

Tutor Training Program

Book I: Instructional Theory and Design

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Version 2.0

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INTRODUCTION

This book contains the materials you'll need during the initial tutor training sessions as well as a brief reference guide.

This first training is about learning how to “teach” as opposed to how to teach a specific subject; it is non-subject and non-level specific. It is focused on general concepts of instructional theory and design that are applicable across the entire range of programmatic offerings.

After completing this training, you will be paired with a mentor and given a first assignment; don't worry- training does not stop there.

In the Plainfield Model, additional tutor support pieces are modular and targeted; this includes subject specific professional developments, course guides, and materials. Your local program administrator will keep you apprised as they become available.

Because all programs are a little different, your local administrator will also be providing you with program specific training and orientation materials, including protocols, policy, and additional curricular resources. Similarly there may be places where your instructor chooses to make changes to the materials contained herein.

A key concept in the Plainfield Model's instructional philosophy is regular and meaningful assessment, reflection, and improvement; we model what we teach and would love to hear any comments or suggestions as to how we can better support you and your students.

This version is our first public release and we look forward to learning how we can improve the next edition.

Thank you for all you do,

Scott Kuchinsky
Coordinator of Literacy Services
Plainfield Public Library

INSTRUCTOR NOTES

Suggested training schedule

Orientation/Interest Meeting	Training Day 1	Training day 2
Have potential trainees get a taste for the different subjects, meet other members of the program, and familiarize themselves with policy, procedure, and resources	Utilize Section 1 to give all trainees a basic foundation in instructional design. Insert pieces from Section 2 ¹ as appropriate. End day with assignment to bring in a completed lesson plan for the subject matter specific day. This is the bridge between trainings. Please provide them with a program and subject appropriate list of topics from which to choose More details in Section 1	Trainees go to subject specific trainings. Make use of Section 3 materials. New tutors will present the plans they finished for homework and receive feedback from the instructor and their peers. If your program cannot support multiple subject trainings have each tutor present their completed plan to the class, and provide them with feedback. Insert pieces from Section 2 as appropriate.

We intentionally left some blank cues in assignments. Because each program, and even each training group, will have its own focus, we felt it best to allow the trainers in these cases to provide their own examples and materials. If you have a group that was only interested in tutoring ESL, you wouldn't want to have those using examples solely from math.

¹Section 2 has a lot of useful information that didn't quite fit into the structure of section 1 or 3. **We particularly recommend making use of the sections on classroom management.**

SECTION I

TRAINING

DAY I

ACTIVITY

NEW TUTOR TRAINING ACTIVITY

What questions and concerns should a teacher have while planning for a class?

There are no right or wrong answers here. This is about figuring out what your concerns are as a new tutor.

Please list below:

1. _____

2. _____

3. _____

4. _____

5. _____

LESSON PLANS ARE CRUCIAL

What you just completed was a “Do Now” for this training’s main activity on effective lesson planning.

Now that we’ve discussed those concerns, we are going to examine how they affect and are accounted for in a standard lesson planning model. What follows is a lesson plan to teach creation of lesson plans. It is a variation on the **Hunter Model** which is the gold standard for teachers and is used throughout the supplemental subject specific materials.

This training is about how to design instruction-in-general. It uses this format as a model/tool to explain concepts, illustrate instructional best practices, and to organize the preparation process. We are not, as a program, concerned with tutors creating and turning in formal lesson plans.

Many of the exercises are blank or broadly generic to allow your trainer to fill-in examples appropriate to the subjects and levels with which the group works.

LESSON PLAN ON LESSON PLANNING

Student Will Be Able To (SWBAT):

Design a lesson plan

Standards/Rationale:

Uses proper lesson planning format to demonstrate how theories of education play out in instructional design and classroom activities.

Do Now:

What questions and concerns should a teacher have while preparing for a class? **(Prime)**

Procedure/Activities:

- 1) Review **Do Now** and write answers on the board- Have class look for trends and takeaways **(Explain)**
- 2) Pass out model Lesson Plan and walk students through headings and considerations **(Model)**
- 3) Using the activities and examples in the training packet, as a class, design parts of a variety of sample lesson plans **(Do it together)**
- 4) Have students work individually to make a lesson plan to teach a skill they know **(Do it individually)**
- 5) Have the students share their plans in small groups of three while their peers fill out the "Peer Review Form" **(Guided Group work/ Peer Review)**

Closure:

Review Group's findings as a class. **(Assess and Course Correct)**

HW:

Using your peer's feedback forms, turn your rough draft of a lesson plan into a final copy. **(Implement and Assess- when collected)**

Materials Needed:

Model Lesson Plan

Make Your Own Lesson Plan Instruction Sheet/ Blank Template

Lesson Plan Graphic Organizer (blanks)

Peer Review Sheet

STUDENT WILL BE ABLE TO (SWBAT) & STANDARDS/RATIONALE

CHAPTER OVERVIEW:

STUDENT WILL BE ABLE TO (SWBAT):

Design a lesson plan

Standards/Rationale:

Uses proper lesson planning format to demonstrate how theories of education play out in instructional design and classroom activities.

- **STUDENT WILL BE ABLE TO (SWBAT)**
 - Demonstration of practical skill
 - Assesses if lesson has been successful
 - Provides frame for design

- **Good STUDENT WILL BE ABLE TO (SWBAT)s**
 - Articulable
 - Correct Scope
 - Avoids “Understand”
 - Avoids Instructional Methodology
 - Maintains focus on end not means

- **Standards and Rationale**
 - Provides Context
 - Connect lessons from class to class
 - Justifies Lesson to Teacher and Students

STUDENT WILL BE ABLE TO (SWBAT) & STANDARDS/RATIONALE**Student Will Be Able To (SWBAT)**

Design a lesson plan

Standards/Rationale:

Uses proper lesson planning format to demonstrate how theories of education play out in instructional design and classroom activities.

These two pieces generally work together; **STUDENT WILL BE ABLE TO (SWBAT)** is the articulable goal. It is a practical demonstration of the target skill, and it is how we will we assess if the learning has occurred.

Standards/ Rational usually references **CCS**² or **CCCS**³ In public schools, but is still useful if you think of it as providing context for the **STUDENT WILL BE ABLE TO (SWBAT)**. It is the justification for the lesson. Why is the articulable goal important?

We tend to start with a broader concept or topic we want to cover and by breaking it into **STUDENT WILL BE ABLE TO (SWBAT)** and **Standards and Rational** we can refine the purpose and procedure.

Knowing specifically where you want the students at the end of class makes planning easier. It's like solving a maze on a children's menu by starting at the end and working backwards.

² <http://www.corestandards.org/read-the-standards/>

³ precursor to the CCS in New Jersey

GOOD “STUDENT WILL BE ABLE TO” (SWBAT)s

- **Articulate-** It can be measured. Can the student’s complete two digit multiplication problems? The reason we want something articulable is so that we can assess whether the lesson was successful. **You don’t know they understand a concept until you see them apply it. This is a very common first year teacher mistake. We know the concept we are covering, but by forcing it to this focus, the structure of the lesson will reveal itself.**
- **Correct Scope-** The articulable end can’t be too many steps ahead of the students. While it may be where you want them to be at the end of the unit, there are probably smaller steps along the way. ⁴ You wouldn’t say "Students will learn how to use Word," you would say “students will be able to cut and paste” or whatever nested skills make up a mastery of Word.
- **Avoid “Understand” and its synonyms- Capiche?-** These are not articulable. Take statements like these and imagine how someone would “show” that they understand the concept. That’s probably a much better STUDENT WILL BE ABLE TO (SWBAT).
- **Avoids Methodology-** Don’t put how you are going to achieve the end goal into the STUDENT WILL BE ABLE TO (SWBAT). That muddies your goal and confuses methodology with purpose. Why is it important to remove methodology? Because it’s not the destination. Sure, you want to go to California; the roads are just how you get there. Focusing on the route and not the destination reduces flexibility. If there is a detour - you reroute. What makes teachers valuable is their ability to react to students.

⁴ See Break It Down for more detail

THE VALUE OF STANDARDS AND RATIONALE:

Asking yourself “why am I teaching this?” helps to create overall cohesion as skills build from class to class. Sometimes, it lets us realize when we’re actually just dealing with a “super cool” activity that doesn’t have a real place in the class.

If you can’t articulate the importance:

Why are you doing it?

How are you going to motivate your students?⁵

EXAMPLE:

Let’s look at the thought process behind today’s training.

What do I want to teach? I want to introduce a way of thinking about education so they can have a foundation in some basic pedagogical practices as applied to instructional design.

That sounds valuable, but doesn’t give us a structure.

What would demonstrate that skill? Making a lesson plan!

⁵ See Hooks for more detail

ACTIVITY:

What is wrong with the following goals? Where possible, fix and rewrite the following into STUDENT WILL BE ABLE TO (SWBAT) and Standards/Rational pairs.

1. Students will understand cutting and pasting in word.

2. Students will know the difference between “who” and “whom.”

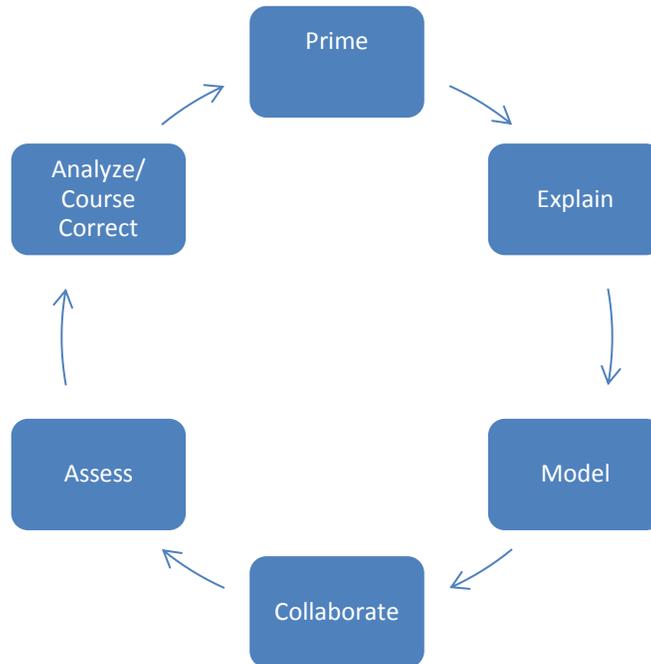
3. Students will understand the difference between complete sentences, run-on sentences, and sentence fragments.

4. Use Romeo and Juliet to explain Iambic Pentameter to the class.

5. Will use a file cabinet to explain digital file management to the class.

THE CYCLE OF INSTRUCTION

CHAPTER OVERVIEW:



- Provide context for the new concept. (Prime)
- Introduce the new concept. (Explain)
- Demonstrate the concept. (Model)
- Do the concept together. (Collaborate)
- Test mastery by having them demonstrate the concept on their own. (Assess)
- Determine whether to move-on or not. (Analyze/ Course Correct)

THE CYCLE OF INSTRUCTION

ACTIVITY: Take a few seconds and think of a lesson that you, as a student, felt was particularly effective. What was the lesson and why does it stand out to you?

All teaching and learning roughly follows a particular cycle. This makes lesson design much easier once we have isolated skill and practical application as detailed in the prior section.

1. **Provide a familiar context for the new concept** (Prime) What is this like? How does it connect to prior lessons? Why is it important?
2. **Introduce and explain the new concept.** Usually this should connect to the introduction by showing the need or use of the concept to be taught. Remember if they don't know why they should care, they won't. (Explain)
3. **Model the concept. Show them how to do it.** (Model)
4. **Do the concept together** (Collaborate)
5. **Test mastery by having them demonstrate the concept on their own.** (Attempt)
6. **Assess results.**

Did the students display mastery? Yes, then make sure they have some way to reinforce the concept at home and move-on and be sure to periodically retest them to keep it fresh. Did they not display Mastery? Can you isolate a specific area of concern? If so, address the issue and do a quick check. Did they completely miss it? Analyze how you taught the lesson and attempt a different way. (Assess, Examine, and Adjust Accordingly)

If you'll notice, that is almost how each subsection of these materials has been laid out.

ACTIVITY:

Now recall the example I asked you to jot down at the start of this section. Did it fit this pattern? If not, how did it differ?

Let's see how this theory plays out in the next few sections.

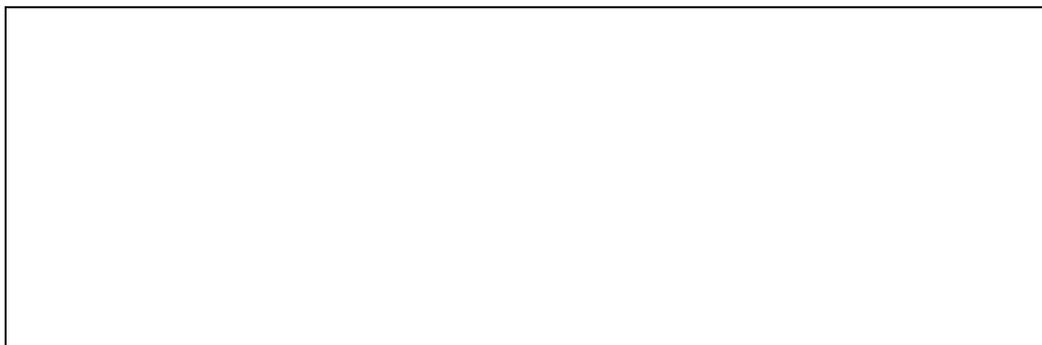
DO NOW

CHAPTER OVERVIEW:

- **Do Nows**
 - **Create Interest**
 - **Do not require information students could not yet have**
 - **Encourage deep and sustained individual thought**
 - **Bridge prior knowledge to new concept**
 - **Establish relevancy/ purpose of the lesson**
 - **Ask for production**
 - **Provide class structure**

ACTIVITY:

Think of anything you've learned well or mastered. What motivated you to do it?

**Almost all learning begins from curiosity or need**

A “Do Now” gets students thinking about why what you’re showing them is important, or it finds a way to grab their interest.

It can set-up the connection between a prior lesson and push them to think that next step, connect the new lesson to a familiar yet unrelated concept, or get them to recognize a need that the skill to be taught will fill.

It gives you time to get the class in order since they are quietly writing in their notebooks.

In the example lesson plan we are using, the goal was to show you the need for some sort of formalized prep and to get you thinking about design so you would understand how this model does and doesn’t address those concerns. Most importantly, it created relevance so that you didn’t think I was having you learn lesson planning simply for boring administrative uniformity.

GOOD DO NOWS:

1. **Do not require information students could not yet have. Don't quiz them on what you're going to be teaching.**
2. **Encourage deep and sustained individual thought.**⁶
3. **Bridge prior knowledge to new concept (Context is really important).**
4. **Establish relevancy/ purpose of the lesson.**
5. **Asks for production (they should have a notebook for Do Nows).**

EXAMPLE:

Teaching Order of Operations in Math.

Do Now: Place a mixed operations problem on the board, similar to:

$$(2 + 1) + 5 \cdot (4 \div 2) = x$$

Procedure: Let the students solve the do now. Invariably, they will get different answers. When this happens, have them each explain how this happened. They should realize that by performing the operations out of order, they have created different solutions. This sets the framework for explaining the necessity of order of operations. From there lay out PEMDAS (Parentheses, Exponents, Multiplication and Division, Addition and Subtraction) and show examples of its usage, including in the Do Now. We will skip over exponents for now; tell the students that the "E" is a placeholder for an operation they have not yet encountered.

ANALYSIS:

This is an effective "Do Now" because it connects the prior skills students have completed, addition, subtraction, multiplication, and division, to the next level of complexity. It also, shows the necessity of the skill we are teaching. Finally, because students need to know order of operations before they know exponents, we have adjusted for it.

⁶ See questioning techniques section for more information

ACTIVITY:

Let's take a look at a few example topics and see if we can come up with appropriate "Do Nows" and concerns they will need to address. How you think about crafting these is more important than the actual crafting.

1. STUDENT WILL BE ABLE TO (SWBAT): Students will be able to add and subtract fractions with uniform denominators to and from each other and whole numbers

2. STUDENT WILL BE ABLE TO (SWBAT): Use coordinating conjunctions to create compound sentences.

3. STUDENT WILL BE ABLE TO (SWBAT): Match pronouns in a sentence to their proper antecedents

4. STUDENT WILL BE ABLE TO (SWBAT): Use Pythagorean Theorem to determine the length of the hypotenuse of right triangles.

5. STUDENT WILL BE ABLE TO (SWBAT): Highlight the topic sentence in a paragraph.

PROCEDURE/ACTIVITIES

- 1) Review Do Now and write answers on the board- Have class look for trends and takeaways (Explain)
- 2) Pass out model Lesson Plan and walk students through headings and considerations (Model) Use a series of analytical questions to have the students isolate key components they should be looking for in a lesson plan.
- 3) For each section of a lesson plan as a class review considerations and either make or correct samples for topics in the session activities (see materials).
- 4) As a class and in small groups have students finish putting together a lesson plan following the Hunter Model for one of the topics in the section activities(Do it together)
- 5) Have students work individually to make a lesson plan to teach a skill they know to the class (Do it individually)
- 6) Have the students share their plans in small groups of three while their peers fill out the "Peer Review Form" (Guided Group work/ Peer Review)

You can reverse order on group work/individual, depending on the lesson, nor must you always do both.

ACTIVITY:

1. Compare the above lesson plan with the cycle of instruction chart.
2. Look at the various types of activities. What broad categories can we come up with? I.e., (group work, lecture, discussion, etc.) Thinking of activities in broad categories can help when you have Writer's Block.
3. Within these categories can we think of some other tasks that would fit?
4. Why might we choose one activity over another for different steps or in different scenarios? What are the pros and cons of each category?

CONSIDERATIONS:**1. How much time will it take? Is it appropriate for the scope of the skill?**

Throughout the guide, I've been mixing up individual work, whole class activities, and pair and group work. Each has its own strengths, weaknesses, and uses. In fact, your instructor has probably strayed from the suggested activities in response to how the class is functioning and time constraints.

2. What level of independence are the students ready for?

Do they know enough to be able to engage in the activity? Peer editing is great, but if the students don't know how to correct run-on-sentences why would it be useful for that? We don't want a blind leading the blind scenario.⁷

3. During the activity, how much support can you be providing to the class and to individuals?

For example, I could make a group work assignment on a day that I want to conference individually with students to review essays.

Because it is group work, I can be somewhat freed-up, but being able to float between groups is incredibly important to provide structure.

It might be better to save conferences for a test day.

⁷ For more information on designing effective group work and peer editing materials see Materials Needed

Activity	Pro	Con	Implementation Tips
Lecture	Fast. Easy to Plan. Some materials really can only be done this way.	Low student engagement. Hard to determine understanding. Ignores application.	Use as briefly as possible. Incorporate questioning techniques. Provide graphic organizers when possible. Make use of the board. Intersperse other activities. Use as a "launch pad"
Group Work	By placing students in the role of assessor they more fully understand the process. Some students may be more comfortable contributing in smaller group. Creates sense of "Community" Team skills are important.	Hard to hold everyone accountable. Some classes may not be mature enough to handle it. May not allow for individual assessment and targeting.	Have clear roles. Combine with a piece that is produced individually. Be actively engaged in the room. Avoid focus on production value over substance.
Independent class work.	Can allow students who are less forthcoming opportunity to engage. Allows time to meet with students individually.	Many times may be better to assign as homework.	Great in small bursts to allow students to formulate answers. BE COMFORTABLE WITH SILENCE. It means they are thinking and working. Example. Instead of going directly to hand raising tell students to write down an answer.

ACTIVITY: Fill in the blanks below with other activity ideas.

Activity	Pro	Con	Implementation Tips

CLOSURE & HOMEWORK

CHAPTER OVERVIEW:

Closure: Collect Student Work to Assess Understanding and Provide Feedback

HW: Using your peer's feedback forms, turn your rough draft of a lesson plan into a final copy.

CLOSURE

- Determines whether the goal from the STUDENT WILL BE ABLE TO (SWBAT) was successful
- Indistinguishable from "Assessment"
- Checks mastery before moving on
- Provides opportunity for course correction

CLOSURE CONCERNS

- Similar to Procedure concerns
- Is the scope appropriate to the skill?
- Will the Closure provide enough feedback to the instructor?
- Will the Closure provide clear enough feedback to the student?

Homework

- Reinforcement
- Efficient use of classroom time
- Must be incorporated into class
- Don't assign "busy work"

CLOSURE & HOMEWORK

CLOSURE: Collect Student Work to Assess Understanding and Provide Feedback

Nodding does not mean understanding.

Closure activities are how we determine whether the articulable goal from the Student Will Be Able to (SWBAT) was successful.

In many ways the term is indistinguishable from “Assessment”. Saying you can do something is not the same as doing it.

Don’t barrel on without making sure the students understand the last point. It’s a recipe for getting lost. Imagine telling someone to follow you; you turn off your cell phone, peel out, run every yellow light, and never look in your rearview. Maybe they get there, maybe they don’t, but you have lost the opportunity to pull over and help them.

Just as with Procedures, Closure Activities can take many forms; the same concerns apply.⁸

- Is the scope appropriate to the skill?
- Will the closure provide clear enough feedback to the instructor?
- Will the closure provide clear enough feedback to the student?

Activity:

What methods of assessment have been used today?

What are the pros and cons of each form?

How did the assessments affect the flow of the class?

In general, we use less formal assessments to do spot checks between more formal assessments which function as end points on groups of related / nested skills.⁹

⁸ For more information see Feedback and Assessments

⁹ Id.

CLOSURE & HOMEWORK

HW: Using your peer’s feedback forms, turn your rough draft of a lesson plan into a final copy.

Homework serves a variety of purposes including **reinforcement** and **efficient use of instructional time**.

Make sure the students understand the purpose of assignments. No one likes to feel like they are doing “busy work.”

If you assign it, it should be:

- A relevant extension of the prior lesson or set-up for the next lesson
- Collected, utilized in class, or reviewed.

Reinforcement: Learning is theory plus practice. It is always important to make sure the students have a way to reinforce the skill you worked on in class.

Efficiency of Instructional Time: Well-designed homework assignments are great for classroom management. You can shift some activities that do not require class time allowing you to be more efficient in class.

For example, if we were writing essays, the actual writing of the essay does not need to be done completely in class. That would eat a lot of instructional time. What we can do instead is shift parts to homework. For a lesson on body paragraphs, you could assign the closure, “production of body paragraphs” as homework, and pick up the next class with reviewing those pieces.

or

If we were working on a novel, we might not want to have all of the reading happen in class, etc.

Activity :

Your Instructor will be giving you topics from the previous activities for which you and a partner should design procedures and closure following the cycle of instruction.

We want to prime/prep, explain, demonstrate, attempt, assess, review. Don’t worry if they start to seem repetitive; that’s just the pattern.

Under each heading (STUDENT WILL BE ABLE TO (SWBAT), Procedure, etc.) include a brief explanation of the concerns you were addressing or the process behind the design decision.

STUDENT WILL BE ABLE TO (SWBAT):

Standard/Rational:

Do Now:

Procedure:

Closure:

HW:

MATERIALS NEEDED

CHAPTER OVERVIEW

MATERIALS NEEDED:

- Establishes Flow
- Final Review of Plan
- Preparation Checklist

MATERIALS NEEDED CONCERNS:

- Is technology available/working?
- Is there a contingency plan?
- How will materials be distributed?
- Are materials clear/appropriate/sufficient?
- Do you need photocopies?

MATERIALS NEEDED:**Model Lesson Plan****Make Your Own Lesson Plan Questions****Blank Lesson Plan****Peer Review Sheet**

This is an important section for a variety of reasons. Going back through the plan looking for these specifically makes the teacher imagine how to move from piece to piece creating smoother transitions and a prep checklist.

Consider flow from activity to activity. Walk through the class in your head. Think about a detective show; they try and reenact the crime to see what's out of place. The same applies here....though thinking of your class as a crime scene is probably bad.

- How are you going to store/distribute the documents you need for the class to minimize downtime?
- What extra things do you need?
- How will you transition between activities?

A very common first year mistake is not having all of the necessary copies together or prepared/organized in a way that is easy to access or distribute. Remember, while the office is more than happy to make photocopies, they may not be available on demand, and hence the copy request protocols (see policy and procedure for more information)

Also, it reminds teachers to verify the availability and functionality of any technology that will be used. This is particularly important with videos and computers.

IMPORTANT:

There should always be a plan B. Having a back-up plan is particularly important when dealing with technology.

Yes, most issues can be fixed in 10-15 minutes, but that is a lot to ask of a class, and there is no guarantee that it will ultimately get fixed during that period.

PRO-TIP: Wait to distribute anything until you've finished giving the relevant directions. Otherwise, students will ignore you and just read what's in front of them.

EXAMPLES:

Let's also take a look at the materials I decided to give you.

ASSIGNMENT SHEET: Basic instructions

MODEL LESSON PLAN- Gives an example and point of reference

MAKE YOUR OWN LESSON PLAN QUESTIONS- Provides an order of operations that also reinforces the larger concerns of Instructional design that the lesson was really about.

BLANK LESSON PLAN SHEET- Self Explanatory

PEER REVIEW SHEET- Creates structure for group work and avoids the blind leading the blind scenario that is a common pitfall of peer editing. The peer review sheet is similar to the Make Your Own Lesson Plans sheet specifically to reinforce the process for both reviewer and the reviewed.

ASSIGNMENT SHEET

Your instructor will be handing you a list of potential topics. These topics have been selected based on the subject specific training you will be attending at the next session.¹⁰

After picking a topic from the list, you will have to prepare a lesson plan and be ready to present it at the next session.

Your instructor may give you time this session to prepare a rough draft which you will then review with a partner.

¹⁰ Instructors note: you may choose instead to have trainees pick a lesson based around something they are personally comfortable and familiar with. In this case make sure to focus on the take-away or underlying skill/lesson as opposed to a straight how-to.

INDIVIDUAL ACTIVITY.

Please ask yourself the following questions while working on your lesson plan.

STUDENT WILL BE ABLE TO (SWBAT)/Standard:

What is the purpose of the lesson?

How can it be demonstrated?

Are there “nested skills?”

What prior knowledge will the students need?

How does this lesson connect to the needs of the class?

Do Now:

How can we demonstrate the need/ purpose of the target skill?

Are there other similar concepts the students might be familiar with?

What can they be asked to produce?

How will this create interest?

Procedure:

Does the procedure follow the cycle of instruction?

Are the activities suited to the class, time constraints, and goal?

What alternative activities could you use if the class stalls?

Closure:

How can you verify that the STUDENT WILL BE ABLE TO (SWBAT) has been met?

Will this be a midpoint check or will the lesson be complete?

How will the closure activity be assessed?

How will I be able to provide feedback?

HW:

What would reinforce the lesson?

Do you need to off-shift prep work from either after this lesson or leading into the next day?

How will I use the homework assignment?

Materials Needed:

Have you accounted for flow from activity to activity?

What do you need to make/check prior to class?

What contingency plans do you have?

BLANK LESSON PLANNING SHEET

STUDENT WILL BE ABLE TO (SWBAT):

Standard:

Do Now:

Procedure:

Closure:

HW:

Materials Needed:

PEER REVIEW SHEET**STUDENT WILL BE ABLE TO (SWBAT)/Standard:**

What is the purpose of the lesson? Can it be broken down into even further articulable steps?

What prior knowledge do you need?

Do Now:

Is it clear? Did it get your interest? Does it flow into the procedure?

Procedure:

Does the procedure follow the cycle of instruction? Is/are there missing information/steps?

What potential problems do you see?

Closure:

Does the closure reflect the STUDENT WILL BE ABLE TO (SWBAT)?

HW:

What is the purpose of the homework? Reinforcement? Assessment? Prep for next session?

Materials Needed:

Is there a clear flow from activity to activity? Are any pieces missing? Is there something else they should consider?

DEMO LESSON PLAN REVIEW

I wanted to teach you, not how to make a lesson plan, but how to use the lesson plan format as a way to structure your thoughts about teaching and to keep your classes focused on skill building.

I needed my goal to be articulable so the product was to have you demonstrate understanding by designing a plan.

I got you thinking about it by asking you to think about how you plan in general, and we were able to discuss that as a way to discover what we already knew, what we needed to address, and to have us be able to build to an understanding of the purpose of the lesson rather than just telling it to you.

I then modeled the plan while referencing back to the “do now” to keep the context and relevancy fresh. For each heading, we saw the modeled version and had some sort of activity to expand and demonstrate understanding.

Then we built a lesson as a group both so you would feel more secure, but also so I could spot any glaring issues to address

Then I had you make your own plans with some guidance and produce a piece that I could use to assess if the learning had happened and if not, how to fix it.

There was both the macroscopic loop of priming, explaining, modeling, cooperating, producing, and assessing for the final product, but even for the imbedded concepts we attempted to follow the same cycle as feasible.

There’s also a lot of flexibility in there, not only so I can address things that I realize aren’t working, but also if you ask a good question, I need to be able to give it consideration. If I refuse to deviate, it makes you feel like your input is pointless, and instead of us building together, you have no ownership of the class.

Hopefully, the main training activity gave you a fairly solid base to begin thinking about educational theory and design.

SECTION II

SECTION II INTRODUCTION

This section goes much further in-depth into specific topics. It begins with an overview of the PPL instructional model and then covers presentation of information, effective assessments and feedback, encouraging critical thinking, equipping your students to learn on their own, and classroom management.

Trainer Note:

The materials in section II can be freely adapted and inserted into parts of any of the other training days. Additionally, they can be used together as an additional training day, or simply read on their own. Please feel free to adapt, assign, and use them as best fits the needs/time constraints of your training schedule, although we do particularly recommend finding time to use the classroom management materials.

PPL's INSTRUCTIONAL PHILOSOPHY

CHAPTER OVERVIEW:

PPL's INSTRUCTIONAL PHILOSOPHY

- All learning is Instruction plus Practice followed by Assessment
- Look to provide meaningful immersion outside of class
- Focus on one skill at a time
- Strong foundations are more important than broad subject matter

PPL's INSTRUCTIONAL PHILOSOPHY

#1 THEORY/INSTRUCTION, PRACTICE, ASSESSMENT

Acquiring skills is a cycle of Theory/Instruction, Practice, and Assessment.

Imagine you were a baseball player. Just as if someone shows you proper batting stance, knowing that alone isn't enough to be effective. You still have to practice it in the batting cage.

Practicing in the batting cage isn't enough. If you aren't analyzing what you are doing and receiving feedback, the time is wasted.

It is important for both teachers and students to understand this. Often, students think there is a magic bullet; there isn't. **Unless they put in the work outside of the class, they won't make gains.**

- They won't have the fluidity with the skill to be able to use it effectively. Imagine, someone can show you a multiplication table, but until you memorize it cold, it isn't helpful.
- As teachers, you cannot evaluate whether students have learned a skill simply from their nodding. You need to see it in practice.
- By using the skill both the teachers and students can spot where an explanation was unclear and tweak it. Think about how many times you thought you understood what someone meant in a conversation, and it turns out there was miscommunication. Assent is not nearly enough.
- We aim for skill mastery, not just familiarity.

This simple structure is the bedrock for designing effective instruction. Lessons should follow this pattern and have an instructional component, a practical component, and both a demonstration and feedback component¹¹.

Your class should include time for students to practice the skills and for you to check understanding and provide feedback.

This philosophy applies to not only classroom instruction but to any skill acquisition. This same cycle¹² that we use for lesson design informs the model of analytical thinking and exploration we want our students to develop so they can learn on their own.¹³

¹¹ See Cycle of Instruction Chart

¹² See Cycle of Instruction Chart

¹³ See Analytical Order of Operations

#2 IMMERSION

This is a continuation of the practice element. We are constantly looking for ways to allow students to immerse themselves outside of the limited instructional time. Classroom teachers should be looking to connect what they've covered in class to opportunities for the students to practice and reinforce that instruction until the next class.

Meaningful homework asks students to apply the skills practically.

- If you are working on percentages ask students to calculate sale prices when they go shopping
- If you worked on activity specific vocabulary with ESL students ask them to engage in that activity (speaking to a child's teacher or asking for directions)

Extra-Curricular resources can also be difficult to find. Make sure you provide students not only with a list of activities, but also direct them to additional program resources such as open tutoring hours, or the computer lab.

#3 FOCUS- *You can't put up windows until the frames are in place.*

Sometimes the amount of ground our students need to cover can be intimidating. You can't fix everything at once.

Keep the lessons focused on small articulable pieces so that students:

- a) Don't get lost
- b) Can build from simple skills to more complex ones
- c) Can continually feel a sense of accomplishment each time they master a new skill.

#4 FOUNDATIONS/ PACING

Almost all of the skills in the subject areas we cover are just more and more complex applications of a simple set of core skills. In math you rarely need any more computation than a 10 x 10 times table¹⁴. In reading, spotting the main idea is the same no matter the level of the text, and learning grammar always requires knowing the parts of speech. Digital literacy requires knowledge of file management, etc. Take the time to focus-on and master the foundations. It may, initially feel slower, but in the long run, students will have a much easier time moving through complex topics.

EXAMPLE:

A child piano "prodigy" can memorizes a complex Rachmaninoff piece. While it is impressive, learning any other piece will be much more difficult, because they didn't learn the foundations or how to read music.

¹⁴ Really! See Teaching Math materials.

HOW TO EXPLAIN CONCEPTS

CHAPTER OVERVIEW:

Break It Down

- Look for articulable steps by actually doing the thing.
- Was there any prior knowledge you needed?
- Were there any transitions between steps that were incomplete?
- For these transitions what knowledge and skills:
 - Do your students have?
 - Can be included in the lesson?
 - Require their own plan?
 - Are tangential, but unnecessary?

Context

- Gives a framework to which they can attach the new skill / piece of information.
- Makes learning easier. Needing/wanting to know something makes people pay attention.

Paint a Complete Picture

- Everyone thinks in a combination of words and pictures.
 - Give the student a method to visualize a concept to aid in explanation.
 - Use evocative words
 - Incorporate visual aides
- Two types of images instructors can use
 - Direct: actual picture of what you are saying.
 - Indirect: metaphors, similes, and analogies.

BREAK IT DOWN

While knowing subject matter is important, being an expert is not wholly analogous to being a good teacher.

We've all had that teacher or professor who was brilliant, but couldn't explain a thing.

Teaching requires breaking down the a skill you have mastered into the component steps you may not consciously think about anymore.

Look at anything written in English.

You can't help but read it, yet you are not consciously sounding those words out. It has become so automatic, that those steps are not obvious, yet you wouldn't teach a student to read by saying, "Just look at it."

Highly skilled people "make it look easy," but expert execution isn't necessarily a good way to teach.

EXAMPLE:

Wilson, a martial arts expert wants to teach a shoulder throw. He is so fluid that students can't see the component steps. They just see the ceiling and little birdies.

Frank, a competent martial artist, though not to the degree of Wilson, is less fluid, and students can perceive all of the steps. The students are still flung about the room, but they see how they got there.

TAKE AWAY:

Fluidity comes with practice. When examining the target skill, mine the process and give the students handholds by which to pull themselves up. What steps and discreet skills are nested in the final project?

PRO TIP:

Try and explain a concept to a 6 year old. They always will ask "why?" forcing you to unearth all of the underlying mechanics.

One of the benefits to teaching is that we also improve by forcing ourselves to be conscious of the rudiments and to analyze our own practices.

HOW TO EXAMINE AN ACTIVITY TO IDENTIFY ARTICULABLE POINTS:

1. Go through the entire process. By actually doing the thing, we don't allow our brains to shorthand steps. It's the same reason detectives reenact crimes. It's why reading aloud something we wrote is such an effective means of proofreading.
2. While going through the process, narrate everything you are doing. This is even better with an audience, if you can find someone to listen. What are all of the articulable steps that would not be obvious to a lay person?
3. Was there any prior knowledge you needed?
4. Were there any transitions between steps that were incomplete?
5. Of these gaps, which knowledge and skills
 - a. Do your students already have?
 - b. Can be included in the planned lesson?
 - c. Require their own plan?
 - d. Are tangential but not necessary? It's always good to keep those explanations handy for student questions.

ACTIVITY: Let's look at some processes and determine what isolatable skills are within each.¹⁵ Please pair up with a partner and narrate completing a task.¹⁶ Use the above questions to break the task down into steps, skills, prior knowledge, and analyze what "handholds" students will need and how you will address those.

¹⁵ It can be hard to know when you've gone too far down the rabbit hole.

¹⁶ Instructor's note: This can be anything from changing a tire to making a recipe or solving a word problem. The subject matter is not as important as the process for this.

HOOKS PART I: CONTEXT IS KEY

WHY IS IT IMPORTANT?

When I was still teaching English, students would always ask why it was important. This was my answer.

Many of you are taking a foreign language. Try thinking in only that language. Do you notice how you aren't really able to think about much? Language is how we think, and our skill with it is directly related to the quality and depth of our thoughts.¹⁷

Now that we have broken the skills down to pieces that are "lesson plan sized," we need to provide students with context.

Putting the lesson into overall context :

1. **Gives them a framework** to which they can attach the new skill/ piece of information. Now instead of lessons being stand-alone and disparate the students see how they relate. Instead of looking at the composite pieces of a motor they can group it as a motor. The more connections we can make between pieces of information the more useful it is. Think of a person's memory as a filing system. Each connection is a cross reference that makes it easier to recall and relate.

It also allows for practical application. If we don't know how all of the parts of the motor work with each other, we probably can't fix it.

2. **Makes learning easier.** Explaining a skill in a vacuum is not so great. Students always ask, "Why do we need to learn this?" You should have an answer. Needing/wanting to know something makes people pay attention.

It is not a stretch to say that student motivation, is a stronger factor in student learning than the actual instruction itself.

This is usually what happens when we look at effective self-learning.¹⁸

Great teachers spend the time on effective hooks to inspire the students. The class is then working together instead of being dragged along.

¹⁷ Thank you Mr. Orwell

¹⁸ See Organic Learning pg.

HOOKS PART II: MOTIVATION

Need and interest are the two major motivational factors, and they can be used in combination.

Need: There is a practical application of this with real relevancy.

Think about people who have a medical condition or a family member with a medical condition. They many times must educate themselves on the subject. Often, without the benefit of medical school or formal training, they still develop an understanding of an incredibly complex and difficult subject .

Needs twin is fear of external consequences. Imagine the pressures associated with grades.

Interest:

That kid who can't pass math can go into deep logical and statistical analysis about their favorite sports team, because the hook was so effective for him. Here we could also flip this and use sports as a way to motivate the student to learn about statistics and probability.

Always have your hook in mind.

ACTIVITY:

Pair up with a partner and look at some classically "dry" academic subjects¹⁹. How can we create hooks for them?

¹⁹ Provided by your instructor

PAINT A COMPLETE PICTURE

Everything is obvious once it is known.

So, how are we now going to explain the concept? Often times in the material, you will see a lot of metaphors and similes.

Why is that?

The best way to learn a new concept is to frame it in terms of another concept. Metaphors allow the teacher to give the student a method to visualize a concept to aid in explanation.

Everyone thinks in a combination of words and pictures. If we just give words, it is not the complete thought. It is only the soundtrack of the movie. Think in the broadest terms of people who overuse pronouns, while they may know to whom they refer, because they are imagining that person, we have not been given the antecedent or picture.²⁰ This leaves us curiously pondering who is she that was told by her.

There are broadly two types of images that instruction can create

1. **Direct:** This would be the actual picture of what you are saying. Be mindful of clarity. Don't overuse vague pronouns. Make sure your language is specific and is actually creating the intended image.
2. **Indirect:** These are metaphors, similes, or just analogies. They are helpful when a direct image is either impossible (metaphysical concepts) or obtuse enough to require a link to a similar principle. They can also be used to simplify things. This is a helpful tool, but be aware of the limitations of imperfect analogies.

Compare:

A: An explanation of gravity using only a dry examination of Einstein's theory of relativity, and the curvature of space time.

B: Think of space-time as a mattress with lots of different objects sitting on it. Those objects due to their weight and density make a variety of indents. Let's imagine there's a bowling ball, and some golf balls, and maybe a coffee mug or two. Now if I roll a marble down that mattress, the intensity of those indents effects its trajectory by how strongly the marble is pulled to it.

While there may be some slight fuzzing of details in B, it was much easier to grasp broadly and creates a great framework to use in examining all of the fun complexities in A.

²⁰ Please see Orwell's Politics and the English Language for a much better explanation

ACTIVITY:

As a class, can we come up with effective metaphors, similes, practical demonstrations, or anecdotes for some topics²¹?

1.

2.

3.

4.

Providing all of this information or creating these images in a class may mean drawing on the board, or using words that specifically call images to mind.

Understanding that information is given and processed in multiple mediums and being able to illustrate a concept in multiple ways is the key to our next concept.

²¹ Provided by your instructor

DIFFERENTIATED INSTRUCTION

CHAPTER OVERVIEW

Differentiated Instruction

- Everyone tends to have a dominant way that they process and give information
 - Visual, Kinesthetic, and Auditory.
- Students have different strengths and weaknesses
- Differentiated Instruction is often misused
- Differentiated Instruction for instruction, not for assessment

Tips

- Separate the goal from the method. Become adept at adapting.
- Be aware of how your students seem to learn best
- Look at the subject matter in a vacuum (may be more prescriptive than class make-up)
- Find where your comfort area is
- Stay outside your comfort zone 50%

DIFFERENTIATED INSTRUCTION

This is a really big buzz term in education **that is almost universally misused**.

Generally, differentiation means that not all students learn in the same way; teachers should try to present concepts in a variety of different ways.

Just as we wanted to have different examples and metaphors,²² we also want to think of different ways to present that information. We want to maintain a classroom awareness of when the explanation is working and be flexible enough to offer different examples delivered in different mediums to make sure the point connects.

Key Points:

- A teacher's job is to make sure the transmission of information connects.
- People process information differently.
- Everyone tends to have a dominant way that they process information. Some people do better hearing instructions; some do better with diagrams, etc. There are a variety of ways to view the major "modalities" of learning, but in essence, we can simplify to visual, kinesthetic, and auditory.
- We tend to also give information in our dominant modality, because that's how we function.
- Even if people have a dominant modality it is not universally the best method for them.
- Some concepts can also be better explained in one way rather than another or with a particular balance of these things. Some information is simply easier to convey in particular mediums.

²² See prior section

EFFECTIVE DIFFERENTIATION:

Differentiation is for instruction, not for assessment. Differentiation is about how you instruct not about what the students produce.

This is where the concept of teaching to student's strengths tends to get derailed. A visual learner should not be allowed to draw a picture instead of writing the essay. They should be given a graphic organizer to help them learn how to write the essay. The skill you are trying to teach is the same; you just may need to use a different method. To say, "Well some people are good at stuff and some aren't so only make people do stuff they are good at" would invalidate the entire concept of teaching people anything.

When applied reasonably, this concept is helpful to adapt instruction to the needs of the class.

It is "How do we get them to point B?" not "How do I change point B."

Separate the goal from the method. Become adept at adapting.

Student comprehension is the goal. There are a variety of ways to present information. Be able to switch methods when the current method isn't getting you to the goal. Once we stop being wed to our plan we develop adaptability.

EXAMPLE:

you have mapped a route to the beach. You pass a sign that says "BRIDGE OUT." Do you barrel through because it's the plan? No, you change the plan; the goal was to get to the beach not to follow the specific route.

TAKE AWAY:

We always want to have a plan, but that plan was designed to be the best way to reach your destination. If conditions change, so too must the plan.

HOW:**Be aware of how your students seem to learn best and where your comfort area is**

Try to be outside of your comfort zone at least 50% of the time. Also when a lesson seems to be going wrong it's a good framework to come up with an alternate means to get a point across. If students seem lost in the discussion, use the board to draw a quick chart, etc.

Look at the subject matter in a vacuum

A subject like geography is going to dictate how information is presented far more than individual learner style.

ACTIVITY:

To wrap up our unit on explaining concepts, your instructor will be assigning each group an instructional topic. Your group should answer the following questions and present their findings to the class.

1. What are all of the necessary steps?

2. Does the topic prescribe a particular medium?

3. What are some analogies and examples we can use along the way?

4. How can we incorporate a variety of mediums into the procedure?

BUILDING LEVELS OF UNDERSTANDING

CHAPTER OVERVIEW:

BLOOM'S TAXONOMY²³

- **Levels of processing involved in a task.**
 - Recall
 - Inference
 - Critical Thinking
 - Synthesis
 - Judgment

- **Use questions to build up from one level to another.**
 - What are the pieces of information?
 - Is there a concept that holds them together?
 - How can that concept be applied beyond this instance?

²³ Many educators now use Webb's depth of knowledge or (DOK); conceptually, they are fairly interchangeable.

BLOOM'S TAXONOMY

This is a classic way to view the level of processing involved in a task. We want to build from one to another. There have been a variety of other scales such as Webb's Depths of Knowledge, but they are all essentially the same and function similarly as a tool to allow you to frame your thoughts about instruction. You may see this represented using different terminology, but the concept is consistent.

Recall- Memorization of a fact. E.g. What color was the dog in the story?

Inference- Making a justified extrapolation. E.g. What can we tell about the boy's relationship with the dog?

Critical Thinking- Given the boy's relationship with the dog how would he have reacted if?

Synthesis- Can you compare the boy's relationship with the dog to a relationship from outside the story?

Judgment- Form and defend a conclusion/opinion on the concept/work presented.

While oftentimes people are pushed to focus on the higher ends of the scale, it is important to remember that absent the lower levels, they have nothing with which to work. An opinion or conclusion absent facts is useless. It is best to use the scale as a model to walk people up to the highest level, as it builds a concept within an area all the way to a trend applicable outside the subject.

Start them off with the low level and then use your questions to move them to more complex conclusions.

Establish facts first (recall) and extrapolate from there.

This is a great template for questions. Ask for a fact and then analysis based off of it. This also trains students to always give facts with analysis.

When in doubt, ask students to consider the following questions:

1. What are the pieces of information?
2. Is there a concept that holds them together?
3. How can that concept be applied beyond this instance?

BUILDING LEVELS OF UNDERSTANDING: QUESTIONING TECHNIQUES- SOCRATIC METHOD

In critical reading, the key to engagement is asking questions; the same is true in class.

If you just give them the answer as opposed to leading them to it, they'll never be able to find it again. The questions that you ask the class should be mimicking the process of critical thinking and as such be modeling how deep analysis looks. Bloom's²⁴ is a great framework to use for asking questions in class. We want to ask questions that progressively move students through those levels.

1. Questions automatically engage by asking for a response
2. Questions model good critical thinking which is the skill underlying all other skill acquisition
3. Questions force students to look at their conclusions and unearth the underlying process that brought them there
4. Questions as a response to a student statement are much less combative than "No, you're wrong."
5. Don't get so caught up in mapping your questions that they are no longer questions but are actually rhetorical statements.
6. Allow students to answer differently than your expectations and follow up with a question as to why it differed. This is actual engagement and far more valuable than looking for a rote response.
7. A good question should be two part, the first part is a reference to a piece of information that is the basis of the question and then the analytical question. This also models the expectation that student's response will have a similar two part structure of analysis followed by support. Remember critical thinking without facts is just as useless as facts without critical thinking. Let us not create an environment devoid of either.
8. Your questioning at its core should model how to examine and draw conclusions from information. If a student's answer has a strange conclusion, use your questions to have them analyze how they got there and to point them towards the divergence.
9. An answer is not complete without both "What" and "Why."

²⁴ See above

ACTIVITY:

Please respond to the sample questions and scenarios that your trainer has given you. Are they “good” questions? Why/ Why not? How could you improve them/ follow-up on them?

1.

2.

3.

4.

ACTIVITY:

Come up with a some questions in response to the materials your instructor has given you.²⁵ As a class we will review them to see what level of Blooms they are, and how we can build from them.

1.

2.

3.

4.

Questions both assess the students and provide feedback. Questions are only one type of assessment and feedback; the next section will go into both designing effective assessments and providing good feedback.

²⁵ It's best to give them a short article. Otherwise, you could have them work off of a different section in this book.

ASSESSMENTS & FEEDBACK

CHAPTER OVERVIEW:

Assessments

- Demonstration of skill
- Clearer view of class and individual
- Correction for students
- Correction for teacher

Effective Feedback

- Finds trends
- Gives a concrete focus for the future
- Does not overwhelm
- Is appropriate to expectations
- Calls for consideration
- Builds to mastery

FEEDBACK AND ASSESSMENTS

Why are graded assignments important?

There is a reason beyond simply competitive grading; we as teachers need **feedback** to determine how effectively the lesson has been learned and whether the skill can be implemented by the student. Without those determinations, teachers cannot course correct or make sure that the students who are struggling get the help they need. While this program does not have grades in the popular sense of the term, we encourage teachers to assign and review work frequently.

1. Reinforcement and feedback.

Assignments provide the opportunity for practice and individualized feedback. That is why every lesson in the curriculum ends with some form of assessment to determine if the lesson was successful, and if not, where there needs to be additional reinforcement.

2. Individualized assessment shows you which students are not grasping material.

Often times in a class, a student who is lost will not volunteer that information or participate hoping simply to go unnoticed due to fear of embarrassment. Individual assessment allows you to see privately where your students are having problems, and where they are succeeding.

There is a variety of assessment methods that can broadly be broken down into two categories.

FORMATIVE AND SUMMATIVE ASSESSMENTS

Formative assessments check along the way, and **summative assessments** check at the end to make sure everything works. The standardized midterms and finals we use in the cycle fill those roles on a larger scale to determine where students are getting lost, which are ready for the next level, and which need to repeat a cycle.

Formative assessments can be more informal. (E.g. checking individual work while students are practicing a skill, effective questioning with summative assessments coming at the end of instruction on a particular skill.)

Without course correction along the way, a summative assessment is simply overwhelming.

We want to mix assessment methodologies. Imagine we were teaching students to write a five paragraph essay. Contained within this are a variety of elements and skills; it's a complex process. If we simply went straight through the instruction and then as the only assessment assigned a final copy of an essay, the students would feel unsure about every step of the writing as all of the steps and composite skills would be new. Similarly, by not having addressed foundational weaknesses along the way, it would be impossible for them to put in place the higher end skills required. If you make one wrong turn all of the other turns will also be incorrect.

ACTIVITY:

As a class, let's list the different ways we can check understanding.

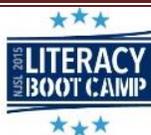
For each:

- 1) Analyze the associated pros/cons.
- 2) What would be the most appropriate usage for each?

To get you started imagine you had the goal of teaching the five paragraph essay. What are the composite skills, and are they dependent upon each other in such a way as to dictate the order in which they must be mastered? What can we do along the way for each of those skills to balance formal and informal assessments and to make sure by the time students completed the summative assessment of the five paragraph essay that they were fully prepared.

Now that we have the assessment(s), we know what was effective, and where they are lost, but we must communicate it to the students.

Assessments are only as effective as the feedback you provide. Simply saying "you got a 50%" or "try harder" is not effective. The next section will cover the essentials of providing feedback.



EFFECTIVE FEEDBACK

The most important thing is to **find trends and offer solutions**. A paper with 800 million red marks all over it is not only demoralizing, it's impossible to take anything from it other than, "I am a failure."

These are students. That implies that they are learning, and learning is a process with concrete steps.

Once a skill is learned to a specific point it requires less thought which frees the learner up to focus on acquiring a new skill. When we try and have them fix everything all at once, they cannot focus on mastering anything specifically. They are not building progressively and sustainably.

I recommend using a variant of the **Focus Correction Area** tool:

For example, prior to an essay (after working on subject verb agreement), you might tell the class that the Focus Correction Area (FCA) is Subject/Verb agreement. This way they will pay special attention to reinforcing that skill. This is particularly useful as we are building a toolbox in whatever subject area we are in and we don't want to overload students **who** are just now learning what a complete sentence is with proper use of "who" versus "whom".

You can also use Focus Correction Areas (FCAs) after an assignment by assigning a FCA to a student as your feedback. After reading a paper, you realize that while there are other errors, The student first needs to work on having clear topic sentences, etc.

You may be able to see all of the things they are doing wrong and how they can improve, but it is not about you saying "AHA!" It is about you plotting a way forward for them.

If you were giving lost tourist directions, you wouldn't just rattle off everything as fast as possible and tell them all sorts of interesting details about a landmark that they'll pass after 15 steps. They will remain lost and overwhelmed. No, you take your time, give them simple easy to follow directions, and make sure they have one step down before proceeding. Feedback is the same way.

EXAMPLE:

I had the opportunity to help out at a training for the Attorney General's Office to teach them how to conduct training of their staff. We did mock direct and cross examinations while these senior attorneys picked us apart. They were brutal, which was a problem. As the trainer told them, "You are all attorneys with many years of experience. Of course you can point out lots of things, but they can't fix them all at once. Otherwise they'd be as good as you overnight. It took you years to gain your mastery; why would you expect anything less from them? Give them one big thing to fix for when they come back; once they have that, give them another. "

TAKE AWAY:

Don't show them how far away they are from the end goal. Show them how to get to the next step.

We don't just hand students encyclopedias and say "Here you go, Doctor!" Plot a course to the peak and show students how to find handholds, and yes, when necessary point out one or two. If you just show them all the handholds, that's the only mountain they'll be able to climb!

Good Feedback, be it in class or on an assignment:

- Finds trends
- Gives a concrete focus for the future
- Does not overwhelm
- Is appropriate to expectations.
- Calls for consideration. That's right! Questions can be effective feedback!
- Builds to mastery

ACTIVITY:

Looking at the assignment prompt²⁶ and sample response essays your instructor has given you, let's provide some feedback.

Having the prompt is important. We need to know what they were asked to do to know how well they did it. Context is key.

As a class we will review the marked up essays and provide feedback to each other on our feedback.

²⁶ Your instructor will provide you with the prompt and example.

ORGANIC/ SELF-DIRECTED LEARNING

ORGANIC/SELF –DIRECTED LEARNING

- It is the acquisition of skills outside structured classroom environment.
- People regularly engage in this process unconsciously to learn about the things they like/need.
- **Learning how to engage with things you don't like is a valuable skill.** By making students aware of how they have acquired skills/information in the past, they can apply this process consciously to mastering new subjects.

A SKILL ISN'T MASTERED UNTIL IT IS PORTABLE

- Many skills can be used in a variety of contexts.
- Often time people don't realize when they are employing a skill.
- Bridge disconnect between application of skill in "fun" context with additional practical application
 - Student can make excellent arguments about favorite sports team. Apply format to drier subject.
 - Student "hates reading," but plowed through all of the Harry Potters.
 - Student can do percentages when figuring out a sale.

PROCESS

- required to solve problems, acquire new skills, and correct mistakes
- Similar to Scientific Method
- Requires Critical Thinking

MODEL THE PROCESS IN CLASS

1. Discover the problem.
2. Analyze the component pieces.
3. Determine if further outside research is needed.
4. Conduct research.
5. Hypothesize potential cause.
6. Test the hypothesis.
7. Analyze results.
8. Repeat until fixed.

WHY IS SELF-ASSESSMENT SO HARD? The Dunning-Kruger Effect²⁷.

- Accurate assessment often requires the same skills and knowledge that mastery of the skill does.
- If we can't tell great from good from mediocre from bad - it is hard to learn by comparison

²⁷ Why People Fail to Recognize Their Own Incompetence *Current Directions in Psychological Science* June 2003 12: 83-87

ORGANIC LEARNING**ACTIVITY:**

Are there any subjects you are an “expert” in that you didn’t learn about in school? Think about hobbies and areas of interest. They don’t need to be practical.

How/Why did you become an expert?

THE TAKE AWAY:

People learned things before school. Most of the things that you know you probably learned outside of the school setting. This is “organic learning.”

Analyzing phenomenon lets us better design classroom instruction.

Think about the student who hates math, but without realizing it does statistical analysis regarding their favorite sports team. The very same student may profess to hate reading, but engages in complex critical thinking while reading the sports page and uses of evidence when debating merits of particular players.

We learn about the things we like, because the goal is getting more about what we like. Context is ever-present, and because the level of engagement in the material is inherent, it doesn’t feel like a chore.

It can’t always be fun: Learning how to engage with things you don’t like is a valuable skill. Let’s just not pretend it’s easy.

This doesn’t mean every project can be disguised as their interest. It does mean that engagement is key and that providing context may help them bring those tools of engagement to different subjects.

That doesn't mean let students study/do whatever they want.

The key is making them conscious of the higher order functions they are performing both in the acquisition and application of knowledge when they are interested in something and being able to apply them to things they are not interested in.

It may in fact be that academically successful people either A) Are able to more consciously engage that level of analysis and thus can marshal the skill to any subject whether self-selected or not, or B) are not in fact any more capable of doing so, but they find academic subjects more naturally engaging so that to them, the text book is the sports page in the prior analogy.

Make the act of learning the means to a goal not the goal itself.

The student learned complex rules for a game to be better at the game- not to study syllogistic interactions. The other student learned statistical analysis for his fantasy football league - not because he loved math.

They haven't mastered a skill until it is portable.

Can you let them use the thing they like to learn the skill and then "reveal" its application to other things? Can we strip the nouns from the process so that the steps can become analogous for the drier subject?

Students don't hate reading. They hate reading things they don't like.

Every year, when I was still in the public schools the same students who had read every Harry Potter book would complain about how much they hated reading. No, they hate being bored. They love/hate reading as much as they love movies but hate watching slow black and white foreign films.

ENCOURAGING SELF-DIRECTED LEARNING

Consistently, no matter the situation, there are steps to problem solving and acquiring knowledge that are the same. Essentially, it is scientific method.

If students can master this cycle, we have “taught them to fish”. They most likely have applied this cycle to problems they innately wanted to solve, and by isolating and reinforcing these steps, this pattern of self-learning will become ingrained.

PROBLEM SOLVING

1. Discover the problem.
2. Analyze the component pieces.
3. Determine if further outside research is needed.
4. Conduct research.
5. Hypothesize potential cause.
6. Test the hypothesis.
7. Analyze results.
8. Repeat until fixed.

Whether it is for perfecting chocolate chip cookies, fixing a computer, or defeating the boss in a video game, the same steps are involved.

EXAMPLE:

I want to bake great cookies, so I get a basic recipe for chewy cookies. The results are OK.

1. Discover the problem.

I want them to be really chewy.

2. Analyze the component pieces.

First I check whether I followed all of the steps in the recipe properly. There are a few component pieces here. The recipe, the equipment, the ingredients. I eliminate for human error and double check that I followed the recipe correctly. I did. Next I verify that my oven was working properly. Finally I make sure that all of my ingredients were still good.

3. Determine if further outside research is needed.

This leaves us with the recipe. It just doesn't produce chewy enough cookies, so I'll have to tweak it. I don't know anything about baking, so while I could experiment blindly, maybe I should do some research.

4. Conduct research.

I look up what different ingredients do in baking and find out that it's the darkness of the sugar that you use that is one of the biggest contributors to chewiness.

5. Hypothesize potential cause.

I was not using dark enough sugar.

6. Test the hypothesis.

I make a new batch where I use some Brown Sugar as opposed to all granulated sugar

7. Analyze results.

The new batch is chewier, but not chewy enough.

8. Repeat until fixed.

I hypothesize that I need more brown sugar, so I make a new batch where I increase the ratio of brown sugar to granulated sugar. Then I test. Yup, Chewy. Problem solved!

To improve or fix anything we need to do this.. Now what's the first step? It's knowing that something is wrong. This is in-fact the hardest thing for students when it is not a binary such as car runs/ car doesn't. You have to know what it is supposed to do and what it looks like when it is working and what it looks like when it isn't working well. The next section addresses why this is so hard.

ACTIVITY: Think of a time you “fixed “ a problem on your own (like my cookie example).

Write out that process.

What made you do that instead of giving up or passing it off to someone else?

What discreet skills did you employ?

THE DUNNING-KRUGER EFFECT²⁸ or why self-assessment is so hard.

The Dunning-Kruger Effect is a fun piece of psychology that explains why people who can't sing insist on singing. Because they are so bad at the skill, they cannot differentiate when it's working from when it isn't. This also means they can't fix their singing because they can't, by looking at the differences between their singing and "good singing" hear what needs to be improved.

To improve we must be able to self-asses accurately, regularly , and as part of performance.

So there is a bit of a Catch-22 that you need to know enough about something or be skilled enough to be able to get the ball rolling, but absent outside forces that doesn't happen. This is why when doing feedback, we should try to always build-in guided self-assessment.

Think about the people you know who truly excel in things. They are their own worst critics.

This doesn't mean to improve students should beat themselves up, but by engaging in this cyclical process of assessment, students take ownership of the process of improving their skills.

How do we get there?

Model the process. When you do activities, do your reflection out loud. It is far less intimidating when students see that learning and improving is a constant process for everyone, and that the trait that separates successful people, from non-successful people is not natural ability nor what they already know, but the constant engagement in this cycle.

Successful People:

- Study examples and compare them to their own product
- Seek out constructive criticism and expert advise
- Are aware that they may not have an accurate self-perception
- Don't say, "Well I don't know the answer, so I better get someone to do it."
- Do say," I wonder how to fix this?"
- Don't say, "I'm good at this." or "I'm bad at this."
- Do say, "How can I do this even better?"

They don't write themselves off so easily, because they know that even if they can't do it immediately, they'll be able to figure it out. Removing the mystery of how people acquired and improved the skills in the first place is important.

Model the process with their work. For essays, have them look at a rubric and grade papers then have them grade their own work and see what they would give their papers. In math make sure they always test their answers. Self-assessment and correction should be built into every task. Otherwise, the cycle is "I try it, and it's basically a shot in the dark. Then I give it to the teacher to do all of the other stuff."

²⁸ Why People Fail to Recognize Their Own Incompetence *Current Directions in Psychological Science* June 2003 12: 83-87

TEACH PROCEDURES NOT ANSWERS

This is essentially a continuation of the prior point; you want to be modeling the method of analyzing, arriving at, and challenging conclusions rather than focusing on the conclusions themselves. Do not mistake that for any of the sort of current rubbish that facts or specific information is not of value, because you most certainly cannot do the aforementioned critical thinking without said facts.

In fact by modeling the process, you can point out the value not only of the specific information, but of having other stores of knowledge on which to draw. Often times, given the ubiquity of the internet, the ease with which information can be gained, and with such specificity as to insulate people from the horrors of accidentally finding out more information or context, people do not see the value of having prior knowledge as they can always “google” it. This ignores the basic fact that creative and critical thinking involve drawing connections between two things by analogy or metaphor. Drawing a line requires more than one point doesn't it?

People's failure to critically think may be correlated to the change in how they view information acquisition. Instead of it existing as a goal itself, it is something they look for task specifically which leads to cherry picking and confirmation bias. This not only limits the pool from which they can draw and the value of context, but also reinforces a way of thinking that is incredibly linear. It pushes students not to even think about prior knowledge they may already have since they're programmed to just draw task specifically. Of course this shallow bench limits such on demand analysis to surface level.

You should model the incorporation of prior knowledge and how to properly investigate or acquire new knowledge. Prior to the internet without the advanced search features and cut and paste, a research paper meant reading an entire book “GASP!” and then with this “expertise” being able to properly evaluate the specific information to use from the book and to actually understand and present the information's value in context.

This plays out in short instances where students will read the question for a reading passage and skim for key words treating it as a simple match round peg to round hole exercise; by not wanting to read the “filler” around it, they have tried to complete the task without having to actually learn about or process the entire piece. This produces shallow incorrect answers devoid of analysis.

CLASSROOM MANAGEMENT

Classroom Management requires clear and consistent policy, procedure, and expectations.

CHAPTER OVERVIEW:

MAXIMIZE ON TASK TIME & MINIMIZE PROBLEM BEHAVIORS

- Minimizes student focus on uncertainties that are non-educational
- Reduces decision fatigue
- Avoids perception of favoritism
- Gives students more security/freedom of action
- Establishes academic tone/atmosphere
- Models professional behavior

TIPS FOR CLASSROOM MANAGEMENT

- Distribute and review rules, procedures, and expectations at the start of the first class
- Consistently enforce rules and procedures
- Prepare and review your lesson plan in advance
- Plan flow from activity to activity
- Review the day's plan at the start of each session
- List daily/weekly tasks on the board.

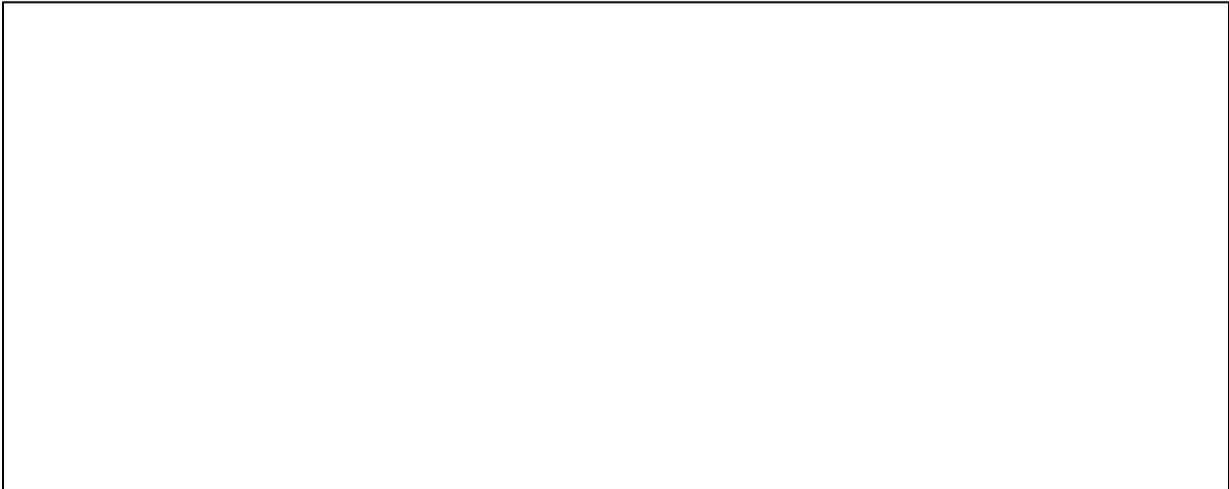
CLASSROOM MANAGEMENT**ACTIVITY:**

Think of the best and worst boss you've ever had. What traits do you associate with each?



While not wholly analogous, the relationship of teacher to student has many parallels to the employer/employee relationship.

What can we apply to the classroom environment from the prior exercise?



THE KEY TO CLASSROOM MANAGEMENT IS TRANSPARENCY.

When people do not know what to expect and what is expected of them, they have no freedom of action. When students know what is expected of them, they know what to do. When they know what the class is doing and why, they can take ownership and participate.

It is easy to have your interactions politicized by students when they do not see consistency in treatment.

DON'T HIDE THE BALL!

Have you ever been in a car with a driver who won't tell you where they're taking you? That idea seems insanely weird and uncomfortable - with good reason.

Why be mysterious and inscrutable? Let the students know the schedule. Let them know what you'll be covering that day. Let them know why it's important. Surprise is great in a movie, but it's very hard to work in the dark. I like to do a "State of the Union" every Monday. After the "Do Now", I review what the students can expect over the coming week, and I'll usually have a list of the daily and weekly tasks on the board.

When assigning anything, it's important to spend time being clear about your expectations. If possible show a model of the assignment.

Policy

An administrator I worked under once said, "I don't know fair. I know consistent."

Having rules is one thing, enforcing them consistently is far more important. It is hard. We want to treat our students as individuals with individual circumstances, but it puts you in the position of making judgment calls that again invariably will give different results for different students.

EXAMPLE:

You have established a "no excuses" for late papers policy. Tina tells you her computer died. Tina is the most honest student you know, so you let it slide. Now Mark says the same thing, but you trust him as far as you can throw him. Do you offer him the same amnesty?

TAKE AWAY: Inconsistent application and enforcement creates different rules for different people.

COUNTERINTUITIVELY: THE MORE STRUCTURE IN A CLASS, THE MORE COMFORTABLE STUDENTS ARE.

Barring extreme cases, transparent and consistent policy is your friend. Not only is it good for you, but it's good for the students. When things are neither clear nor specific, they don't know what to expect. That uncertainty gets in the way of operating in the class.

It is always worth taking time at the start of a cycle to distribute a written list of the class goals, tentative schedule, policies, and procedures. If students don't know what to expect, they have to worry about things other than learning.

MAXIMIZES ON TASK TIME

You want to automate the administrative procedures necessary for the class to function so that both you and the students can spend your time on the more amorphous and far less structured business of learning. Think about how much instructional time you save if every class you don't have to explain to the students that they should do the "Do Now" or get a text book from the back, or how they should hand in their homework.

PROVIDES FREEDOM OF ACTION AND AVOIDS DECISION FATIGUE

Think about a company with many employees. If there are no standard operating procedures, each action requires a judgment call that those individual employees not only have to make, but may not have the authority to make stick.

Decision Fatigue is real.²⁹ The more inconsequential decisions students are forced to make, the less will power they'll have to stay on-task.

IF YOU SAY IT. YOU HAVE TO FOLLOW THROUGH ON IT.

Otherwise you lose legitimacy and the students never know which edicts you were choosing to follow through on. Don't make any rules you aren't willing to enforce.

²⁹ See generally Vohs, Kathleen, et. Al. "Decision Fatigue Exhausts Self-Regulatory Resources" Psychology Today <https://www.psychologytoday.com/files/attachments/584/decision200602-15vohs.pdf>

DISRUPTIVE BEHAVIORS

Most problems are not disciplinary ones. Adult Learners want to learn.

CHAPTER OVERVIEW:

DISRUPTIVE BEHAVIORS

- Monopolizing discussion / Calling out
- Sidebar conversations
- Inattention
- Cellphone conversations and texting
- Sleeping in class
- Absenteeism

CAUSES

- Student may be unable to grasp the material or frustrated with a lack of progress.
- Student may not understand how the current activity is relevant.
- Sleep deprivation and absenteeism may be due to work and family responsibilities.
- Student may feel conflicted because spouse does not want them learning.

RESPONSE

- If the disruption is affecting the class, try to give the student a different task.
- Where possible address disruptive behavior privately after class.
 - Addressing issues in front of the class creates an adversarial situation.
 - Allows time to cool off and consider whether this was a discipline issue or a misunderstanding.
 - Provides the student with a non-confrontational forum to explain their behavior. Students who feel ignored may shut down or respond with anger.
- When waiting is not possible, take a short break to defuse and address the situation.

DEALING WITH PROBLEMATIC STUDENTS

In general Adult Learners aren't discipline problems. They want to be there.

If when people want to be there, they aren't a problem, when there is a problem, why don't they want to be there?

In most cases problem behavior is about an underlying disconnect:

- The student may be struggling and is frustrated with a lack of progress.
- The student may not understand how the current activity is relevant.
- The student may be unable to engage with the actual material and calling out is their only way to participate.
- The student may be sleeping in class because they just worked a double shift.

Remember, you are there to help the students.

You can't help them without finding out what they need.

No good ever comes of forcing a confrontation:

- If the disruption is affecting the class, try to give the student a different task until you can speak with them after class. **As always, please reach out to the office if you feel overwhelmed**
- Unless the situation has escalated to the point of being a danger it is best to **address these situations privately.**
 - Addressing disciplinary matters in front of the class automatically paints an adversarial relationship.
 - It doesn't give you, the teacher, a chance to cool off and to evaluate whether this was truly a discipline issue or possibly a misunderstanding
 - It doesn't provide the student with a comfortable forum to actually explain their side. If they feel you aren't hearing them out or listening to them, they will just shut down.

CONFLICT RESOLUTION

When I was in principal school, a professor said something very simple and very true. He asked the class to remember past conflicts with people. Then he asked, “How many of those turned out to just be complete misunderstandings?”

He was right. The majority of the time, had we just stopped and asked what they meant or explained what we had perceived they had meant, they would have been able to clarify and correct and the situation would have been diffused. Miscommunication is much more likely than malice.

No one has ever uttered the phrase, “I wish I had been angrier when I did that.”

PROBLEMS SPECIFIC TO ADULT LEARNERS

While Adult Learners rarely cause disciplinary problems there are many other difficulties specific to the group.

Pacing/Patience – This is perhaps the hardest part of working with adults. Many times our and their expectations are out of line with reality. There is a persistent fallacy that because the skills being taught are associated with school age children that adults should just “be able to get it.” That is a rather generous view of the amount of school age children who actually are proficient in these skills.

- The PIAAC (Program for the International Assessment of Adults) consistently shows that the average American has major gaps in basic skills when compared to other economically similar nations.³⁰
- Selection bias says that those students that are in this program are more likely to have had problems with acquiring these skills in the first place. Many times these students have learning disabilities that were not flagged when they were originally in school.
- A school age child in New Jersey is given approximately 32.5 hours of classroom instruction a week and over the course of a school year is expected to advance one grade level. Many times the adults in our program are attempting to make far greater gains in far less time with far less instruction.

These factors and incorrect perceptions lead to an atmosphere that can easily frustrate a student.

Let’s go back to not hiding the ball. Let your students know the difficulty involved. The flipside to this patience is to still have expectations.

It is not, “this is hard, so whatever.”

It is, “this is hard so you better work your butt off.”

Don’t get upset with them because they don’t get it. Get upset when they don’t put in the effort.

While sometimes the perception that this should be “easy” leads to self-doubt and shame, it also can make students think there is some magic bullet, and they’ll make great strides with little sweat. Sometimes they even hold both views simultaneously.

³⁰ See generally <http://www.oecd.org/site/piaac/>

Be patient but firm. Temper their expectations, and give them mile markers. Many times they can only see the large goal of getting their GED or becoming fully fluent. If you use that binary world view, then each day you don't reach the top is a failure as opposed to a step along the way. Just as for instruction we want to break tasks into articulable steps; make sure they understand the same applies to their progress.

Finally, the most difficult part of dealing with adults is that, they are adults. This is not meant to be flip.

They have adult responsibilities.

They have children of their own to take care of. They have work. Many times because of the skill and credential gaps, this work is sporadic or consists of multiple jobs cobbled together leaving little stability in the schedule. That makes it very hard for them to commit at the levels necessary. It is very difficult to balance an understanding of those realities but holding firm to work and attendance expectations.

These are the same reasons this work is important.

Remind them that while their children will take up their time, investing in the program will ultimately benefit their children.

They are serving as an example for their children.

How would your students react if they found out their children weren't doing their homework? Students can model good study habits at home by doing their homework while their children are doing their own assignments.

SECTION III

HOW TO USE THE SECTION 3 MATERIALS

The students will be bringing back in lesson plans to demo and work on; **these should be the focus of the day**. Each trainee, at some point in the day, should demo their lesson for the class and receive feedback. There are a variety of ways in which they can be incorporated into this session.

The purpose of this day is not just to give them some teaching strategies, but to let them practice all of the teaching skills they worked on in day two. Many of your tutors will not have any prior classroom experience, and spending the time letting them practice and get feedback is the most effective use of their time. Remember, content based instruction and content specific strategies will be woven into your feedback, but by basing it on their performances, you are giving them a practical framework and actively engaging them in the process.

While content specific strategies and knowledge are important as well, it is simply impossible to cover everything that is important in a matter of days. The program was designed with an eye to getting tutors classroom ready as fast as possible with a foundation that additional trainings could build off of as they begin tutoring.

Your day should include:

- **An intro activity** -we have included a sample activity for each subject.
- **The students teaching their sample lessons to the class**- Make sure to build in a cycle of feedback and workshopping with the rest of the students. This should be the bulk of the day.
- **A follow-up on the original demonstrations**
- **A review of available additional resources**- We have provided a list of helpful resources but obviously could not speak to what your program specifically has.
- **An explanation of core, foundational aspects of teaching these subjects**. They will have access to a lot of support and in-depth information through the course books, teaching materials, their mentors, etc.³¹ Resist the urge to try and cover everything in one day. Stick with large guiding concepts. Refer to day two's constant mantra of building foundational skills in a logical order. It would be a bit ironic for us to throw that out the window now. They will always be able to add on top of that with the continued support your program will give them. **Do not overload them with all of the intricacies of the subject when they have yet to get comfortable standing in front of a class.**
- Leave the students with the next step. Try and get them to connect with each other as a support system, and let them know when and what additional training and support will be available.

³¹ Each of the major subjects could be covered for weeks, but because of time limitations we brought it to a practical demonstration and feedback. In the near future we plan on releasing subject specific course guides with additional subject specific materials and lesson plans.

While this should not be the focus of the day, we have included for each subject:

- An overview of the key concepts you should cover.³²
- A collection of workshop activities
- An overview of our course structures and subject area skills.³³
- General hints, tips, and strategies for approaching the subject.

The materials have a much less linear structure than the day 2 materials. Subject specific lesson plans as well as more detailed analysis of specific content area skills will be available in the PPL course guides (publication date TBA). We will also be updating this section in future versions.

We are currently working on subject specific course guides to provide you with even more support.

³² These tend to be a mixture of teaching strategies and how to approach the subject broadly.

³³ Even if your program does not use the same breakdown, these lists function as the isolated skills that the tutors should be covering in whatever order best fits your program. Additionally, we are in the process of producing sample lesson plans for all of the skills listed. Please be patient and we will notify you as soon as they become available



DAY 3 MATH MATERIALS

MATH

Math Training Specific Notes: While Math is a very broad subject, and we have included a variety of notes in the packet, what is most important is to keep the students focused on the following core principles. You may also choose to use this sheet as an outline during your training. There is more information on each of these concepts within the training materials.

1) Math is two specific skills - Computation and Mathematical reasoning.

- You must know computation.
- You only need 10×10 (The power of 10)
- No calculators!
- Mathematical reasoning is the language of thought
- Math is malleable
- Everything is Algebra.

2) There is nothing to fear (or) Math is math is math

- Scary looking math is just shorthanded values (there is only one operation)
- Have a plan!
- Keep it visual!
- You use Math all the time!

3) Connecting Mathematical Concepts

- The “Amazing Times Tables”
- There is a purpose
- Using the Scientific Method to discover Math

MATH INTRO ACTIVITY

Note to instructors: We have included three classic riddles. These are great intro activities. Pick which of these riddles you feel most comfortable with, or that you feel would be best for the room; feel free to substitute in a different riddle. Not only are these entertaining and a great way to break the ice, but we can use the riddles to bridge a few major points about math.

- a. Math can be fun. Math is the easiest subject to gamify. I once knew a math teacher who ran an in-class Dungeons and Dragons campaign to teach probability amongst other mathematical concepts.

Try and key into what made these riddles more fun than straight problems. They were certainly more complex than the average world problem, yet people were far less scared to engage with them.

- b. All math is a puzzle. All puzzles work in this manner. They take place in a closed system. It is how we use the information that we have been given to discover the information we haven't. Think about geometry, algebra, Sudoku, even a jigsaw puzzle. This same process underlies all mathematical thought..
- c. Mathematical thought is problem solving. We had to use logic to get through these riddles! Colombo was more a mathematician than anything else.
- d. Visual aides are key whether it is keeping track of physical or chronological order. Trying to explain these complicated reasoning charts without a graphic is almost impossible. The same is true for math. We always want to lock the concept to a concrete image. Many times the gap between students is their ability to visualize a mathematical concept.

MATH INTRO RIDDLE 1

"Einstein's riddle³⁴".

There are five houses in five different colors in a row. In each house lives a person with a different nationality. The five owners drink a certain type of beverage, smoke a certain brand of cigar and keep a certain pet. No owners have the same pet, smoke the same brand of cigar, or drink the same beverage. Other facts:

1. The Brit lives in the red house.
2. The Swede keeps dogs as pets.
3. The Dane drinks tea.
4. The green house is on the immediate left of the white house.
5. The green house's owner drinks coffee.
6. The owner who smokes Pall Mall rears birds.
7. The owner of the yellow house smokes Dunhill.
8. The owner living in the center house drinks milk.
9. The Norwegian lives in the first house.
10. The owner who smokes Blends lives next to the one who keeps cats.
11. The owner who keeps the horse lives next to the one who smokes Dunhill.
12. The owner who smokes Bluemasters drinks beer.
13. The German smokes Prince.
14. The Norwegian lives next to the blue house.
15. The owner who smokes Blends lives next to the one who drinks water.

The question is: who owns the fish?

³⁴ This riddle has been around for a very long time, and I could not find an original publication. Instead I borrowed a copy of the rules from <http://www.iflscience.com/editors-blog/solving-einsteins-riddle>

RIDDLE #2 THE ANTARCTICAN PRISONER

The guards in the Antarctic prison system like to play games with their prisoners. In this particular game, the rules are as followed.³⁵

The prisoners will be lined up as in the diagram below.

After being lined up, they will all face the wall.

The prisoners are shown 4 hats

2 black and two gray

A guard will place either a black or a gray hat on each prisoner.

The prisoners cannot see their own hat or the hat of anyone behind them.

They can only see the hats of the people in front of them, and they cannot see through the wall

If any of the prisoners can correctly guess the color of the hat they are wearing, then all of the prisoners will get ice cream.

If a prisoner guesses incorrectly, they will all be tazzered. Ice cream, as delicious as it is, is not worth getting tazzered, so no prisoner will guess unless they know the answer.

The prisoners will be tazzered if they do anything other than declare the color of the hat they are wearing.

Which prisoner knows what hat he is wearing and why?

						Wall		
A		B		c				d

A can see B and C

B can see C

C can only see the wall

D can only see the wall

RIDDLE 3: THE MONTY HALL DILEMMA

³⁵ I did not write this. I have no idea where this puzzle originated. I heard it from a fellow student in high school. I am unable to find the originator of the riddle.

Suppose you're on a game show, and you're given the choice of three doors: Behind one door is a car; behind the others, goats. You pick a door, say No. 1, and the host, who knows what's behind the doors, opens another door, say No. 3, which has a goat. He then says to you, "Do you want to pick door No. 2?" Is it to your advantage to switch your choice?³⁶

³⁶ This riddle was popularized in Marilyn Vos Savants column in 1990

INSTRUCTOR'S NOTE: SOLUTION TO EINSTEIN'S RIDDLE

1	2	3	4	5
Yellow	Blue	Red	Green	White
Norwegian	Dane	Brit	German	Swede
Cats	Horses	Birds	Fish	Dogs
Water	Tea	Milk	Coffee	Beer
Dunhill	Blends	Pall Mall	Prince	Bluemasters

Be sure to walk students through all of the logic involved in grouping and eliminating. This is basically solved in the same manner as a Sudoku.

Remember by determining what cannot be in each space, and that we are drawing from a limited pool, this is fairly easy to solve. It's a great reinforcement of the closed environment concept that is math. Remember all the information is there it just has to be uncovered and sometimes this happens by plugging in a variety of options and testing solutions as well as eliminating options.

Additionally, we can't solve the entire problem at once. It required breaking it into small enough pieces to work on independently such as what can we tell about the order of the houses. We want to do the same thing with word problems and complicated geometry and systems of equations. There may be multiple unknowns. What is the first thing we can solve, and how does that information bridge to the next unknown.

- 1) We have to start with the fact that the Norwegian is in the first house.
- 2) If the Norwegian lives next to the blue house then Blue must be #2.
- 3) If Blue is #2 because green and white are paired then we know they must be house 3 and 4 or house 4 and 5.

Just like filling out a Sudoku, what it can't be is just as important as what it can be.

We fill in what we can, and we eliminate what we can. Following this one at a time process makes even the most complicated problem quite simple.

INSTRUCTOR'S NOTE: SOLUTION TO THE ANTARCTICAN DILEMMA

Do not comment on the answer until provided with both which prisoner and why. **Otherwise students will just start randomly guessing.**

It is prisoner B in the middle.

Why?

Prisoner A said nothing.

There is a finite number of arraignments. Let's look at all of the possibilities that B knows could exist

Option 1



Option 2



Option 3



Now if option 3 existed Prisoner A would immediately yell that he was grey. The two black hats would be accounted for. Obviously if two hats of the same color were visible he would have to be wearing the opposite. Since he says nothing prisoner B must realize that his and prisoners Cs hats are different meaning that Prisoner B is wearing a gray hat.

Logic, reasoning, guess and check, process of elimination. These are all skills we use to solve math.

Obviously in all options Prisoner C is wearing black, because B knows that.

INSTRUCTOR'S NOTE: SOLUTION TO THE MONTY HALL PROBLEM

The Monty Hall Dilemma was pretty hotly debated, but yes, you always want to switch.

Remember when explaining that the key is the initial pick not the secondary pick. Show the options for whether the initial pick was right versus wrong.

Because Monty was never going to show a car on turn one, all we get is more information about the two doors that were not picked. We get no new information about the door that was picked. This is why the probability changes for the door that is left.

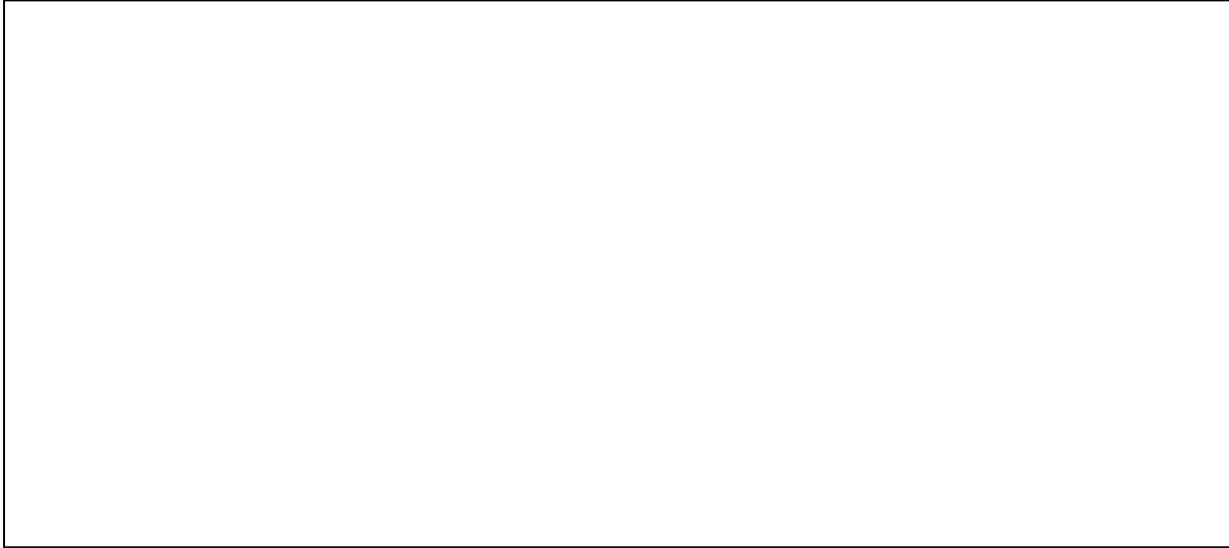
That forcing of his hand shifts the probability just slightly higher when we shift in response. Because we know more information about the new door which is now a true 50/50 as opposed to the door you originally picked.

This problem really suffers if they don't think in the alternative. Remember though the point was to engage in logic and reasoning and not necessarily to come to a consensus on the problem.

This one is pretty serious.

MATH ACTIVITY:

Let's think of some examples of using mathematical reasoning that you use on a daily basis.



Here, it is most important to isolate a few major concepts

1. The type of basic math we do on a regular basis is frequently more complex than what we see in the problems in class.
2. When using Math in daily life, problems are far easier, somewhat because it is disconnected from the fears about Math, but also because there is a clear concrete connection
3. If this is the case, then these analogs are great to use in class. It is quite often that a student can't work with decimals yet has no problem with dollars and cents.

INTRO ACTIVITY: LAISSEZ LES BON TEMPS ROULEZ

INSTRUCTORS NOTE: To play this game you will need a good mix of dice. Try and find D3s, D6s, D10s, and D20s.³⁷ It's a great way to focus students on mathematical thinking. While great in this teacher training, it's also a great tool in the classroom.

To play this game, one person rolls any of the dice. This is the target number. Then that person rolls all of the other dice and these are your "tools". Place all of these numbers on the board and set a timer. The class will write as many different equations as they can using those tools to create the target number. The student with the most distinct equations wins. Use some judgment on how much variety is needed to count as distinct as the ways to "game" this are numerous.

To add more challenge and structure

Easy Variations:

- How many of the tools are used
- Whether a number can be used more than once,
- Specific operations that must be included
- How many numbers can be used from outside the pool (amount or ratio)

What are the take-aways?

1. Math can easily be gamified
2. There are many ways to get an answer. The focus is on the process of moving things around.
3. Equations are immensely malleable. When we are stuck, try and shift things around to see a problem differently
4. Everything is a value, but is it currently in its most simple/ optimal form for what you need?

Math is a toolbox to solve problems presented. It is not a map. Just like examining any problem, if the way to solve it were immediately apparent, why would they need you to fix it? More of math is about figuring out how to solve the problem than solving the problem. The last part is the easy bit. It's also the only part a calculator can do for you (**which is why they are not as useful as people make them out to be.**)

³⁷ If you already own these, pretend I threw in some smack talk about your lv 19 half-elf Bard.

WORD PROBLEM ORDER OF OPERATIONS

This next section deals specifically with how to deal with and teach Word Problems. We have also included some helpful handouts for you to use with your students. Why are word problems so important?

1. The majority of Math problems in a testing situation are now word problems
2. Word problems are how we engage the mathematical reasoning portion of mathematics. It is much more about creating equations than solving them.
3. Word problems are how we show real world application of math. This establishes relevancy.
4. Word problems are more easily identified as puzzles and are more engaging.
5. Word problems create a visual overlay to the underlying math which eventually makes them much easier for students to work with.

Teaching word problems

There is no spoon– Lana & Andrew Wachowski

Why are word problems hard?

1. The wording is confusing
2. They're not "real"
3. They aren't about the math.
4. Most students do not apply math to real life situations
5. Many students are not English Language speakers

Retrain your students

No calculators! Working without calculators increases numeracy. Numeracy leads to thinking about the world mathematically. That's what word problems test.

Everything is Algebra. Even if you are doing simple addition, subtraction, multiplication, or division, you should represent it horizontally with X where the answer is. This gets students thinking about what an equation is, and makes the leap to actual algebra much less scary.

Everything is Algebra Pt. 2 Word problems ask you to construct algebraic equations one piece of information at a time. Each object is a variable and each verb is a sign (see sheet). You may have multiple equations showing relationships between variables. That's okay. The most important skill is being able to interpret words into math.

Find real life examples that can become word problems. Frustration is less overwhelming when students see there is practical application to the skill

Dabble in some basic logic. Formal logic is essentially turning arguments into Algebra or as we like to call it.... Word problems.

The key to navigating word problems is the ability to translate words into mathematical symbols

SIGNAL WORDS FOR WORD PROBLEMS

Words that Signify SUBTRACTION :	
Decreased by Minus Less Difference between Difference of More than Less than Only	Fewer than How many more How much more Left Remain(s) Words ending in "er" (fewer, lower, shorter, faster, etc) Take away
Words that Signify ADDITION :	
Increased by More than Combined Together Total Total of Sum	Altogether Both In all Additional All Another Added to
Words that Signify MULTIPLICATION :	
Of Times Multiply by Product of Increased by Decreased by Factor of Every	At this rate In all Total Each Doubled Tripled Quadrupled
Words that Signify DIVISION :	
Each Equal Equally Per Percent (division by 100)	Separate A Ratio (of) Quotient (of)
Words that Signify EQUALS :	
Is Are Was Were	Will be Gives Yields

THE ORDER OF OPERATIONS FOR WORD PROBLEMS (WITH MANY THANKS TO DAVID DUNCAN)

1. What is the question asking for? This is X
2. Specifically what is it asking for? Is it in feet, centimeters, minutes, etc?
3. What are the givens? What information do you have? Can they be represented as equations?
4. What information is pertinent?
5. Will you need to convert anything?
6. Are any specific formulas needed? (Area of a circle etc?)
7. Write the Problem
8. Can you make any estimates? This is really important.
 - many times in a multiple choice situation this allows easy elimination
 - by engaging the tools we use to estimate, we sometimes find it easier to approach solving a problem in a less pressurized situation
 - We have something to reference back to help double check our calculation.
9. Complete the problem (This usually means making x all by itself on one side of the = sign.)
10. Check your work.

Let's apply this checklist to a problem!

Your instructor will be giving you a collection of word problems to work through. While some of steps may seem excessive for the complexity of the problems or simply non-applicable, it is important to check each of these steps even where not necessary to determine if they are. For example not checking whether conversion is necessary can be problematic when it is. Additionally, while you may be able to shortcut some of these, for this exercise, and in general, the answer is less important than analyzing the process. In this exercise, your instructor will be asking the class to walk through each step when giving answers.

THE AMAZING TIMES TABLES

The nexus of all of these concepts is the consistent use of the times tables. Yes, that sounds crazy, but every concept we will be covering in this program can be built and explained using it.

NUMBER LINES



This is fairly straight forward, but what do we do when we need to count more than ten? We add another row. Essentially, it's like an abacus, with the X axis or your original number line limiting us to sets of 10. This concept of how many "sets" is important.

TIMES TABLES For Counting sets of tens

So if we add another row on top

We can still count. So 13 would look like this

Or 1(rows up) 3 (rows over)

Since straight counting is in base 10, simply going across works. Now what happens when we change our base? Well, if I wanted to work in sets of 4 and I had to count 17 what would I get?

COUNTING IN SETS OTHER THAN TEN OTHERWISE KNOWN AS MULTIPLICATION AND DIVISION

First, we find 4 and set a mark, because each time we hit that we start a new set, or a new line.

Now, let's fill in.

So we got 4 sets of 4 and 1 remaining or essential 4 remainder of 1, Yup that's right we just did division.

What if I wanted to know how many units I'd need to fill 5 sets of 6?

Same deal, I'd find 6 and go up 5 levels

Now that would take a really long time to count so we might as well fill in those values.

Once we fill in those values, we have a times tables, and now that those values are there, look how much easier it is to do the division we did earlier.

Let's look at the same problem from last time, 17/ 4 We start the same way by finding 4 on the x axis and then we move it up to the closest number without going over 17. We see that is 16, which is 4 levels up, so we got 4 sets and then remainder of 1

FRACTIONS

All we're doing for fractions is essentially the same thing we did for multiplication and division. It's all about changing the "base" from 10 to whatever the fraction is. Keep in mind that division and fractions are completely interchangeable.

PRIME NUMBERS

And what about the numbers that aren't on the times tables? Well, if they are under 100 and still not on the table, then they are a prime number; that's why we learn prime numbers so we don't go nuts looking for them. A prime number signals that you are (probably) done simplifying.

NEGATIVE NUMBERS

Now, let's go back to another concept, now that we know to look at number lines as either the x or y axis of a times table. What about when we do negative numbers? We are simply extending the number line over the 0. Some people use the metaphor of traveling on a road, but I find using a hot air balloon's rise and fall works well so we'll use a vertical line and talk about adding hot air or ballast (negatives).

CARTESEAN PLANE

Now, what happens when we extend both our x and y axis of our times tables to show negative numbers? That's right, we end up with a Cartesian plane which we use for graphing. We can also use the graph to show students how to remember what happens with positive and negative multipliers by labeling the quadrants so they know what happens if their answer falls in it.

GEOMETRY

Of course this explains how we get to graphing on this, but let's now look at the other major subject we cover which is geometry, which we can also do completely on a times table because..... we just saw it's a graph, and it even transfers. The key to geometry is to remember that all of it is based off of the area formula for a rectangle..... which is just a straight multiplication problem..... because we are drawing a box from the base to the amount of sets see prior. Add up the amount of boxes covered and you have your answer. All of the other geometric formulas derive from how those shapes fit within a rectangle.

GOING TO 11.

All of these concepts work no matter how far up or down we scale things. Imagine if within one of the boxes on the times table, we put another 10 x 10 box. Since there is a hard connection now between shapes and numerical values which we derived from establishing that multiplication and area of a rectangle is the exact same here, All of the stuff we've done still works. Watch what if we had a

rectangle with side lengths of 3.2 and 4.2? Well, the multiplication still holds. And to measure it out on the times table we'd just need finer and finer breaks.

COUNTING

The disconnect between boxes when counting by hand verses the number already written into the chart is because, the numbers written in the time table only line up when there is a perfectly full set with no remainder that we are counting. It is difficult for people to remember that our horizontal is the base with our vertical giving the amount of sets of the base and our top line gives the remainder. It becomes easier to see when you think in sets of 10 which just happens to be what we usually work in.

SUMMATION

All math can be visually represented. We can measure multiplication.

Addition is the only operation. We just need to think of it in sets. It's just normally that we are working in sets of 10 or 1

Everything is a fraction. Normally, it's just over 1 and percent is over 100.

Everything in math is connected and can be represented on a times table.

MATH SKILLS ARRAY

CCS MATH GOALS	
Make sense of problems and persevere in solving them.	Use appropriate tools strategically.
Reason abstractly and quantitatively.	Attend to precision.
Construct viable arguments and critique the reasoning of others.	Look for and make use of structure.
Model with mathematics.	Look for and express regularity in repeated reasoning.

PREREQUISITES FOR MATH I all without calculator ³⁸	
Addition of Two Digit Numbers	Subtraction of Two Digit Numbers
Times Tables to 12	Division corresponding to Times Tables
MATH I	
Order of operations and mixed problem	Using 0
Negative numbers	Decimals
Fractions	Percent
Exponents Part I	Radicals part I
Single Variable Equations Part I	Number Lines
Interpret Bar Graphs	Interpret Circle Graphs
MATH II	
systems of equations	Mean, Mode, Median
Probability	perimeter of regular quadrilaterals
perimeter of a triangle	Area of squares and rectangles
Area of a right triangle	Surface area
Area of Polygons	Area of circles
Volume of squares and rectangles	Circumference of circles
Pythagorean Theorem	Pi
Cylindrical, conical, and pyramid volume	
MATH III	
Line and dot graphs/Intro to Cartesian plane	Pythagorean theorem – distance formula
Complementary and supplementary angles	Arc length
Parallel Lines and angles	Quadratic equations
Binomial theorem: Foiling	Binomial theorem: factoring

³⁸ If students cannot pass this prerequisite they will work in academic support to master their times tables.

LOOSE MATH HINTS, TIPS, AND FOCI

With thanks to Steven Bennet for significant contributions and editing

Underlying Issues in MATH

1. *Math-phobia has reached epidemic proportions and standard methods of presentation are a factor in this.* Our approach is a little different. Math has too often been treated as input/output computation with logical reasoning skills left as a mere subset of the tools. Logic is at the core of mathematics. By focusing on mathematical reasoning in our lessons, we hope to encourage active problem solving. This will lead to students developing the ability to find their own methods to solve mathematical problems, and will also apply to other aspects of their lives, aiding in an understanding of science and writing. Logic can, and should, be applied to most everything else.
2. *Students have trouble understanding what the math they are doing means.* Visualizing a concept underlines students' comprehension of the subject. It is far easier to understand a bike shed than a nuclear reactor, but at some point we will have to build from one to the other. By showing how these theories work by incorporating extreme enumeration of steps as well as basing many explanations on the times tables, they will be able to move on. Everything in math can be represented visually!
3. *Math is a marathon, not a sprint.* Native English speakers cannot look at a sentence in English without reading it. You do so now without any awareness of the underlying process. It is sometimes the same with math. The reasoning involved in the individual steps blends together – which is fine for those already versed in the subject, but tends to lose others. By isolating, in as much detail as possible, the ways in which numbers can be used at the simplest level we hope to train students to think in mathematical patterns; There really are only 10 numbers and one operation, it is the ways in which they are combined that adds complexity.³⁹ If you can do it with integers, you can do it with decimals.

³⁹ Don't worry, we'll get to that.

KEY CONCEPTS IN MATH

1. YOU WILL/DO USE THIS! MATH IS THE FORMAL LANGUAGE OF THOUGHT!

You and your students have always been doing Algebra!

Math is really a way of thinking that is easy to work with: numbers are quantifiable and the reasoning is explicit. The same reasoning that we use to work with math is the same way we solve problems in real life and in many cases mirrors how we think through problems.

Consider this idea: *All Math is balancing scales, which we do through addition and subtraction.*

If you need to weigh a cat, you put the cat in a carrier and put the carrier on the scale. You then minus the weight of that carrier from the total weight. Most of us would have thought to do that, but what did you really do?

Carrier + Cat = Total

Cat = Total - Carrier

You just may not have thought of it in those terms, but you created an equation and removed things from it to determine the unknown weight of the cat, or if you're feeling mathy, "x"! At a very practical level, you just performed algebra mentally.

By realizing that we already engage regularly in mathematical reasoning; we are simply taking those concepts and isolating them, they can be applied to other scenarios as well. This also means the more we exercise mathematical reasoning, the better we can apply those same analytical skills to non-mathematical scenarios.

Even when multiplication and division come in, we are still doing the same thing, but scaling up the ratio! We know that if ten uniform bricks weighs 100 lbs in total, one brick weighs 10 lbs. What did you do?

$$10B = 100 \text{ lbs}$$

$$B = 10 \text{ lbs}$$

And we know this works because if we were to subtract one brick at a time, we would have to subtract 10 lbs each time to keep the scale balanced. It's applying a ratio in changing the scale of a recipe. If you knew that for a particular drink you were told three parts of Cola for one part of grenadine, and you wanted to make five drinks, you would simply multiply the parts by five!

What we did there still maintained the key concept that math is a balancing of scales. If we know what one side totals out to we can shift to find what's missing. Again this is "X".

Once we understand we are in a closed system, it's just shifting and rewriting things to make them fit!

Algebra is less a subject and more a tool. The PPL's model of teaching uses algebraic expressions and equations as its backbone: we treat everything as algebra, because mentally it effectively is.

Algebra will become more complicated in time, but in these early steps, it should match intuitive mathematical reasoning. Understanding the concept of what Algebra is and getting rid of that fear is a huge step in understanding math. This first lesson will combine letters and numbers into very simple mathematical equations.

Place a few single operation equation on the board, such as

$$9 + 5 = ? \qquad 12 - 10 = ? \qquad 2 + 3 - 1 = ? \qquad 1 + 4 - 2 = ?$$

Review and replace all "?" with "x" after the equal signs. For example,

$$9 + 5 = x$$

All X does is stand in for what we don't know. We use letters as opposed to the ___ they are used to, because there may be situations where we need more than one piece of information and you can't tell ___ from __. it is hard to represent applying operations to question marks.

Now take the problems and show them with X in a different spot ie.

$$9+X= 14 \quad X-10= 2 \quad , \text{ etc.}$$

Place these under their counterparts. Students should have no problem solving these and we have made the jump from simple arithmetic to algebra (which was really the same thing all along.)

Why is algebra so important? It is the tool that people use in the real world, sometimes without even realizing it, expressed on paper. The world rarely asks you to perform math by giving you a nicely written out operation. We need to find something out when we use mathematics. By writing out the relationship of the information we have (shown as numbers and operations) with the information we need (shown as x, y, and any representation of a variable or unknown term) people craft a mechanical process that can be used to solve the problem. From here we will build the closed system concept by treating the equals sign as meaning well, what it is, equal- just like balancing a scale.

2. MATH IS A COMBINATION OF TWO THINGS: COMPUTATION AND LOGIC

In some ways, the study of mathematics can be broken into the computational aspects and the logical reasoning aspects. As students progress in Math they are asked to use more and more logical reasoning that builds in complexity. Computation on the other hand never changes. There are only two operations in Mathematics, addition and subtraction (really just addition if we think of subtraction as adding negative numbers). It would just be a pain to always write these things out so we short hand them with multiplication and division and exponents. In a sense numbers are also just numbers, but they too can be a pain to write out. Look at Pi. Or for example radical 4 is 2 and radical 16 is 4, but radical 7 on the other hand would be much more unwieldy. The basic idea of operations and numbers is the same toolbox from level one all the way through. The problem is that without a complete toolbox, it is hard to teach students the more complex reasoning. Even if they get the concept, without having fluidity with the vocabulary of computation, they can't understand the process or they lag behind.

One of the problems the Math department at the Plainfield Public Library has reported is that even when students grasp more advanced concepts than the basic four operations, their lack of mastery of the times tables and other fundamentals prevents them from completing assignments.

Because times tables lends itself to rote practice leading to memorization, facility with 2 digit addition and subtraction as well as times tables up to 12 without the aid of a calculator or pen and paper will be the prerequisite for entry into the basic math class. This is all they need to do any direct computation after the logical reasoning portion of any problem, everything else in math is teaching them how to mold the puzzle to a shape they can compute. Students who cannot meet the prerequisite will be assigned to the academic support room.

This also means that the current assessment methods are not quite suitable, as it is possible for students without mastery of these operations to score at deceptively higher grade levels. To build off of the PPL model of mathematical instruction as outlined above, we feel it is absolutely necessary for students to have mastered computation before real instruction can begin. It's like teaching grammar before they know the parts of speech. You can do it, but it's far more difficult and time consuming than just spending the time on the foundational skills particularly when it is such a limited and easily mastered pool.

3. DISCOVERING FORMULAS

We've all seen math taught as just rote input/output. Math is more than memorizing the formula: it is understanding the formula and its ramifications. Engineers have told me a joke in this vein: All machines are powered by mysterious black smoke, and when it all escapes, the machine stops working. This is the mindset we want to avoid! The mechanics of math should not be mysterious.

Humor aside, it's important to know how a machine works to be able to fix it or to know when to use it. For example, if you don't know how a car works and it stops running, you are stuck. However, if you know that it needs gas, you can check for that – or for a host of other problems, such as lacking

transmission fluid. The better you can understand the machine, the more you can fix it, and the more utility you get in the long run from using it.

In a sense, all logic is a blueprint for the machine that is mathematics. Finding things that can function as the necessary parts is important, but may require redrawing the very blueprint (or equation). No one has ever solved a problem by staring at it and saying, “ok brain think harder.” The trick lies in getting in and rearranging the pieces so you can see a different angle, and having an understanding of how these tools work allows the student to mold the problem to fit given tools. When problems don’t fit particular molds, we often combine several tools to turn a larger problem into a series of smaller, more familiar ones. Compare people who can put together IKEA furniture to carpenters: we want students to leave as carpenters. So, then, our problem can be stated as thus: What do we do about formulas?

Well, first: What is a formula? Scientists use formulas to get a particular result (e.g. Coca Cola, a model of entropic chemical reactions, etc.). A formula relates complex or unapparent ideas into a simply-manipulated representation. People before us have done work to establish these formulas. Look at Pythagorean Theorem: long ago, Greeks figured out how to determine the length of the hypotenuse of a right triangle. Sure, we could draw that crazy grid to prove it every time we needed that information but having tested the relationship and previously proven a simple method of calculation, we can use the pattern that we extrapolated instead!

This makes formulas seem like recipes. Consider, still, that knowing and understanding a recipe are two different things. When you understand how a recipe works – why particular ingredients do what, how certain cooking methods will change flavor – you can use the recipe as a tool to change things. You might want sweeter brownies or lighter cookies. If you only know the recipe but don’t know how each ingredient affects the final product, you can only make that one thing; if you make a mistake or don’t have an ingredient, you can’t perform a substitution. So we want to *understand how to derive these formulas* and *know the formulas*. Knowing the formulas saves time, but grasping their derivation makes them less abstract and more relevant.

We can teach math in such a way that each concept is a logical step from prior concepts: we continue down the analytical “rabbit hole.” To help with this we want to give the students a constant tool to visualize with here. This is the basis for our often-used 10x10 grid. The same grid that they know as a times table can be used to explain most of the concepts we will be working with⁴⁰.

⁴⁰ See The Amazing Times Table.

PPL MATH PHILOSOPHY**1: WE AVOID USING CALCULATORS!**

No calculators! Working without calculators increases numeracy. Numeracy leads to thinking about the world mathematically. That's what word problems test. Getting students to think mathematically is the goal of Math as a subject, which is essentially a way of thinking about the world and the cornerstone of logical thinking. This is why Logic when taught as a philosophy course is essentially algebra and a skill that works across content areas.

2: WE TREAT EVERYTHING AS ALGEBRA!

Everything is Algebra. Even if you are doing simple addition, subtraction, multiplication, or division, you should represent it horizontally with X where the answer is supposed to go. This gets students thinking about what an equation is, and makes the leap to actual algebra much less scary.

3: WHENEVER POSSIBLE WORK FROM WORD PROBLEMS.

Remember: everything is algebra! Word problems ask you to construct algebraic equations, one piece of information at a time. Each object is a variable and each verb is a sign.⁴¹ You may have multiple equations showing relationships between variables. That's okay. The most important skill is being able to interpret words into math⁴².

4: THERE ARE MANY WAYS TO SOLVE A PROBLEM.

...but some are easier than others. Remember the ten-brick problem? We could have used subtraction OR division in that problem and gotten the same answer.

⁴¹ See Working with Word Problems sheet

⁴² See How to Approach Word Problems Supplement.

5: ALWAYS SIMPLIFY AND BREAK INTO DIGESTABLE PIECES

Difficult, complex problems are just simple problems put together: just as with drawing something complex art students are told to first pull out the shapes they know, the same concept applies to math. For example, $427 \div 3$ can be done in the same way that a student would perform any division problem.

But instead if we look for things we do know it becomes

$$\begin{aligned}
 427 \div 5 &= (27 \div 5) + (400 \div 5) \\
 &= (27 \div 5) + 4(100 \div 5) \\
 &= (27 \div 5) + 4(20) \\
 &= (27 \div 5) + 80 \\
 &= (25 \div 5) + (2 \div 5) + 80 \\
 &= 5 + (2 \div 5) + 80 \\
 &= 85 \text{ r } 2 \text{ or } 85.4
 \end{aligned}$$

6: MATH IS NOT SCARY!

- Computation is computation: there are only four operations, addition, subtraction, multiplication, and division. Really, there are only two operations, addition and subtraction, but as writing everything out in those terms would be difficult we have developed short hand. Exponents are still just multiplication. Try showing them how complex and how simple the same problem can be written, and that simplification is key.⁴³
- Numbers are numbers: there are still only 10 numbers. If you can add and subtract with three digit numbers, nothing changes when you are working with five digit numbers, or with decimals. The foundations of computation are all students will need, and the rest of math here is just figuring out how to use those tools.
- Even funny-looking things are still just numbers: π is still a number; it's just a really hard one to write out⁴⁴. $\sqrt{4}$ is just 2, but every so often we need something like $\sqrt{7}$ which would be hideous to write out. $4 \div 5$ is still 0.8 and sometimes the decimal is easier, but in the case of $1 \div 3$ the fraction is easier. They still are just values.

⁴³ See "Let the good times roll" game

⁴⁴ Infinitely hard



DAY 3 READING & WRITING MATERIALS

Reading and Writing Training Specific Notes: While Reading and Writing are very broad subjects, and we have included a variety of notes in the packet, what is most important is to keep the students focused on the following core principles. You may also choose to use this sheet as an outline during your training. There is more information on each of these concepts within the training materials.

GENERAL

- The Fourth Grade Break
- Functionally Illiterate/ Non-Literate
- Reading is a long build skill
- Why do some people like to read?

SCOPE

- Fiction v. Nonfiction
- Can be applied to Social Studies and Science Curriculum
- Overlaps with Academic ESL but proceed with Caution
- Same skills more difficult materials

SKILLS

- Identifying Main Ideas
- Deciphering Unfamiliar Vocabulary
- Active/Passive Reading/Effective Marginalia
- Visual vs. Auditory Proofreading
- Critical reading
- Basic argumentative structure

READING AND WRITING INTRO ACTIVITY

Instructor's notes: Below we have included the materials for a few different reading and writing intro activities. Please feel free to pick the one you feel is best for your program or to use a variety of them to break up your day three training. Many of these activities can be used in the ESL day as well.

Reading and Writing Intro Activity 1

Place the following prompt on the board:

Pretend I am an alien that has never seen a chair before in my life. Please use the space below to describe one so that I could understand what it looked like.

Let the students write for a few minutes.

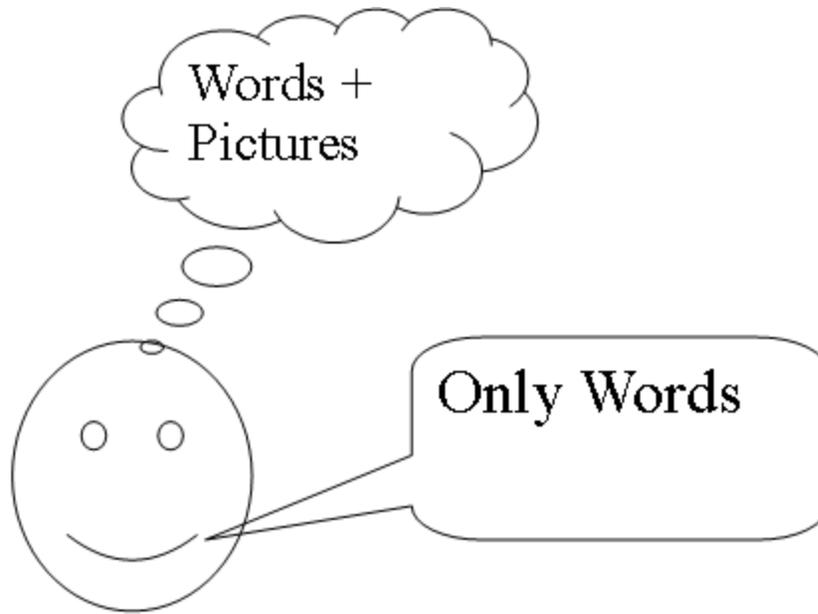
When they're ready, have them pass their description to a partner who reads it out loud.

While the partner reads it out loud, be as obnoxious and literal as possible as you try and draw the chair according to their description.

They will say, "wait, that's not what I meant"

This leads to the introduction of a few key points about writing.

1. You are not over your reader's shoulder while they are reading. What is clear in your head is not necessarily clear on the page.
2. Writing and speaking are two different skillsets. People mistakenly assume because they can functionally speak and express themselves that they should just be able to pick up and go with writing. This is not so. Remember the majority of information that is given in conversation is nonverbal.
3. A basic introduction to the theory of communication



Speaker

- People don't always communicate their whole thought.
- They need to use words that convey the accompanying pictures.
- Otherwise, to the listener, it's like hearing the soundtrack of the movie without seeing the screen.
- Remembering this is one of the most important parts of writing.

READING AND WRITING INTRO ACTIVITY 2 – REVERSE MADLIBS

Take a text and remove every 4th, 5th, or 6th word. Have your students read the paragraph. They should attempt to fill in missing information where possible. Have them discuss how they made the connections between missing information. Focus on the following

1. How did they use context clues to determine meaning? What does this say about the act of reading?
2. Which missing information was most difficult to work around? What exterior information made it easier?
3. How did this change the act of reading? Did they feel more engaged?

A version of this can also be done with foreign text. For that I would suggest either German or Spanish due to cognates and roots. You can also substitute foreign words into the body of the text.

READING AND WRITING INTRO ACTIVITY 3

Reading Jumble⁴⁵

Give your students the following, or a jumble of your own. They may have seen this prior.

Aoccdrnig to rscheearch at Cmabrigde uinervtisy, it deosn't mttar waht oredr the ltteers in a wrod are, the olny iprmoetnt tihng is taht the frist and lsat ltteres are at the rghit pclae. The rset can be a tatol mses and you can sitll raed it wouthit a porbelm. Tihs is bcuseae we do not raed ervey lteter by it slef but the wrod as a wlohe.

What are the take aways? Well most of them are in the paragraph, let's rehash that reading itself is far more than the mechanical sounding of phonemes . The point of this is to isolate all of the skills involved in the process of reading and comprehension.

⁴⁵ No one seems to know the specific origin of this one, but the idea has been around in cognitive psychology for a while. I've given the Snopes link if anyone wants to track it down. It also cites to some more detailed studies on the phenomenon. <http://www.snopes.com/language/apocryph/cambridge.asp>

READING AND WRITING SKILLS ARRAY

PRE READING	
Students struggle with letter recognition, phonics, and have limited sight words. Office will conduct additional assessment and take more complete history. Refer to individual coaching or appropriate service agency. Depending on evidence of and severity of developmental delay/disability	
READING I: ACTIVE READING SKILLS	
Actively read and notate an essay	Distinguish similes and metaphors
Use Context to decode unfamiliar vocabulary	Use Root Prefix Suffix to decode unfamiliar vocabulary
Identify the main idea of a paper	Identify Topic Sentences
Distinguish Literal and Figurative language	
READING II: READING INFORMATIONAL TEXT	
Determine whether a statement is fact or opinion	Create a reverse outline of a piece
Distinguish Author's point of view from different sources	Identify underlying assumptions in Author's claims
Find specific information from a variety of charts and graphs	Compare and contrast two conflicting pieces
Identify when additional information is needed	
READING III: READING ADVANCED TEXTS: PERSUASIVE, EDITORIALS, SHORT STORIES AND POETRY	
Identify Allusions, Personification, and other basic literary terminology	Identify logical fallacies (THIS IS THE MOST COMPLEX THING WE WILL BE DOING)
Identify the underlying argument in a paper	Produce counter arguments in response to persuasive pieces

WRITING I: GRAMMAR	
Label the parts of speech in a sentence	Identify which homophone to use when (too, to two, there, their, they're)
Identify fragments, complete sentences, and run-ons	Use commas to offset prepositional phrases
Correct run on sentences	Apply best proofreading practices to edit an essay
Use test taking order of operations to identify potential grammatical errors	Correctly pair subjects with the verbs attached to them
Identify the subject of a sentence	Identify the plurality/singularity of a subject
Writing 2: CONSTRUCTED RESPONSES	
Construct a basic two part response to a question on text. I.e restate and cite evidence	Properly introduce a quotation
Provide Short Answer Responses to Recall Questions	Properly construct a paragraph following Point, Evidence, Connecting Statement (PEC) Format
Provide Short Answer Responses to inference Questions	Construct a proper thesis
Incorporate textual evidence into a response	Construct an introduction
to create a basic outline	Construct a conclusion
Properly use transitions to connect body paragraphs	Describe an object avoiding relative measurements and pronouns
Remove first person pronouns from academic writing.	
WRITING III: ACADEMIC WRITING	
identify paraphrasing, direct quotation, and plagiarism	create a note bundle (proper research note taking)
properly internally cite quotations	Use appropriate citation and bibliographic format
construct a logic chain to represent an argument	Score an essay using the grading rubric
Identify unsupported statements	Develop unsupported statements
find legitimate sources to research a topic	

LOOSE READING & WRITING HINTS, TIPS, AND FOCI

IT'S ALL ABOUT THE ACTIVE READING- Active readers ask questions. Ask students to think about something they are really interested in. When they engage in that topic, be it reading an article or listening to someone speak about it, they should realize how much more is going on inside their head. Every statement they hear leads to a question. They are engaged and being critical. They have to take that skill set and apply it- even to things they may not be interested in.

Break them of the belief that if they have to ask questions about something they have read that it is a failure. No, if they are asking questions, then they are engaging with the piece.

Somehow we began to believe that asking questions makes us seem dumb. That is ridiculous. Analytical people are constantly asking questions. It's the only way to explore something.

Your significant other is talking about something, and you are "Yes Dear" ing them. Then they say something crazy. All of a sudden, "Yes Dear" becomes, "Wait! What?!"

If all you have done as a teacher is made your students willing to ask questions- You've won.⁴⁶

Model think- aloud drills: Read aloud and stop and tell them what questions you are thinking.

Assignments don't have to be about answers. Have students write their own questions about pieces. Normalize the formulating of questions as part of the reading process.

DO NOT PASS GO. DO NOT COLLECT 200 DOLLARS- Reading and comprehending are two different things. Students should learn to stop after each paragraph and ask themselves to summarize the point. If they can't, then they didn't read closely enough, and going on would be futile.

They need to go back.

Many times students get caught up in rushing due to time constraints, but they don't realize that reading a passage really well once, while it may be slower will in the long run save them time as they will only have to read it the once.

Try and connect all of these engagement strategies into using effective notes and marginalia!

It is also helpful to turn this into a notetaking drill. Have them actually write a fragment or sentence to summarize each paragraph.

Finally, it is hard to enjoy reading if you don't understand what you have read or engage in it.

⁴⁶ See Organic Learning Section for more details

DECODING UNFAMILIAR VOCABULARY- If the goal of reading is comprehension and analysis, we need to understand the words we are reading. There are four major ways to work with unfamiliar vocabulary.

Context- This is the most natural form of vocabulary acquisition. Often times by simply covering the word in question your brain will be able to fill in an appropriate synonym. One way to test a book's reading level is to see how many words you can remove and still comprehend the text (it also according to some shows the level of a writer's excess.) Remember to look for conjunctions that show the relationship between the word in question and other parts of the sentence.

Root/Prefix/Suffix- We can also dissect the parts of a word to glean its meaning. For example, we know "re" implies to do again. While natural usage, immersion, and exposure are still the best methods to acquire new vocabulary, finding and studying Root Prefix and Suffix charts is much more efficient than learning individual words.

Cognates- (see ESL tip sheet)

Dictionary- Now all of the above methods are great in the moment, but none of them are fool proof. It's always a good idea to underline or make a note of unfamiliar vocabulary, and when possible look it up. Treat it like a game; see how accurate your predictions were! Additionally, it's good to get students to habitually look up things to answer the questions they had while reading. It should be a built in step after they finish reading. Look at your marginalia. What do you need to look-up? Look it up.

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DON'T MARGINALIZE MARGINALIA- All of the above reading strategies, can and should be translated to annotating text. This has the effect of engaging students, teaching them notetaking, and reinforcing things. It creates a visual frame work and structure that not only will help them remember, but will also help them comprehend simply by having to engage and sort on the page.

- Write your questions in the margin.
- Circle unfamiliar vocabulary.
- Summarize important paragraphs.
- Underline key phrases and quotes.

⁴⁷ Could possibly put a chart in here for order of operations for active readers. May not be worth doing pre subject supplements.

THE CAUSE BECOMES THE EFFECT BECOMES THE CAUSE- Reading is only enjoyable if you're good at. The only way to get better, at it is to do it. Remember when you were in school and the teacher would have each student take a turn reading a paragraph and there was that one student everyone groaned when it got to them because of how bad a reader they were? Well, that's the voice they hear in their head when they read.... not very enjoyable. So how much reading is that student going to want to do? If they don't read often, how will they improve?

Yet everyone loves story time, because the voice of a good reader is much more pleasant.

Students who don't read well don't like to read.

Let's imagine the scenario of how people read at different levels looking at one single sentence "What are you doing?" he said angrily.

Now a beginning reader is going to be sounding out some of these words or at least a hard syllable split. They may not put together the full meaning of that sentence until after it has been said. The reading and the comprehending are distinct so the comprehension can't inform the reading hence a stilted dry read.

A better reader may be able to treat all of these as sight words, but because the "angrily" isn't shown until the end of the sentence, they won't read the first quoted dialogue properly even if read fluidly.

The better a reader you are the larger the groupings you can process simultaneously. So looking at how much of a sentence is processed while being read informs how the "reader's/narrator's" voice sounds.

The larger chunks that can be processed at a time, the better the voice sounds not just that it is less stilted, but that it informs the emotional tone and delivery of the text.

STUDENTS DON'T HATE READING; THEY HATE READING THINGS THEY DON'T LIKE-

Reading is about sustained practice. Fortunately, the more of it we do, the better we get and the better we get, the more we like doing it. So, encourage your students to constantly be reading, but it is much more important that they enjoy what they are reading as opposed to reading "literature."

Every hobby or interest has a magazine that goes with it. Identify where they are already reading in their lives and look to maximize it.

GRAMMAR

1. Stress the relevance.

Yes, some grammatical constructs are archaic and arcane, but improper grammar can lead to confusion. The biggest difference between speaking and writing is that when writing you do not have all of the other tools at your disposal such as tone of voice, hand gestures, and audience response; they nod or ask questions allowing the speaker to clarify. That advantage does not exist in writing which makes grammar and precision far more important for the written word as opposed to the spoken word.

Think of the fun we can have with misplaced modifiers and unclear antecedents. Oh the fun!

Even when it is not an issue of clarity, people will judge writers by their grammar. This is particularly relevant for job seekers; while grammar may be irrelevant to the position for which they are applying, a lack of proofreading shows carelessness; that does not make for a good first impression.

2. **Parts of the machine!** “The kneebone's (sic) connected to the... something. The something's connected to the... red thing. The red thing's connected to my *wrist watch*” –Dr. Nick Riviera

You must teach the parts of speech.

Imagine trying to fix a car without knowing what to call a fuel pump or a piston. “Well, the thing needs to go to the other thing so it can do the thing”

Students need to know how the machine that is a sentence works, and what each part does so they can make appropriate repairs.

3. Sometimes we proofread with our eyes. Sometimes we proofread with our ears.

People mostly proofread by hearing the sentence in their head. This is why the most common errors are: Homophone misuse: to/too/two, their/there/ they're

Comma Splices: What do you do when you read a comma? You pause. What do you do when you read a period? You stop. They sound exactly the same.

You need to teach students to be visual proofreaders.

Other times, with some types of errors, reading out loud is useful to engage native ear. They are both important tools and ultimately students should learn to use both.

4. It's not your fault!

American Schools stopped teaching grammar years ago. They relied on a variety of native ear and modeling approaches essentially, “They'll learn it by hearing and seeing it used good and such.” This is patently ridiculous⁴⁸. It would only be worthwhile were spoken and written language interchangeable, and there was an abundance of people modeling proper grammar; neither is true.

⁴⁸ This applies to native English speakers; the prescription is different for ESL students.

WRITING

CLARITY IS KING-Ya Grok me?

The entire purpose of writing in an academic setting is to transmit information.

You always know what you meant.

The biggest consideration when writing is whether someone else, reading your work, would be able to fully comprehend the information presented.

It is not about big words and long sentences versus little words and short sentences. It is about fidelity of information.

Example 1:

Jupiter is a gargantuan, humongous, colossal planet. –

Sure, I used a few 5 dollar words, but they were repetitive and non-specific.

Example 2:

Jupiter is big-

This is barely better. While it is shorter than the last example while giving the same amount of information, that amount is still zero.

Example 3:

According to Dr. David R. Williams of NASA, Jupiter has 317.83 times the mass and 1321.33 times the volume of Earth (Williams)-

Here we used concrete measures and cited where the information came from. It doesn't necessarily use bigger words, but it gives more specific information in a more easily understood fashion.

IF CLARITY IS KING THEN STRUCTURE IS QUEEN.

Remember to have your students plan each paragraph.

Briefly, each paragraph has three major pieces.

1. The Point
2. The Evidence
3. The Connection

Example:

1. The point: The defendant killed the victim.
2. The evidence: The glove.
3. The connection: The glove belonged to the defendant and had the victim's blood on it. It was found at the scene meaning the defendant was there and did something to get the victim's blood on it.

YOU CAN NOT MAKE A POINT WITHOUT ALL THREE PIECES! Imagine walking into a court room and just saying, “He’s guilty!”

That wouldn’t be terribly effective. In fact it would be as effective as simply throwing the glove down with no explanation. Any combination of one or two of these factors minus the third will fail. You don’t necessarily have to order every paragraph this way, but all the pieces must be included - no matter what! Sometimes, they can be combined in one sentence. Still, all of these pieces must be present.

This actually applies to the larger structure as well. Think of your intro paragraph as the point with the supporting paragraphs proving the individual elements needed. We’ve all seen enough Law and Order to know that proving Murder in the first degree is more complex than “He killed him and such” There are elements. So the intro might be:

The Defendant did kill the victim. He did so deliberately, willfully, and with premeditation.

Here, the supporting paragraphs would be

The defendant killed the victim – show that he did it

He did so deliberately – It was the result of an intentional action

He did so willfully- It was the intent of the defendant to kill the victim

The action was premeditated- self explanatory

Now all of these sub paragraphs are the pieces needed to equal the main point of the argument which is that the defendant is guilty of first degree murder. So the larger structure is the Point and laying out what needs to be shown to prove it and then each body paragraphs providing the evidence and connection for each of these sub points.

You can really go pretty far down the rabbit hole with each sub point having its own sub points and generally that is what is meant when someone says ideas need to be developed more. There were nested assumptions/conclusions that had not had their own PEC laid out.

Make sure your students learn to write paragraphs with all of these pieces and to look for all of these pieces when critically reading; it is a great tool for analyzing an argument.

DAY 3 ESL MATERIALS⁴⁹

⁴⁹ Because of the heavy correlation, please see the Reading, Writing, and Grammar materials for additional support.

SUBJECT SPECIFIC TRAINING: ESL**ESL training Specific Notes:****Empathy!**

- Language as thought
- Concerns and Frustrations of ESL students
- The Difficulties of the English Language
- Examine language acquisition

GOALS

- Academic vs. Conversational Fluency⁵⁰
- Task Specific Fluency vs. Traditional Fluency
- Preparing for the Citizenship Exam
- Creating Student Development Plans

FORMS OF INSTRUCTIONAL DELIVERY

- English Immersion Opportunities
- Working with Practice Dialogues

⁵⁰ It is suggested that you incorporate the grammar training portion of the reading and writing materials into your ESL training program.

ESL INTRO ACTIVITY #1

Instructor's Note: On the following two pages, you will see sample dialogues, the first in Spanish and the second in Mandarin. Run these with your students to help them understand the perspective of being an ESL student.

Variations 1: do this drill with a completely made up language, or by taking an English dialogue and peppering it with a variety of foreign words to have the students deal with the struggle of decoding.

ESL INTRO ACTIVITY #2

Instructor's note: To do this activity, pick an everyday simple topic or activity. Give the students either a Spanish to English dictionary or a limited vocabulary sheet and have them try and construct viable sentences.

ESL INTRO ACTIVITY #3

Instructor's note: This is a pretty well-known acting drill. Give the students a scenario or characters to act out, but limit their vocabulary. What this does is points out how much information we can convey with hand gestures, tone of voice, and context. Some variations can be:

1. literally only using one word such as "meh"
2. Tutors can only use 1 word at a time before their partner speaks
3. One tutor can use English while the other can only use the options in 1 and 2 and you have given them a cooperative task or something to find out.

Things to focus on in these drills

1. Showing the tutors that communication is absolutely possible, even with the most limited of English speakers.
2. There is an extreme frustration in the disconnect between the complexity of one's thoughts and what they can express.
3. There is such a huge comfort factor in speaking one's native tongue that it makes it very easy for non-native English speakers to fall back on it or to avoid immersion by limiting exposure to English outside of class.
4. The amount of active thought required to communicate in a non-native tongue requires a high degree of engagement, and it is exhausting.
5. Become familiar and comfortable with work arounds
6. Develop the perspective of a novice English speaker and understand what helped or hindered their ability to communicate.
7. Understand and speaking are two related but different skills.

ESL TRAINING INTRODUCTION EXERCISE (Borrowed from James Byrd)

CHINESE LANGUAGE CLASS 101

(STUDENT #1) – Nin hao a?

Hello, how are you?

(STUDENT #2)- Wo hen hao. Ni ne?

I'm fine, and you?

(Student #1)- Hao, xie xie nin

I'm fine. Thank you.

(Student #2) Zianjian, ziajian

Goodbye.

(Student # 1) Zianjian, ziajian

Goodbye.

Spanish Language Class 101

(STUDENT #1) Buenos dias? Como esta usted?

Good morning, how are you?

(STUDENT #2) Muy bien, gracias. Y usted?

I'm fine thank you, and you?

(STUDENT #1) Muy bien

Fine

(STUDENT #2) Adios.

Goodbye

(STUDENT # 1) Adios

Goodbye

ESL SKILLS ARRAY/ ACTIVITY GENERATOR

In many cases the student's goals/needs will dictate the subject. A great way to plan lessons is to take something from the settings or functional skills box and pair it with something from the grammar box. This gives you a vehicle to move the class along with real world relevant examples while also building foundational skills. Many of these are more task than skill oriented and may be recycled at progressively more complex levels. Obviously, this is not an exhaustive list of activities nor is it an exhaustive list of academic/grammar skills; please consult the reading and writing guides for more detailed information.

When we combine these two statements, we will most likely end up with a complete SWBAT⁵¹ though it may become necessary to bleed the topic into the rational section.

SETTINGS / VOCABULARY	
Doctor's office	School
Supermarket	Job Interview
Police Station	Restaurant
Museum	Citizenship Interview
Compare and contrast aspects of their country of origin to the United States	Going to a movie
ESL CONVERSATIONAL SKILLS	
Find resources to prepare for scenarios in English	Look up unfamiliar vocabulary
Use question to structure response	Ask for directions in English
Introduce themselves	Ask for an interpreter
Give Directions	Make an Appointment
Place an order	Follow Directions
Fill out forms	Summarize and respond to short works in English
GRAMMAR	
Label the parts of speech in a sentence	Identify idiomatic phrases
Identify fragments, complete sentences, and run-ons	Construct simple Subject verb sentences
Identify the subject of a sentence	Construct sentences with indirect objects
Identify the plurality/singularity of a subject	Use Root Prefix Suffix to decode unfamiliar vocabulary
correctly pair subjects with the verbs attached to them	Maintain consistent tense
Identify which homophone to use when (too to two, there, their, they're)	Construct Sentences in Future Tense.
Construct sentences with compound subjects	Construct Sentences in Present Tense
Construct Sentences in Past Tense	

⁵¹ See Basics of Instructional Design

The most requested ESL class , Citizenship test preparation, is still far more about basic fluency than anything else; it just the citizenship process and materials as the medium.

Let's look at an example: I'm teaching an ESL class. I know that a lot of my students have school age children. I decide that we will work on a parent teacher night scenario. I also notice many of my students are struggling with proper past tense usage so I'll make that the correction area and try and steer the conversations to both discuss how the child has been performing and what the teacher would like to see in the future.

Another example: Here, I have noticed my students are having a hard time using transitions. I decide to combine this with following directions as a life skill, and have the students present a how to for their favorite recipe. This way they will have to practice using transitions, and it assures I will get some tasty treats brought to class that night.

For the lowest level students, it may be difficult to base the activity in a scenario. Instead you are focusing on basic word equivalencies to build simple vocabulary building blocks. You may also be dealing with students that do not know the English alphabet. Make sure to have plenty of visual aides to correlate to any new words and to illustrate concepts that you may not be able to explain verbally.

Loose ESL tips, tricks and Foci

1. **Language acquisition is all about immersion.**

Your parents didn't teach you English by holding up flashcards of words. You learned it by being surrounded by and engaging with it.

Why would we think it would be any different for a second language?

Avoid using their native language, and encourage them to immerse themselves as much as possible by practicing English at home, with their children, and by watching TV in English. It's hard for them. They fear their children losing their native language, and forcing yourself to only listen to a foreign tongue means forcing yourself out of your comfort zone. It is exhausting, and without the structure of a class much harder to follow through on. This also means, whenever possible, if doing group work, try to not pair people with the same native language.

2. **Perfect is the enemy of good.** *Le mieux est l'ennemi du bien- Voltaire*

ESL has functional goals. If we get hung up trying to fix every mistake then students aren't practicing communication. How many people who are native English speakers use perfect grammar? Focus on increasing interaction and sticking to English. The rest will come later

At most pick a single thing to work on (Focus Correction Area) such as correctly using the past tense, and only correct that.

Particularly because you are dealing with adults, they will want to run before they can walk so remind them that this will actually give them quicker and more practical gains.

3. **Cognates! Cognates! Cognates!**

The one time it is useful to use their native language is when dealing with students whose native tongue is Latin based. While we are a Germanic language, our big fancy words are mostly Latin based, so when a Spanish speaker doesn't understand a word in English they should stop and ask themselves if it is similar to a word they do know in Spanish. While cognates are not 100% reliable, it is a good enough percentage to be a really useful tool. Model this for the students by reading a text in Spanish and showing them how an English speaker can use context and familiar words to figure out pieces.

4. **Activities.**

Again if language acquisition is through usage, avoid direct instruction and have the students complete tasks in English. This can be anything from role playing a useful situation to having them present a how-to for their favorite recipe. You can even have them play games as a group. Try and assign them activities outside of class that involve organic engagement with English speakers.

5. **Academic vs. Conversational**

Conversational fluency is much easier. We convey more information when speaking than in writing. We have tone of voice, gestures, facial expressions, etc⁵².

Don't believe me? Try this acting drill where you take a simple sentence and read it to convey a variety of different meanings.

Because the gains will come quicker, focus on Conversational fluency first. Academic fluency can be incredibly frustrating and even more so when they don't yet feel comfortable functioning in English in any real capacity.

6. **Empathize**

Thought is directly related to language. Think about how limited you are in what you can think about in a language you lack fluency in. This makes it particularly hard for adults learning English because they cannot express complex thoughts. It can feel like a constant handicap.

7. **Remember that they are adults!**

⁵² See generally the works of Professor Albert Mehrabian

FINDING ADDITIONAL RESOURCES

Another problem in Adult Education is the both lack and abundance of resources. Very few companies specifically cater to the market, and even when they do, most programs can't afford to buy into a whole system. On the other hand, many people working in Adult Ed make their own materials and put them on the web. The problem is, there is no vetting of the materials. You don't know what you're getting, and even if the materials are in and of themselves good, they rarely fit into a coherent scope and sequence. There is also so much of it, it can be hard to tell the difference; people can easily become overwhelmed like Vladimir Ivanoff in Moscow on the Hudson upon seeing the plethora of toilet paper options.

One of the goals of the Plainfield Model is to allow programs to easily establish a clear and consistent educational model. That is why in Plainfield, we have both moved to uniform text books, and are in the process of producing guides for each subject that we offer. We will also be supplementing these materials with video lessons, resources, and worksheets correlated to the guides. Obviously, this is a huge job, and until it is finished, you will need materials.

I highly recommend consulting with your program administrator about their suggested resources.

If you do use the internet, I suggest planning your lesson first, and then you'll have a much better picture of the supplemental materials (guides, charts, worksheets) you'll need. That puts a lot less pressure on you to try and fit a lesson to the materials, and it gives you a clear purpose to guide the evaluation of any materials that you find.

If you develop your own materials, please share them with us. Ultimately, we want a repository of materials by subject that will make it easy for tutors to get what they need.

While we are working on creating, collecting, editing, and organizing materials, here is a list of websites we like for a variety of things. Are there more websites? Absolutely. Are some of them good? Yes, but a smaller aperture makes it easier to know where to start.

Here are some websites to get you started. Please talk to your program administrator regarding on-site resources.

MATH

- <http://math-drills.com/> Of all the Math worksheet websites, theirs seems to be the most uniform and easy to navigate. My only issue is they don't have as much word problem practice as we would like.
- www.khanacademy.org – Is a very good site for math practice. Do remember although it is technically self-directed, it is probably most effective if your students are treating it as reinforcement.

Reading/ Writing

- <https://owl.english.purdue.edu/owl/> Purdue's On-line Writing Lab is basically the gold standard for academic writing instruction. This is the site for everything from Grammar, Writing, Citations, and even ESL. This should be your first stop in any of those subjects. It is more focused on explanation and demonstration rather than practice exercises.
- [Ereadingworksheets.com](http://ereadingworksheets.com) Reading/Writing Worksheets
- Englishclub.com a good starting point for ESL but a little overwhelming.
- <http://www.voanews.com/> Voice of America. News in English but designed for non native English speakers. Excellent resources as well.
- BBC ESL <http://www.bbc.co.uk/learningenglish/> More resources for students rather than teachers, but an excellent site.

STANDARDS

- <http://www.corestandards.org/read-the-standards/> CCS
- <https://www.wida.us/standards/eld.aspx> WIDA

GENERAL

- ged.com has lots of information for students, and Pearson-Vue has also developed a lot of support modules for teachers.

SOME FINAL THOUGHTS

While we hope the preceding activities and text have provided you with a solid foundation, in no way should it be considered exhaustive on the topic.

We have spent much of this book advocating for both teachers and students to follow a rigorous cycle of assessment and refinement. It would be hypocritical to ask any less of ourselves; please let us know if there is anything you felt worked particularly well or needs additional review.

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