

**LEARNING SCIENCE WITH AGNES PFLUMM
LESSON PLANS FROM THE AUTHOR**

Agnes Pflumm and the Stonecreek Science Fair

STANDARDS: Inquiry and Literacy Connections (grades 4-8)

SCIENCE AREAS: Integrated / General

TIME FRAME: 2 weeks (or whatever you decide)

MATERIALS: Preferably a classroom set of *Agnes Pflumm and the Stonecreek Science Fair*. Many if not most schools have funded the class sets with grants or with literacy resources.

- OBJECTIVES:**
- (1) To make the science research process less painful (and even appealing!) to students (and thus, their parents and teachers).
 - (2) To teach science content through the powerful medium of storytelling.
 - (3) To promote literacy, critical thinking, problem solving (both independent and cooperative), anti-procrastination skills, and a LOVE for science. **(Note: Many 4-6th grade teachers use my books as part of their language arts curriculum, too.)**
 - (4) To create an atmosphere where metrics and accurate measurement are both absorbed *and* put into practice.
 - (4) Very importantly, to teach the **N.S.T.A. standards** for scientific **inquiry** and **science literacy** in an active, engaging way.

PREPARATION:

(1) **Actively engage students in a series of fun, reliable-data-producing experiments which teach the concepts of independent and dependent variables, hypothesis, constants, control, and repeated trials.** (I use paper whirligigs, an idea adapted from *Science Scope*. By changing variables such as weight, wing fold direction, and wing length, students clearly see the relationship between cause and effect and the importance of constants and a control. See lesson: [*The Amazing Paper Whirligig and THE SECRET OF THE RAP.*](#)

This is also the perfect time to reinforce the importance of lab safety. First, I put students in groups, and ask them to write down a list of 10 LAB SAFETY RULES that they think would be important. Then, I look around the room and find a student who would be in direct violation of these rules (long hair hanging down, open-toed shoes, shirt tails out, dangling jewelry, etc). I bring each one up to the front and ask the class to guess what lab rule he or she is. Then, we collectively come up with a list of safety rules for a science lab.

AN IMPORTANT NOTE ABOUT GRAPHING

If you have already reviewed data graphing skills, give your students time to figure out how to set up graphs for data from classroom experiments **BEFORE** showing them how. Ask them to take out graph paper and pencil, draw the x and y axes, label the axes with the independent and dependent variables, and then set the scale for the data. Walk around and check their progress.

THIS ASSESSMENT IS VERY IMPORTANT FOR IDENTIFYING AREAS OF EXISTING MISUNDERSTANDING. AVOID LETTING THEM LET COMPUTER SOFTWARE DO THEIR THINKING FOR THEM WHEN GRAPHING DATA.

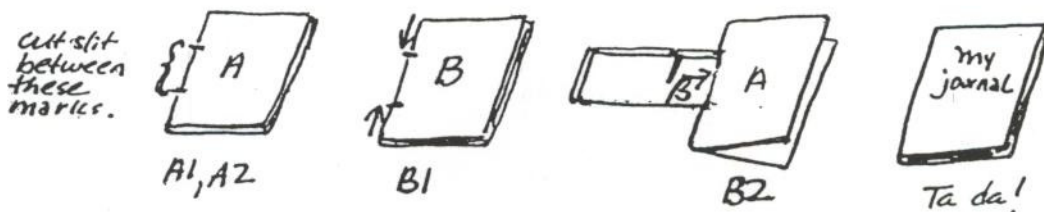
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Here's one of my favorite activities: It's called the BURRITO BOOK (learned many years ago at a conference). It's the perfect way to make a little notebook for a lab report. If you use legal sized paper – *Voila!* You have a sketchbook!

HOW TO MAKE THE BURRITO BOOK

Supplies: 3 sheets of 8 1/2 x 11 letter sized paper (for lab reports) OR 8 1/2 x 14 legal sized paper (for sketchbooks), metric rulers, scissors, pencil or pen

- A 1** Fold 1 sheet of paper in half “Hamburger” style.
- A 2** Measure in **4 cm from each end of the fold** and make a pencil mark at these points; then cut a slit BETWEEN these marks. This will be part of your **cover**. (**NOTE:** If using legal sized paper, make your pencil marks **5 cm** from each end of the fold.)
- B 1** To make the **inside pages**, fold the remaining two sheets of paper in another “Hamburger” fold, and again measure and mark **4 cm** from each end of the fold (5 cm for legal sized paper). This time, cut UP TO these two marks from each end.
- B 2** Finally, fold these inside pages into a lengthwise “Hotdog” fold, and slide them into the center cover slit until their slits are lined up with the center opening. Unfold the pages, and you have a Burrito Book!



NOW, BACK TO YOUR LESSON PLANS:

(3) Read *Agnes Pflumm* yourself, and practice your voices (especially that of Mrs. Melrose). Practice the Science Rap on pages 20-24. Any instrumental rap music with a good beat will work. Be sure to familiarize yourself with the topics listed in the **FYI** section (pp. 128-129) in case you want to structure your own set of lesson plans.)

(4) Now you're ready for Agnes! LET THE FUN BEGIN!

(NOTE: At certain points in these lessons, I propose taking a DETOUR to concentrate on specific skill building exercises.)

THREE DAYS BEFORE.....

Begin wearing button or name tag that says "**WHO IS AGNES PFLUMM????**" but don't give anything away. Ask students to bring a folder with pockets and notebook paper to class. (or make these up ahead of time, depending on your resources). This will become their Science Fair Planners.

DAY 1.....

Read aloud chapters 1-5, then close the book with a flourish. They will protest and beg for more. Resist and begin copying homework questions on the board.

HOMEWORK (HW): Answer questions from Chapters 1-2 in folders. Good composition and grammar are musts!

DAY 2.....

Go over HW questions. (Draw names to be sure everyone gets a turn eventually.)

Read chapter 6 aloud. Don't forget to practice the Science Rap at home first! Don't be shy!

Distribute books! Your students will go bonkers! Mine sure did.

HW: Match the parts of the Scientific Method with the verses in the Science Rap.

DETOUR # 1: THE SCIENCE RAP LIVE!

Teachers around the country have really had fun letting their students practice and perform the SCIENCE RAP as part of their first inquiry units. Some teachers have been asked to have their students perform the SCIENCE RAP for PTO meetings. One enterprising teacher (and a good friend) Marguerite Jones of Spearman Elementary in Piedmont, SC, teamed with her school's music teacher, Mrs. Blume, to guide the 4th and 5th grade through a taped performance (with original music and choreography!) of the SCIENCE RAP.

DAY 3.....

Read chapter 7-8 aloud, then in class go over questions from this section of the book.

HW: Write your own answers to the above questions in their journal. Read chapters 9-12.

DAY 4.....

Divide class into cooperative dialogue groups to discuss q.1-4, Chapters 8-9. Have each group chose a spokesperson to share their group's opinions with the class. Students will have a *lot* to say about how much help parents should really give.

HW: Answer q.1-3, Chapter 10 in journal.

DETOUR #1

GETTING THE IDEA!!!! If you have the technology available to you, go to my website www.agnesplumm.com, and the link *No Fear Science Fair Projects*. There you will find ideas, background information, and lots more!

If you can't go online in your classroom, try to compile a list of interesting project ideas from any number of excellent resources available. Distribute 2 timetables per student for this year's school and local science fairs (One for the student to put in their Science Fair Planner and the other to be sent home to parents.) Allow class time for students to paste this schedule of due dates into the front cover of their Science Fair Planner. Then have them write the dates for each assignment due (for example – 3 possible ideas for your project; bibliography of sources; background information, etc. (Note: The links on my website will help you greatly with planning your fair.) **BE SURE YOU HAVE CHECKED YOUR SCHOOL CALENDAR AND HAD THE DATE, TIME, ETC. APPROVED. IF YOU WILL BE USING YOUR SCHOOL'S AUDITORIUM, GYMNASIUM, OR CAFETERIA, COORDINATION AND COMMUNICATION ARE ESSENTIAL!**

HW: Read chapters 13-15.

DAY 5-6.....

Discuss THE MEETING. If you do have internet access in your classroom, be sure to bookmark the science project sites (You'll find them on my website!) ahead of time. If you can enlist the help of your media specialist, this is also a great time to team teach research skills - from using the *Reader's Guide to Periodical Literature* to learning how to properly cite sources.

Though using the book form of this guide may seem “old fashioned” these days, it will provide invaluable hands- on experience with fact finding.

Encourage students to make their projects as original as possible and to avoid “cookbook” projects that have been done to death.

Teach students how to prepare a bibliography for different types of resources.

DETOUR # 2:

NOW'S THE TIME TO DISCUSS PLAGIARISM, WHAT IT IS AND WHY IT'S CHEATING. (See my web site for links to this subject.)

Later in the week, give a **25 point quiz** over library research techniques, writing bibliographies, and facts about plagiarism.

DAY 7.....

Discuss questions from Chapters 14-15, giving notes on those in Chapter 15. Students will clearly see how important it is to be precise in science as well as to make their procedure repeatable. In what ways did the *Anything Goes* group violate the Scientific Method?

HW: Give students a cake recipe and ask them to make a list of at least 10 variables that might be changed.

DAY 8.....

Compare student answers on homework assignment and show how a separate experiment could be made from each variable changed.

In class: Students read chapters 16-21, then make a list of the problems each of the characters encountered in the initial phases of the project. Collect their journals for a “spot check” just to make sure they’re keeping up with it.

DETOUR # 3 : THE METRIC MOMENT....BROUGHT TO YOU BY AGNES PFLUMM

It was no accident that I had character Andy Crotts do an science fair project on Metric Measurement. Early on in the teaching of the inquiry process, you must stop to assess your students’ (and your!) comfort level and proficiency with the metric system. Here’s a step by step plan which I have used with great success:

1. Go to page 108, **TEST YOUR METRIC I.Q !**, which Andy has to bribe his classmates to take.
2. Enlarge the test roughly 125% (It should about the size of half a sheet of copy paper).
3. Paste 2 copies of the enlarged version of the Metric Test on 1 sheet of paper to serve as your master. Make copies equal to half the number of your students. (This saves paper!)
4. **Announce to your students that today will be the first of many METRIC MOMENTS.** Begin by explaining to them that in spite of the fact that the entire field of science and technology (from medicine to astrophysics) is done in metrics, the United States has stubbornly hung on to its English System of measurement, based on such “trustworthy” standards as the length of an English king’s foot! In fact, we are the only civilized, progressive nation on the planet that still resists measuring our car trips in kilometers, our newborns in kilograms, and our sodas in liters.

To be “fluent” in science, one must master metrics and be completely comfortable using it. However, because we in America have been raised with the English System of Measurement, we must first be able to readily go from English to Metrics in our heads. How else are we to travel the world, where we must read a map, go to a market, or take the proper amount of medicine – ALL IN METRICS!

5. Announce that today’s **METRIC MOMENT** will involve your students taking a PRE-TEST to determine their **fluency in METRICS**. Assure them that the scores will NOT count against their averages but will only be used as a reference point against which to compare improvement later. **Also tell them not to be embarrassed if at this point, they score quite poorly.** Administer Andy’s Metric I.Q. test, and then have students take out a red pen. Read out the answers. With each question worth 7 points, have them figure their Metric I.Q. (their test score) and write it on the top of the test. Then, collect the papers and write the scores (minus student names, of course!) on the board. Have the class calculate their AVERAGE METRIC I.Q. on (write the date).
5. Over the next week, plan many METRIC MOMENTS and activities. With **CAROLINA measurement equipment**, you can create a **METRIC LEARNING CENTER**.

Stage a school-wide METRIC OLYMPICS. Events can include estimation games for mass, length, volume, temperature, and (for older students), density.

6. After your METRICS unit, re-administer Andy's test, and you and your students will be proud and amazed at the improvement in their METRIC IQ!

DAY 9.....

Read chapter 22 aloud. Discuss annoying, intrusive, and well-meaning parents. **Allow students to share** their own stories on this subject.

Then read chapter 23 aloud and demonstrate the proper way to shake hands and introduce one's self (NO DEAD FISH HAND SHAKES!) Have students practice on each other.

HW: Read chapters 24-26. Have students make a list of possible problems they might expect to encounter with their own projects.

DETOUR # 3.....

Provide a handout on what the project display board should look like. Bring out some old projects (if you have some) to show students. Introduce the ready-made Tri-board as by far most effective way to display your data.

HW: Finish reading the book! Give one week to finish questions on these chapters.

DAY 10....

Go to *Permission to Act Out in Class* (p. 132) Ahead of class, decide which scenes you want your students to act out and put those scene's numbers in a jar as many times as there are students in the scene. Have each student draw a number to determine which group and scene they will be in. Have them begin improvising immediately. Tell them they're going to be acting them out tomorrow or the next day for a 25 point quiz grade.

THE WEEK BEFORE YOUR SCHOOL FAIR...

Have each student **defend his or her project** to you and the rest of the class. Have them greet you confidently, make direct eye contact, point frequently to their data and/or materials as you ask them as many specific questions as possible. **Be sure to ask them what they would do differently if they were to do their projects again.**

Remind students to jot down all the questions and/or suggestions the judge asked about their projects. These notes will help them be even better prepared for their next judging experience and also allow them to make important improvements in their projects if they are going on to the next level of competition.

NOTES: You should use *Agnes Pflumm and the Stonecreek Science Fair* as it best fits *your* curriculum. If you don't like reading aloud yourself, ask students to volunteer to read pre-assigned chapters. See if you can get someone to bring in a stuffed cat toy or puppet to represent Proton. Also, feel free to add more questions to the list in the appendix. By the time you're through with the book, you will have given several quizzes on the science research process. I always make the project itself worth one to two test grades.

I'D LOVE TO HEAR FROM YOU! My e-mail address is mgate3@comcast.net **And don't worry.** You'll survive the science fair experience. Let Agnes Pflumm make it easier for you and help you teach those inquiry standards at the same time!