CHAPTER 10: THE FIRST HOMEWORK SESSIONS

At its most basic level, the Plan consists of only two elements. First, you and your child should have four fifteen-minute sessions each week in which you work together on the Sample Homeworks, or similar homework sheets that you prepare, in any way that you choose. Second, you should make sure that these session are low-key, low-pressure, and fun.

Although there is a great deal of effort and analysis underlying the Plan, much of that work has been directed at making the Sample Homeworks relatively self-sufficient. You do not need to understand math or the theory of the Plan in order to use the Plan. You do not need to read this Chapter, or the rest of the book. You will help your child a great deal if you simply have four low-pressure homework sessions a week, talking with her about the Sample Homeworks.

That said, it will probably help you do an even better job of implementing the Plan if you understand the underlying structure of the Sample Homeworks. Part 1 of this Chapter describes that structure.

Also, it is possible that you will derive some benefit from looking at the helpful hints that we have developed over thirteen years of experience with homework sessions. To that end, Part 2 of this Chapter consists of a detailed, step-by-step discussion of the sessions involving the first set of Sample Homeworks.

And, of course, you should feel free to use the guidelines and instructions contained in the Quickstart Module – Appendix B – to help you get started with the first ten Sample Homeworks!

Part 3 of this Chapter discusses the second set of Sample Homeworks, called the Early Consolidation Phase. This critical Phase lays the initial groundwork for reading and for the first mathematical operations, addition and subtraction.

The fourth and final part of this Chapter discusses the very important idea of Field Work.

Again, it is worth emphasizing that this Chapter, and in fact most of this book, is not a prerequisite to doing the Plan with your child. It is merely intended to provide additional information that may increase the benefits your child derives from the Plan.

PART 1: The Underlying Structure of the Sample Homeworks

The Big Picture. The homework sessions are divided into Phases. To be honest, the dividing lines between the Phases are somewhat arbitrary because our basic approach is to jump around a great deal, often introducing a new concept only to abandon it for a while, or reviewing old concepts from earlier Phases. Nevertheless, the use of Phases as an organizational principle (one that is, by the way, invisible to the child) is worthwhile

because it helps ensure that in the end we are providing materials that cover well-organized and clearly articulated objectives.

We will begin, appropriately enough, with the first Phase, and will proceed step-by-step until we have completed the last Phase. This process will probably take somewhere between three to four years, depending in large part upon the entry age of your child, and will in the end produce as its output (we hope!) a child who: (i) reads very well, far beyond her years; (ii) loves to read (a different thing than reading well); (iii) enjoys math; (iv) is comfortable tackling unfamiliar math concepts or problems; and (v) is substantially ahead of grade level in math and reading.

If we can achieve all of this, I think you will agree that we have done great things. Your child will be on track to be a dedicated life-long learner and a capable academic performer.

Perhaps you are wondering where you go from there, i.e., what happens next after your child has completed the Plan? It is a bit premature to tackle this questions now, when we have not even started the first homework session! For present purposes, it is probably sufficient to note that there are three main pathways available to a graduate of the Pittsburgh Plan (remember, the graduate might well be only six years old):

(i) moving into the mainstream school curriculum, possibly with some advancement (especially in math), and enjoying the cognitive and emotional benefits of great competence in comparison with peers and the expected curriculum;

(ii) the same as (i), but with added "sideways" or "lateral" enrichment in math; and

(iii) the same as (i) but with continued rapid progress in math using the Pittsburgh Plan techniques.

The question of appropriate next steps following completion of the last Phase is addressed in more detail in Chapter 14. If you opt for path (iii), you may be pleased to know that there are well-developed materials currently being organized for publication that extend the Pittsburgh Plan approach to math all the way to the Pre-Calculus level. It is anticipated that the follow-up volume to this one, Newton Rising: The Pittsburgh Plan, Part 2, will be available by December, 2006.

Overview of the Phases. In general, the homework materials for each Phase follow a structured plan in an unstructured way. Put another way, each Phase has definite objectives that are carefully spelled out and targeted, but these objectives are typically approached multiple times in multiple ways, with significant review and jumping forward and backward. This jumping around frequently occurs across different Phases, to the consternation of our more organized parents but to the general delight and benefit of our children.

Think of it as if we are setting up a playground. We plan the selection of the equipment – swing sets, teeter-totters, sandboxes, etc. – carefully, paying attention to the physical capabilities of the children and also to the skills we wish to help them develop. And, of course, overriding everything else, we ensure that each piece of equipment is safe. Then, after putting a big fence around the playground, we cry havoc and let slip the dogs of play! In less Shakespearean terms, we turn the children loose to play on the playground as they wish. And, apart from occasional coaching on techniques of swinging, digging, etc., we stand off to the side where we can monitor things without interfering too much with the activities.

This picture pretty well describes our approach to each Phase. For each Phase, we will provide you with the following:

(i) a specific set of objectives (the fence around the playground);

(ii) a complete set of relevant homeworks from the Sample Homeworks in Appendix A (playground equipment); and

(iii) a set of detailed suggestions and comments tied to the Sample Homeworks for that Phase (comparable to coaching a child on how to "pump" on a swing).

And, we will ask you to keep the homework sessions low-key and relaxed – the equivalent, in our playground analogy, of making sure that the playground equipment is safe.

Although we recommend that you follow the Sample Homeworks and detailed suggestions fairly closely at first while you are developing a feel for the dynamics of the homework sessions, you are completely free at any time to vary the program within the defined objectives. In fact, it is your session, and your child; you are free to vary the sessions in any way you think appropriate! For example, you may opt to do review sessions with prior homeworks, or to give the same homeworks several times in a row. Or, you may decide to make up some of your own homeworks, guided by the Sample Homeworks and perhaps emphasizing items that are giving your child a little trouble. There is no fixed time frame for a Phase, and there is no rule against reverting to materials from a prior Phase.

This is an important enough point to reiterate in different words. The Phases are defined by their objectives, not by a specific set of Sample Homeworks; they can consist of a few homework sessions or fifty or more – it all depends upon you and your child. Although we will discuss the Phases by referring to the Sample Homeworks in Appendix A, you should feel free to do more or less homework sessions in each phase, depending on your assessment of your child's progress and needs. One common trick, which works very well, is to use the same homework sheets multiple times, since repetition is a powerful learning tool. Let me say that again: repetition is a powerful learning tool. Also, it is quite simple to modify Sample Homeworks to create new homeworks aimed at the same objectives.

As noted above, the Sample Homeworks are by no means linear in their approach to introducing new ideas. Instead, there is a great deal of hopping around and introduction of new concepts followed by their temporary abandonment. This tracks the basic theory underlying the Plan, namely, that although we do not fully understand how learning takes place, we do know that children are very good at it, especially when it comes to learning a native language, so we do our best to provide a rich and varied learning environment similar to that which is present when a native language is learned. And then, we do our best to get out of the way! We do not let our assumptions or preconceptions limit the child.

When we discuss the Phase 1 objectives in the next section of this Chapter, you will see that we take this idea of a rich learning environment very seriously. The foundation of Phase 1 (as with all of the Phases) is a cluster of concrete learning objectives of the usual "pre-school" type – things such as learning to recognize letters and shapes. But lying beneath these concrete objectives is an extra layer of material, a subterranean current of important abstract concepts that find concrete expression in our mundane homework tasks. We do not present these abstract concepts directly to the child; certainly, we do not expect the child to understand them at this point! But we do expect that repeated exposure to concrete expressions of these concepts over a long period of time, with a bit of gentle discussion and guidance, will help the child eventually come to internalize these important concepts and "own" them as a powerful part of her intellectual arsenal.[1]

Note that you do not have to understand these abstract ideas yourself in order to allow your child to learn them in this fashion! That is the beauty of the Plan's approach: by relying on the child instead of the parent or teacher, we can break the vicious cycle of math-anxious parents and teachers begetting math-anxious children. It will suffice if you simply work through the Sample Homeworks with your child and guide the discussions in those sessions as described in this book.

Keeping in mind this fundamental approach -- relatively unstructured homework sessions aimed at well-defined objectives – we are now ready to describe the first Phase, known colloquially as the "Toe-In-the-Water Phase." We will walk you through this Phase in excruciating detail, because it is your first exposure to the way the ideas of the Pittsburgh Plan are implemented.

PART 2: Detailed Discussion of Phase #1: The Toe-In-the-Water Phase

Sample Homeworks: Sample Homeworks 1–14 for a sample child named "Sam."

Objectives: The Sample Homeworks for Phase 1 are simple pages containing only three things: a line for the child's name and date; a few letters; and a few simple shapes. There are actually more objectives for this Phase than there are homework tasks!

[1] As the great John von Neumann said, "In mathematics you don't understand things. You just get used to them."

A few of the objectives contain technical ideas. Remember, you do not need to know or understand – or even read! -- the objectives in order to teach your child under the Plan. Why? Because we are not really asking you to do anything very complicated – just help your child work through these simple homeworks, and allow her to learn. It should relieve you to learn that we are relying on your child, not on you!

In any event, here are the objectives for the Toe-In-the-Water Phase (Phase 1):

- Help the child become comfortable with the idea of a homework session;
- Assess whether the child is ready for regular sessions or instead needs to go through a period dominated by Field Work (see Part 4 of this Chapter, below) with only occasional homework sessions, perhaps once every week or so;
- Learn seven simple capital letters -- in the particular case of the Sample Homeworks, B, O, M, S, A, T, and E;
- Lay early groundwork for reading;
- Learn four basic shapes: circles; squares; rectangles; and triangles;
- Basic counting with one-to-one correspondence to twelve;
- Recognize the child's printed name;
- Introduce the idea of a calendar date;
- Gradually increase the number of homework tasks (e.g., from two rows of three letters to five rows of four letters);
- Introduce the key mathematical ideas of "inside," "included in," and "bounded;"
- Introduce concrete examples of the important abstract idea of symmetry;
- Lay the groundwork for the idea of defining mathematical objects by lists of characteristics (a triangle has three sides, etc.);
- Introduce the idea that things (circles, squares) can be thought of in more than one way;
- Introduce the idea of nested or hierarchical sets (squares are a type of rectangle); and
- Help the child become comfortable using a pencil, pen or crayon on the homework sheet as part of the sessions.

Time Frame For Phase #1. Sammy began Phase #1 at age 22 months and finished seven months later, at age 29 months. Each Sample Homework was used, on average, twice during this period, meaning that homework sessions occurred roughly once per week. During this period, Field Work was done extensively, until Sammy finally seemed ready to tackle homework sessions more frequently.

How can you tell if your child is ready for regular homework sessions? This is a judgment call on your part. If your child is having fun, it probably does not matter whether she appears to be learning anything – it would make sense to do the homeworks regularly, four times a week. The apparent lack of learning might be deceiving; a lot of the action goes on well below the surface. On the other hand, if your child seems completely uninterested in the homework sheets, and just struggles to get out of your lap, then probably you should focus on Field Work and merely try one homework session a week as a check to see if she has become more interested in the sessions.

Detailed Suggestions and Comments for Phase 1: As you go through the following detailed suggestions concerning the Phase 1 Sample Homeworks, it would probably be a good idea to have a copy of the relevant Sample Homework sitting in front of you for easy reference. Please note that at the end of the list of detailed suggestions, there is a transcript of an illustrative session using Sample Homework #1.

We begin with two general suggestions:

1. *Field Work*. Young children are oriented toward tactile sensations – touching, feeling, and even tasting. Part of the job of the early Phases is to build a bridge from your child's early, mostly tactile experience with written language to written language in its more conventional form, i.e., as letters and words written on paper. In order to build this bridge well, we need a strong foundation – that is, we need your child to have had a rich exposure to letters, numbers and counting in tactile forms such as letter blocks, plastic letters, flash cards, letters on signs, etc.

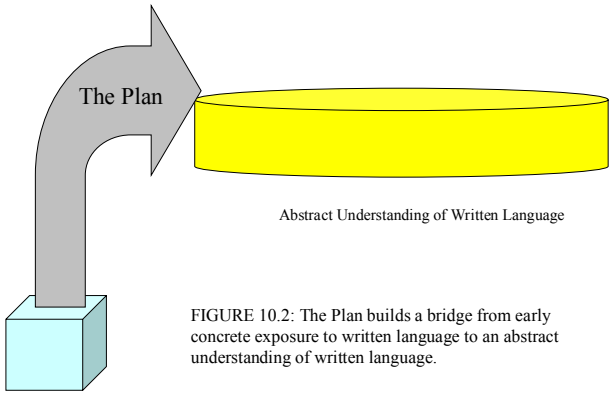


FIGURE 10.2: The Plan builds a bridge from early concrete exposure to written language to an abstract understanding of written language.

It would be best if your child came to the initial homework sessions already having experienced a significant amount of this type of "touching and feeling" exposure to written letters and numbers. But, if that has not occurred, do not worry! We will help you build that foundation at the same time that we are building the bridge to abstract written language. In fact, a large part of the work done in the early Phases of the Plan consists of this type of tactile activity, done outside the formal homework sessions as part of the "Field Work" that is discussed in Part 4 of this chapter (perhaps not surprisingly, under the heading "Field Work").

So, the point here – your Action Item -- is that you should (i) read Part 4, entitled "Field Work" and (ii) <u>do a significant amount of Field Work with your child in these early Phases</u>.

2. *Go Slow*. As you probably already know, it is very important that you speak slowly and clearly when you are working with your child. It is far better to say too little than to say too much, or to speak too slowly rather than too fast.

Approach the material in small chunks, and do not under any circumstance convey a sense of urgency, time pressure, or anticipation of achieving a particular goal. As instructors, we must be like the soft summer wind, or the ancient sage in the old "Kung Fu" television show ("Yes, Grasshopper . . . ."). We are gentle, we are patient, and we are not hurried. We know that time is our ally.

We now proceed to discuss Sample Homework #1 in some detail, introducing a number of Plan techniques. You may wish to read the entire discussion (paragraphs 3 – 10 below) before beginning the first homework session. Of course, it is not expected that you will cover everything discussed in paragraphs 3 – 10 in one homework session! Instead, that material is typically covered over multiple homework sessions by (i) using the same Sample Homeworks multiple times, and (ii) deferring some of the material to sessions involving later Sample Homeworks.

NOTE: Many of the ideas covered in our discussion of Sample Homework #1 will also apply to subsequent Sample Homeworks. We will not necessarily repeat all of these ideas in our discussions of those subsequent Sample Homeworks; instead, we will rely upon you to apply these ideas to similar material in subsequent Sample Homeworks.

This is an example of our general approach to discussing the Sample Homeworks: we give reminders and cross-references from time to time, but in general limit the detailed discussion of each Sample Homework to the new material that is contained in that particular Sample Homework. We trust that you will be able to handle "old" material – i.e., material that merely repeats and builds on work done in earlier homework sessions – by continuing to apply the techniques and approaches discussed in connection with the Sample Homeworks in which such material was originally introduced. Do not worry – this may sound challenging, but in practice, as the homework sessions occur over many days, with repeated exposure to the same Sample Homeworks, you will find that you will not need detailed and repeated reminders.

3. *Breakdown of Sample Homework #1*. As you can see from the list of objectives above, there are really four concrete skills that are tackled vigorously by the Sample Homeworks in Phase 1:

    - Recognition of the child's name;

- Recognition of letters;
- Shape recognition; and
- Counting with one-to-one correspondence.

As we progress through Phase 1, we will encounter these four themes repeatedly. They are discussed in detail in the following four sections.

In addition, there are five abstract concepts that we see bubbling to the surface in Sample Homework #1:

- The idea that things can be thought of in more than one way;
- Pre-reading skills;
- Concepts of inclusion, boundary, etc.;
- Introduction to idea of symmetry; and
- The definition of mathematical objects by lists of characteristics.

These abstract concepts will come up from time to time, opportunistically, throughout the various Phases, and are discussed, opportunistically, throughout this Chapter.

4. *Sample Homework #1: Recognition of the Child's Name.* Begin Sample Homework #1 by writing the letters of your child's name, one by one, where indicated at the top of the page. Discuss each letter as you write it, naming it, tracing it, and allowing your child to mark it, all as discussed below. Be sure to emphasize that this group of letters spells your child's name. If your child's name is long and complex -- Guinevere or Oedipus, for example -- you may wish to freelance a bit; perhaps it may be time for a nickname.

    - *Discussion Technique: Use Questions Rather Than Statements.* In general, when discussing something with a child in a homework session it is preferable to ask questions rather than make statements. Even if the child does not know the answer, a question involves her in the topic in the way that a "teaching" statement cannot achieve. And, of course, a question can have essentially the same informational content as a teaching statement –e.g., compare "Is this an 'O'?" with "This is an 'O'."

    - *The Marking Technique*. When you are discussing an object such as a letter, shape or number, allow the child to color the item, or circle it, or mark it, or even cross it out or obliterate it. This is very good reinforcement, because it lengthens the time the child is thinking about the letter, shape or number, while at the same time helping to build a bridge from the concrete to the abstract.

    - *The Tracing Technique.* Help the child trace the letters of her name with her fingers, saying the name of the letter. Usually, this does not work well at all — young children are too active and imprecise. But give it a gentle, non-

threatening try. Here, we are using Field Work (tactile) techniques to help build that bridge we discussed above. Of course, tracing can also be used with letters, shapes, numbers, etc.

5. *Sample Homework #1: Recognition of First Letters: B, O and M.* Next, introduce and discuss the letters B, O, and M one by one.

   - *Encourage Both Recognition and Production.* It is a good idea to mix in two different kinds of questions: recognition questions ("Where is the B?"), requiring the child to recognize a letter, shape, number, etc. when it is named; and production questions ("What letter is this?"), requiring the child to produce the name from her memory. Recognition and production are two distinct, albeit complementary, skills, and we want to allow the child the opportunity to approach the new material from different perspectives. Recall that one of the Plan's main objectives is to come at things from many angles in order to allow the child to use her favorite learning strategies in mastering the material.

   - *Make Mistakes.* Once your child has begun to identify a letter or shape, make a mistake that she can correct. When you are looking at a "B" ask, "Isn't this an O?" Your child will love correcting your mistake, and more importantly, she will remember the correct answer vividly.

   - *How We Choose the Particular Letters to Teach to the Child.* We are somewhat careful in our choice of the first letters to be presented in the homework sessions, preferably using capital letters in the child's name, but most importantly using capital letters that are easy to recognize and distinguish. We usually start with capital B, O and M as in the Sample Homeworks, although we feel free to substitute appropriate letters from the child's name. Letters in common street signs (STOP) are also good. As you will see as you work through the first few Phases, we begin with capital letters, but quickly introduce a few lower-case letters. Throughout this process, we focus like a laser beam on the goal of reading, so we choose letters that will allow early work in sounding out and reading words -- e.g., the "at" cluster of letters (upper and lower case A, T, C, F, H, P, B, R, S), which allow us to work on numerous "at" words such as cat, rat, hat, etc.

     For a child named "Sam," the first groups of letters might be introduced in the following order, as they are in the Sample Homeworks:

     B, O, M
     S
     A
     T
     E (at the end of Phase 1)
     C

D
a
e, W, R
P
N, L
i
U
Y, I, V
c (at end of Phase 2)

After many inquiries, allow me to save you some time that could be better devoted to the homework sessions: there is NO hidden message contained in the above letters!

6. *Sample Homework #1: Introducing Shapes.* Ask your child if she knows the name of the shapes at the bottom of the page. Our goals are two-fold here, one concrete and one abstract. First, at the concrete level we want her to learn that these shapes are called circles. Second, at a more abstract level we want to lay some groundwork for the idea that things can have more than one meaning by bringing up the idea that the shape can also be thought of as a letter ("O"). Later, when numbers have been introduced, we can add the idea of zero to the list of different perspectives on this symbol. As illustrated in the sample transcript below, we do not push this idea didactically (i.e., in lecture form), instead, we lay the groundwork for the child to learn this idea for herself by just mentioning the idea and perhaps having a gentle discussion about it.

    - *Variations On a Theme: Symmetry.* For fun, in a later session try turning the Sample Homework sheet upside down or on its side. Discuss which letters and shapes look different (B, M). Which look the same (O, circle)? Ask your child why the "O" and the circle do not look any different when the paper is turned upside down or on its side. Do not try to teach the answer to this question; we are simply throwing out into the air a concrete example of the deep abstract idea of symmetry. Deep down, your child's incredible inductive learning machine is already beginning to grind away . . . .

7. *Sample Homework #1: Counting.* Now that we know what the shapes are called (circles, for the educational psychologists who are reading this book), we count them with the child.

    - *Counting Is Actually Two Skills.* The idea of counting actually involves two important subskills: (i) memorizing the sequence of numbers ("one, two, three, four . . ."); and (ii) the idea that mathematicians call "one-to-one correspondence," the idea of saying a separate number for each object that is being counted, with no extra numbers between objects and no objects that do not have a number.

- *Memorization Is Part of the Field Work.* The memorization part of counting can be taught in the traditional way, by reciting the numbers in order, often to music, as in the teaching of the alphabet by the Alphabet Song. This can be thought of as being a part of the Field Work discussed below.

- *Touch As We Count.* Here in the homework session, we reinforce the memorization work and develop one-to-one correspondence skills by presenting the child with a row of circles and teaching her to touch them one by one as she counts. Of course, we can supplement this by counting the B's or O's on the homework sheet as well. One way to encourage the necessary one-to-one correspondence is to ask the child to put a dot in each circle with her crayon as she counts it.

- *Future Uses of the Counting Exercises.* We can use these counting exercises for many purposes besides teaching counting: (i) reinforcing a letter that is difficult for the child by counting repeated instances of the letter; (ii) teaching shapes; and (iii) teaching the child to distinguish letters, shapes, numbers, etc. by writing a row containing, say, triangles, circles and squares and asking the child to count the triangles. Another technique for teaching counting is to draw an interesting picture (e.g., of a dog or a shark) and put rows of shapes inside it. To count the shapes, the child must master the idea of a regular approach, preferably left to right and top to bottom. All of these techniques will be utilized in later Sample Homeworks.

8. *Sample Homework #1: Grade.* At the end of each homework, we give a grade. At these very early stages, the grade can be a simple "√+" (check-plus). Later, we will add more grades (A+, 100%, etc.), not as a measurement or evaluation technique, but as a learning opportunity -- e.g., an early introduction to the idea of "percentage." The grade should always be a good one, because these are "homeworks," not tests; our basic approach is to give the child an opportunity to solve a problem, and then help as needed, so that the experience is always one of success.

9. *Phase 1 Sample Homeworks In General: Miscellaneous Ideas.*

    - *Scribbling*. Do not worry if your child scribbles all over the homework after she finishes, or even as she is doing it – she is just making it her own. In fact, it is not a bad idea to ask her, after you have given her the grade:

        > "Sammy, now that you have finished the WHOLE HOMEWORK, would you like to color on it or draw on it as a special treat for a JOB WELL DONE?"

      See Figure 10.3 for an example of typical scribbling on a homework sheet.

- *Field Work*. Remember to do Field Work – lots of it -- every day. Field Work is described in detail at the end of this Chapter.

- *Duration of Session*. The sessions should end before the child gets bored. Typically these early sessions last only a few minutes – fifteen minutes would generally be too long. But the key benchmark of length is the child's continuing interest.

- *Relax.* This should be a fun activity, parent and child, no pressure, no disappointment, no hurry. Think of it as the same kind of activity as singing "Eensy-Weensy Spider" or playing peek-a-boo. We are operating on the principle of accretion, rather than catastrophic change. Our math and reading program is not intended to produce sudden large changes in your child's knowledge, but instead to achieve great results through consistent and steady small changes – think of the Grand Canyon rather than Mount St. Helens.

- *Where is the Math?* After all of our talk about the Pittsburgh Plan's innovative approach to math, you may be wondering where the numbers are in these early homeworks! Well, we are nothing if not pragmatists. Reading is more important than math; it is ubiquitous and more financially rewarding. So, we start with reading!

- *Allow Rather Than Force.* We are not really "leading" or "causing" the child's mind to accelerate through the learning process. We are simply providing opportunities that your child will seize when she is ready. Let me restate this, because it is very important: We are not forcing anything at all to happen. We are presenting your child with the opportunity to take steps toward reading and math achievement without pressure, anxiety, or time pressure. We simply allow your child to absorb the concepts when she is ready. Thus, we do not chart progress or worry if we are stuck on the same materials for weeks or months.

  Why does this relaxed, no-pressure approach produce such dramatic acceleration of learning in children of all ability levels? It seems too easy, does it not? The reason is very simple – as a society, we vastly underestimate our children's capabilities at early ages, especially in the area of mathematics. Our program simply removes barriers to progress, which then can occur at the child's natural, built-in rate. We enlist as our allies the natural curiosity and the genius for learning that children bring to the world. We are the child's partners, not her drill sergeants.

10. *A "Transcript" of a Sample First Homework Session*. Here is one way you could approach Sample Homework #1 (of course, you should feel absolutely free to freelance as you wish; this is just an example).

    You could say, "Sammy . . . ."

Right here, we need to make a side comment. Believe it or not, in trial runs of this chapter, several parents mentioned that this approach would confuse their children, because they were not named "Sammy." This is one example of a place where freelancing would be appropriate!

Anyway . . . . just as an example, you could tackle Sample Homework #1 by saying:

> "Sammy, now that you are almost TWO YEARS OLD!!! -- now that you are SO BIG!!!! – we are going to start BIG GIRL homeworks!!" (Hand her a crayon or pencil; use a pencil only if she is safe with a sharp, pointed object.) "Here is your crayon. Do you like this red crayon? You will use this red crayon for your BIG GIRL homework!!" (Big hug, high five, etc.)
>
> "Let's start by writing your name here on the line at the top. Because this is the line for your name, and it is YOUR homework! Do you know the letters of your name?" (Pause for a minute and listen to her answer – always pause after asking a question and pay attention to the child; the whole point of asking a question is to shift the focus from you to the child and engage her interest and attention.) "Here is your name . . S . . . A . . .M . . . Sam!" (Obviously, you are writing the letters, unless Sammy is extremely advanced!) "Do you want to use your crayon to color your name?" (She can color her name, or circle the letters, or mark the letters, or do nothing at all – anything is OK.)
>
> "Now, let's trace your name!" (Although this technique often fails with restless young children, go ahead and give it a try. She can try to trace the name with her finger or her crayon, whichever she prefers.)
>
> "Now, we are going to start to learn some letters, OK? Don't worry, we are just starting to learn the letters. It will take a while to learn them! But let's start." (Point to the B.) "Is this a B?" (Pause and listen.) "Yes! This is a B – can you say 'B'? Can you touch the B? Good! Can you touch the B again? Good!" (Point to the B again.) "Is this an O? No!!! That's right, this is NOT an O, it is a B. Do you want to color the B?" (Let her mark, or circle, or color the B.) "Now let's trace the B." (It is OK either way, whatever she wants to do.)
>
> "Now, where is the B?" (Help her if she has trouble.) "Do you see another B on the next line?" (Run her finger along the second line.) "Now let's trace the B!" (Take her finger and help her trace the shape of the B. Do this several times.)

Point back to the B on the first line. Ask, "What letter is this?" (Note that after beginning with recognition questions -- "Where is the B" -- we have switched to a

production question, requiring the child to produce the name of the letter from her memory.)

Go through the six letters (two B's, three O's and an M) relatively quickly. It is absolutely OK that Sammy does not have a clue about these letters! This is just step one. After the last letter, you might continue:

> "Well done, Sammy! We have finished the letters. This was excellent letter work for your VERY FIRST homework! Now we are going to count some shapes. Do you know what these shapes [i.e., the circles] are called?"

Be ready, it is just possible that your child will answer, "O?" That would be exciting! First, it would mean that she has learned the letter O. More importantly, it would give us a natural opportunity to expose her to the idea that things can be thought of in different ways, or from different perspectives – a rare moment in the Plan when we actually teach, because the child is primed and ready for a new idea. If she does say "O," praise her, give her a high-five, and then say:

> "You are right! Where we are thinking about letters, this shape is called an O. Very good! But here is a fun thing – sometimes we think about this as a shape, instead of a letter. And when we are thinking about it as a shape, we call it a 'circle.' It is a different name for the same thing – just like sometimes we call you 'Sam' and sometimes we call you 'Sammy.' Just like you have more than one name, so does this shape. It is the letter 'O' and it is also a circle."

Here, we are seizing the opportunity to introduce one concrete instance of the important general idea that we can think of things in more than one way – one of our key learning objectives.

More likely, when you ask, "Do you know what these shapes [i.e., the circles] are called?" your child will shake her head or sit quietly. That is fine! Just continue:

> "This looks like an 'O,' doesn't it? And it is! But now we are thinking about its shape, and its shape is a circle. Can you say 'circle'? Good! Can you point to a circle?" (Help move her hand if necessary.) "Good! Can you point to another circle?" (Help again if needed.) "Do you like circles? Good! Let's trace one with your finger." (Help her trace the circle – let her use her crayon if she wants.)

Note that in this case, where the child does not herself notice that the shape is an O, we merely mention in passing the idea that the shape can also be thought of as a letter, and then move on. We do not "teach" the idea of multiple ways of thinking about something didactically, we just make a brief mention of it and

leave room for the child to uncover this idea for herself, inductively, through repeated future exposures.

Continuing on, point to one of the circles:

> "Is this a square?" NOOOO, of course not!! It is not a square, it is a . . . . that's right, a CIRCLE! Is it also a letter? Is it also an 'O'? YES! Very good!"
>
> "Now, are you ready to count the circles? We will count them and touch them at the same time."

If she is a counter, let her try. If she has trouble, or is not yet a counter, take her hand, help her extend the index finger, and count the circles as you touch them: "One . . . Two . . . Three! Good!" Note that we are working here on the very important idea of one-to-one correspondence – touching a circle every time that we count it.

After completing the counting, we finish up:

> "Well done, Sammy, that was excellent! Now it is time for your grade. We will give you a √+. Here is the √, and here is the plus."

This brings closure to the session and also lays the groundwork for using the plus sign in addition problems a little later on.

11. *The Rest of Phase 1: Sample Homeworks #2 -14.* Now that you have an understanding of the basic Phase 1 objectives and techniques, the remaining Phase 1 Sample Homeworks are merely variations on a theme.

    - *Use Techniques and Approaches In Connection With Many Sample Homeworks.* The above discussion of Sample Homework #1 will be germane to many of the following Sample Homeworks. Thus, we will not provide a detailed discussion of each Sample Homework; instead, we will merely comment when a Sample Homework contains something new or when it is time to introduce a new approach or concept. For example, Sample Homeworks ##2 and 4 are merely reconfigured versions of Sample Homeworks ##1 and 3, respectively, and do not require separate discussion.

    - *Repeating Homeworks Is OK – In Fact, It Is Encouraged.* Remember that you should feel free to repeat Sample Homeworks several times in a row, or go back and redo a prior Sample Homework (in general, jumping ahead is not encouraged, although there is no hard and fast rule against it).

    - *Sample Homework #3.* In this homework, we introduce the fourth letter, capital "S," and ask the child to count to six (circles). The techniques

described above for Sample Homework #1 will work well in guiding your child through these two extensions of her prior work.

- *Sample Homework #5.* Now we add the letter "A" and introduce a new shape – the square. Ask the child to count how many sides there are on a square. For extra credit, ask her how many sides there are on a circle! This is just a way to provoke thought; discuss it with her but do not try to teach an answer to this "silly" question.

- *Sample Homework #7 -- Repetition.* We add the date at the top, next to the name. This is not a very important task from our perspective; mostly, it is just nice to have a date on the homework for reference purposes. Although we do not introduce any new letters in this homework, note that we have worked our way up to four rows of four letters. Also, we are using repetition (three B's in the last row) as a way of cementing the child's knowledge of that letter. Repetition plays an essential role in fueling a child's innate inductive learning mechanism (the innate language ability), as any parent who has read Goodnight Moon a thousand times will attest. Figure 10.3 below shows the actual homework sheet done by Sammy – note the marking of each letter and the post-homework general scribbling all over the sheet. Also note that it is often more fun for the child if the parent copies the Sample Homework in the parent's own handwriting – it seems to give the homework session more of a collaborative feel.

FIGURE 10.3: One of several actual homework sheets done by Sammy based on Sample Homework #7. Note that the homework sheet was hand-copied from the typed form of Sample Homework #7 in order to enhance the "mutual effort" feeling of the homework session. The counting task (five squares) was omitted from this version of Sample Homework #7 and a picture of a cat was inserted instead, at Sammy's request. The counting task was included in other sessions based on Sample Homework #7. Sammy marked each letter as she read it, received a grade of "√+," and scribbled on the homework sheet after she was finished. A careful look at the left side of the homework sheet, slightly below center, reveals a drawing of a winged horse presumably done by one of Sammy's older siblings.

Perhaps the most important lesson of Figure 10.3 is that you should feel free to modify the Sample Homeworks to fit your child's particular needs or

desires. In the case of Figure 10.3, the counting task (five squares) in Sample Homework #7 is omitted and a picture of a cat is inserted in its stead -- something that was done at the request of Sammy. Sammy did not miss out on the square-counting task; it was included in other sessions based on Sample Homework #7.

- *Sample Homework #8.* We introduce an amateurish picture of a snake containing circles to be counted. Apart from spicing up the counting exercise a bit, this allows the introduction of important concepts such as "inside," "contained in," and "boundary." Again, we do not teach these ideas in a formal, lecture-style way. Instead, we simply discuss with the child the idea that the circles are inside the snake, that the snake is like a fence around the circles holding them inside, and perhaps we even use the word "boundary."[2]

  We are not teaching these important abstract concepts; we are merely discussing one concrete instance of them, helping the child's induction mechanism ferret out the abstract concepts over time.

  For many people, it is heresy even to think about introducing this type of abstract concept – "inside," "contained in," and "boundary" -- as part of the education of young children. They will point to many studies, and great thinkers beginning with Piaget, each confirming that young children cannot handle such abstraction. We have two responses:

  (a) First, and most importantly, we are <u>not</u> trying to teach these concepts to our very young children. Such an effort would undoubtedly fail. Instead, we are making sure that these rich concepts are in the child's intellectual environment. We are making sure that we do not limit the child by limiting the ideas to which she is exposed. We are allowing her the opportunity to bring her formidable intellectual weaponry to bear on these important ideas over time.

  (b) Our second response is less considered: Look at the state of our schools, look at the results obtained by these critics – why in the world should we listen to them? Perhaps the time has come to deep-six these corduroy-patch-on-the-elbows bozos and trust our children for a change.

- *Sample Homework #9.* This is an important homework, in which we introduce several new things:

[2] Children learn the words they hear. If we use words such as "owie" and "boo-boo," they will learn those words. If we use words such as "cut" and "bruise," they will learn those words instead. So, we might as well use good words! This is just one more example of the ways in which parents limit their children by their limited expectations of them.

(a) *The "AT" Word Cluster.* The capital letter "T" makes its first appearance.[3] This is significant, because the child's "tool set" now includes both A and T, enabling us to begin working on reading the "AT" family of words – at, bat, cat, fat, hat, in, pat, rat, and sat.[4] We will do this by beginning to discuss the sounds that letters make – probably not quite yet (unless you want to), but soon.

(b) *New Shapes: Triangles and Rectangles.* There are two new shapes in this homework: triangles and rectangles. We can exploit this rich new material in a number of ways. (By the way, please do not feel that you have to cover every angle on every topic in a Sample Homework in each homework session based on that Sample Homework! Just cover them all over time through repeated use of the Sample Homework in question.)

(i) *Distinguishing Shapes.* First, of course, have your child name the shapes (introducing them in the same fashion that circles were introduced in Sample Homework #1). Discuss how they can be distinguished from each other, how they are different. Focus on the number of sides they have. Count the sides. For fun, ask again how many sides a circle has, then discuss this idea (one side, not really any sides, can you have a side that is not a straight line, etc.; anything is really OK, we are just looking for discussion.) Ask the child to color each triangle blue, color each circle red, etc. This can be used not only to reinforce the names of the shapes, but also to reinforce the child's knowledge of colors.

(ii) *Squares and Rectangles: Deep Idea of Inclusion; Definitional Lists of Characteristics.* Here we try to plant a few seeds for much later harvesting. Specifically, we ask a number of leading questions and then discuss them. Answers are provided in parentheses for <u>your</u> benefit, but you should not "teach" the answers to your child. Just discuss the questions and throw out some ideas, guided by the parenthetical answers and by your own knowledge and instinct.

- Ask your child to count the sides on the rectangle, then count the sides on the square. They both have four sides!
- Ask if the corners all look the same (they do; they are all square).
- So how are the square and the rectangle like each other? (four sides, square corners.)

[3] As a reminder, you should use the techniques described in connection with Sample Homework #1 to introduce your child to this new letter.

[4] We included the word "in" just to see if you were paying attention – were you?

- How is the square different from the rectangle? (The square has sides that are all the same length; the rectangle can have a width that is different than its height.)

- Can we think of the square as just being one kind of a rectangle – a special kind of rectangle, with its own name, because all of its sides are the same? (Again, we do not expect the child to understand this, and we do not really "teach" it, we just float it out there, eliciting as much of it as possible from the child herself. We simply want to get the idea out there into the environment.)

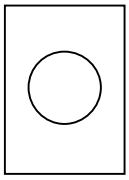
With these questions, we are working toward an understanding of a specific instance of the deep mathematical concept of inclusion – the idea that squares are a subset of rectangles. Also, we begin to focus, through a specific example, on the important abstract idea that mathematical concepts can be defined in terms of a list of properties (e.g., a rectangle has four sides and four square angles).

(iii) *Introduction to the Deep Idea of Symmetry.* In the universe of ideas, symmetry is the royal flush, the top dog, the latte grande; it is the blue-ribbon, black-belt, Achilles, Alexander, Lancelot and Roland of ideas.[5] Symmetry defines beauty in art and in love; it separates a great poem from a lesser one; it even underlies the great advances in theoretical physics over the last century. By now you know that the Plan does not shy away from these types of grand-slam ideas, but instead embraces them. So it will not surprise you to hear that we tackle this idea – at least, one concrete realization of it – in our very first Phase!

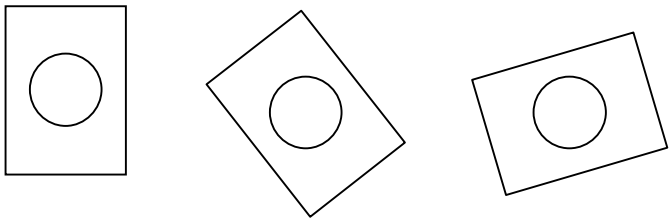
Here is how we do it, spread out over many homework sessions (this is a long project, but that is OK; to paraphrase Arlo Guthrie, "We are not proud, or tired"):

[5] Roland? Yes, Roland! And Oliver too, for that matter. See The Song of Roland (Anon. c. 1050?). We mention Roland for his iconic status as the greatest and bravest of Charlemagne's knights; we do not in any way view the Crusades with favor.

- Using a computer, print out a page that is blank except for a large circle in the middle of the page. Our goal here is to have a perfect circle in the middle of a blank page, like this:

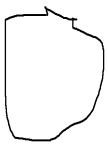


- Now, have your child rotate the page a little bit, then a little more, and so on:



In each case discuss whether the circle looks different after it has been rotated. For example, ask if the circle is "pointing in a different direction." Make sure to distinguish between the direction of the rectangular page and the appearance of the circle. If this is confusing your child, cut the circle out carefully with scissors and just use the circle. (Of course, the circle looks the same after it is rotated because it is highly symmetric.) Do not teach, just discuss!

- Now draw a circle by hand on a separate piece of paper, making sure that it is noticeably irregular, like this:



Do not be proud; make sure that it is obviously irregular. Ask your child about this crummy new circle: "This is not really a good circle, is it? Why not?"

The answer, of course, is that the circle does not look the same all the way around; some parts look a little different.

- Now have your child rotate this new crummy circle. Ask her if it looks different after it has been rotated, if it points in a different direction. Again, make sure that she is not focusing on the orientation of the rectangular page; if she is, carefully cut out the flawed circle with scissors and just rotate it.[6]

- Try another idea with each of the circles – have your child close her eyes while you rotate the paper so that the top is now the bottom (so the rectangular shape of the page does not give away the rotation). When she opens her eyes, can she tell if the perfect circle has been rotated? How about the flawed circle? Switch roles and let your child turn the pages while you cover your eyes. Let her ask you if you can tell if the circles have been rotated.

  Of course, unlike the perfect circle, the flawed circle looks different after it has been rotated, and your child probably will be able to tell that it has been rotated when she opens her eyes. Why? Because the flawed circle is not the same everywhere; it lacks the rotational symmetry of a perfect circle.

- Do the same thing with other shapes: a square; a rectangle; and finally an equilateral triangle (i.e., a highly regular triangle having three sides of equal length). These shapes do look different unless you rotate them certain special amounts (e.g., multiples of 90 degrees for a square, multiples of 120 degrees for an equilateral triangle.) Discuss.

- Do the same thing with an irregular shape – one that never looks the same unless you rotate it completely around 360 degrees. (This is really no different than the flawed circle from above.) Discuss this with the child. Ask her to comment: "When does this look the same? Can we tell if the top has moved to a different spot?" Etc.

- Again, do not try to teach your child the idea of symmetry, just discuss the circles and other shapes with her. We are merely enriching her environment so that she has the opportunity to develop – over a period measured in years! -- a deep and intuitive understanding of this important concept.

- *Sample Homework #13.* Here we add the letter "E." Also, we begin to standardize the first few letters of the letter recognition task, so that they are

[6] Why not just cut out the circles to begin with, eliminating the potential confusion caused by the orientation of the rectangular page? Because we are not teaching, we are exploring and learning, and the circle on the page is a richer learning environment, with more interesting symmetry aspects, than the circle by itself.

the same for most homeworks. There are two ideas behind this standardization. First, it allows the child to start every homework with a successful streak. Second, it gives us another angle into the beginning of reading. We choose the standardized beginning letters so that they form a simple, familiar word, which can then be used as an early reading task (eventually, once letter sounds have been introduced). We will call this word the "Key Word." In this case, the Key Word is "S A M," chosen, obviously, because the student is named "Sam." Henceforth, at least for a while, most homeworks will begin with the Key Word.

PART 3: <u>Detailed Discussion of Phase #2: The Early Consolidation Phase</u>

Sample Homeworks: Sample Homeworks #15 – 33.

Objectives: Phase 2 is a consolidation period in which the child builds a base for the two great and intrepid adventures that will begin in Phase 3, namely, reading and elementary math operations (addition and subtraction). As with Phase 1, it is possible that your child will not yet be ready for a full-scale schedule of homework sessions, and once again Field Work is heavily emphasized in this Phase.

Here are the objectives of Phase 2:

- Continue to reinforce the letters and shapes from Phase 1;
- Continue to do Field Work regularly;
- Count higher (to 27);
- Introduce backward (countdown) counting in the "Blast-Off" game at the end of each session (this lays the groundwork for subtraction, which will come along almost before you know it!);
- Introduce the first numbers: 1, 2, 3, 4;
- Introduce many new letters, including ones that are important for reading readiness (vowels and letters contributing to the "at" cluster of words). In the case of the Sample Homeworks, the new letters are C, D, a, W, e, R, P, N, L, i, U, o, V, I, Y and c;
- Begin introducing the letter <u>sounds</u>, especially for letters that are relevant to early reading work (a, A, S, B, C, T);
- Teach recognition (and possibly sounding out) of the Key Word (e.g., "SAM" in the Sample Homeworks);
- Continue exposing the child to concrete instances of the important general concepts of Phase 1: included/bounded; definition by list of characteristics; symmetry; nested (hierarchical) sets; and thinking of things in more than one way; and
- Introduce the idea of vowels as a special category of letter.

Time Frame for Phase 2. Field Work continued to be more important for Sammy than a full schedule of homework sessions. As a result, Sammy took approximately eight months to finish Phase 2, starting at age 29 months and finishing at age 37 months. You

can see that she continued to work at a relaxed pace – nineteen homeworks, each repeated on average three times over 34 weeks, working out to between one and two homework sessions per week -- supplemented with a great deal of Field Work.

Detailed Suggestions and Comments for Phase 2:

1. *Continuation of Phase 1 Approaches*. You should continue to follow the good practices discussed above with respect to Phase 1. For convenience (and because repetition works well with adults too), we will list these suggested approaches again:

    - Do Field Work;
    - Go slow;
    - Do not try to cover everything in each session; just cover everything over a period of time;
    - Use questions rather than statements;
    - Encourage your child to circle, cross out, or otherwise mark letters, numbers, etc. that are being discussed;
    - Encourage tracing (finger or crayon);
    - Elicit both recognition and production;
    - Allow your child to correct your (intentional) mistakes;
    - Touch as you count (one-to-one correspondence);
    - Repeat homeworks;
    - Repeat material within a homework session;
    - Occasionally discuss distinctions between shapes – how one tells them apart; how they are different;
    - Occasionally "float" the idea that squares are one kind of rectangle, but rectangles are not one kind of square; and
    - Occasionally raise the symmetry notions discussed in Part 2 (using the techniques discussed in Part 2).

2. *Be Honest About the Plan's Approach to New Ideas*. No matter how hard you try to keep things relaxed, there is always the possibility that your child will be on guard, looking for signals that you expect more of her or are unhappy with her performance. This can create problems in the many cases where we introduce new concepts at an early stage. From our perspective, we are just launching these new ideas into the cognitive ocean, knowing that they will not find land for a while (possibly a great while!), but at least hoping to enrich the environment of ideas in which the child's powerful inductive learning apparatus is operating. The problem is that your child may have a different perspective; she may worry that she is not grasping some of the concepts you are introducing, and may become anxious or feel pressure. How do we handle this? Quite simply – we follow the theory of the Plan; we trust the child, and make her our partner. We tell her repeatedly, especially when we are introducing a new idea, that our whole idea is to learn ideas over time rather than the first time they show up.

Let me give you an example. You might preface a discussion of squares being a kind of rectangle by saying something like this, slowly, and in very relaxed, happy way:

> "Sammy, now we are going to talk about these shapes a little bit. We will talk about some new ideas. These new ideas are fun, but they are very hard. These are SIXTH GRADE IDEAS! Even fifth graders don't know these ideas! We do NOT expect you to know these ideas yet! Because you will not be in sixth grade until next year!" [Allow her to correct this obvious mistake.] "We are just going to talk about these ideas for a minute for fun. You know how we do things, right? We talk about ideas fifty times! And of course you do not understand them the first time, or the second time, or the third time. But after fifty times, suddenly, without even trying, we will find that you understand the idea! How about that! Isn't that neat? So this is just the first time, just for fun. Will you understand it today? Of course not! That is OK! We are just having fun for a minute talking about SIXTH GRADE IDEAS!"

You should tailor this kind of discussion to fit your child's personality and attention span, but maintain the basic approach of relieving your child's potential anxiety by making her your partner rather than your student.

3. *The Phase 2 Homeworks: Sample Homeworks #15-33*. We discuss below those Sample Homeworks in which new ideas or techniques come up. Of course, you should use these ideas and techniques in other Sample Homeworks as well, where appropriate. For example, the ideas discussed below in connection with the cat diagram of Sample Homework #15 work equally well with the strange animal diagram in Sample Homework # 16.

   - *Sample Homework #15.*

     - *Key Word.* Notice that the first row of letters begins with the simple Key Word that we have decided to emphasize, in this case the child's name, "SAM." See if your child notices that the first few letters are her name or the other Key Word you have been showing her in past homeworks (and discussing as part of the Field Work). If she does not notice that fact, prompt her gently.

     - *Letter Sounds In the Key Word.* Work with her gently and briefly on the sound that each of the letters in the Key Word makes (which again also should be part of the Field Work). Show her briefly how these letter sounds can be said close together, resulting in the saying of the Key Word itself. <u>Do not expect that she will be able to reproduce or even understand this idea</u>. It could be many months before she makes the cognitive leap from knowing the sounds of individual letters to

understanding how those sounds can be merged into the sound of a word. Be patient; we are just laying the groundwork now.

- *Letter Sounds in the "at" Cluster of Words.* Note that we increase the counting to 14 and add the new letter "C," which will be useful for early reading work (e.g., in the word "CAT"). Begin teaching the sounds made by the "at" cluster of letters, i.e., the letters that can be used in simple "at" words such as "cat," "fat," etc. So far, we have introduced a, A, T, c, B, and S from this cluster. This early phonetic work should be done both in the homework sessions and as part of the Field Work. Note that our Key Word, "Sam," has the same vowel and vowel sound as the "at" cluster of words. Teaching the sounds of the "at" cluster of letters should now become a regular part of most homework sessions.

- *The Cat Counting Diagram.* You may wish to use the cat diagram at the bottom of the page to discuss the concepts of inclusion/boundary:

  > "Sammy, can you see the big circle that makes the cat's body? Can you trace it with your finger? Are the little circles inside the big circle? Or are they outside the big circle? YES! Very good, the little circles are INSIDE the big circle. So then, is that big circle a 'boundary' around the little circles? A boundary is like a fence. Is the big circle a boundary around the little circles because they are inside the big circle? Can you say 'boundary'?"

  Also, it might be fun to ask your child to spot circles (the cat's body, head, feet and eyes) and triangles (ears). If you desire, you can slowly write out the word "cat" next to the diagram and discuss the letter sounds, etc. with your child. And, of course, your child will probably enjoy coloring the cat! (Remember, we generally use the Sample Homeworks more than once, so do not feel pressured to get this all done in one session!)

- *Grades.* In Phase 1, the grade given at the end of every homework session was a "√+" unless you free-lanced a bit – which is, of course, perfectly OK! Now we expand the grades; we still give a √+ at the end of every session, but we also either select a letter or (preferably) allow the child to select a letter, and give that grade as well (usually also with a plus). So, if the child selects "M" as her letter grade, the grade would be "√+, M+." Also, we give a grade of the form "VE__", where the VE stands for "Very Excellent" and the child selects the part of the homework that she felt best about – for example, the grade could be "VENW" for "Very Excellent Number Work." Note that we give grades that teach!

- *Sample Homework #18.* Here, we introduce the new letter "D" – now we can add the word "DAD" to our list of words to be sounded out in the homework sessions and in the Field Work. If you want, you could also add the word "MOM" to that list, but we have always been concerned that it might be best to limit yourself to one vowel sound at first (the "a" sound in "Sam," "cat" and "DAD").[7] Feel free to make your own decision; freelance a bit!

- *Sample Homework #19.* There is a lot going on in this Sample Homework:

    - *Lowercase "a."* We introduce our first lowercase letter, "a." Obviously, this is helpful for Field Work in connection with the "at" cluster of words, since most occurrences of those words (cat, sat, bat, etc.) out in the "field" will use lower case letters. Surprisingly, lowercase "t" does not show up until Sample Homework # 34; this is an oversight in this particular set of Sample Homeworks and should probably be addressed by bringing it up earlier either in the homework sessions or in the Field Work. (You will be amazed at the ease with which your child can overcome this kind of oversight!) Note our use of repetition – the entire bottom row of letters consists of "a" repeated five times.

    - *Lowercase "a" Again.* You may wish to supplement the Sample Homework with a brief introduction to the handwritten small "a" – which looks like an italic typed "*a.*"

    - *Weird Diagram*. There are many things that can be explored using this diagram – a few of which are set forth at the bottom of the Sample Homework.

        - You can ask your child to count the circles and the triangles.

        - She can then color the circles blue and the triangles red.

        - You can discuss the ideas of boundary and inclusion as usual.

        - Finally, just for fun, you can introduce and explore the rich idea of a *parallelogram*, which is basically a rectangle where the top side has been pushed to the left or the right, leaving the right and left sides slanted but still parallel to each other (i.e., some of the angles are not ninety degrees). More technically, a parallelogram is a four-sided figure where both pairs of opposite sides are parallel to each other:

[7] There is no truth to the despicable rumor that I favor early reading of the word "Dad" over the word "Mom" because I am a father.

In the Sample Homework, the front part of the weird animal's body is a parallelogram.

The word "parallelogram" is not really critical, although your child is definitely capable of learning it and it is a great word; it is a much better word than "Voldemort" or "Snicket"! Instead, the real value of this new shape lies in the many deep relational ideas that arise naturally in a discussion of it. I guarantee that your child will not be ready to understand these ideas, but it is probably worth your while to put them into play in a relaxed way over a few different sessions using this same Sample Homework (it would be excessive to try to cover all of this new conceptual material in one session!)

Because we are drifting into areas that are fairly technical, let us remind you again: It does not matter at all if you do not understand these areas, and are not able to answer questions or even know what to teach. None of that matters! What matters is very simple: namely, just the fact that you and your child discuss ideas such as how the body of the weird beast (i.e., the parallelogram) is like a rectangle and how it is unlike a rectangle.

Here are some of the ideas relating to parallelograms that you might raise and discuss with your child in a gentle and gradual way:

- How is a parallelogram like a rectangle? (Four sides, with opposite sides being parallel, meaning that they go in the same direction.) How is a parallelogram not like a rectangle (corners are not square). Here, it might be fun to draw various pairs of lines, some parallel and some not, and discuss the idea of lines being parallel (i.e., "going the same way").

- Discuss the idea that a rectangle is a kind of parallelogram (since the rectangle has opposite sides that are parallel, the key definitional characteristic of a parallelogram.) But a parallelogram is not a rectangle, because a rectangle must have square corners.

- For real fun, discuss the ideas that a square is a kind of rectangle, and a rectangle is a kind of parallelogram. (This is a super-sized example of nested or hierarchical sets.) See if you can lead the discussion into the notion that this means that a square is a kind of a parallelogram.[8]

- An interesting Field Work project relating to this idea is to take a flimsy rectangular box and squash it or push the top a bit to the side so that the rectangle formed by each side of the box becomes a parallelogram.

- *Sample Homework #20.* We introduce three new letters: W, e, and R. Probably for the moment only the "R" should be added to the list of letters that you and your child are sounding out. In the diagram, you may wish to discuss how rotten the circles are – they are really "ovals." (Why not teach this word to your child? If she can learn "Sponge Bob Square Pants" she can learn "oval"!) What is the difference between a rotten circle (e.g., an oval) and a good circle? Discuss.

- *Sample Homework #21.* The new letter is "P," which again fits nicely into the "at" cluster of words ("pat") and thus should be taught immediately as a sound as well as a letter. Ask your child to compare the "P" with the "R" that she learned in the prior Sample Homework – what are the similarities; what are the differences? In the counting exercise, ask your child to count the triangles, then the rectangles, then the circles. Which is the biggest number? Also, she might enjoy coloring the shapes different colors.

- *Sample Homework #23.* This Sample Homework is notable for the introduction of the session-ending "Blast-off." Simply count backward from ten slowly, as in a countdown, finishing up "3 . . 2 . . 1 . . BLASTOFF," at which point you should do something dramatic, such as lifting your child high into the air or tickling her. Then do the same thing again, only this time counting backward from twenty. These countdown drills lay the necessary groundwork for our early introduction of subtraction, as you will discover in Phase 3. These countdowns should also be practiced (together with regular forward counting) as part of the Field Work.

- *Sample Homework #24.* Numbers make their first appearance! As part of your discussion of each number with your child, you should discuss the idea that numbers tell us "how many" of something there are – e.g., how many pennies, or books, or fingers. We do this just to make sure that the symbol is connecting up well with the child's existing understanding of the concept of

[8] For the mathematically interested reader, this is one example of a deep mathematical concept known as the transitive property of set inclusion.

number. In particular, it is good, when discussing "3" for example, to put three pennies down on the table and have your child count them, emphasizing (in our usual low-key style) that the symbol three means the same as the "counting" three. Figure 10.4 shows the actual homework done by Sammy – you can see how excited she was at the introduction of numbers; she did her best to write "1" and "2" next to those numbers on the homework sheet. Also note her efforts to write her name and age at the top of the page.

FIGURE 10.4: Note Sammy's efforts to write the letters of her name, her age, and the numbers "1" and "2" at the bottom. Also note that she chose the number "3" as one of her grades, thus receiving a "3+" in addition to an S+ and an N+

- *Sample Homework #25.* "L" and "N" are introduced. Since L is a hard sound that is not involved in the "at" words, we often do not teach it phonetically at this point. You should decide for yourself how you want to handle such matters.

- *Sample Homework #26.* Lowercase "i" enters the arena. Because we teach new letters by asking our children to look hard at the letters and try to see what features distinguish them, we find that Plan participants often refer to small "i" as the letter "dot!" After years of being bothered by this, we finally hit upon the solution. Now, we encourage the child to think of the "dot" as the letter's "eye" looking at her.

- *Sample Homework #29.* As we continue through this consolidation period, we introduce two new vowels: "U" and "o." You will be pleased to know that children have very little difficulty extrapolating from capital "O" to small "o." You may wish to use the diagram in this Sample Homework to introduce ideas related to separation into pieces (concepts that are important in many areas, e.g., division). You might ask, "How many pieces is this shape divided into? How many circles are in each piece?" Where is the

middle piece? Can you trace the boundary of the middle piece with your finger? Can you color the three pieces different colors?"

- *Sample Homework #31.* Note that we are now counting to twenty-seven. We introduce three new letters – "I," "V" and "Y" – and then launch the concept of vowels. We do a number of things with the idea of vowels:

    - We memorize them (a, e, i, o, u and sometimes y). A little chant sometimes helps with this memorization task:

        "a, e, i, o, u and sometimes y cha cha cha [tickling your child on the 'cha's]"

        For the musically inclined, we sing this chant with "a," "e," "i," and "o" being quarter notes and "u," "and," "some," "times," "y," and all three cha's being eighth notes, making the whole chant two measures long. This chant should be repeated several times. Memorization of vowels and practicing of the chant should also be part of the child's Field Work.

    - We use vowels to introduce the idea of consonants. In essence, we try to help the child figure out the simple rule that the consonants are simply those letters that are not vowels. Then, we do not have to memorize the consonants, we can just memorize the vowels and apply this simple rule to see if a letter is a consonant.[9]

    - We discuss the fact that vowels all have sounds that are very easy to make, and give examples (all have the mouth open, lips and tongue relaxed, etc.).

    - We discuss the interesting idea – related to inclusion – that "y" is sometimes a vowel and sometimes not, depending on how it sounds. Y has one basic non-vowel or consonant sound (as in "yikes") and two predominant vowel sounds (as in "Sammy" and "sky").[10]

    - At some point, often after the sounding out of words has begun, we discuss the fact that English is a very hard language in which every rule is broken somewhere. The many sounds that vowels can have is

[9] It will probably not surprise you to learn that this is a concrete example of an important idea from set theory. Specifically, if we let L be the set of all letters and V be the set of all vowels, then the set of all consonants C can be expressed as L\V, the "complement of L relative to V."

[10] This is true only in English; in other languages, "y" can have different sounds. We should mention here a point that is probably obvious – the Pittsburgh Plan is focused on teaching math and the reading of the English language. We tried at one time to develop a program for teaching the reading of Japanese, but were hindered by the fact that none of us could actually speak Japanese. In hindsight, it seems ludicrous, doesn't it, that we would attempt to teach a language without speaking it – but then again, how is that different from the teaching of math in our elementary schools?

just one example of this – when we are reading, sometimes we have to try different sounds for the vowels to figure out what word we are reading.

- As soon as possible, we allow the child to write the vowels herself.

- *Important!* <u>We practice the vowel sounds as we study them</u>, proceeding gradually (e.g., starting with "a," the moving to o, e, i, u and y in that order. Always, as we are discussing a vowel's sound, we also discuss possible alternative sounds the same vowel might occasionally make.

- *Sample Homework #32.* The number "4" is introduced.

- *Sample Homework #33.* Lower-case "c" makes its first appearance – useful for our upcoming work on the word "cat."

PART 4: <u>Field Work</u>.

When you look at the sample homework materials, you will see immediately that the initial homework sessions cannot possibly last as long as fifteen minutes. Do not get too excited -- we still want our entire fifteen minutes! Instead of devoting the whole fifteen minutes to the homework session, we want you to make up the difference (and preferably a lot more) doing "Field Work."

"Aha," you exclaim, "I knew you weren't telling the truth! You promised that the Pittsburgh Plan would only take fifteen minutes a day, four days a week. Now you are asking for even more time!"

We could raise a technical defense – that Field Work is not a part of the Plan per se – but we won't. We admit it; you caught us; we were sandbagging. We misled you in the hope that by the time you discovered the truth, you would not balk at the idea of spending up to <u>two</u> or even <u>three</u> hours a week to change your child's life forever. And we still hope that you are willing to do just that!

What do we mean by Field Work? We mean reinforcing the ideas of the Sample Homeworks by practicing them now and then, through play and otherwise, and by finding concrete examples of them in day-to-day life. Field Work can begin at any age — there is no need to wait until your child is old enough to commence homework sessions.

Here are the key Field Work tasks for Phases 1 and 2:

- Make it a constant practice to spot letters, shapes, numbers and words with your child in books, on signs, and everywhere else they occur in day-to-day life (even skywriting!).

- For example, if you are working on capital "B" and the butcher stand at the grocery store has a large sign in the meat case saying, "Big Bucks Butcher's Break: Buy Beef Brisket Before Breakfast," grab the opportunity; go wild pointing out B's with your child!

- Note that we say "with your child," not "to your child." This distinction neatly sums up the most of the difference between the Plan and elementary school.

- Use tangible toys to reinforce the ideas of letters and numbers.

  - For example, buy a set of plastic letters, and then play games with them. Put four or five letters on a stool across the room, and then, while hugging your child, tell her to run across the room, get you a "B" and bring it back. (If you do this, it would be best if one of the four or five letters is a "B.") Or, have a handful of letters, and ask her to select the "B" and take it over and put it on the stool.

  - Play with letter blocks (blocks that have letters on each side), and ask questions about the letters on the blocks, or ask your child to stack the next block so that the "B" is on top.

  - Get plastic letters with magnets inside them (make sure that the magnets cannot be swallowed by your child), and play games involving sticking the letters on the refrigerator and taking them off.

  - Everyone seems to think flash cards are evil, that they are the visible manifestation of overzealous, pressure-packed parenting. Not so! Think of them as a fun game and your child will too. Make up a few flash cards and play games with them (homemade flash cards are much better than store-bought ones, for the same reasons that crummy graphics are better than professional graphics in the Sample Homeworks). If possible, the games should involve your child handling the cards. At this early stage, the cards should simply have the letters, numbers and shapes on them, as well as possibly the child's name and the Key Word (if different than her name). Later, we will suggest possible expanded uses of flash cards.

- Have your child count objects (pennies, blocks, toys, people at the table, etc.), always focusing on one-to-one correspondence.

- Say a number between one and ten (for fun, you can try eleven or twelve sometimes to see what happens) and have your child hold up that many fingers. Then hold up fingers and ask your child to tell you how many you are holding up – strive to reach the point where she recognizes the number and does not have to

count. This is important precursor work for the addition and subtraction problems she will encounter in Phase 3.

- Use your time in the car to practice memorization tasks:

    - Counting (reciting the numbers in order – the memorization part of counting)
    - Counting backward (blastoff)
    - Calling out a number and having the child hold up that many fingers
    - Reciting the alphabet and singing the alphabet song
    - Reciting the months in order
    - Reciting the days of the week in order
    - Spelling your child's name and the Key Word
    - Practicing letter sounds ("What does a 't' sound like? What are the different sounds that an 'a' can make?")
    - Reciting the vowels and chanting the vowel chant

- Point out real world examples of symmetry (e.g., twin towers of an apartment building, etc.)

- Discuss real-world examples of set inclusion. For example, "Are shirts a kind of clothes? [YES] Are clothes a kind of shirt?" [NO]

- Read to and with your child at every opportunity. (This is not technically Field Work, because it is not really optional; it is as important to your child's welfare as feeding her!)

- Do the types of things described in paragraph (b)(iii) of the discussion of Sample Homework #9 above using drawings of circles, squares, rectangles and other shapes.

Phase 2 is done, and not a moment too soon! Now it is time to strap on your seat belts, because the real adventure is about to begin.