Employing Science Fiction to Increase Literacy in the Science Classroom

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> Print culture affords irreplaceable forms of focused attention and contemplation that make complex communications and insights possible. To lose such intellectual capability – and the many sorts of human continuity it allows – would constitute a vast cultural impoverishment. (National Endowment for the arts, 2004, p. 3)

PROBLEM STATEMENT

The 2004 report *Reading at Risk,* by the National Endowment for the Arts, suggests that our nation is losing its ability to critically engage literature. The report, which examines the reading habits of Americans, shows an alarming decline in the reading habits (types of book, frequency and duration of reading), of Americans in all demographic groups. Younger readers (the 18-24 age group) had the sharpest decline (28% drop in reading rates) during the ten-year period. When compared to other age groups, younger readers had a 55% drop in reading rates. A subsequent study, *To Read or Not to Read,* (National Endowment for the arts, 2007), documents similar rates of decline in the reading habits of 9-17 year olds. The study shows an increase in the number of youngsters who never read at all, with a comparable decrease in the number that read every day. The study suggests that the decrease in reading habits worsens, as students grow older: the decline in reading is greater for 17 year olds than for 9-year-old students. These trends are alarming for educators as reading ability and literacy are essential components of a rigorous education. The guiding national education standards (the Common Core Curriculum) places great emphasis on reading as it is foundational to success in all subject areas.

> To build a foundation for college and career readiness, students must read widely and deeply from among a broad range of increasingly challenging literary and informational texts. Reading a variety of genres from diverse cultures and groups provides students a literary and cultural knowledge and familiarity with various styles and structures (Common Core Initiative , 2009, p. 2)

Reading should not be limited to traditional English or literature courses as reading in all disciplines provides content specific skills that will help students become better critical thinkers. It is hoped that our efforts to infuse reading into our curriculum will help students "acquire the habits of reading independently and closely, which are essential to their future success" (ibid).

I teach chemistry in an all girls' special admission school in Philadelphia. Students in our school are selected based on their academic histories and performance on standardized assessments. Although most of my students possess adequate reading skills few are able to engage texts that require a deep and close reading of complex material. While many of my students read books in their free time, they are usually non-demanding youth oriented fiction. This is not to suggest that my students lack critical analytical skills. There are countless instances when we engage in discussions around intriguing science concepts that demonstrate their keen reasoning skills. These conversations happen when something in the lesson or in their life piques their interest. Topics include genetic engineering, star cycles, time dilation, evolutionary biology, nanotechnology, black holes, alternate universes, etc. These subjects are not usually part of my curriculum, however I make time to have the discussions in order to illustrate the role of science as a way of understanding the world around us. Although these conversations are extremely animated and engaging, I must usually curtail them, as the pacing of my curriculum is very demanding.

My decision to enroll in the Teacher Institute of Philadelphia's seminar, *Aliens and Others: African American [Re] Writing Genre Fiction,* was based on my desire to create an environment in which my students could explore a wide range of science related concepts while improving their critical literacy skills. The course's focus on African American (male and female) science fiction writers was of equal importance, as I wanted to expose my students to African American[1] science fiction writers. A science fiction unit focusing solely on the traditional (mostly male) voices would not be suitable given the diversity of cultures in our school.

PROPOSED UNIT OF STUDY:

Employing Science Fiction to Increase Literacy in the Science Classroom

This unit is intended to improve student's reading (technical and analytical) skills through an investigation of science fiction short stories. The unit's major goals are:

- To increase an understanding of the nature of science and how science and technology affect our present and future (imagined) reality
- To discern and analyze the social commentary in science fiction texts
- To introduce students to African American writers and the social- historical context in which they lived.

The unit will unfold in two distinct phases: an exploratory phase in which students study the structure of SF texts, and a second student driven period in which students engage in research and analysis of SF texts of their own choosing. The unit will culminate in a writing project in which student groups produce an original SF text.

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[1] Please note that throughout the unit, the term "African American " includes the voices of writers from all under-represented minority populations.

PHASE ONE:
Students will analyze the plot, alternate reality, characters, and theme of three SF texts. The analysis will also include a discussion of the science (or technology) that establishes the alternate reality of the text and how the science relates to the theme of the story. An essential component of the analysis will be an investigation of the historical period in which the text was written as both the science that informs the story, and the underlying theme are contextualized by the historical period in which the text was written. These lessons will help establish the protocols that will be used to analyze subsequent texts.

PHASE TWO
In the second phase, student groups will select stories [2] to analyze using the protocols developed in the first phase. Each group will present their analysis to the class. We will use these discussions to generate a list of issues in their lives that could serve as themes for a SF text. Once the group analysis is complete, students will begin to write an original SF text.

Objectives: Students **W**ill **B**e **A**ble **T**o:
- Analyze character, plot, theme in selected SF texts
- Discuss the science that informs SF texts
- Research historical time period to determine social / political context
- Research an emerging scientific theory / concept
- Write an original science fiction short story

STANDARDS
The standards that inform this unit are taken from the Common Core Literacy Standards[3] and the Common Core Science Literacy Standards. The common core literary standards focus on a set of skills used to analyze all literary genres. The common core science literary skills focus on a similar set of skills, however these practices help students evaluate and critique the hypotheses, assumptions, and scientific theories that inform science texts and science phenomena in their everyday lives. The standards are listed here, as they are central to the learning in this unit:

COMMON CORE SCIENCE LITERACY STANDARDS
CCSS.ELA-Literacy.RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions

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[2] Although the unit intends to focus on the works of authors from under-represented minority populations, students will be free to choose the works of any writer that holds their interest.
[3] A complete list of the common core literacy standards can be found in Appendix C

CCSS.ELA-Literacy.RST.9-10.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

CCSS.ELA-Literacy.RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account

CCSS.ELA-Literacy.RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.

CCSS.ELA-Literacy.RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of process, phenomenon, or concept, resolving conflicting information when possible (Common Core Initiative , 2009)

SCIENTIFIC LITERACY

Engaging in the discursive practices outlined in the common core science standards fosters scientific literacy. Fostering scientific literacy is the primary goal of the national science education standards as it is an indispensible intellectual ability in a world that is increasingly defined by scientific discoveries and technological innovation (National Research Council, 1998)

> Scientific literacy is the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs and economic productivity (p.22).

Scientific literacy requires a deep understanding of science content, however it goes beyond the remembering of facts, as it demands that students use their knowledge to analyze the science that informs topical social and cultural issues. In the science classroom, students must be able to read texts (of all genres), evaluate the science that informs those texts, engage in substantive discussions that explore the impact of science on society, and take critical stances on the science - technology that informs and continually transforms their lives. (Bucher & Manning, 2001).

SF texts provide a challenging, engaging, and educative forum in which to teach scientific literacy skills (Czerneda, 2006). Students enjoy the stories because they are always enjoyable and entertaining but they must use science to interpret the reality and theme of the text and then articulate and defend their interpretations in reasoned well-structured arguments. This is a vitally important aspect of this unit as it is meant to encourage all students to think critically about difficult social and cultural realities.

It is also important to note that no one interpretation is correct as the complexity of the stories will foster differing and competing analysis of the texts. Zigo and Moore (2004) describe SF as a "metaphoric literature for social and cultural introspection and for inspiring multiple interpretative possibilities" (Zigo & Moore, 2004, p. 85). For this

reason all analysis work will take place in collaborative group setting where each student will feel free to voice their personal opinion. No one voice will be privileged.

BACKGROUND

DEFINING SCIENCE FICTION

The goal of this unit is to increase student's literacy skills through the critical analysis of science fiction literature. In order to achieve these goals, the teacher of this unit must have a clear understanding of science fiction texts and how they are structured. A precise definition of Science Fiction (SF throughout) is however, problematic because this type of speculative fiction is a continually evolving genre that has existed since the time of the early Greek writers[4]. The thematic structure of science fiction texts is in continuous flux because these stories respond to changing social, cultural, and political realities of the societies in which they are written (Suvin, 2005). Thus as human societies become more diverse and complex so do narrative structures, themes, and critical perspectives of SF. The nature of science fiction stories in the modern era reflects the increasing complexity of human society as we transitioned from agrarian cultures into a world defined by an ever-expanding reliance on science as the driving force of humanity's ongoing evolution. Mankind's continuing transition from industrial to modern technological societies is the direct result of our deepening knowledge of science and the extensive technological applications that have revolutionized our conceptions of every aspect of our existence (Franklin, 2009). Our ability to manipulate our environment (and control its resources) has however, occasioned profound changes in our relationship to the earth, our modes of consumption, our belief systems, our governing institutions, our interrelations with other cultures and our treatment of the marginalized populations at the periphery of societies. It is within this context of our continuing industrial to scientific – technological revolutions that SF emerges as a way of commenting on the social, ethical, and philosophical ills that characterize the modern world. Thus Mary Shelley's gothic SF text, *Frankenstein: The Modern Prometheus* [5] (1818) questions an emerging reliance on science in society, H. G. Well's *War of the Worlds* (1897), uses Martian invaders to critique England's imperialism, George Orwell's *1984* (1949), uses a dystopian society as a caution against governmental oversight and intrusion (appropriate to our current congressional debate on the Patriot Act), while Star Trek's 1969 episode, *Let That Be Your Last Battlefield*, (CBS Entertainment, 2015), ridicules racism in American society. These and other SF texts critique social realities (power inequities, hegemony, discrimination, etc.) in ways that are "entertaining," provocative, and educative.

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[4] The earliest speculative text is attributed to the satirist Lucius of Samosata, who wrote, *A True Story* in AD. 202, (Samosata, 202).

[5] Shelley's text is considered the first SF text given its strong commentary on the role (and limits) of science in society (Stableford, 1995).

ALTERNATIVE REALITY IN SF TEXTS
The underlying question these texts pose is "What If?" SF texts help us answer this question by creating alternative realities that "place the reader in worlds different from one's own [but] different in ways that invite the reader to interrogate those differences to ask "hard questions" about them in terms of what they can tell us about our world" (Booker & Thomas, 2009, p. 3).
The alternative reality created by the SF writers is the first structural component that we will discuss in our analysis of SF texts.

THE SCIENCE IN SF TEXTS
It is however, necessary that the alternative realities established by the text be continuous with the reality of our everyday experiences (Gunn, 2005). It is the plausibility of the alternative reality that helps "establish a link between the experienced world of the reader and the world of the work of fiction." Without such a connection to the alternate reality, we are not able to ask "the hard questions" that make for critical analysis of our societies. It is however, this plausibility of the alternate world that differentiates science fiction from other forms of speculative fiction. The major difference between science fiction and fantasy lies in the fact that fantasy takes place in a world in which the rules of everyday experience do not apply, and science fiction in the world of everyday experiences extended" (p. 9). This is an important structural component of SF texts and a central aspect of this unit: for it is the use of science that differentiates SF texts from other forms of speculative fiction. Thus, the second structural component that students will use to analyze text will be the investigation of the scientific theories used to establish the alternate reality of the text.
Understanding the science in the SF text is an important objective in this unit, as it will provide an opportunity to engage students in authentic discussion on the nature of scientific knowledge and the processes through which that knowledge evolves.
Exploring the science that undergirds the SF text will provide the teacher the opportunity to teach science content within the context of an exciting story.
At this point in the unit, the teacher will engage students in lessons that explore current theories on (for example; genetic engineering, artificial intelligence, robotic technology, astrophysics, etc.). The goal of these lessons will not be to debunk the creative use of science in the SF text, but rather to analyze how the science is used to establish the reality of the text.
Since the unit will explore several historical SF texts, students will also be able to investigate how our science theories have changed over time, and how the speculations of the past have become science "facts" of today. It is important that students discover the ways in which our science knowledge develops and evolves as many students think that science is static and unchanging process.
 An equally important and misunderstood aspect of scientific discoveries is the creativity and imagination, that is part of all science. It will be interesting for students to explore those theories are subsequently proven to be correct. One theory that I will explore is current "understanding" of black holes. When first postulated, these structures were

deemed nearly impossible, however they now form part of our everyday conversations. It will be instructive to trace the history of this theory from the early postulates of Einstein, through the calculations of Schwarzschild to S. Hawking's work in the early 70's, which finally "proved" the existence of black holes [6]. Students will be given the opportunity to explore the history of other scientific theories during their research period.

SCIENCE THEMES

SF texts are informed by a wide array of scientific theories that range from the probable, to the unlikely / impossible (based on our current knowledge). This continuum is ever changing as mankind's scientific knowledge and ability to manipulate nature continue to expand. It would be counterproductive to attempt to list or limit the range of scientific theories that this unit will explore. This list will be established by the texts students choose to analyze during their research period. I however plan to introduce the unit with an exploration of SF texts that explore the following themes

- *I Am Legend:* Bio-Genetic Engineering:
- *Frankenstein: The Modern Prometheus:* Biological Engineering
- *I Robot:* Artificial Intelligence: Robotic Technology / Self-Aware Operating Systems
- *The Comet:* Astrophysics: Objects in Space: Comets, Asteroids:

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[6] Our theories on black holes are still in flux, as the scientific community is in midst of a considerable debate over Mr. Hawking's recent comments on the nature of the event horizon of black holes (Saul, 2014)

UNIT PLAN

PHASE ONE

Day One	Topic: What is an SF Text?

Essential Question: What characterizes an SF Text? What structural components differentiate these from other genres?
Goals: To establish protocols for analyzing SF texts
Standards: CCSS.ELA-Literacy.RST.9-10.2 & CCSS.ELA-Literacy.RL.9-10.5
Objective: To describe the structures in SF texts in order to differentiate SF from other forms of speculative fiction.
Narrative: Teacher will introduce the unit with a brief video titled, *What is Science Fiction*. Video will serve as an opening to a group conversation in which the students will discuss their conceptions of SF texts. Titles of popular movies, television series, novels, and short stories should provide a variety of descriptors for SF texts.
Direct Instruction: Teacher will use examples from classroom discussion and video introduction to establish the following structural components of SF texts: (Texts may be movies, short stories or novels)**:**   • The setting of SF texts is an alternate reality that is different from our own reality.   • The alternate realities of SF texts can be understood using science: (either existing theories, or imaginative extensions of existing theories).   • SF is a form of speculative fiction that differs from fantasy or horror   • SF texts critique or satirize social realities
Classroom Activity: Class will divide into four groups. Each group will select a SF text and analyze its structure using the protocols. Groups will then discuss their analysis of the texts. Note: Discussion Format: Each group will contain approximately 8 students. Each group will have an organizer, recorder, and reporter. Roles will change daily. Each student will have a personal journal in which to write her contribution to the discussion. Groups will have the option to report on an individual's perspective or one that summarizes the group's viewpoint. Teacher will remain outside of the discussion as facilitator. It is important that teacher resist directing student voice.
Exit Question: What is SF to you? How can you tell the difference between a SF text and other types of genres?
EXTENSION HOMEWORK: List the name or title of any SF text that is familiar to you. Describe the reality and theme of the text.
Materials: SF Genre: A video compilation. Available at from You-Tube at: https://www.youtube.com/watch?v=hbJrqZaB4oI

Day Two	Topic: Alternate Reality In SF Texts

Essential Questions: What are the characteristics of the alternate reality (the setting) in SF texts? How did this reality come about? Why did the author choose to create such a reality? How does the reality help to communicate the theme of the text? How does science inform / create the text?
Goals: To Analyze How Science Establishes The Alternative Reality In SF Texts.
Standards: CCSS.ELA-Literacy.RST.9-10.2 & CCSS.ELA-Literacy.RL.9-10.5
Objective (SWBAT): Describe the characteristics of the alternate realities in SF texts; explain how science (of technology) helps to create the alternate reality. Students will also analyze how the alternate reality and science help inform the theme of the text.
Narrative: Class will view opening sequences of *I Am Legend* (approximately 40 minutes). Students will describe the setting in which the story unfolds. Classroom groups will discuss the theme of the text and how the setting relates to the theme.
Direct Instruction: Teacher will explain the science of biogenetic engineering as it relates to story line in the text. Teacher will explain the benefits, dangers, and ethical considerations of bioengineering. Teacher will explain how the events detailed in the film could have occurred.
Classroom Activity: Students will break into groups and analyze the following: • The alternate reality of the text   • The science that informs the text   • The theme (social commentary) of the text   Groups will present their analysis to the class.
Exit Questions: How does science help create the reality of the text? Does the use of science make the theme more urgent? Would the story be a SF text without the scientific explanation?
EXTENSION HOMEWORK: Students should recall other SF texts that have bioengineering (and its hidden dangers) as a theme[7]. Should note the alternate reality of the text, the science used to create the text, and the theme (social commentary of the text). This should be written in their journal as homework.
Materials: *I am Legend* Film. Available at Netflix: http:// Netflix. com

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[7] A list of SF texts organized by theme can be found at the Science Fiction Encyclopedia located at: http://www.sf-encyclopedia.com/category/themes

Day Three	Topic: Science Themes In SF Texts

Essential Question: How does our scientific knowledge evolve? How has our increasing scientific – technological knowledge contributed to the development of SF texts?

Goal: To describe how scientific knowledge evolves and informs speculations in SF texts.

Standards: CCSS.ELA-Literacy.RST.11-12.8 & CCSS.ELA-Literacy.RST.11-12.1

Objective: SWBAT: Describe how scientific knowledge evolves and how scientific theories inform historical SF texts.

Narrative: Teacher will show video; *When Science Fiction Becomes Science Fact*. Class will note speculations predicted in past science fiction texts that have since become established "fact": (for example: robotic technology, computer technology (the internet), and biogenetics engineering). This lesson will explore the relationship between emerging scientific knowledge and SF texts. Many SF writers have either a scientific background or they engage in extensive research of scientific theories in order to create the realities of their text: for example Michael Crichton's research on bioengineering that informed the Jurassic Park series: or theories of space time distortions around black holes that have yet to be proven true.

Direct Instruction: Teacher will describe the processes of scientific discoveries, how scientific theories evolve over time, and how emerging scientific theories inform SF texts: two representative theories are bioengineering and theories of space- time distortions (black holes; worm holes). Teacher will detail the history of the development of these two theories [8] and how they have informed SF popular SF texts.

Classroom Activity: Student groups will each select a SF text (movie, television episode, or short story) and describe the science that informed the text, and how (and if) that science speculation has become established fact. Given our thesis that the science in SF texts informs a social commentary, student groups will be asked to comment on the theme of the text: did the predictions of the text come true?

Exit Question: Which science speculations in SF texts have become science facts? Did the predictions in the text come true? Are we better or worse off?

EXTENSION HOMEWORK: Research and note at least three scientific theories (real or speculated) that would make for a good SF text. The theories can exist now, speculated (possible in the near future), or maybe possible in the distant future. Write the theories in your journal.

Materials: *Black holes: movies and books* (Hamilton, 2006): Jurassic park (Crichton, 1990): Video: *When Science Fiction Becomes Science Fact* video available from YouTube at: https://www.youtube.com/watch?v=Ear4Prg9G8w

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[8] This is a suggested list of topics; the topics may change based on discussions during the first three days of the unit. It is suggested that student interests be the deciding factor on which scientific theories are discussed in this lesson.

Day Four: Topic:	Historical SF Texts

Essential Question: How have changes in society affected the themes in SF texts? How have changes in science – technology affected the themes in SF texts?

Goal: To describe how changes in society affect the theme of SF texts.

Standards: CCSS.ELA-Literacy.RST.11-12.21 ; RL.9-10.5 & RL.9-10.6

Objective: SWBAT: Describe how changes in society, and in scientific knowledge inform the theme of a SF text.

Narrative: SF texts address social / cultural problems of the societies in which they are written. Throughout this unit, students have identified the social commentary in contemporary SF texts. This lesson focuses on texts from other historical eras in order to examine the historical relationship between SF texts and the societies in which they were written. Part of the analysis will include a description of the science that informs the text and whether (or not) the science has changed over time.

Direct Instruction: This lesson will begin with a discussion of Shelley's Frankenstein as an example of a historical SF text. Teacher will describe the historical period, the economic, sociocultural conditions as well and the role of science in the 19th century English society. Students will read excerpts of the text and view a brief vignette from the Kenneth Branagh's 1994 version of *Frankenstein*. Class will discuss the text using the protocols previously established, focusing on the social commentary of the text. What is the science that informs the text? Do we have similar preoccupations given our current advances in biology and biogenetic engineering?
Note that Mary Shelley is the only well known female SF writer until the early 1960's

Classroom Activity: Students will read excerpts from Shelley's *Frankenstein* and view two vignettes from the film. Groups will analyze the text using established protocols. Groups will then discuss the science that informs the text, and the social commentary of the text: What was Shelley's preoccupation? What were her warnings?

Exit Question: Do you think Shelley's warnings were correct? Does our reliance and dependency on science pose a threat to mankind?

EXTENSION HOMEWORK: What science theories / or technologies pose a threat to our existence or way of life? Explain your reasoning.

Materials: Excerpts from Shelley's *Frankenstein* and the Branagh film , *Frankenstein,* available from Netflix at: http:// Netflix. com: Information on M. Shelley's life is from (Burdon, 2014)

PHASE TWO OF THE UNIT

Day Five:	Topic: Historical SF Texts
Essential Question: how have the changes in society affected the themes in SF texts? How have changes in science – technology affected the themes in SF texts?	
Goals: to explore the history of themes in SF texts	
Standards: CCSS.ELA-Literacy.RST.11-12.21; RL.9-10.5 & RL.9-10.6	
Objective: (**SWBAT**): describe the theme and social commentary in historical SF texts.	
Narrative: SF texts address social / cultural problems of the societies in which they are written. Throughout this unit, students have identified the social commentary in contemporary SF texts. This lesson focuses on Dubois's text to highlight how SF themes examines race in a given historical era in order to examine the l relationship between SF texts and the societies in which they were written.	
Direct Instruction: This lesson will begin with a reading of Dubois' *The Comet*. Note: The teacher will NOT provide background information on the text.	
Classroom Activity Class will read entire text: Each group will answer the following questions • Is this a SF text? • What is the alternate reality? • How does science establish the reality? • In what time period does this text unfold? • What is the social commentary? What does it tell you about race relations? • How is the protagonist in this story similar (and different) from to Dr. Neville in I *am Legend?* • How do the texts address issues of race differently? • Does our current society mirror this change?	
Exit Question: Do you think that race is a topic for a SF text?	
EXTENSION HOMEWORK: Complete reading of text. What is your opinion of race relations in our country? How could an SF text address this situation?	
Materials: Copies of Dubois's *The Comet*	

SECOND PHASE OF UNIT
The second phase begins with an exploration of the African American and other underrepresented voices in SF texts. Students will then begin their analysis of texts using the protocols established during phase one of the unit. The unit will culminate with a two-day writing workshop in which the students will write an original SF text.

Day Six	Topic: African American Voices in SF

Essential Questions: Who are the underrepresented minority voices in SF? What themes are explored in the works of these authors? Why might these authors have difficulty publishing their work?

Goals: To introduce the voices of underrepresented minority authors explore the social - historical context of their work.

Standards: CCSS.ELA-Literacy.RST.9-10.2 & CCSS.ELA-Literacy.RL.9-10.5 & 10.6

Objective (SWBAT): Describe themes in texts written by African American and writers from other unrepresented minority writers and explore themes relevant to their daily lives.

Narrative: The class will listen to an interview with three SF writers and an editor of a SF book. Class will follow a listening guide as they listen to the interview. A class discussion will follow.

Direct Instruction: Teacher will ask class to list names of familiar SF texts. Teacher will list names of authors (and biographical data). Teacher will define the term "underrepresented author" and compare these to famous (predominantly European, male) writers. Teacher will discuss the historical period in which these writers were first able to openly publish their work.

Classroom Activity: Teacher will play excerpt from Faria Chideya's interview. Class will discuss why authors from minority populations may have had difficulty publishing their work. Student groups will discuss the following questions:
- What is speculative fiction?
- Name the different genres in speculative fiction?
- What themes might be of importance to these writers?
- Why might these themes be difficult to discuss openly?
- Why is it easier to publish their work today than in the past?
- What changed in our society to make it easier for these writers to publish their work?
- How much did race and gender affect their careers?
- How have they addressed these issues in their work? (Choose one writer)
- Did these writers change the style of SF texts?
- Can you name a new genre of SF? Describe it?
- Did the writers mention any themes that might be of interest to a teenager?

Exit Questions: Why is it easier for all writers to publish their work now?

EXTENSION HOMEWORK: Students should consider themes important in their lives and list at least five themes that might be used in a SF text.

Materials: List of SF works written by well-known writers and those written by authors from underrepresented minority populations. Audio of Farai Chideya interview (Chideya, 2007) NPR interviews.

Day Seven: Topic	Group Analysis of SF Text
Essential Question: How do the author's use of structures help communicate the theme of an SF text?	
Goals: To Determine And Analyze The Theme In An SF Text.	
Standards: CCSS.ELA-Literacy.RST.9-10.2 & CCSS.ELA-Literacy.RL.9-10.5 & 10.6	
Objective (SWBAT): Analyze the alternate reality, science, and theme in an SF text.	
Narrative: Students (either in pairs or as a group) will select an SF text for analysis. Students will then divide into groups and begin their analysis. The analysis will be completed during the next class	
Direct Instruction: Teacher will provide students a list of SF texts[9] and help groups select their text for analysis. Teacher will list the protocols used to analyze SF texts. Students will use a set of six analysis cards (from Czerneda, 1999)	
Classroom Activity: Group analysis of SF texts.	
Exit Questions: Why did you choose your text?	
Materials: List of SF texts organized thematically and SF analysis cards.	

Day Eight: Topic: Group Analysis of SF text	
Essential Question: How do the author's use of structures help communicate the theme of an SF text?	
Goals: To determine and analyze the theme in an SF text.	
Standards: CCSS.ELA-Literacy.RST.9-10.2 & CCSS.ELA-Literacy.RL.9-10.5 & 10.6	
Objective (SWBAT): Describe the alternate reality, the science / technology that informs the text and analyze the theme in an SF text.	
Narrative: Students (either in pairs or as a group) will present their analysis of their SF text. Class will assess each presentation using a rubric.	
Direct Instruction: Teacher and class will create a presentation rubric.	
Classroom Activity: Analysis of SF text and student group presentation.	
Exit Question: Which text was most interesting to you? Explain why.	
Materials: Presentation Rubric	

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[9] Teacher should have a range of texts available for students to select. Texts should be based on student interest. There is a list of possible texts arranged by topic in Appendix A. Teachers must screen their list to make certain all texts are in compliance with their local standards as some texts may be inappropriate for younger readers.

Day Nine and Day Ten	Topic: The SF Writer and Writing an original SF Text

Goals: To Use Established Structures to Write an Original SF Text

Standards: CCSS.ELA-Literacy.RST.9-10.2 & CCSS.ELA-Literacy.RL.9-10.5

Objective (SWBAT): Create an original SF text.

Narrative: Student groups should use their learning to create an SF text.

Direct Instruction: Teacher will play Octavia Butler interview with Terri Gros. Students will discuss the writer's comments. Once completed class will begin to write their SF text. will list the structures used to analyze SF texts.

Classroom Activity: Students groups will listen to interview and answer the following questions:
- Do writers need to have empathy?
- How did her life experiences affect her as a writer?
- Why does she write SF?
- How does she address issues of race and gender in her books?
- What bothered her about SF stories when she was child? Who wrote most of the books? Who did they write them for?
- What are her points of view as a writer?
- Did her family encourage her to be a writer?
- Did her family worry about her writing such strange stories?
- Was she a confident person?
- How does a writer's personality & life history affect their writing?

 Once discussion is completed, students will begin to write their text. Students will use their journals to discuss possible themes for a story, along with the possible scientific theories that could be used to create the story's alternative reality. Students will complete the rest: plot, characterization, and story line of the text. Student groups may use a variety of media for their text: short story, movie script, or comic book for their story. Texts can be composed individually, in pairs, or as group collaboration.

Materials: Audio of Terry Gross(Gross, 2006) interview with Octavia Butler and student journals.

APPENDIX A: STUDENT RESOURCES:

RESOURCES: READING GUIDES: Lists of SF texts for Young Adults:

Reading guide at About SF: This guide covers a set of 20 stories with teenage themes. Each reading guide presents a short synopsis of the story along with guided discussion questions. Each guide is approximately five pages long.
URL: http://www.aboutsf.com/main/reader-resources/reading-guides

Eight Young Adult SF texts with African American Heroes Reading list
URL:http://chroniclesofharriet.com/2014/09/18/8-ya-heroes/

Teen Science Fiction Stories: Compilation of Stories for Teens: All authors
URL: http://www.wattpad.com/stories/science-fiction

goodreads SF booklists
Organized in the following categories:
Best YA Science Fiction Books and Readers Choice Young Adult Science Fiction
URL: http://www.goodreads.com/list/tag/young-adult-science-fiction

SF and Fantasy Short stories at east of the web: Site contains SF and Fantasy Short Stories. Stories can be sorted by age, length, and rating. Stories can be previewed and printed.
URL: http://www.eastoftheweb.com/short-stories/index.php?p=web/library/sci-fi/contemporary&pg=1&ob=length&obv=15-19

Teen Ink: Science Fiction / Fantasy written by teens
Compilation combines SF and Fantasy. Books are partially available: Biographic data on authors is available: Students can interact with writers and other teens.
URL:http://www.teenink.com/novels/sci_fi_fantasy/

APPENDIX B: TEACHER RESOURCES
About Science Fiction Website; Maintained by the University of Kansas Center for the Study of Science Fiction. A wide range of resources including on-line lessons for teachers, study guides, course syllabi, lectures, interviews, links to research libraries and other SF websites.

Gunn Center for the Study of Science Fiction: Maintained by James Gunn.
A wide assortment of resources: Essays by James Gunn and other noted SF theorists, Writer's Resources, A SF historical timeline (from prehistory to the future), Teacher and Scholarly research resources, Anthologies, Blogs, and more.

URL: http://www.sfcenter.ku.edu/

Science Fiction Studies @ Depau University: Scholarly articles on literary criticism of SF
http://www.sfcenter.ku.edu/
URL:

Great Black Authors of Science Fiction: Website compile brief biographies of 16 African American writers: from Charles Chestnut, W.E.B. Dubois, Paula Hopkins, to S. Delaney, and Ronald Jones.
 URL: http://chroniclesofharriet.com/2012/11/01/great-black-authors-of-science-fiction-fantasy/

Top 100 Science Fiction Texts: Compiled by NPR listener survey. A good site for adults, some texts are appropriate for teenagers.
http://www.npr.org/2011/08/11/139085843/your-picks-top-100-science-fiction-fantasy-books

APPENDIX C: COMMON CORE LITERACY STANDARDS

CCSS.ELA-Literacy.RST.11-12.8
Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
CCSS.ELA-Literacy.RST.11-12.9
Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of process, phenomenon, or concept, resolving conflicting information when possible.
CCSS.ELA-Literacy.RL.9-10.5
Analyze how an author's choices concerning how to structure a text, order events within it (e.g., parallel plots), and manipulate time (e.g., pacing, flashbacks) create such effects as mystery, tension, or surprise.
CCSS.ELA-Literacy.RL.9-10.6
Analyze a particular point of view or cultural experience reflected in a work of literature from outside the United States, drawing on a wide reading of world literature. (Common Core Initiative , 2009)

BIBLIOGRAPHY

Booker, M. K., & Thomas, A.-M. (2009). *The Science Fiction Handbook.* Malden, MA: Wiley-Blackwell.

Bucher, K. T., & Manning, M. L. (2001, Winter). *The Alan Review.* Retrieved April 22, 2015, from Taming the alien genre:Bringing Science Fiction into the classroom : http://scholar.lib.vt.edu/ejournals/ALAN/v28n2/bucher.html

Burdon, S. (2014). *Almost Invincible: A biographicala novel of Mary Shelley-author of Frankenstein.* London: Criteria Publishing.

CBS Entertainment. (2015). *Star Trek Database* . Retrieved May 17, 2015, from Let that be your last battlefield: http://www.startrek.com/database_article/let-that-be-your-last-battlefield

Chideya, F. (2007, August 13). *NPR: The Black Literary Imagination.* Retrieved March 27, 2015, from Black Science Fiction and Fantasy: http://www.npr.org/templates/story/story.php?storyId=12742905

Common Core Initiative . (2009). *Common Core state standards* . Retrieved 2015 йил 16-February from Common core literacy standards : http://www.corestandards.org/
Czerneda, J. E. (2006). Science fiction and scientific literacy. *Science Teacher , 73* (2), 38-42.

Du Bois, W. E. (1920). The Comet. In S. R. Thomas (Ed.), *Dark Matter: A century of speculative fiction From the African diaspora.* New York , NY: Grand Central Publishing .

Franklin, H. B. (2009). what is science fiction- and how it grew. In J. Gunn, M. S. Barr, & M. Candelaria, *Reading Science Fiction.* New York, NY: Palgrave Macmillan.

Gross, T. (2006, March 3). *NPR: Fresh Air.* Retrieved April 12, 2015, from Octavia Butler: Speculative and Strong: http://www.npr.org/templates/story/story.php?storyId=5243647

Gunn, J. (2005). Towards a definition of science fiction . In J. Gunn, & M. Candelaria, *Speculations on Speculation* (pp. 5-12). Lanham, Md: Scarecrow Press.

Hamilton, A. J. (2006, Sept. 7). *ASTR;2030 Black holes:Movies and books*. Retrieved June 2, 2015, from ASTR; 2030 Black Holes: http://casa.colorado.edu/~ajsh/astr2030_06/bhmovies.html

Lacey, L. J. (2014). *The past that might have been, the future that may come: Women writing fantastic fiction, 1960s to the present.* Jefferson, North Carolina: McFarland and Co.,Inc.

N.P.R. (2006, March 3). *NPR: WHYY.* Retrieved May 22, 2015, from Octavia Butler: Speculative and Strong: http://www.npr.org/templates/story/story.php?storyId=5243647 National Endowment for the arts. (2004). *Rading at Risk: a survey of literary reading in America.* Washington, D.C: National Endowment for the arts.

National Endowment for the arts. (2007). *To read or not to read.* Retrieved 2015 йил 21-February from National Endowment for the arts: arts.gov/sites/defaluts/files/ToRead.pdf

National Research Council. (1998). *National Science Education Standards.* Washington, DC: National Academy Press.

Orwell, G. (1961). *1984.* New York, NY: New American Library.

Samosata, L. (202). *A True Story.* Retrieved 2015 йил 26-May from Internet Sacred Text Archive: http://www.sacred-texts.com/cla/luc/true/index.htm

Saul, H. (2014, January 1). *The Independent .* Retrieved March 30, 2015 , from Stephen Hawking: There are no black holes : http://www.independent.co.uk/news/science/stephen-hawking-there-are-no-black-holes-9085016.html

Shor, I. (1999). *What is Critical Literacy? Critical Literacy in Action: Writing Words, Changing Worlds.* (I. Shor, Ed.) Portsmouth , Boynton/ Cook: Caroline Pari.

Stableford, B. (1995). Frankenstein and the origins of science fiction. In D. Seed, *Anticipations: Essays on early science fiction and it precursor* (pp. 46-57). Syracuse: Syracuse University Press .

Wolfe, G. K. (2005). Coming to terms. In J. C. Gunn, *Speculations on Speculation* (pp. 13-22). Lantham, Md: Scarecrow Press.

Zigo, D., & Moore, M. T. (2004). Science Fiction: Serious reading, critical reading. (doi:10.2307/4128779, Ed.) *The English Journal , 94* (2), 85-90.