



***Exploring Science through Memoir***

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This curriculum unit is recommended for:  
High School Science classes

**Keywords:** chemistry, literacy, scientists

**Teaching Standards:** See [Appendix 1](#) for teaching standards addressed in this unit.

**Synopsis:**

This curriculum unit looks at the impact of memoir on science and how it can be used to build a more personal understanding of science. Often science seems like a very clinical set of topics--facts and theories that have long been determined. I would have students look at how science affects those that have performed it and made some of the scientific breakthroughs that are so well known. I would also have them look at how science affects their own lives and see where they use science on a daily basis by having them write about the ways in which it affects them. It could be as simple as them writing about their favorite cookie recipe that their grandmother made and then discussing the chemistry behind baking. This could be expanded to have them find ways to tweak their recipes to make the cookies even better.

*I plan to teach this unit during the coming year to 100 students in Honors and AP Chemistry.*

*I give permission for Charlotte Teachers Institute to publish my curriculum unit in print and online. I understand that I will be credited as the author of my work.*

## Exploring Science through Memoir

*Kassie Woodard*

### Introduction

*“Either write something worth the reading or do something worth the writing.” - Benjamin Franklin*

I have that quote on the wall of my classroom because I have always loved reading and writing. They are activities that make my life full. They simultaneously ground me and allow me to escape to other places. Both are equally important to keep me sane in this life. There are several reasons, both personal and professional, why I chose “Exploring Memoir” as my CTI seminar.

As I said above, I have loved reading and writing since I was a small child. I was always ahead of my grade in reading level when we would take those tests. I spent free time writing stories with others. I still do. When people look at me or ask me what I do for a living and I answer that I am a chemistry teacher, it seems to surprise them that I also like reading and writing. Maybe the seminar I am in could be argued that is more geared toward English and Art teachers. Maybe I could have signed up for science geared seminars. But does that really make me a well-rounded person? I would argue that it does not. That it limits me. That it narrows me down to a specific range of actions that are acceptable for me to do. I don't want that.

It was my first college advisor who told me to take classes outside of my major so that I had something else to occupy my brain. As much as I loved my science classes, that was some of the best advice that I got in college. The other classes that I took made me use another part of my brain and gave me a break from the technicalities of science. So in searching for a CTI seminar, I applied the same logic. And while I will be relating in my curriculum unit this seminar to science, on a personal level, this seminar is far more fulfilling than doing something within the science realm would have been.

And thus, I guess, that those personal reasons do bleed over into the professional. I want my students to see that science is more than theory, math and application. I want them to see the scientist behind the science. I want them to see how that theory affects the world. That is when they truly see science as a part of our world and not just a class in school. That's something no final exam can truly test for but is, in my opinion, so much more important.

## Rationale

This unit will be designed for the different levels of high school chemistry that I teach - Honors, Standard and AP. Within Charlotte Mecklenburg Schools and William A Hough High School, there is a drive to use literacy more in each classroom. For my classes, I would like to promote a better understanding of science in the bigger picture of the world. There are a dozens of texts out there students can use to learn science (for example, texts that teach students how to balance chemical reactions or convert one unit to another). These texts often provide students with a wealth of knowledge of science but with no real idea with how it affects the world or how the scientists that do science are affected by it. I would have my students come away with a better knowledge of the bigger picture - that science isn't just about equations and the periodic table, that science is done by people and it affects their lives and the world. To become better citizens in this world and make informed scientific decisions on policies that affect this world, we need to focus some of our class time not only on the conceptual knowledge of science but the practical aspects that affect our world.

I have selected books for this curriculum unit that involve either delving into the life of scientists and the effects of their work (*Lab Girl*, *Uncle Tungsten*, and *The Poisoner's Handbook*) or into science topics that focus on memoirs of objects or ideas (*The Genie in the Bottle*, *That's the Way the Cookie Crumbles*, and *Disappearing Spoon*).

## School/Student Demographics

William A. Hough High School is located in the North Learning Community of CMS. The student population comes from a largely suburban and rural background unlike many of the schools throughout Charlotte. We have over 2500 students. Our school is growing bigger and bigger each year.

One of the great things about Hough High school is the community involvement. There are many community outreach programs that help the school. The biggest of which is our partnership with Bailey's Glen. They are a local retirement community that helps to raise funds for our school so that teachers and students can obtain some funds for school supplies they might not otherwise be able to obtain.

That said, our students do face some challenges as they are still teenagers. There are still poverty issues with several families at Hough even though we are in a suburban area. There are still students for which English is a second language and struggle with course content because of that.

The largest problems that our demographic has is the pressure to achieve and do well in their high school career. Many of our students will go on to college and many have great ambitions for what colleges they would like to be accepted into. Thus there is

internal pressure on the student to do well so they can get into their choice college. Because of this, many high flyers at our school take several AP classes, head a club and are on some type of sports team. This internal pressure to achieve can see many students reach a burn out point.

As they are teenagers, they also have typical teenager problems as well. Motivation and determination can be issues for our students. They are used to knowing the answer right away or being able to find it easily, thus when an answer doesn't present itself immediately, they can become disheartened and give up. As the AP chemistry teacher, I see this first hand when they reach my class and they have never been truly challenged until then. It causes them to have to rethink who they are. They are no longer the student that 'gets' things easily but a student that needs to work hard. We all reach something in our lives that does not come easily to us. We have a choice at that point: give up or persevere.

A majority of those students will end up taking chemistry as there is a push for students who are going to go on to college to take Chemistry for their physical science class. In my classroom, I have anywhere from 20 to 40 students depending on the level of the class. My standard chemistry classes are usually under 30 students, my honors chemistry classes are usually over 30 students and my AP chemistry class can be anywhere from 15 to 25 students. As I teach all levels of chemistry I want to make this curriculum unit accessible to all levels of chemistry.

### Unit Goals

I have three main goals for my students in this curriculum unit: reading, writing and holding meaningful discussions. These three goals go hand in hand and I don't see how any of them can happen without the other.

### *Reading*

Obviously, students will have to read the texts that are either assigned or chosen by the student. I will have a few common excerpts from books or articles they must read so we do have some commonality of information to talk about. I believe that choice is vastly important to student motivation. So I believe letting them have a few books that they choose from to read throughout the semester would be the best way to go about implementing this curriculum unit.

My goals for my students when it comes to reading the text are as follows:

- To read about scientists and their work
- To develop an understanding of how science affects the world
- To build curiosity in science
- To develop an understanding of what it means to be a scientist

Reading would be assigned on a weekly interval. Reading could be from one of the books in the content research section, articles from newspapers and magazines or interviews.

### *Writing*

For the writing portion, I want students to keep a science journal or daybook much like we have been keeping in our seminar. This notebook would be geared toward science and should focus on responses to what they have read and not summaries of what they have read. It should be a safe space for them to write what they think about the science in the article or book they are reading. Thus teachers should only check that students are maintaining it unless they want to share something they have written with their teacher or classmates.

A list of writing topics regarding science will be given to students for those who need a prompt to choose from because the muse of writing has died (Appendix 2). This list could be given out to students at the introduction of the science daybook and pasted on the inside cover of their daybook to use as a reference.

Students can also use this daybook to discuss more personal thoughts and feelings about labs that they do in class. As lab report writing tends to be an impersonal thing because writers often do not use personal pronouns in lab reports. Science daybooks could provide a space to talk about their feelings or thoughts while working in the lab so they can develop a more meaningful relationship with science.

While my class is chemistry, when it comes to this science daybook, I want it to be a little more generalized so students can write about things that aren't necessarily chemistry but are science. As the teacher, at times, I will give them directed prompts for writing that are chemistry-based to get them to think about topics in our class. They will also have some time for prompts and reading they have a choice on. The ultimate goal is to get them to build a relationship with science, not just chemistry. I would encourage students to find items within their casual reading that might address science so that they would begin to see that science is a part of everyday life.

At the end of the course, I will assign a culminating project that relates to what they have put into their science day book. This could take the form of a written story about something they have read or done relating to science, a presentation, a piece of science artwork or a daybook defense.

As far as when they will do the writing, I can see a mix. Some should be done at home for homework and some class time should be used for writing.

## *Discussion*

After reading and writing about a topic, we will engage in discussion which I believe is a vital part of this project. It takes what a person has read, pondered about, and written their own thoughts down about and allows them to share it to another person or to the whole class. A person should be willing to stand behind what they write and hold a meaningful discussion about it if someone should disagree with them. One of the skills everyone needs to build is having a meaningful discussion like that without taking arguments personally or making personal attacks. Thus before any discussion on the reading or writing about science topics would occur, we would need to outline discussion rules for being respectful (Appendix 3).

Students need to feel like what they say in a discussion is heard and has value. Thus we need to make sure that there is a safe classroom environment for discussions so that no one feels attacked or like their words have no value.

Discussions could happen in class in small groups or in a whole class setting. Discussion could also happen in a discussion assignment on canvas (a Learning Management System that the district has access to). Either way, the teacher would monitor and facilitate discussion but should allow students to develop their own flow of discussion much in the fashion of a Socratic seminar.

## **Content Research**

In doing research for this curriculum unit, the content can be divided into two sections: the texts that I researched on memoir writing and texts on science. The memoir writing texts are ones that I've found to help with inspiration for teaching strategies while the science texts are ones that I plan for students to read.

### Memoir Writing Texts

*Writing a Life: Teaching Memoir to Sharpen Insight, Shape Meaning-- and Triumph over Tests.*

Katherine Bomer has a wealth of ideas for how to implement writing in the classroom, especially personal writing. She defines memoir as a “mere slice of ordinary life - a certain time period, a special relationship, a particular theme or angle on life.”<sup>1</sup> For the purposes of this curriculum unit, I am looking at time periods, themes and individuals in regards to science. There is a reason why these topics are written about. A story needs to be told about them. All of the science texts selected for students to read from were chosen with thought to the overall story they tell.

She suggested that giving the students a list of prompts to choose from when they can't think of something is a good idea. These should be possibilities only and not lists of assigned topics that way the students have the choice to write about that prompt, another or one of their own making.

#### *Teaching Memoir in the Elementary School Classroom: A Genre Study Approach.*

While this article is about Tara Gibney's use of memoirs in a 6th grade classroom, many of the ideas and examples can be translated to a high school classroom. One of the tenants of students writing in the classroom that she suggests is to protect writing from the distractions of the day.<sup>2</sup> I cannot agree enough with that. All distractions should be put away during writing and reading of a text.

Gibney also suggested five minute partner writing discussions for students to bounce ideas back and forth during. She found that it strengthens the writing community of the classroom and students begin to get used to expressing their ideas in smaller settings.<sup>3</sup>

#### *Reading and Writing Essays about Objects of Personal Significance*

Leigh Van Horn says "that writers sometimes model an original piece of writing on a work of literature."<sup>4</sup> This would be a great way to get students to think about certain topics in science, especially paired up with one of the excerpts from one of the science texts. It would give them some inspiration that could then be refined to talk about a topic more in their own voice than modeling it off someone else.

#### *Composing Infographics to Synthesize Informational and Literary Texts.*

Creating infographics on texts that have been read requires students to synthesize information and "engage in higher order thinking."<sup>5</sup> Infographics as defined by Lindblom combine "data, visualizations, illustrations, text and images together into a format that tells a complete story."<sup>6</sup> This could easily be done within their science daybook as something they use to organize their thoughts on a section of reading or could be separate item for a larger discussion where every student brings an infographic to class on what they've read in their chosen books.

#### *A Reader's-Writer's Notebook: It's a Good Idea*

Linda Rief has her students keep a notebook for writing ideas, reading thoughts, memories, observations of the world, grown and any other ideas. It's a very open form book with total freedom. She has them divide the notebook into three parts: response, notes, and vocabulary.<sup>7</sup> My students science daybook will be an adaption of this style.

### *Minds Made for Stories*

Thomas Newkirk looks at narrative as a way in which people comprehend information. He argues that it engages readers by giving a plot to even informational writing that the writer creates anticipation and gratification that makes reading more sustainable. He argues that most textbooks are flat, passive, overload information, have no point of view, and stay away from metaphor and analogy. His argument is that narrative is not a genre of writing but a way of writing that can make the reading more enjoyable. When there is a chronological story, a cause and effect, what a person reads becomes more enjoyable to them.

### Science Texts

These texts are the actual books and articles that would be used in my curriculum unit by students. Some of these are the ones they'd be allowed a choice of what to read from for their own reading and others are ones from which I would pull excerpts that I would want all of my class to read.

### *Periodic Tales: A Cultural History of the Elements, from Arsenic to Zinc*

A book that divides elements into groups based on power, fire, craft and beauty. And it starts with the author talking about his memories of the periodic table. It is very much rooted in the author's view of what elements are important to the cultural history of the world. It discusses how certain elements are viewed throughout history and their current cultural impact. I would pull excerpts from this book rather than have students choose it to read from on their own.

### *The Poisoner's Handbook: Murder and the Birth of Forensic Medicine in Jazz Age New York*

This book is great for students that are interested in forensics. It follows the lives of Charles Norris and Alexander Gettler during Jazz age New York. Each chapter is given a different poison that they dealt with during that time and how they worked to discover it in dead bodies and subsequently build an understanding of science in the legal community so it was well respected and could be used to prosecute criminals. They set the standard for forensic for the rest of the country.

This book is my single favorite nonfiction book. It's written well and has a great story. And who doesn't love to learn about poisons? This is definitely a book I would suggest my students read in its entirety.

### *The 13th Element: The Sordid Tale of Murder, Fire, and Phosphorus.*



This book is entirely about phosphorus and its history. And while phosphorus, on the periodic table is the 15th element by atomic number, it was the 13th element to be discovered. It begins with its discovering continues with its production and discusses its many uses throughout history. It is at its core a memoir to phosphorus. There are great spots for pulling excerpts about specific phosphorus chemistry such as the strike of the Match Girls.<sup>8</sup>

*The Jewel House: Elizabethan London and the Scientific Revolution.*

While many of the books in this list are in the near past or cover a range of dates, this one delves into the distant past a little more in depth. It discusses scientific inquiry and important individuals in science at the time of the scientific revolution during sixteenth century London. One of the interesting things that could come up in a discussion of this book is the word “scientist.” This is a nineteenth century term. Prior to then, different words were used in varying degree.

*Rise of the Rocket Girls: The Women Who Propelled Us, from Missiles to the Moon to Mars*

So often women have been used behind the scenes of big breakthroughs in science. Books like that discuss the women that helped the Jet Propulsion Laboratory to create the rockets that we’ve sent off this world are invaluable. People need to read about women in science and see that they are just as capable as men. This book weaves the personal lives of the women “computers” with their professional lives and the cultural movements of the time.

*Lab Girl: A Story of Trees, Science and Love*

This book follows Hope Jarhen and her trials and victories in setting up labs at the various universities that she’s worked for. In it she weaves in her story of being a female scientist and her work with plants. She does a great job of talking about plants in a way that is relatable to what is going on in her life.

One excerpt from this book discusses what her lab is like and does so masterfully.<sup>9</sup> It puts the reader in her space and helps them to understand just how much that space means to her. I would have all my students read that excerpt.

*The Disappearing Spoon: And Other True Tales of Madness, Love, and the History of the World from the Periodic Table of the Elements*

This is a great overview of the elements. Sam Kean discusses elements grouped by similar uses and how they’ve affected the world and his own life. He starts with a discussion about Mercury because it was one of his favorite elements. But some of the

better chapters that students could really see the effect of the various elements of the periodic table are those about elements involved in war and medicine.

I could see picking out a particular chapter for students to read as a whole class and discuss. This book lends itself well to reading out of order and picking out important topics that might relate to what is going on in the world today and what we might be discussing in class. Because of its well-rounded overview of elements, I would also see suggesting students read it in its entirety.

### *The Girls of Atomic City: The Untold Story of the Women Who Helped Win World War II*

Denise Kiernan focuses in on the women of Oak Ridge, TN that worked on the Manhattan project without really knowing the bigger picture of what they were working on. It weaves in science of the time and important figures into the everyday lives of the women in Oak Ridge. Excerpts from their letters and personal journals are throughout the book. It gives a great glimpse at the lives of women during that time and that place.

### *Uncle Tungsten: Memories of a Chemical Boyhood*

Oliver Sacks discusses the impact that chemistry and the scientists in his family had on his life. It ends up being a history of the science told through the lenses of his personal experience with chemistry. This book shows the impact that family has on a person in their pursuits of knowledge and careers in life.

### *Joe Schwarcz books*

All three of these books fall under a similar vein of style. Each tells short stories of specific chemical reactions, elements, compounds, applications or discoveries. These books would largely be used for excerpts for students to read from as a class.

## **Instructional Implementation**

### Teaching Strategies

#### *Science Daybook*

Students will be expected to keep a science daybook that will serve as their journal for class. In this way, they will have a space for their personal thoughts on the science done in class or reading assigned from texts. It is important for students to have that personal space in a topic that is often so impersonal. When we write lab reports, we keep students from using personal pronouns. This will be a safe space for personal pronouns and thus help them build a relationship with a topic that is often distant to them.

Their science daybook should be divided into two sections: a space for responses and a space for vocabulary. As they read they will come across words that they should put in a bank of words that they don't know well. The responses section will vary from responses on teacher chosen text excerpts to responses on student chosen reading and responses about science they've done inside and outside of the classroom.

### *Think-Pair-Share*

This is a common method used to get students to talk to each other about a topic. Students will first write about a topic, then pair up with another person to share and finally they will be encouraged to share their thoughts with the whole group.<sup>10</sup>

### *Socratic Seminars*

This is a common discussion method in which students discuss texts in class.<sup>11</sup>

### *Online Discussions*

Canvas, a learning management system, will be used to facilitate discussions on line to teach students digital citizenship skills.

### *Infographics*

Students will create infographics for selected texts and for chosen texts to synthesize the information with the text. This will get them to look at the material in a new way and make connections that they might not previously make. It creates a visual frame of reference that may help to better understand and study for a topic.

## **Classroom lessons/activities**

As I envision this being a curriculum unit that spans the semester, I will create three general lesson plans that I believe can be adapted to any reading or topic throughout the semester. In a way, I see this curriculum unit as a way to teach material and less as a distinct unit separate from everything else.

### Lesson 1: Reading Reflection

*Goal:* For students to make connections between science reading and science in their life and the world around them.

*Reading:* Any reading on science that is either chosen by the teacher or the student. For example, I would have my students choose a book to read for the duration of the class or

I would pick out a section of reading for the whole class to read. This decision would be made based on where we were in the year and if there was a pertinent reading that I thought all students should read. The reading would be assigned to be done before the class on which we would do a reflection it.

*Time:* ten minutes

*Directions:*

1. Have students spend 3-5 minutes reflecting in their science daybook about the reading assigned or chosen.
2. Have students turn to their neighbors and share their reflections with each other
3. Ask students for any volunteers or call on specific students to share their reflections or what they have learned from their peer's reflections.

The class discussion these reflections could offer would be an excellent way to assess whether those students or pairs that speak understand a concept from the reading. It could be adapted to group students into slightly larger groups and have each group give a quick report about what was discussed amongst their group members. In that way, the whole group is held accountable to listen and discuss with each other the topic at hand.

*Notes:* Modeling the reflection piece would be beneficial to students. Early on in the course, pick out a short reading that everyone should read. Either allow everyone to read it alone or read it as a class. Then model a short reflection or your own so that students will know what a reading reflection looks like. Many students may be hesitant to share their ideas so this would be helpful to guide them and give them some confidence in what is expected of them.

## Lesson 2: Unit Reflection

*Goal:* For students to make connections and reflections between topics we are learning with a unit and science in their lives.

*Time:* varies depending on depth of assignment

*Directions:*

1. Each unit in the course should have some sort of piece to tie into the real world or to get students to discuss the science of that unit in a different way.
2. See below for examples using chemistry.
3. Any of these unit reflections could be expanded up on to make them small assignments or more involved assignments.
  - a. For example, in the notes below, if I were to have my students bring in a recipe for cookies during our reactions unit. I could have them write about what that recipe means to them and have them look up the chemistry

behind the baking. To make it more involved, I could have them create an infographic about it.

*Notes:* Here are some ideas based on chemistry topics we cover in my class

1. Atomic Structure - Have the students pick an element that they find interesting and write a short piece about a day in the life of that element.
2. Periodic Table - Have the students write about a day in the life of a hydrogen electron.
3. Nomenclature - Have the students go home and look through their home medicine cabinet or at their favorite soft drinks to write down the chemicals they found on the box. See how well they match up with what we have been learning on how to name the chemicals. Have them research the chemical ingredients and what they're used for.
4. Bonding - Have students create a comic on ionic, covalent and metallic bonding.
5. Reactions - Have the students bring in a family recipe for cookies or cake. They can write about why they brought this recipe in and what it means to them. Then some in class and out of class time can be spent looking at the chemistry of baking and relating it to the ingredients and steps in their recipes.
6. Moles and Stoichiometry - Students could write a story about a mole that wants to do chemistry and always has to be exact in all his measurements.
7. Gas Laws - Students could read a short passage about gases used in chemical warfare from the perspective of a person that was affected by one of these gases. They could then make a case for or against using chemical warfare using the Support Ideas with Examples template in appendix 4.
8. Solutions, Kinetics, Equilibrium - Students could examine what solutions they use every day and write about how those solutions have affected their lives. For example, many of the drinks that we drink everyday are solutions.
9. Thermodynamics and Nuclear chemistry - Students could read a passage from a person that may have been affected by a nuclear bomb and fill an anticipation guide both before and after the reading. They could then support and defend their opinions about nuclear bombs and nuclear reactions.

### Lesson 3: Scientist Discussion

*Goal:* To foster peer discussions about scientists that perform science.

*Forum:* Online through canvas and in class. The decision of which forum for discussion would come down to time available in class and whether the scientist to discuss is something that lends itself better to online or in person discussions

*Time:* varies.

*Directions:*

1. Given students some resources for researching a specific scientist. An excerpt from a book or websites about the scientist would work well
2. Give a few initial questions about the scientist to answer.
  - a. When did they live?
  - b. Where did they live?
  - c. What did they study?
  - d. What are they known for?
3. Expand to have the students reflect on the scientist's life as a whole and what it might have meant for that scientist to do science in their life and be considered a scientist.

*Notes:* The list of potential scientists that could be used here is long. But for chemistry there are some notable people that students should know and talk about: Marie Curie, Mendeleev and Avogadro. The choice of scientist could always be left up to the student. Maybe one discussion could be for them to bring a scientist that is similar to them in some way.

#### Assessments

##### *Daybook Defense*

This is a way to assess student learning by allowing them to select and reflect on their daybook assignments.<sup>12</sup> Students would do this every few weeks and turn it in online by taking pictures of the parts of their daybook that they are reflecting on and writing about it in a document that they would upload for the teacher to look at and assess. See Appendix 3 for an example of this assessment.

##### *Online Discussions*

Students will respond to prompts online through Canvas. Then they will need to craft responses to their peer's writings. The teacher can monitor the discussion and assess student learning from their ability to answer the prompt and respond to others' work.

##### *In class discussions*

See appendix 4 for any resources for classroom discussions

#### Alpha Boxes

In this activity, students work on their own for a few moments to come up with words for each letter of the alphabet that has to do with the topic assigned. Then they come together in small groups, discuss their words and fill in any blanks they may have had. Then the whole class comes together to read off their words in a round robin fashion and foster

more discussion upon the words chosen. Student can argue about which words would be important or relevant and give supporting evidence for those words. A template is in appendix 4.

### Anticipation Guides

Statements about a reading are put in the statement column. Teachers can edit this to go along with any reading done in class. The students then give their opinion about the statements before the read. Then after they read, they revisit their opinions to either change them or keep them the same. Then they support their opinions with items from the text. A template is in appendix 4.

### Golden Line Routine

Students read a passage and highlight a sentence or short portion of the text that is meaningful to them for some reason. Then they come together in small groups, present their line that they chose and discuss each other's chosen lines.

### Support Ideas with Examples

Students either come up with or are given an opinion statement to put in the box at the top of the template (see appendix 4). They then use the text that was assigned to provide evidence for that opinion. After using the assigned text, they can bring in other texts (TV shows, movies, websites, artwork, other reading), the world (news), and life experiences as evidence. This can then be used to have the student write a few paragraphs supporting an opinion or idea with examples from what they have read or experienced.

## **Appendix 1: Teaching Standards**

Chm.1.1 Analyze the structure of atoms and ions.

Chm.1.2 Understand the bonding that occurs in simple compounds in terms of bond type, strength, and properties.

Chm.1.3 Understand the physical and chemical properties of atoms based on their position in the Periodic Table

Chm.2.1 Understand the relationship among pressure, temperature, volume, and phase.

Chm.2.2 Analyze chemical reactions in terms of quantities, product formation, and energy.

Chm.3.1 Understand the factors affecting rate of reaction and chemical equilibrium

Chm.3.2 Understand solutions and the solution process.



## **Appendix 2: Science writing topics**

This is a list of possible prompts for a student's science daybook:

- A memorable science lab that they've done in school
- A topic in science that interests them
- What they think it means to be a scientist
- Write from the perspective of an element
- What would they have in a lab if they created their own lab room.

### **Appendix 3: Daybook Defense<sup>13</sup>**

Take a few minutes to look through your daybook. Use sticky notes to find examples of the following points. Label each sticky note and adhere it to the page so you can reference it later. Find an example of:

1. A relevant and strong connection you made to something you read
2. Where you were confused
3. When you showed understanding of an idea or concept
4. An "a-ha" moment
5. A favorite daybook passage
6. Something you wished you understood better

After you have marked and labeled these passages in your daybook, take a few minutes to reflect (through writing) why you picked the passages you did. On the next available page in your daybook, spend the next 10 minutes writing your daybook defense. This is when you can show your understanding of what you have been able to accomplish this year in this class. Use the daybook as "evidence" of your accomplishments. You can write in paragraph form or bullets, but try to address each of the six sections you marked in your daybook.

**Appendix 4: Resources for in class discussions**

Alpha Boxes Topic: \_\_\_\_\_

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P/Q
R	S	T	U
V	W	X,Y,Z	0,1,2

**Extended Anticipatory Guide**

Use the space below to generate questions about the “text.” You will use your questions later in an academic conversation.

Statement	Opinion Before Lesson		Opinion After Lesson		Evidence
	Agree	Disagree	Agree	Disagree	
1.					
2.					
3.					
4.					
5.					
6.					

**Supporting Ideas with Examples**

Support Ideas with Examples |



This Text (Provide a page number for each piece of evidence)	Other Texts (TV shows, Movies, Websites, Artwork)	The World (Perhaps the News)	Life (Personal Experiences)
Evidence:                Guiding Questions: 1. Can you give an example from the text? 2. Can you show me where it says that?	Evidence:                Guiding Questions: 1. What are examples from other texts? 2. Are there any cases of that on TV shows, Websites, or other books/articles?	Evidence:                Guiding Questions: 1. What is a real-world example? 2. What does that look like?	Evidence:                Guiding Questions: 1. What is an example from your life? 2. Why do you say that?

## **Appendix 5: Materials for Classroom Use**

Any books in the resources for students or teachers

Other reading that might pertain to the subject matter taught

Canvas or other LMS for online discussions

Composition or spiral bound notebook for each student

## Appendix 6: Resources for Students

Aldersey-Williams, Hugh. *Periodic Tales: A Cultural History of the Elements, from Arsenic to Zinc*. New York: Ecco, 2011.

This book is a good general highlight of elements

Blum, Deborah. *The Poisoner's Handbook: Murder and the Birth of Forensic Medicine in Jazz Age New York*. New York: Penguin Press, 2010.

This book is a great story for the birth of forensics.

Emsley, John. *The 13th Element: The Sordid Tale of Murder, Fire, and Phosphorus*. New York: John Wiley & Sons, 2000.

This book is all about phosphorus

Harkness, Deborah E. *The Jewel House: Elizabethan London and the Scientific Revolution*. New Haven: Yale University Press, 2007.

This book looks at the scientists during the scientific revolution

Holt, Nathalia. *Rise of the Rocket Girls: The Women Who Propelled Us, from Missiles to the Moon to Mars*. New York, NY: Little, Brown and Company, 2016.

This book is about the women who worked at JPL to help make missiles and get us to space.

Jahren, Hope. *Lab Girl: A Story of Trees, Science and Love*. London: Fleet, 2016.

This book discusses Jahren's life as a female scientist

Kean, Sam. *The Disappearing Spoon: And Other True Tales of Madness, Love, and the History of the World from the Periodic Table of the Elements*. New York: Little, Brown and, 2010.

Another good book about many of the elements of the periodic table.

Kiernan, Denise. *The Girls of Atomic City: The Untold Story of the Women Who Helped Win World War II*. New York, NY: Simon & Schuster, 2013.

This book is about the women who helped to make the atomic bomb.

Sacks, Oliver. *Uncle Tungsten: Memories of a Chemical Boyhood*. New York: Alfred A. Knopf, 2001.

Sacks discusses his love for the periodic table.

Schwarcz, Joe. *Radar, Hula Hoops, and Playful Pigs: 67 Digestible Commentaries on the Fascinating Chemistry of Everyday Life*. New York: W.H. Freeman, 2002.

Several stories of different science topics.

Schwarcz, Joseph A. *The Genie in the Bottle: 64 All New Commentaries on the Fascinating Chemistry of Everyday Life*. New York: W.H. Freeman, 2001.  
Several stories of different science topics.

Schwarcz, Joseph A. *That's the Way the Cookie Crumbles: 62 All-new Commentaries on the Fascinating Chemistry of Everyday Life*. Toronto: ECW Press, 2002.  
Several stories of different science topics.

### Notes

1. Bomer, Katherine. Writing a Life: Teaching Memoir to Sharpen Insight, Shape Meaning-- and Triumph over Tests, 4.
2. Gibney, Tara. "Teaching Memoir in the Elementary School Classroom: A Genre Study Approach." 246.
3. Gibney, Tara. "Teaching Memoir in the Elementary School Classroom: A Genre Study Approach." 248-249.
4. Horn, Leigh Van. "Reading and Writing Essays about Objects of Personal Significance," 275.
5. Lindblom, Ken, Nicole Galante, Sara Grabow, and Brittany Wilson. "Composing Infographics to Synthesize Informational and Literary Texts," 37.
6. Lindblom, Ken, Nicole Galante, Sara Grabow, and Brittany Wilson. "Composing Infographics to Synthesize Informational and Literary Texts," 38.
7. Rief, Linda. "A Reader's-Writer's Notebook: It's a Good Idea," 41.
8. Emsley, John. The 13th Element: The Sordid Tale of Murder, Fire, and Phosphorus, 85-102.
9. Jarhen, Hope. Lab Girl: A Story of Trees, 12-14.
10. Simon, Cathy. "Using the Think-Pair-Share Technique - ReadWriteThink."
11. Filkins, Scott. "Socratic Seminars - ReadWriteThink."
12. Manning, Chandra. "Daybook Defense."
13. Manning, Chandra. "Daybook Defense."

## Appendix 7: Resources for Teachers

Bomer, Katherine. *Writing a Life: Teaching Memoir to Sharpen Insight, Shape Meaning - and Triumph over Tests*. Portsmouth, NH: Heinemann, 2005.

Bomer discusses what memoir is and strategies for bringing it into the classroom.

Filkins, Scott. "Socratic Seminars - ReadWriteThink." Readwritethink.org. Accessed September 24, 2016. <http://www.readwritethink.org/professional-development/strategy-guides/socratic-seminars-30600.html>.

These are strategies for socratic seminars

Gibney, Tara. "Teaching Memoir in the Elementary School Classroom: A Genre Study Approach." *Read Teach The Reading Teacher* 66, no. 3 (2012): 243-53. doi:10.1002/trtr.01108.

These are strategies for using memoir in classrooms.

Horn, Leigh Van. "Reading and Writing Essays about Objects of Personal Significance." *Language Arts* 78, no. 3, (January 01, 2001): 273-78.

These are strategies for using memoirs in classrooms

Lindblom, Ken, Nicole Galante, Sara Grabow, and Brittany Wilson. "Composing Infographics to Synthesize Informational and Literary Texts." *English Journal* 105, no. 6 (2016): 37-45.

These are strategies for using infographics in the classroom.

Manning, Chandra. "Daybook Defense." *AHS Teacher Talk*. N.p., 22 Sept. 2014. Web. 29 Oct. 2016.

This site outlines a strategy for assessing a student's daybook

Newkirk, Thomas. *Minds Made for Stories: How We Really Read and Write Informational and Persuasive Texts*. Portsmouth: Heinemann, 2014. Print.

This book discusses the use of narrative to learn scientific material.

Rief, Linda. "A Reader's-Writer's Notebook: It's a Good Idea." *Voices from the Middle* 10, no. 4 (May 2003): 40-41.

This article outlines the good reason for having a student keep a writer's notebook

Simon, Cathy. "Using the Think-Pair-Share Technique - ReadWriteThink." *Readwritethink.org*. NCTE, n.d. Web. 29 Oct. 2016.

These are strategies for using think-pair-share.