Science Fiction and Scientific Literacy Worksheets by Julie E. Czerneda

Dear Educator:

The following pages come from the workshops and presentations I've done over the years. Feel free to use or adapt as best suits your needs. All the activities and student material here have been class-tested. If you have any questions concerning these materials or how to use them, please don't hesitate to contact me.

I sincerely hope you find them useful.

Contents:

Mary C. McCurdy Lecture, presented by Julie E. Czerneda at NSTA, Philadelphia, March 18th, 2010

Engage the Wonder: Developing Scientific Literacy Using Science Fiction

Science is a human activity, full of passion, imagination, and creativity. The consequences of science matter to each of us, as well as to society, yet reading and discussing science ideas present an insurmountable challenge to many citizens. Explore the humanity and consequence of science ideas with your students through the "what if?" question at the heart of good science fiction storytelling. Discover how to develop the skills of scientific literacy, from critical thinking to informed decision-making, in students of any and all abilities. Engage the wonder of imagination in your classroom and prepare your students to cope with a future of change.

** Strand: Connecting Content Between, Within, and Among Subjects

I don't, as a rule, share my presentation notes. For one thing, I rarely follow them myself once in front of my audience. However, I've been asked to provide whatever I had for this lecture. So ... please keep in mind I didn't always follow this script. The intent, definitely. - Julie.

Last month, while visiting our daughter in Ottawa, we went for walk to enjoy a bit of early warmth -- despite the snow. While stopped at a traffic light, we were chatting and idly watched group of teenaged boys, 13-14ish, clowning around on the opposite corner. All at once, two of the boys chase each other out on the road, laughing away.

Right in front of an ambulance with lights and siren blaring.

The ambulance managed to stop, the boys rejoined their group, giggling the way kids do when they've had a close one and how cool was that, and the adults on all sides went a little greyer. Makes you wonder how our species survives.

We do it, most of the time, like this. We tell each other stories. We talk. That's how we connect.

So. How do you caution a child about the dangers of crossing the street? You could give details about the traffic patterns, the impact force of a car or truck bumper on flesh and bone - a particular favourite of teenagers, the statistical likelihood of driver distraction due to any number of reasons. Give them all the facts and let them decide what to do.

Good idea? No. You choose the right words. You engage empathy, by inviting the child to imagine how you'd feel if anything bad were to happen, how the driver would feel, how it would be best to prevent any of this. You elicit responsibility by helping the child understand the consequence of decisions about roads and traffic. Repeat as necessary. And, if the child survives being a happy-go-lucky teen, he or she will do the same.

Mary McCurdy was known as a motivator as well as a teacher. What I've read of her tells me she knew how to communicate science in a way that connected its ideas for

people, and to people, whether students or other teachers. Connecting is the key. Words? That's the medium.

So how do you talk about science in a way that connects? How do you tell the stories of science? Where can you find the words to develop empathy, responsibility, and consider consequence?

You know why I'm here.

From this point, I used short movie clips to illustrate my points. My notes are interspersed. I was impressed by the interest and enthusiasm of the teachers who attended this lecture. I'm sure their students will be inspired too.- Julie

Clips from Mary C. McCurdy Lecture, NSTA

My File Ref	Movie Title / Scene	Point(s)
What is science fiction?		
1-new guy 2:00	*Men in Black* (1997) birth along the road	the presence of aliens is always a good clue
2-plans @ 2:00	*War of the Worlds* (2005) opening	classic sf is about looking at the universe so is science
Science fiction's power is speculation beyond the known. It's about consequence.		
3-real world 2:15	*The Matrix* (1999) uncorking Neo	-the boundaries between perception and reality, the rise of AI
4-someone who knows 1:50	*The Net* (1997) they can erase me	-not only the "far-out" ideas, but those here and now, identity theft
The what if? question		
5-hundred percent 4:30	*Gattaca* (1998) identity salesman	-biology issues, the close relationship between science and society, the standards we set
6- crusade @ 2:00	*Crusade* (1993, made for TV, based in Babylon 5 universe) opening	- illustrate the what if...? premise, in this case "what if Earth had to be quarantined?"
7-no idea 2:40	*Evolution* (2001) they're aliens-time	-sf also takes a fond look at science, mad and otherwise.
Science fiction movies reflect the concerns about science of their time, from radiation/mutation to climate change today.		
8-arrival in peril @ 3:00	*ET - The Extraterrestrial* (1982) opening in forest	- the 70s saw the rise of the environmental movement and the green revolution.

9-arrival with peril @ 3:00	*Independence Day* (1996) opening in space	- the early 90s were a much less positive time, between economic downturns, the Gulf War and other conflicts

SF provides opportunities to explore the same "what if" in different ways, something that's extremely important when considering the impacts -- and uses -- of new science and/or technology. My fellow authors and I are invited to help speculate all the time.

It's better to have students generate lists of possible impacts, as many as they can imagine, then discuss, than to have them pick one. The ability to generate ideas is something we can't afford to lose. By giving students the freedom to speculate, you give them a skill they'll use throughout life.

You don't have to show movies or have students read science fiction, though that's great. Given the time there isn't, in my mind the best approach is to teach students how to think science fiction. On my site, you'll find a pdf of the components of a science fiction story. Not the story, the components. The key is to have students think, not only of interesting "what if's" but of who will be affected. Make the science real. Make the consequence -- be it positive or cautionary -- personal.

Students have such hard time thinking of themselves and science. SF makes it easy.

10-summer job @ 4:00	*Titan A.E.* (2000) future in space	- people are people
11-sample recovery 2:15	*Day After Tomorrow* (2004) save the cores	-scientist as hero new to movies, always in literature
12-my job sucks 1:10	*Galaxy Quest* (1999) board room	-role of women in science
13-the real deal 4:00	*Contact* (1997) make me a liar	-getting it right on all levels

As a scientist, to me science fiction is the lab I couldn't possibly have, where I can explore any idea in safety. Not just safety for the world, but safety for myself. I remember in high school being told everything important was now known, so future research would just fill in the details. That could well have crushed any interest I had -- except, well, I didn't believe it. How could I? I could imagine questions that had no answers - yet - and I was only 16. There's also the safety that comes from being able to contemplate the very dark, the very dangerous, without it being my fault, or having to take it home.

And science fiction lets me say all this in a story, to share with anyone. Because we're people. And we connect by talking.

I'll leave you with ...

14-real deal plus 1:30	*Jurassic Park* (1993) he really did it	-sense of wonder, passion that is part of science, as well as the varied attitudes to it
Q/A		

Educator Sheet: How Scientifically Literate Are You?

> *"Scientific Literacy: the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity. National Education Standards (1996) National Academy Press Washington"*

Creativity and Imagination in Science

- Students should view science as a human activity, not simply a body of accumulated knowledge. As such, science has an inseparable impact on society, history, and the future -- and vice versa.

- A scientific theory is accepted until proven wrong. In this way, science incorporates uncertainty and change as useful and inevitable.

- Science and technology have consequences and impacts that must be imagined in order to be considered properly.

Critical Reading Skills

- Students need to evaluate where they obtain information about science, including which sources are trustworthy and how they can decide.

- Students should be aware of the consequences when people don't read critically.

- Avoid the Cynical Reflex - What is it? Ignoring or dismissing science as being an integral part of society. Or, feeling helpless and lost before the unknowable mysteries of science. Neither attitude is helpful, yet both are much too common.

Effective and Reliable Communication of Ideas

- Be able to talk about science ideas.

- Be aware of what you do and don't know as you read - be willing to look for more information.

- Avoid jargon and other means of exclusion. Look up the meanings of words, rather than ignoring those you don't know at first.

Decision-making/Problem-solving

- Be able to list potential risks and benefits to the use (or non-use) of any new technology or science idea.

- Be aware of the need to verify information before making a decision based on it.

- Be able to ask questions and discuss ideas, allowing the input of others.

- Be able to make up their own minds, then change them as new evidence comes to light.

About the Worksheets:

"Are You a Scientifically Literate Person?"

I developed this quiz as a pre- and post- self assessment, to use with any unit incorporating science fiction to develop scientific literacy. It's been adopted by several school boards since, to my great pleasure. I've learned of it being used before and after first year general science programs as well.

If possible, allow students to keep their choices to themselves. Confidentiality does encourage honesty, particularly in those age groups prone to peer pressure.

"Swimming in Science"

This is more of an introduction to scientific literacy. I often use this in adult workshops as an ice breaker, but I see no reason it couldn't be used as well, or as an alternative, to the quiz above.

Let them complete the entire form before taking it up.

1. If you wish, compile the reasons "why/why not" for the room. It's a useful list to reveal commonalities etc. Not a bad time to mention/elicit that most SF readers are not credulous.

2. (a) This one is usually easy.
   (b) This one may or may not be. Ideal if a range of people are identified, including: someone of a previous generation, the very young, someone without a science background, someone with literacy challenges, or someone who "doesn't think science matters/is believable etc", then add those to the list. etc.

3. This is where the meat is. Feel free to elicit examples of each, discuss away. Emphasize the pitfalls of finding these tasks difficult.

4. While your participants may not change their minds about themselves or the person they named as an example (though I've had it happen), people coming to these questions in a more naive way certainly do.

Are you a scientifically literate person?

Complete the quiz below to find out.

(Circle the answer that best applies to you.)

1. Can you identify the scientific issues underlying personal and societal decisions?

        Most of the Time   Sometimes   Rarely

2. Are you able to express your views on those issues in appropriate scientific terms?

        Most of the Time   Sometimes   Rarely

3. When you evaluate the quality of scientific information, do you consider both its source and the methods used to obtain it?

        Most of the Time   Sometimes   Rarely

4. Do you feel you make and evaluate arguments based on evidence and apply conclusions from such arguments appropriately?

        Most of the Time   Sometimes   Rarely

5. (a) Do you ask questions about what makes you curious in everyday life?

        Most of the Time   Sometimes   Rarely

  (b) Do you determine or find the answers to those questions?

        Most of the Time   Sometimes   Rarely

6. Do you read and understand articles about science in the popular media?

        Most of the Time   Sometimes   Rarely

7. Do you discuss with peers the validity of the conclusions in such articles?

        Most of the Time   Sometimes   Rarely

8. Can you distinguish between what is and what is not a scientific idea?

        Most of the Time   Sometimes   Rarely

Swimming in Science

1. Do you consider yourself a scientifically literate person? Can you swim confidently through this scientific world of ours? Give two reasons why or why not.

_____

_____

_____

2. (a) Write the first name of a person you know well who you consider scientifically literate. _____

   (b) Give the first name of a person you know well who you consider not to be scientifically literate. _____

3. Which of the above individuals would, in your experience, have difficulty with the following tasks? Write the first name(s) beside each.

_____ Understanding why a prescription should be taken as described.

_____ Voting on a science-related issue.

_____ Comparing information presented on labels.

_____ Judging the accuracy of scientific information provided by media.

_____ Discerning the credibility of any source.

_____ Discussing an everyday occurrence, such as weather, in scientific terms.

_____ Discussing an unusual occurrence in scientific terms.

_____ Shopping for a healthy meal.

_____ Diagnosing problems with a technological device.

_____ Understanding the value and limitations of basic statistics.

_____ Finding information on a science-related concern.

_____ Describing the nature of science to a non-scientist.

4. Have you changed your mind about the person you considered scientifically literate? About your own level of literacy? Why or why not?

_____

_____

The What if ...? Scenario

Read through the science article provided.

Discuss as a group.

Based on the ideas presented in the article, decide on a What if ...? question you could pursue in a science fiction story. Consider the following approaches. Feel free to combine them.

> ➢ an extrapolation of this science into the future. What more might we be capable of doing or discovering from this starting point?

> ➢ a speculation about another application of this science. Who or what else might be affected?

> ➢ a speculation about a combination of this science with another aspect of science or society. How might this approach or information affect something else?

> ➢ an extrapolation of the impact of this science, if successful, into the future. If this happens/works, what might be the situation in 50 years, in 100 years, and so on.

Ideas:

_____

_____

_____

_____

_____

_____

_____

_____

Key Elements of a Science Fiction Story

Using your "What if...?" scenario, outline a story which will express your ideas and/or concerns to a reader. Include the following components:

What if ...? This is the extension from the known you will have at the core of your story.

_____

_____

The Problem This is where you pick an imagined consequence to the What if to explore. (Plus a good story needs something for characters to face.)

_____

_____

Viewpoint character (protagonist) There should be a good reason the "what if ..." matters to this character.)

_____

_____

Expert witness This is someone who understands and expresses the science ideas. It could be the narrator, the protagonist, or anyone. But the reader should find the information source credible.

_____

_____

Tone As a starting point, choose what you wish readers to feel after reading this story.

_____

Setting Science fiction can take place in any setting, or time. Pick what works.

_____

_____

Consequence This will be the answer this particular story provides to your "what if" speculation.

_____

_____

_____

Educator Sheet for "Xtreme Science Speculations from the Known"

What if? That's the question asked by science fiction writers. It's a useful question for anyone interested in science as well. In this activity, your students will practice their abilities to think beyond the known, to take a leap of imagination, to boldly go ... you can see where this is heading, I trust. They will take a piece of what they accept to be "science" and use it as a starting point, not an end, to creative thought.

Purpose:

To find an Xtreme Speculation from the Known. This will be the "What if?" question that interests most students in the class.

Procedure:

1. Provide students with a recent news article or topic from science class. Discuss the science for a moment, to be sure each student has a working understanding of the major concept involved.
    Recommended news sources: current newspaper articles, online articles from reputable news sites, popular science articles from reliable print publications.
    Recommended topics: choose anything students have done or are about to do in class, keeping in mind that they will need sufficient grasp of the topic to speculate beyond it.
2. Have students move into groups to produce a list of one-line questions about that concept, each starting with "what if ..." Encourage *Xtreme Speculation*. Get them thinking bigger and bolder. Do not make them aware of the final criteria.
3. If you wish, after each group has three questions, groups can compare their questions with one another by having a representative visit other groups. Allow trading of ideas, but groups cannot present the same idea in competition. If two or more groups enter the same question, it will be removed from competition for all.
4. After the comparison is complete, the groups will reform and decide on which question will be their entry into the *Xtreme Science Speculation Contest*. The class will vote on the winner based on these criteria:
    * significance in the real world
    * importance to individuals in this class
    * potential for benefit or harm to society

Follow up:

Each student produces a work of fiction or art depicting how they would turn the *Xtreme Speculation* into a science fiction story, keeping the science as accurate as possible.

Xtreme Science Speculations from the Known

"What if … ?" If A were changed or different … what would happen to B? That's the question asked by science fiction writers. It's a useful question for anyone interested in science as well.

In this activity, you will test your ability to think beyond the known, to take a leap of imagination, to boldly go …

How? Take a piece of "real science" and use it as a starting point, not an end, to creative thought.

Problem:

To find the most Xtreme Speculation from the Known. The winning "What if?" question will be picked by students in the class.

Procedure:

1. Your teacher will provide you with a recent news article or topic from science class. You don't need to be an expert on the science, but be sure you have a good understanding of the major concept involved. Ask questions if you don't.
2. Work in a group to produce a list of one-line questions about that concept, each starting with the words: "what if …" Think impact, consequence, change! Aim for Xtreme Speculation!
3. You may be asked to compare your top three questions with those from other groups. If so, you can trade ideas, but keep in mind that groups cannot enter the same idea in the competition. If two or more groups enter the same question, it will be removed from competition for all.
4. Decide, as a group, which question you will enter in the Xtreme Science Speculation Contest. The class will vote on the winner based on criteria supplied by your teacher.

Follow up:

Take the Xtreme Speculation one step further! Create a work of science fiction or art depicting the most important consequence of what you think could happen. Keeping as much of the science accurate as you can, but tell or show a good story!

Educator Sheet for "Alien by Design"

Depending on the depth you ask from your students, this activity can be used an introduction to a unit on living systems, allowing you to evaluate the existing knowledge base of your class, or as the culminating project for such a unit. It can also be used as a useful bridge between biology (biodiversity especially) and space science, by adding the aspect of designing a spacesuit to help the designed alien survive in our or another environment.

Groups of 3 or more are ideal. You want to encourage conversation and mixing, so ideally have materials in a central, shared location.

Suggested Materials:

This can be done with a drawing as the product, but works far better if students have the opportunity to create a three-dimensional model. Donate excess materials to another class after the activity, if you wish.

- fasteners (glue, paper clips, wire, magnets, pins etc.)
- assorted craft products (eyes, feathers, wool, little gears, bits of wood, string, balloons, springs, pipe cleaners, beads etc. I like to go through a hardware store as well as a dollar store looking for intriguing items -- and the basement)
- Styrofoam balls of various size
- paint
- tissue paper
- modeling clay

Optional but recommended: a piece of foam core or cardboard per group as a base. Any shape will do. I've done this activity with bases shaped like puzzle pieces, so students walk around and find their "match" then attach their bases together and work through a simulated "first contact."

Hints:

- Have students consider behaviors as well as structures.
- The criteria cited here are only suggestions. You may prefer to work with your students to generate a different set of environmental constraints. One of the most interesting is to have students find the conditions on Mars, the Moon, Europa, or one of Earth's more extreme environments, then use these for the design challenge.
- Accept any design that the students are able to support with logical arguments based on their present knowledge.
- Give them the opportunity to reexamine their designs and make any changes they feel necessary.
- Display the results. If you wish, add language arts integration by having students write a short science fiction story featuring the 'alien' of their choice.

Alien by Design

The trunk of tree allows it to hold leaves up in the sunlight. The long legs of rabbits help them outrun predators. Human fingers allow the use of fine tools. These are examples of body parts or structures that help living things survive. Use your knowledge of the structure of living things on Earth and your imagination to design an alien.

Challenge - design an alien life form whose body structure will help it survive the following conditions:

Daytime temperatures up to 50 C; nighttime drop to –10 C

Very strong and gusty winds, up to 100 km/h.

Extreme dryness for months at a time, followed by a brief interval of heavy rain and flooding.

Gravity about ¾ that of Earth.

Make a model of your alien using whatever material you choose. (To record and share your model, take a digital picture from two sides, including an object for scale)

Be prepared to explain how each body part helps your alien survive in its environment.

Extension: if you are given a base for your alien, add details of its environment.

Web Resources of Interest (Last checked March 2010)

http://www.sciencenewsforkids.org/articles/SciFiZone.asp

SciFiZone is a special area of **Science News for Kids**, featuring archived challenges by Julie Czerneda related to scientific literacy, several with teacher notes. (Note: *Science News* has halted new material on the site for now.)

http://www.jessesword.com/sf

The Science Fiction Citations is an ongoing and fascinating project by the Oxford Dictionary to record first use and meaning of terms coined by SF writers.

http://fifdb.com/

Fiction into Film is a searchable list of movies and TV shows based on works of fiction; as much detail about the source material as could be found is provided. It focuses on science fiction, fantasy, and horror film.

http://www.sff.net/rff/readlist/readlists.htm

Reading for the Future reading lists for children and young adults, developed by a group of educators, authors, and interested individuals to promote literacy through the use of science fiction.

http://www.sfsite.com/scribe/scribe01.htm

This is **SFSite's** excellent searchable database of science fiction, fantasy, and horror writers, with links to author sites and book reviews. Well maintained.

http://www.goldenduck.org/

The **Golden Duck Award** recognizes outstanding science fiction for children and is administered by educators, librarians, and others interested in literacy. It maintains an extensive annotated list of recommended works, including picture books. Submission guidelines for eligible work are included, along with teacher resources and links.

http://www.ku.edu/~sfcenter/young-SF.htm

Science Fiction Youth Program. A site to encourage reading, with extensive links to SF sites of interest to librarians, teachers, and younger readers.

http://www.speculativeliterature.org/

Speculative Literature Foundation, includes K-12 resource material for educators as well as resources for writers and academics.

http://www.ivec.org/womeninscience/

Women in Science: The Female Scientist in Fiction. An ongoing project to amass citations for female scientists presented as characters in science fiction. Several of the listed titles provide engaging and realistic role models.

Science Fiction in the Classroom - Broad Applications

Here are some broader uses for science fiction within the classroom:

1. Unifying Themes
- ❑ *Developing critical reading skills for the evaluation of context and intent for science source material, both as original science non-fiction and as used within a science fiction story, including an expanded vocabulary of specific terms.*

2. Inquiry and Design
- ❑ *Analyze works of science and science fiction in terms of authorship, personal experience, and context, including the influence of cultural setting and authorial ideology.*
- ❑ *Expressing the key idea within a science article as a what if question, locating details in support of that idea and using those as part of a speculative treatment of potential consequences of the use or non-use of a particular idea or technology.*
- ❑ *Write a science fiction story to describe, explain, and inform on a specific what-if and consequence.*
- ❑ *Looking at cause/effect and consequence through the reasoned extrapolation of scientific ideas.*

3. Science, Technology and Human Endeavors
- ❑ *Analyze science fiction novels, short stories, comics, game scenarios, and film in the context of the role of science and technology in society, as well as the attitude and preconceptions of society towards those who work in science and technology.*
- ❑ *Expressing the key idea within a science article as a what if question, locating details in support of that idea and using those as part of a speculative treatment of potential consequences of the use or non-use of a particular idea or technology.*
- ❑ *Self-monitoring of level of scientific literacy.*
- ❑ *Write a science fiction story focused on a particular what-if speculation, complete with related ideas, consequence, and with appropriate narrative, descriptive, and/or expository compositions.*
- ❑ *Produce a variety of science fiction stories from the same starting what-if, to include as many potential consequences as possible, as well as different styles of fiction, ex. from humor to drama.*

Science Fiction in the Classroom - To Develop and Implement Science Curricula

<u>**Science Fiction and Science Skills**</u>
Science fiction can be used to develop these science skills (among others).
Here are some ideas you might like to try with your students.

Reading and comprehending scientific information

How? Have students identify the scientific premise of a story. Use this premise as the starting point for a research project into this or a related topic. Encourage retelling and other means of sharing information learned with others. If time permits, repeat the same activity with another story, or a popular science article.

Critical thinking about scientific issues

How? Choose a story which is based on a science-related issue, ideally one in the news such as overcrowding, pollution, or genetic engineering. (Keep in mind the knowledge base of your students.) Have students identify the point being made about the issue by the author. Have students debate/discuss this point, making a list of any additional information they would need to make a good decision. If time permits, have students continue to a research phase.

Evaluating sources of scientific information

How? Provide students with an assortment of "wild" headlines about science, some from tabloid-style media and others from credible publications, without telling them which is which. Have them sort these into science "fiction" and science "fact." Elicit how they made those quick decisions. Give students samples of both types of article and generate a class list of recommendations on how to evaluate a credible source.

Creative and imaginative thinking in problem-solving

How? In the middle of a science lesson, stop, and have students work in small groups to generate ideas for a science fiction story based on the science they are exploring. If time permits, have students write their stories. Stipulate that the story may have one speculation, or "what if," component about science, but all else should fit in with what students have learned could happen.

The scientific method

How? Select a sf story which depicts the main character(s) using the scientific method to resolve the story's problem. Have students identify each component of the scientific method as it occurs in the story and explain why this approach was successful.

Understanding the role of science and scientists in society

How? Have students brainstorm the characteristics of a scientist. Record all responses without comment. Have them read a science fiction story which depicts a believable, real scientist as a character. Go over their list of characteristics and discuss any discrepancies.

Appreciating possible consequences of technological change

How? Begin reading a short story or novel which deals with a major technological or scientific change about to occur. Stop reading and have students make their own predictions on the effect of such a change. As a class, go over the predictions and reach a consensus if possible.

Tips on Using SF to Encourage Reading

Be Aware of:

Jargon - Watch for scientific or technological terms which may be unfamiliar to students. Use this opportunity to build classroom vocabulary as a group. If there is a made-up language or system of names, have students make up their own in a story-writing exercise with a glossary.

Concepts - Watch for science concepts. Authors vary greatly in the rigor of their use of science, but there are always opportunities to use SF stories to launch discussions, to introduce and enhance science topics, and to explore the role of science in society.

Assumptions - Watch for knowledge the author has assumed in the reader. While some authors provide a knowing character (or "expert witness") to provide needed explanations, others rely on the reader. Read the story for yourself and identify what assumptions might have been made before using the story with students. If necessary, help students discover the scientific knowledge they need in order to appreciate the story.

Context - Watch for the date of publication and other clues about the author. Encourage students to think about the author. When was the story written? What was happening in the world at that time? If the author has a strong message about science in the story, help students interpret this message in the context of that time. For example, many students are unaware of the tensions during the Cold War and need assistance to appreciate some science fiction from that era.

Some hints to help students choose SF for reading:

Access - Organize and display a classroom SF collection which students can access for quiet personal reading or assigned reading. Have students participate in decorating and maintaining this display. (Be sure there are private moments for book selection. Some students who might happily choose a science fiction title on their own may not in a group.)

Peer reviews - Have students publish book reviews for their peers. These could be featured on a class webpage. Favorably reviewed books could be given a coding on the shelf, such as a star for every positive review.

Theme week - Has there been a science event or issue in the news? Perhaps a new movie or popular game? Tap into this interest by making it a theme of a student SF reading festival.

Some other tips:

Produce your own "radio serial" by reading a classic SF adventure such as Jules Vernes' 20 000 Leagues Under the Sea for 10 minutes a day at a regular time. Link activities such as art projects to the day's reading or to momentous events in the story.

Use retelling, charades, or roleplay in which students must communicate the essence of the story to others who haven't read it. Have them make their own book covers.

Encourage students to communicate about what they've read. Hold discussion groups, invite guests, write to authors, etc. Use Internet resources to learn more about the author.

Take your class to visit the science fiction sections in other libraries. Have them look for favorite authors as well as new ones.