence, no less. But, as he stated with conviction, "I couldn't tell you a panda did all that. Everyone knows pandas can't really roller-skate!"

Situation #2 (Processing Problem): A young child is constantly mixing up lower case "b" and "d". She can see the difference, but her hands can't seem to make those circles to the left of the line. Frustrated, she sits through yet another visual discrimination game to help her see and understand the difference between "b" and "d".

In the first situation, we had a child who really did Understand the story and could complete the comprehension exercises perfectly. The child, however, was not willing to Express his knowledge because the fact that the panda was roller skating and doing the Hokey-Pokey was just too incredulous for him to talk about. The logic and mind of a child leads to many situations in which children Understand but are not willing to Express a skill.

In the second scenario we had a child who also Understood the skill, in this case the difference between "b" and "d", but had a writing processing disorder, dysgraphia, that did not allow her to Express that knowledge. As we discussed in Chapter Two, our inability to detect processing issues happens way to frequently in classrooms and is the root of many Expression problems. When these are not detected, we have a well-meaning but inappropriate response, as seen in this example. In other words, we fail to teach the lessons the child really needs. So, as we can see,

Understanding and Expression will be key concepts for us to remember. It is important to realize, though, that there are some tendencies in the field that make this task a bit harder than it should be.

Assumptions about Understanding and Expression

When teachers problem-solve how to work with a child having difficulty, we tend to make certain assumptions. With most academic or academically-related subjects, we tend to assume the child does not **Understand** the concept or skill. For many children, however, their true difficulty lies with Expression. Maybe it's fear, shyness or a processing, but regardless of the source of the problem, many children fully understand and no amount of "teaching" will assist them. It is a common mistake to view any academic or functional skill as an Understanding problem when it really may be an Expression problem. Instead of teaching the skill, what we really need to do is to find a better way for the child to express what they already know.

As you can see, the concept of Understanding and Expression is critical to the process of teaching academic skills. It is important, though, to realize that this concept applies to ANY skill that is learned, including behavioral skills. Unlike academic skills, though, the problem with behavioral issues is that we usually assume the child Understands the behavior but are refusing to **Express** it. We have the reverse of the assumption we had for academic problems. For example, if the child is not sitting quietly in circle we assume they are choosing not to express a skill due to inappropriate behavior. Rarely do we consider that they may not understand "how" to sit in circle or "how" to maintain that behavior for any length of time. We approach most behavior problems as Expression problems when often they really are Understanding problems, a difficulty that we will cover in detail in Chapter 8.

An important task for teachers, then, is to figure out which is the child's difficulty, Understanding or Expression. If we don't take time to analyze this right from the beginning, we are setting both the child and ourselves up for failure. We could be using a wonderful set of teaching strategies...just not the right ones for that particular child. When we ignore the concept of Understanding versus Expression, the results for the child are always the same: frustration and disengagement from the learning process.

So what is "Understanding" and "Expression" and how can we use these strategies with children? If a child has **Understanding**, they have formed basic mental concepts of the topic or skill. They recognize its pattern and can use the information with increasing skill to mentally manipulate and solve problems. Eventually, they will be able to generalize the concepts to new situations. Expression works in tandem with Understanding for MOST children. **Expression** is the showing or using of a concept in a tangible way. Some children express skills through their hands, others in their speech and still others by the way they emotionally respond to something or someone. In most situations, children readily express what they know, but this is not always the case, as we saw in Chapter Two. Many children have processing disorders that do not allow them to Express what they Understand. We will outline exactly what to do in each case as this chapter progresses, but first, the very last piece of the framework puzzle must be put into place.

Sequencing a Skill

As we have seen, there are times that we have to make it possible for a child to show or Express a skill they already Understand, but what if we really DO need to teach the skill? What do we need to keep in mind if we have to establish Understanding itself?

This is where the concept of Sequencing comes in, the last part of our Neurological framework. Sequencing means that we have the ability to take an objective and outline every step in the total skill. To Sequence a skill well we have to be able to do two things:

1. Define what we are really attempting to teach
2. Construct steps for that skill from its very beginning and to its natural end

Let's work through an example so we fully understand these two points.

One rather controversial skill involves teaching children to use a calendar. Professionals often have strong feelings about when and how this teaching should take place. If we Define the skill we are teaching, step one in constructing a Sequence, many teachers would state the skill as "learning how to use a calendar" or something similar, but is that really what we are teaching here? Well, not really… When we assist children to use a calendar it is true that the physical calendar is being used, but what is it used for? Being able to answer that question is the key to really identifying our teaching objective. When we think about "calendar" in that way, we realize that what we really are teaching are "Ways to Measure Time", and a calendar is just one of those ways.

Now that we have really defined our teaching objective, step number two, we can Construct the sequence, as can be seen on the next page:

Teaching Measurement of Time

Level	Cue
*Here I am in time- what comes next?	Simple schedule with two activities; Start with snack
*Sequence important parts of day	Daily schedule with main activities only
*Sequence total day	Complete daily schedule
*Sequence total week	Transfer one "important" happening of each day to a "Review our Week" chart
*Sequence multiple weeks	Paper calendar; teach vocabulary over time using visual cues (stickers)
*Sequence months and years	Transition to formal calendar

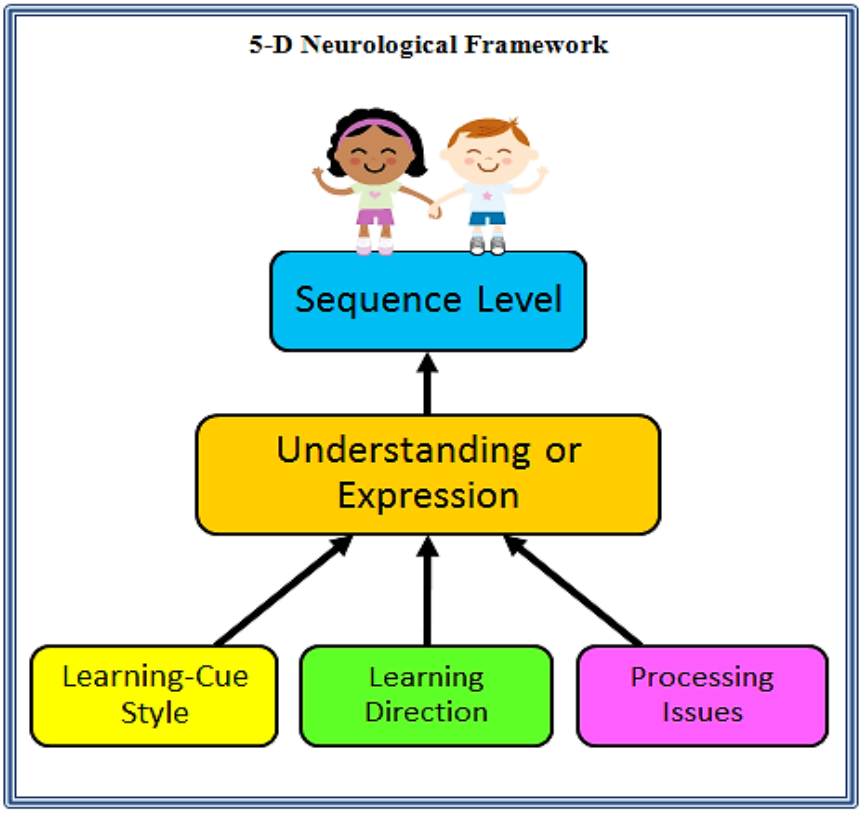
We will look at this "calendar" sequence once more in Chapter 5 and learn how to create the cues to teach this skill, but for now, let's just focus on the overall technique itself.

So, the key to envisioning this full sequence was the correct definition we completed in step one of Sequencing. Until we defined the skill correctly, we were stuck. When we were using the incorrect definition of "teaching calendar", there was no way to make that skill much easier, so it rapidly became inappropriate practice for many age groups. Because the "skill" could not be adjusted downwards, many schools decided to just eliminate the use of a "calendar" in the younger classrooms. When we had the correct Definition of "measuring time", though, we all of a sudden could envision how this skill develops over time and could Construct the sequence we needed for those younger children (step #2). We could understand how "calendar" becomes a skill appropriate for all classroom and all ages in some form!

There are really no words to stress how important the ability to Sequence skills is to establishing appropriate and responsive teaching strategies. Until that sequence is constructed, there is no way to determine where children are operating and what needs to be taught next. In other words, assessment, intervention and documentation fall apart. We will see in later chapters that this is especially the key to behavior intervention. Since we rarely think of behaviors such as "cleaning up" or "taking turns" as a developmental sequence, we do not consider how to systematically teach them to gain Understanding, we just expect children to Express the last step of the sequence automatically. A real problem for the field, and one we will correct before the end of this book.

Using Neurological Concepts to Improve Teaching

Our Neurological Framework is now finished. We have a complete understanding of both typical and atypical learners and the basic structure to use the information. Let's take a moment and lay out the framework visually before we begin to systematically use it.



These five concepts: Learning/Cue Style, Learning Direction, Processing, Understanding/Expression and Sequences will form the foundation of our teaching approach. We will focus on each of these in order, but before we look at them, let's take one step back so we can also apply some of the basic memory concepts we learned back in Chapter One. As we had learned, the foundation of all teaching models is the ability of the approach to assist the child in creating memories and later retrieving them for use. Without this process, learning cannot take place and our Neurological Framework will be worthless. We know how engrams form and can now look at some global ways to enhance their development.

General Rules for Enhancing Memory

As we have mentioned several times, the goal of curriculum is to assist children in forming memory, so how can we enhance our ability to do this? Are there some tricks we can use to make the formation of long-term memories more likely? Luckily, there are some very simple techniques that can be used for any child. They include:

1. Chunking
2. Organizing
3. Connecting
4. Repeating

Let's look at each of these useful techniques in detail.

Chunking is the process of placing information into groups so it can be held in memory easier. Immediate Memory, that first level of memory development, only has so much room, and if the information that is being processed is too big, the brain will just dump out what it cannot hold on to. What makes it even more critical is the fact that the amount of chunks the brain can hold

increases with age. For children in the younger age groups, the typical number of chunks that can be processed is somewhere around three to five pieces. Even older students and adults may only be able to handle seven to nine pieces under the best of situations, do one of the best ways to get longer sequences of information into the brain is through music…

THINK ABOUT IT!

As an adult we sometimes have difficulty remembering the simplest things. A grocery list, someone's name, a phone number, an appointment—all of these items seem to fly out of our head's in a moment.

But, sit down to listen to the radio and be amazed at how much we can remember! Even if we are listening to a countdown of songs from several decades before we were were born, we usually can sing at least a bit of the lyrics.

Why does music have this power?

Why does music hold this unusual power to enhance memory? Well, one of the biggest reasons is its ability to chunk information. When we sing a song, we hold it in memory as one piece. That is why it is easier to retrieve. Over the years teachers have realized the power of music to help children learn long sequences of symbols and words that would be almost impossible to hold in memory when they are first experienced. There are just too many chunks to manage. But put the 12 months of the year, seven days of the week or 26 letters of the alphabet into a song, and it becomes quite easy! So, chunking, whether with music or without, is a viable memory enhancer that should be used often.

Organizing is another way to enhance memory. When we organize something, we allow the child to see patterns and create a higher level of understanding. This helps the child anticipate

and categorize knowledge, which in turn helps the brain link similar memories together, enhancing and strengthening all of them in the process. This is why we intuitively organize our classrooms and teaching. We label items and place them in centers or on shelves in a logical manner. We number, color-code and create visual cues to help children understand the structure of their day and the skills they are learning. A great deal of the work we will do in Chapter 4 on designing our environment will involve Organizing for better Understanding and Expression.

Another techniques is **Connecting.** When we connect knowledge for children, we are helping them anchor the memory to something that they already know. It may be a piece of knowledge they already have or it may be something totally unrelated but easy to remember. For example, many children learned to spell the word "geography" with the following mnemonic technique:

g	**e**	**o**	**g**	**r**	**a**	**p**	**h**	**y**
George	Ellen's	old	grandfather	rode	a	pig	home	yesterday.

Even though this sentence has no relation at all to the word "geography", it can be connected logically by the letters, thus serving as a wonderful memory enhancer. We use this technique in our own lives when we make lists or symbols that remind us to complete tasks, etc. We will not only use this technique in the classroom for academics, but we will also explore this as a valuable positive behavior support in Chapter 9.

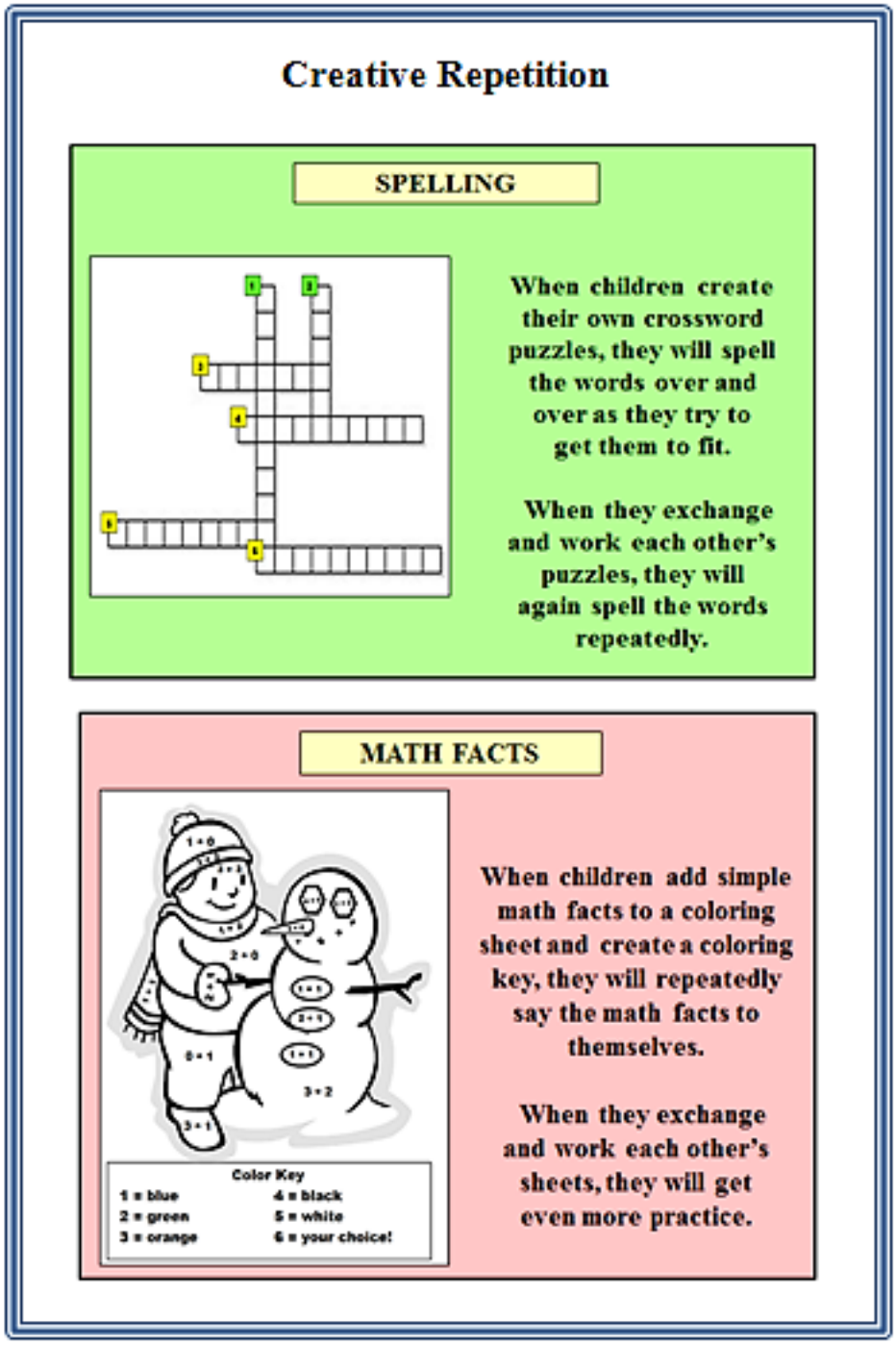
The last memory enhancer we will review is the use of **Repeating.** Repeating information strengthens memory because information that is repeated is perceived as being important by the brain, so a memory is formed. As we discussed in Chapter 1, repetition is also the key to forming those unconscious, implicit memories that are so critical to everyday function like

driving a car. As teachers we intuitively understand that information must be repeated, but unfortunately, some of the old repetition for math, spelling and handwriting (i.e. drills) that we used to do have now fallen out of favor. They are perceived as boring and non-functional.

It is true that we really should look at how to make drill a bit more interesting, but to remove it totally from a skill is neurologically inappropriate practice. We now know that unless the implicit memory is developed for a skill like handwriting, we are condemning the brain to forever having to process the motoric pattern of letter formation while the child is trying to also retrieve explicit information like facts. This lack of implicit memory to manage the motor sequence of writing makes it very difficult for the child to think at the same time, thus reducing their recall on tests, their creativity in writing and overall enjoyment of the writing process. The same problem can be seen in spelling and math facts, but how do you make repetition more enjoyable?

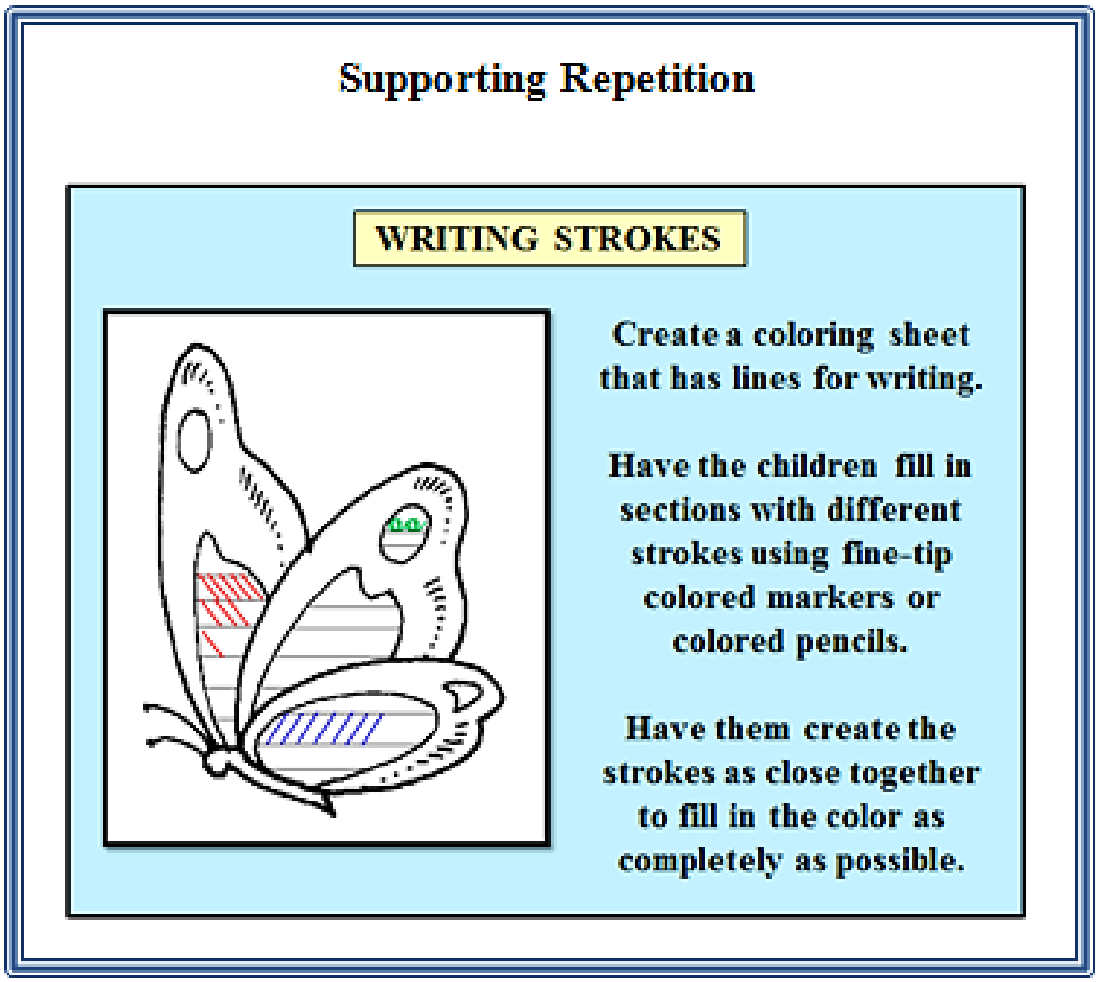
Creative Repetition

The key to providing repetition in the classroom is embedding it into tasks that the child will find interesting. The only limit is our own creativity. Here are a couple of ideas to get us started:



In these examples, we could see that there are natural and fun ways to embed the repetition in activities that the children will enjoy. These techniques can be repeated in many forms and will be able to be used in a multitude of ways over the course of the years and for many skills. But, what about other drill-related skills in the curriculum that are not as easy to include? How do we

develop implicit memory for skills that are isolated and rather tedious? This is where you really will have to use all of our skills as a teacher and probably develop many of the activities on our own. There are possibilities available, though, if we take a moment and consider our options. Just take a look at this approach to providing drill for handwriting strokes



So, it is possible to develop implicit memory and complete drill in a way that is more interesting. Regardless of how you decide to approach these skills, just remember that the implicit memory MUST be developed fully if the child is to be able to use it down the road without hindering explicit memory recall!

Becoming the Teacher YOUR Children Need

We are now ready to take all we have learned about the Neurological Framework and put it into our curriculum Design. Let's take a look at each piece so we can remember the content of each category before we begin. The Neurological Framework consists of:

1. **Learning/Cue Styles** (Auditory, Visual and Physical Cues from Chapter 1)
2. **Learning Direction** (Whole-to-Part and Part-to-Whole from Chapter 1)
3. **Processing Diversity** (processing disorders from Chapter 2)
4. **Understanding/ Expression** (type of skill to be taught from Chapter 3)
5. **Sequence** (level of skill to be taught from Chapter 3)

With these five simple categories we can create a teaching Design that will meet the needs of all learners in any classroom. Let's begin with how to meet the Learning/Cue Styles of the children in our room.

Adjusting for Different Learning/Cue Styles

For the most part, meeting the needs of children from different Learning/Cue Styles is easier in early childhood classrooms than in older classrooms. Because of the Developmentally Appropriate Practice supported by the National Association for the Education of Young Children (NAEYC) and the Division for Early Childhood of the Council for Exceptional Children (DEC/CEC), we understand that young children need hands-on materials and experiences (*). This greatly assists us in meeting the needs of our Visual and Physical learners. The most important errors to avoid in this type of environment are situations where we automatically assume that the hands-on material we are using is really supporting our teaching objective. Let's look at one common example of this error, the teaching of place value.

When we teach place value for the first time, most teachers use some variation of placing a stick in a pocket to represent each day. We typically do this during opening circle while looking at a calendar. On the tenth day, the teacher shows the children how to bundle up the ten sticks and then move the bundle of ten to the 10's place. The children continue this process until they have ten bundles of ten and then are showed how to place them all together into a bundle of 100, a day that is often celebrated with some type of party and 100's-Day activities. So, let's reflect on the Visual and Physical Cues used in this common scenario. Do the children know WHY we are bundling up the sticks on the tenth day? Is there anything inherent in the Visual Cue that makes this clear other than the fact that a teacher told them to do it? What about the transition to a bundle of 100? Do they understand why they are doing this, or is it again only on teacher direction?

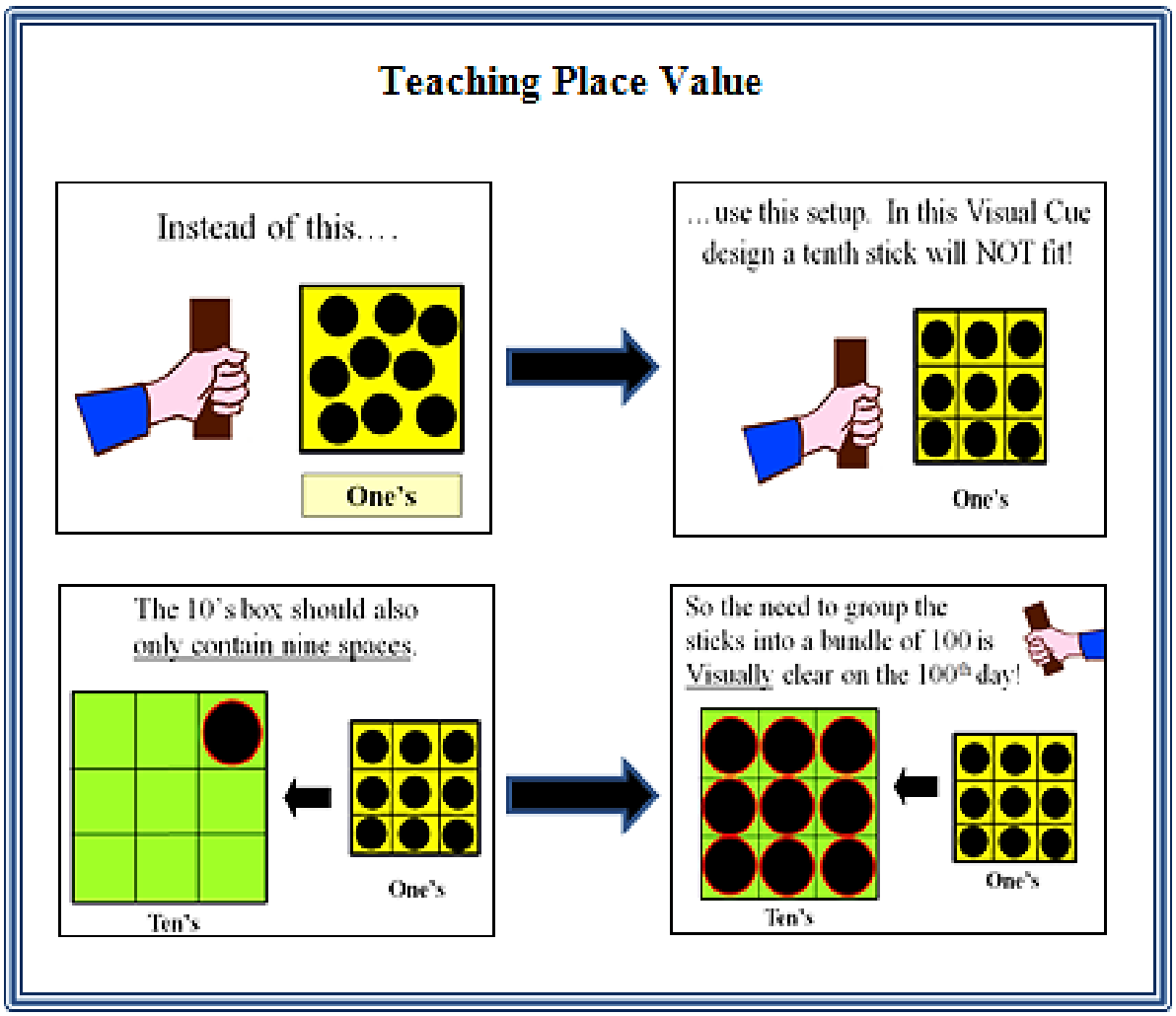
This is where the technique we developed earlier for Sequences will help us. Let's go through the two steps of setting a Sequence and see what it shows us.

1. Define what we are really attempting to teach
2. Construct steps for that skill from its very beginning and to its natural end

When we Define what we are really trying to teach, this example becomes quite interesting. Are we trying to teach *Place Value*? Well, yes, but what does that mean? Let's look at it even closer and examine our actions to really get an idea of the point we are trying to get across. We are having the children bundle the sticks up and move them when they hit ten sticks---why? It is because the 1's spot can only hold nine sticks, more should not fit. THAT is what we need to teach. As for the move of the bundles of ten to the 100's section, why do we have the children do that? It is because the 10's spot can only hold nine bundles of ten, once we get that tenth

bundle, it should not fit. Again, that is what we need to teach. Once we have this Definition in mind, we can Construct the steps for this Sequence appropriately.

So, does this current method do anything Visually or Physically that makes it clear that the ones and tens can hold any more than nine items? The answer is unfortunately, "No." Because teachers are using containers where a tenth stick WILL fit in the 1's spot and a tenth bundle of ten WILL fit in the 10's spot, the Visual Cue holds no real meaning. Will children eventually figure it out? Well, maybe, but many will not understand the concept completely using this approach, so let's modify it a bit to make the Visual cue <u>really</u> teach the Sequence.



Using this method creates a Visual Cue that truly teaches our objective that the 1's and the 10's *cannot hold more than nine*. It is both Visually, and therefore, Physically clear to the children. When this method is used, later work with regrouping makes more sense as well. This, in turn, leads to a better Understanding of key math concepts associated with percentages and decimals in later years, concepts that children can often Express to a degree but Understand so poorly that word problems and other applications are an issue.

This is the main reason to look at our Visual and Physical Cues closely. If the cues we are using do not adequately support our teaching objective, we can end up with only surface knowledge. The children may be able to partially Express this knowledge, but when really pressed with applications, we find out that their Understanding is limited. This is why teachers dread seeing the grades on word-problems in math. When the child has to actually apply what they seem to know, we often find out that they are rotely using information that really has no true meaning to them. Just look at this example from our adult perspective.

1. First, please solve the equation $\frac{1}{4} \times \frac{2}{3} = \_\_\_\_$?

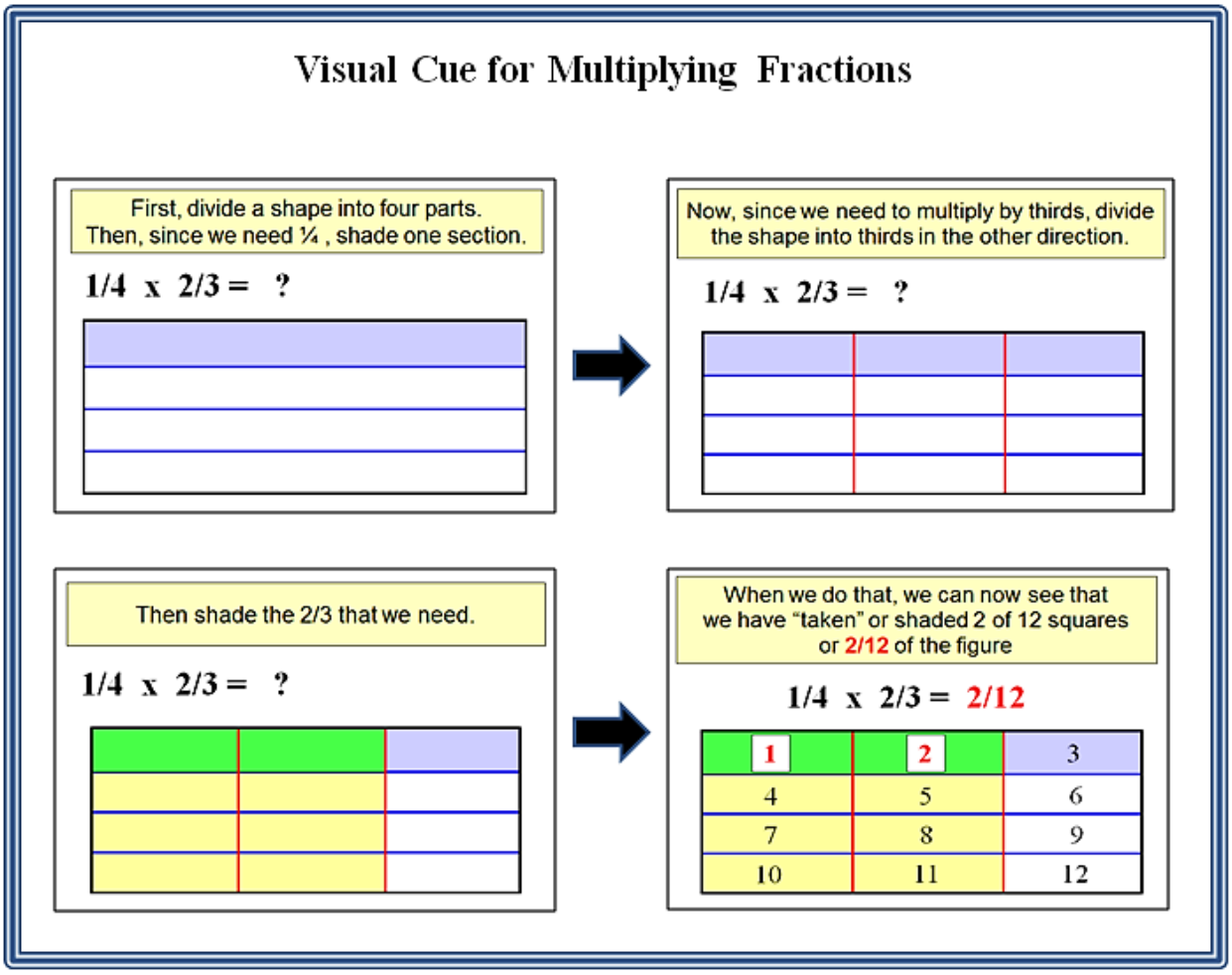
2. Some of you have a Cognitive Cue for this and do not need my help, but for those of you needing some assistance, I could give you the Verbal Cue to, "Multiply the numerator (top) by the numerator and the denominator (bottom) by the denominator." If you do that, you have the following solution:

$$\frac{1}{4} \times \frac{2}{3} = \frac{2}{12}$$

3. Now that I have given you that Verbal Cue, could you solve a worksheet of these problems successfully? Sure, and probably get 100% in the process. You can Express the skill…..but do you REALLY Understand?

4. To test your Understanding, please give me a word problem that could go with the equation we just solved successfully.

5. Did you manage that task? If you are like most, you probably found that quite difficult! This is a wonderful example of how we can Express a skill that we have limited Understanding about. When the Understanding is poor, we cannot use what we know. Let's add a Visual Cue for this problem and see if that helps.



Now that we have that Visual Cue, most of us would be able to construct a word problem.

Something probably along the line of the following:

> *David had a cake for his birthday. Since there were four people there, he cut it into fourths. Everyone ate the cake except one person, so only ¼ was left. If someone came along and ate 2/3 of the remaining piece, how much of the original cake did that person eat?*

$$\frac{1}{4} \times \frac{2}{3} = \frac{2}{12}$$

Could someone still be having problems even after that Visual Cue? Well, of course… That person might need the teacher to get a real cake and help them physically cut it and examine the situation directly. In other words, some of us really need Physical Cues to understand math. The main point of this exercise, other than causing us to fret about how much of our math skills we have lost, is to see that it is possible to end up with "surface" Expression when cues are poor or inadequate. All the more reason to really examine how to put in place strong Visual and Physical cues that really teach our learning objectives!

Adjusting for Different Learning Directions

Adjusting our practice for different Learning Directions is a bit trickier since the direction of our teaching is often embedded in the approach we are currently using, something that we may not be able to or know how to change. Let's review the two Learning Directions quickly and add some common models to the list.

The Part-to-Whole approach is seen when a child likes to learn new skills in small segments of information that are presented in a systematic manner. The Whole-to-Part approach reverses this direction. We see this when a child prefers to deal with information in large chunks that are presented in both random and systematic fashion. From these whole experiences, the child works backwards to self-discover the individual skills. The following list re-highlights these two categories and expands them:

Part-to-Whole	**Whole-to-Part**
Phonics	Whole Language
Craft Art	Discovery Art
Isolated Subjects	Integrated Subjects
Theme-Based Models	*Project-Based Models*
Prepped Centers	*Open Centers*
Shared Objectives	*Hidden Objectives*

We reviewed the first three items in Figure 14 on page 20 in Chapter 1. The following figure will now illustrate the items in italics that we have added to our list.

As we can see, the new items follow the same concepts as our previous list. The Part-to-Whole examples, the Themes, Prepped Centers and Shared Objectives, all lead the child to the content that is to be taught. It may be very subtle, as in the center that is set up to encourage a certain type of play, but since the child needs to receive the information directly in order to move forward, it is provided. In the Whole-to-Part examples, the child operates independently, figuring out what to do or what is being taught on their own. The key to this analysis, though, is how do you manage to teach in both directions at the same time?

The first step to being inclusive in terms of Learning Direction is to first determine which way you currently teach. If you are using a model like Integrative Curriculum (*), Reggio(*) or the Project Approach (*), the analysis is simple. You are teaching Whole-to-Part. If you are teaching directly from an Individualized Education Plan (I.E.P.), Core Curriculum or Individualized Family Service Plan (I.F.S.P.) you are probably further toward the Part-to-Whole end of the continuum. Other approaches may fall anywhere in between. Once you have an idea of the most frequent direction you are teaching, then you must figure out the way to bring the other side in. Let's look at two examples, one from preschool and one from elementary school to serve as our guide.

In the first example, let's imagine that we have a preschool classroom that is being taught using the project approach. In this model, we allow the children to determine what they would like to learn and group them loosely around common themes that emerge over time. In one group, the children are fixated on how pet stores are run. Most of the children are moving their knowledge along using the props put into the dramatic play center, but you notice that a couple of children do not use all the props or seem to realize the store the others are creating includes pet grooming

services. In this case, a simple Part-to-Whole support would be to *Prep the Center* by having several animals in bathtubs or wrapped in towels when the children go to play. Some dogs can already have bows in their hair with another dog waiting with bows and play scissors nearby. All you have done in this scenario is break the information into smaller steps and "show" it to the child directly. You can do this with either a Prepped Center (least support) or through direct play intervention (more support), a topic we will cover in detail in Chapter 6.

In our second example, let's imagine that we are using a Core Curriculum that is mandated to be subject driven. We are introducing fractions in math, states of matter (gas, liquid and solid) in science and studying Japan in social studies. It is also Valentine's Day. When faced with a situation where the curriculum is separated into small parts, you can provide "surround" activities during free time that bring a Whole-to-Part flavor to the day. In this case, we can use the Social Studies topic of Japan to provide inspiration. By having out origami paper, children can discover and work with fractions on their own. Making snow cones or watching a Tea Ceremony could be a time for them to notice states of matter. And allowing them to write "I Love You" on a card in any language they choose could allow some of them to discover the difference between Japanese writing and English. In other words, create the Whole-to-Part opportunities around your curriculum demands.

The reverse is also true. If the curriculum is very integrated with math, science and literacy all rolled into single activities, just make sure that the children see and know what objective is being covered from each subject; a simple reverse check that may be beneficial to the Whole-to-Part children as well. I suggest making this Learning Direction piece part of your planning so we look at easy ways to manage this preparation in Chapter 11.

Adjusting for Processing Diversity

Processing Diversity is another place where planning can be useful. We have already discussed the various processing disorders and the techniques for managing them in Chapter 2, so we will just stress the need for us to include this information directly in our teaching. At first, like Learning Direction, this may require concrete planning as part of our lesson plans.

The only other piece to reflect on is the need for this inclusion to be quiet and emotionally responsive, especially as the child gets older. We can do this to a degree by really providing instruction at all Cue Levels. That in itself will allow many children with processing disorders to function at a higher level. Beyond that, allowing all children to use processing supports at times, such as a tape recorder to complete a worksheet instead of writing, can be a "treat" for some children and keep the child who must use these items regularly from standing out in an inappropriate manner.

Adjusting for Understanding versus Expression

Adjusting practice for children who need to learn a skill versus those who must learn to "show" the skill only requires a mindset about the difference between Understanding and Expression. Once we have that, we can determine a strategy that will help the child struggling with showing what they know. In most cases this will require a cue that will support the child. Let's look at a common example, sharing during circle time.

For a child who does not understand how to "share" information during Show and Tell, a little bit of Verbal Cueing will usually solve the problem. They will, over time, learn what they

should say, manage to be direct and descriptive and eventually handle the activity on their own. In other words, they eventually Understand the task and can Express with greater and greater degrees of accuracy. But, what about the child who Understands what to do, but is too shy or gets too nervous to Express the skill? What are some solutions for this little one?

In order to develop a support for a child who cannot Express, we must know what is keeping the child from that ability. That will lead us to the cue we need to support them. If the child is shy, consider having them tape record their information and play it back. They could even tape record or video it at home the first couple of times to make them comfortable. If the child is just getting nervous and "forgets" what to say, help them with picture cue cards that lead them through four easy pieces of information:

1. What is the objects name?
2. Where did I get it?
3. What color is it?
4. What does it do?

These, of course, are only suggestions to get us started. There are a hundred other ways we could support a child like this. The main point is to just understand that a Visual or Physical Cue will be needed in these cases since we have probably already been trying Verbal Cues without success. Beyond that, the only limit is our creativity!

Adjusting for Sequence Differences

The most difficult adjustment to be made to our teaching is probably going to be adjusting for Sequence Differences. This challenge stems less from our teaching ability and comes more from the fact that many sequences are currently unknown to us and must be constructed as we go. A

further problem emerges once we construct a sequence because many toys and materials do not cover the whole continuum, leaving gaps we must fill in ourselves. So, the best way to learn to adjust for Sequence Differences is to learn to construct the Sequences themselves, the topic for our next section.

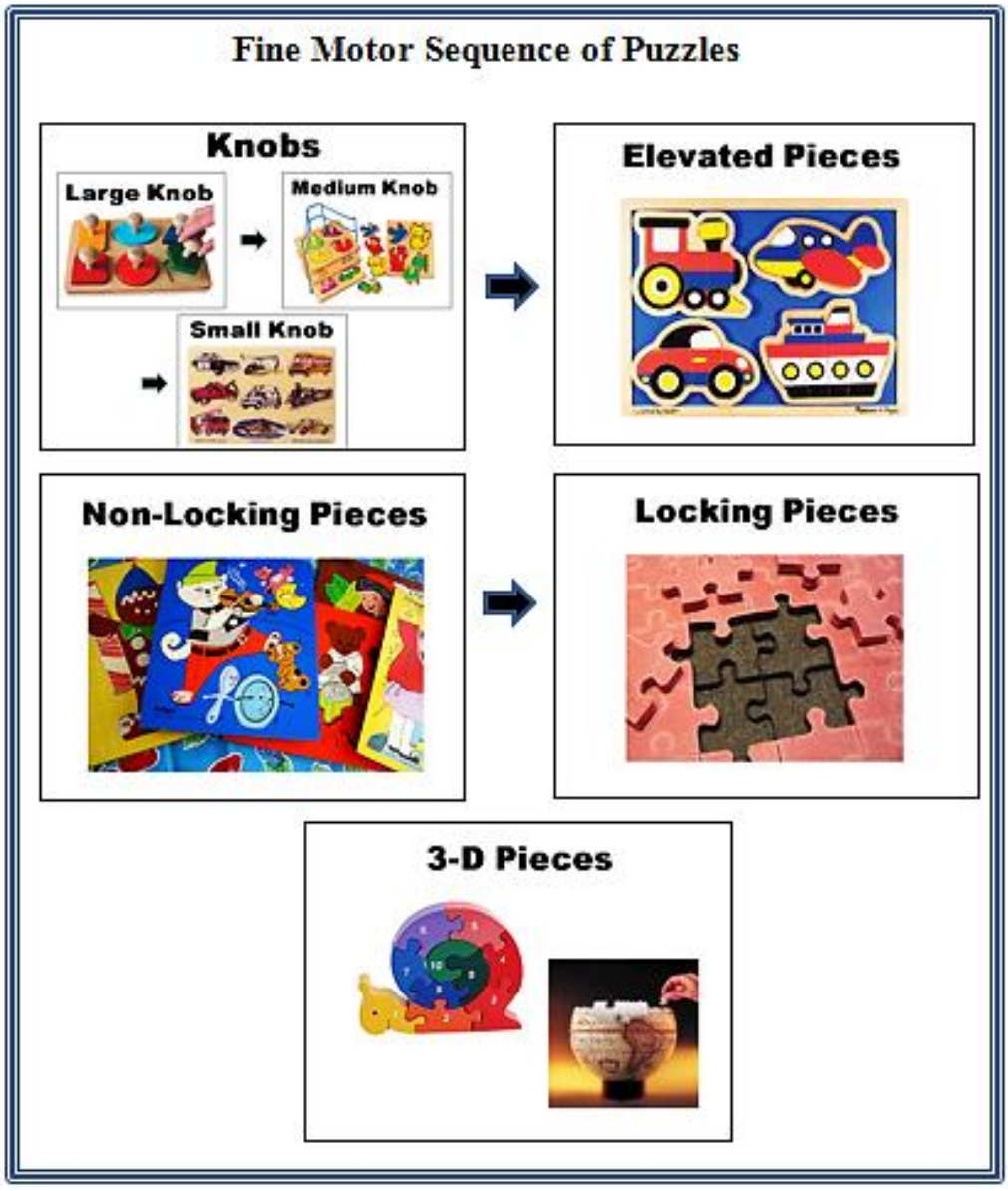
Using Neurological Concepts to Improve Classroom Toys and Materials

The best way to begin to understand the Sequences in toys is to both play with the item and watch children of various developmental levels play with the toys. We can also gain some understanding by just observing how toys for different age groups change over time and try to isolate the type of change that is occurring. Once we figure out those variables that change, we can usually begin to sequence the changes from easiest to hardest. Let's look at some sequences in a common toy to get us started.

Recognizing Embedded Sequences in Toys

Puzzles are one of those toys that some children absolutely love and others dislike. A great deal of the dichotomy stems from the fact that puzzles contain two developmental variables that operate in tandem. The two variables are visual discrimination and fine motor. We will look at the visual discrimination sequence first.

The visual discrimination sequence is fairly straight forward but often passes virtually unnoticed. Once we see it outlined, though, the puzzles that fit into each level of the sequence are quite easy to pick out. The same kind of clarity can be seen in the motor sequence which follows.



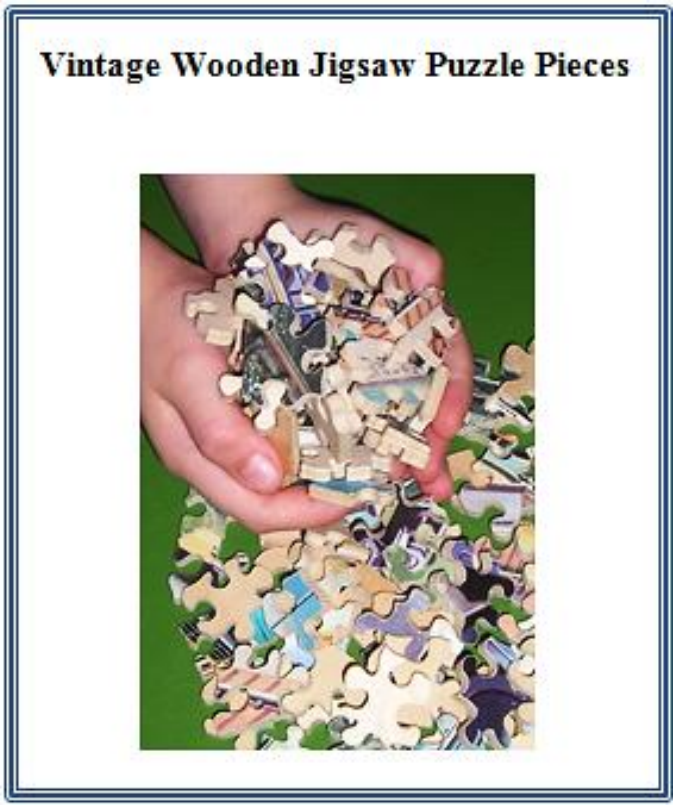
Again, the sequence itself is not difficult to see, once it is pointed out. The way the use of knobs vanishes over time and the true, interlocking puzzle piece emerge is clear. What is most important in this example, though, is also noticing how the two sequences work together. As the visual discrimination goes up, so does the fine motor. The same happens in reverse; as the fine motor demands go up, so do the visual discrimination demands. THIS is what causes puzzles to be a hit-or-miss type of toy for children. A child with poor visual discrimination but great fine

motor would have difficulty finding a puzzle that is engaging; the same goes for a child with poor fine motor that can discriminate well. A child who needs knobs due to a fine motor problem would be stuck with infantile one or simple piece puzzles.

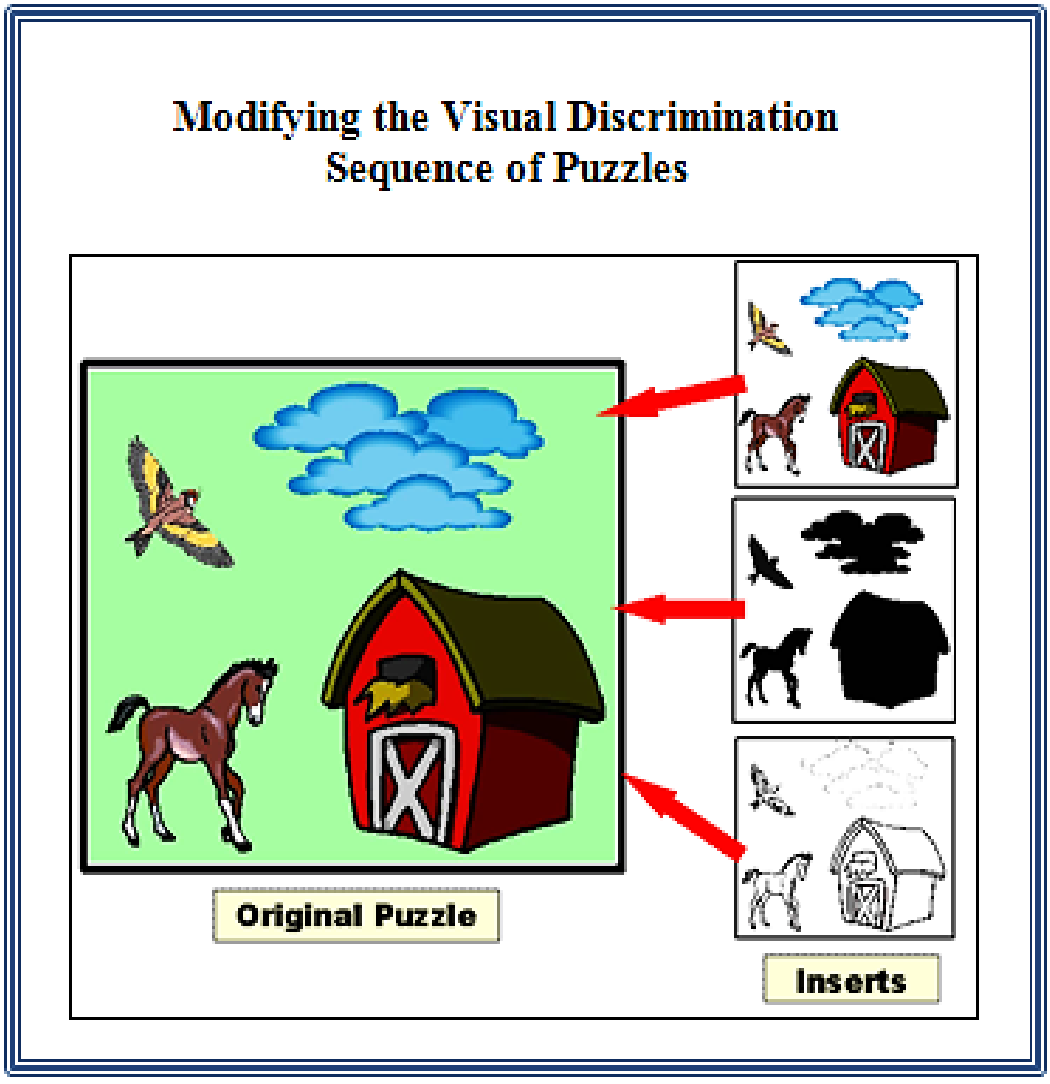
Once we can construct the sequences fully, we can then see why materials are not being used well. We also get a much better sense of how to use materials in planning and assessment. In this case, the sequences we constructed help us realize that being able to complete a "six-piece puzzle", a common objective, can mean many different things depending on the puzzle used! We will continue to explore constructing these sequences and using them in future chapters.

Using Neurological Concepts to Modify Toys

So, if we have a sequence like the above puzzle scenario, what can we do if the materials we are using do not fit the child well? In this case, we either have to search out some puzzles that fit the needs of our child, or we have to modify them on our own. The fine motor adaptation is fairly simple; you just have to add knobs to pieces that can withstand them. In extreme cases where a child's visual discrimination can manage true jig-saw pieces but their fine motor was poor, I have hunted down very old jigsaw puzzles. These were originally made of wood and had thick pieces that could be held much easier than the cardboard versions of today.



Modifying the Visual Discrimination demands is just as easy, now that we know the Visual Cue Sequence. All we need to do is add the Visual Cues to the puzzle back, and a child who has typical fine motor but poor visual skills will be able to use the toy successfully. If we make the modifications in a series from easier to harder, we can even provide intervention over time to improve the child's skill, as can be seen in this example.



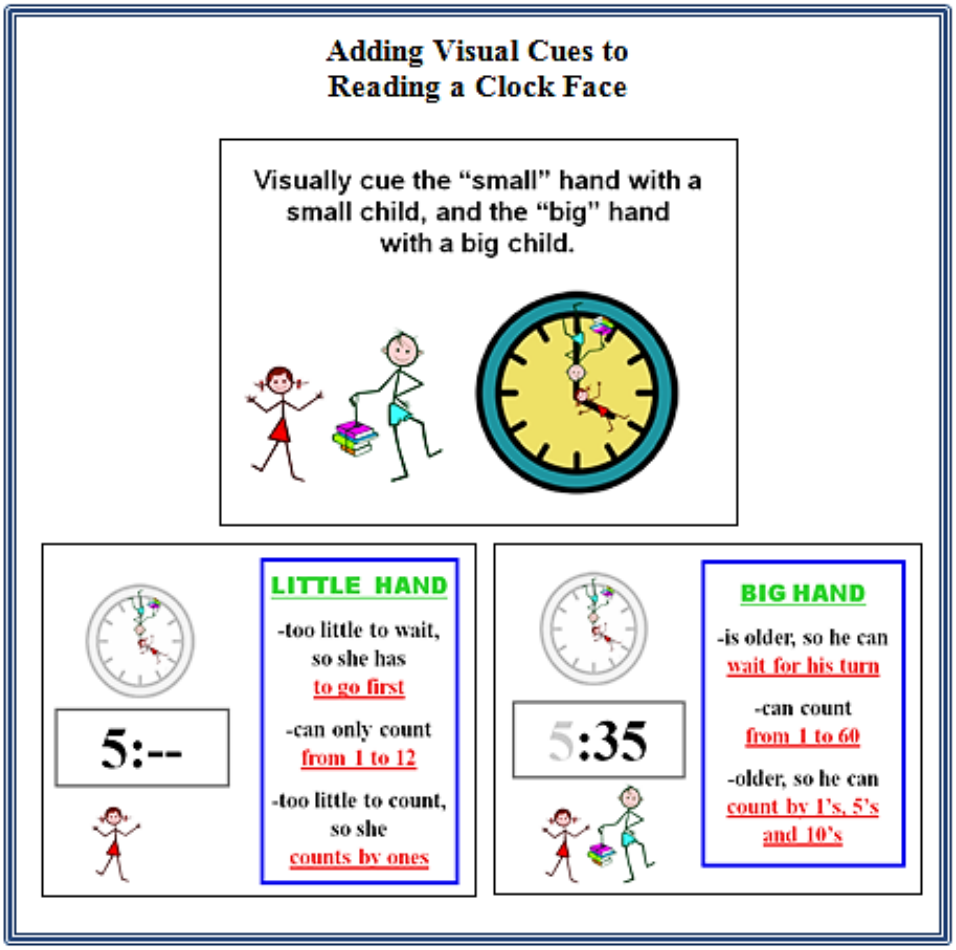
This type of modification can be made to any puzzle by either using a camera and/or a photo copier that prints both color and black & white. This is a simple fix that can make all the difference in the world to a child.

Recognizing and Adjusting Sequences in Classroom Skills

Let's complete one more example, this time with a skill rather than a toy. In this case, we will use the ability to tell time. Imagine we have a child that is a Visual Learner who is having difficulty figuring out how to read a clock face. The use of a big hand and little hand is just too symbolic for the child to process. We know that children have some basic concepts that must be understood in order to use those hands of the clock, and they are as follows:

1. The little hand must be read first and the big hand second.
2. The little hand always represent a number from 1-12, and the big hand from 1-60.
3. The little hand must count by 1's, but the big hand can use 1's, 5's or 10's.

There is more to this sequence, but this is enough for this example. So, how we can re-symbolize the hands on this clock and connect them visually and logically to the three aspects of the sequence we just listed? Let's look at the following to see how this might be approached.



Of course there are many other ways to modify this Sequence, but this suffices to get us thinking in the right direction. Basically figure out the sequence, determine the cue that will *directly teach the needed skill* in a logical manner and then create the support. This can be done for any toy, material, skill **and behavior,** topics we will continue to explore as we move on through this curriculum framework.

Reflections on Teaching in the Modern Classroom

We have now completed the basics of teaching, one half of our second-D, Design. Before we move on to the second half, environmental design, let's look back and reflect on our teaching in a more holistic manner. After all, our curriculum does more than teach skills, it teaches children how to gain knowledge in our world.

The Way We Teach is the Way They Learn to Learn

One of the most difficult aspects of teaching children, whether as teachers or parents, is the fact that they often do not allow us to assist them. Here we have knowledge of more years than we wish to admit, yet this information often is ignored, if not outright shunned, by children, especially as they grow older. This is a very serious topic and a problem that we may be creating inadvertently in our curriculum design.

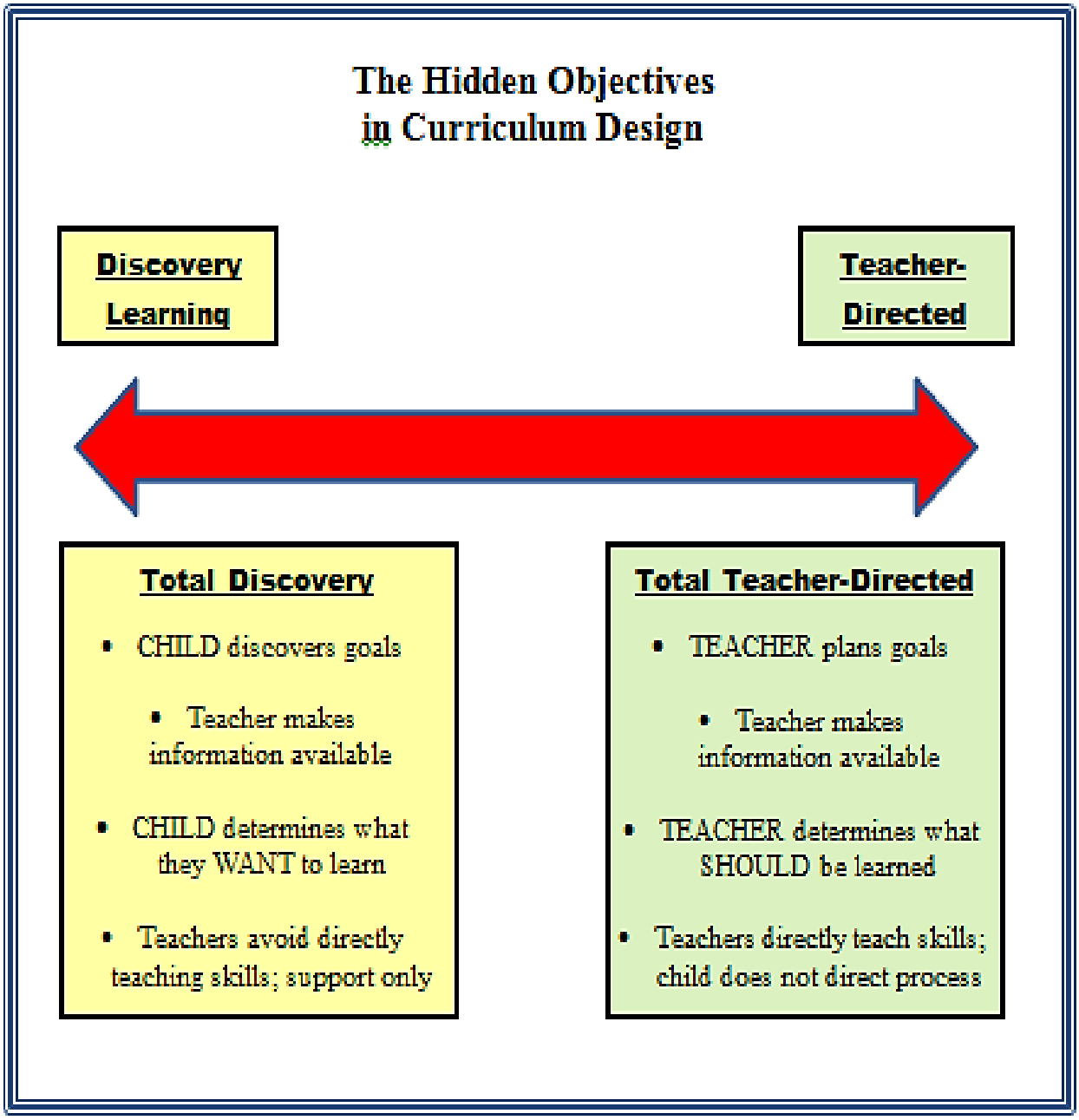
Like always, the best way to tackle this problem is to look at the variables involved. If we want our children to be independent learners yet open to the knowledge of their "elders", what skills do they need to learn? A partial list clarifies some of these skill objectives:

1. Children understand that they can seek out information on their own.
2. Children understand that some information may be dangerous to seek out through own hands-on experience (i.e. knowledge about drugs)

3. Children understand that there is a great store of information available through media.

4. Children understand that there is a great store of information available from those who have learned it before them.

This is enough to get us started. So, let's look at the two ends of the curriculum spectrum and see how they line up with the following goals.



Obviously neither end of the continuum meets our four goals. If we are operating too far over in the "Discovery Learning" side, children are weak in goals two and four. They begin to have a mindset that they should discover information on their own and do not see adults as having much say in the process. They easily discard adult learning suggestions as being irrelevant to their lives, at least from their limited perspective. This can be the root of later attitudes where adolescents feel they need to experience everything on their own and that adults simply cannot begin to offer anything pertinent to the teenager of the 21st century.

The reverse side of the spectrum is really no better. On that side the children are weak in goals one and three. They are passive receptors of knowledge and never become motivated and intrinsically-driven learners. They wait for information and cannot problem-solve how to manage situations unless they have been directly taught to them. They sit helplessly waiting for someone to give them solutions and are frozen when things do not go as planned or expected.

The main point of this section is to understand that our Design does more than teach objectives and set up our room. Our Design teaches children how to gain knowledge in their world. It is clear that a balanced approach is necessary for the best outcome, but unfortunately many programs seem to find this balance difficult to attain. Some so fully support child-directed activities that teachers are afraid to teach and merely set up environments hoping children will learn on their own. In other rooms, the curriculum has become so driven by core objectives, proficiency tests and other assessment demands that teachers panic over the time crunch and little child-initiated learning is permitted. There simply isn't time! Either way is doing a disservice to our children and setting them up for future difficulty. We will look at how to find this balance in detail in the next chapter and Chapter 11, when we deal with planning.

Looking at Pedagogy through the Neurological Lens

The last topic before we move on to the Design of the environment is another caution about trends and new "bandwagons". Since we are going to deal with environmental design shortly, let's use an example related to that topic.

One of the newer trends we see in today's classroom is the grouping of children's desks in a formation that puts them face to face with each other. The purpose behind this is to make cooperative grouping easily possible. The configuration usually looks something like this.

Cooperative Grouping Formations

This configuration is especially interesting given the following facts:

1. At any one time, there are children who must twist in their chair to see the teacher.

2. Convergence Insufficiency (Chapter Two-Visual Processing) is made worse by this design.

3. When adults are provided round tables in a seminar, they almost always choose the ones facing front. No one wants to sit with their back towards the teacher!

This problem with number one and two can be readily seen if we draw the normal sight-lines for the students in the previous classroom.

Cooperative Grouping Sight Lines

As we can see, there is simply no place the teacher can stand that will allow all children to see easily. The constant turning and twisting to see makes visual processing more difficult and is an additional challenge to children who may already be struggling with keeping a quiet body. In addition, children who are easily distracted must now filter out the peers that are continuously in front of their faces. What is so curious about this trend is the fact that we adults would be the first to complain is provided such a seating arrangement in our own learning environments.

So, how do we keep ourselves from wholeheartedly embracing trends that have such little basis in logic and neurological principles? The best way is to determine why a trend is being requested and noting what will be lost. In this case, the whole purpose of the trend is to *facilitate co-operative grouping and interactive activities in rooms where desks are the norm*. Then, the task is simple. Just ask yourself what would be gained if the change is made? For this situation, the new desk grouping would allow the children to interact easily. Then ask yourself <u>what would be lost</u>. As you can see, a great deal is lost if we make this change. After that, just weigh the two and see which makes more sense. For this scenario, I think we would lean towards a different configuration where the children can face the teacher as needed and then face each other when appropriate, not a difficult goal to accomplish in most rooms.

As we move forward with our curriculum design, this "value-testing" of our approach will need to happen over and over. There are many trends, fads and new ideas that come into our sight each year and many of them must be more closely reviewed before they are used. In some cases, they are merely moving the curriculum from one neurological principle to another. We saw this in the historic fight between phonics and whole language. We now know that we need to meet all Learning Directions and should use both. In other cases, they are based on a truism that when

applied to an extreme loses its power. We saw this in our previous example on Discovery Learning and Teacher-Directed Learning. Both of these techniques are valid, but when they are used to an extreme, they lose the goals provided by the other approach. The only way to hit all objectives is to use both ends of the continuum in a balanced way. We will now continue to try and find this balance by using our Neurological Framework to design our physical classroom environment.