Drawing the Impossible . . . Make your own Science Fiction or Fantasy

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THE THEME

Illusion versus reality . . . science and visual art have many similarities. These two subject matters are always engaged, through their own vehicles, in trying to deal with, prove or disprove whether something is an illusion or reality. These two subjects deal with many similar ideas, bring up similar questions, and use similar vocabulary; yet they function in different manners.

Science tries to prove reality through hypotheses, experiments, or equations to obtain basis on facts, truths, proof of physical existence, substance and validity of ideas that man has always tried to answer about our universe, like "Who are we?" Its interest is in the dispelling of illusions or fantasy. Science works on validating reality and how things work in the real world around us. On the other hand, visual arts attempt to answer the same questions by illuminating, imitating or interpreting reality through imagery, theory or myth. Art promotes myth and "what ifs" through stretching the imagination, exploring illusions, and creating fantasies as well. In the process of attaining meaning, visual art tries to learn about our world through observation, introspection, searching for meaning and essence. James Baldwin once said, "The purpose of art is to lay bare the questions which have been hidden by the answers" (Shlain 15).

The procedures of art and science sound opposing and their objectives contradictory, but art and science do have quite a lot in common. It is in the ways of working abstractly that science and art find themselves again, operating on similar "wavelengths." In working in an abstract manner, you use the imagination. You can't escape it. In using the imagination, you proceed to be reflective and introspective, thus searching for meaning, essence and truths. "While their methods differ radically, artists and physicists share the desire to investigate the ways the interlocking pieces of reality fit together. This is the common ground upon which they meet" (Shlain 16).

INTRODUCTION AND OBJECTIVES

This unit revolves around physics, art, fantasy, and science fiction – subject matter that is attractive to our youth. It will involve learning about scientists, artists, physics, and math. Objectively, I will show the connections that art and physics have had in the past, how math connects with our understanding of science, and how artists have used it for their purposes. According to David Bohm, "Physics is a form of insight and as such it's a form of art" (Shlain 15).

It is my intention to expand my students' knowledge in the creation of fantasy and fiction. Concepts come from our imaginations, but they are based on the real world. Artists, as well as scientists, have used their imaginations in order to propose the questions "What if?" and "Why not?" In order to recognize the differences between reality and fantasy, these lessons will prepare students to investigate what's real, what's plausible, and be able to identify what is "not real" or not plausible based on what is currently known about science or physics. Included are lessons about artists and what they've created in the realm of fantasy and science fiction. Due to the nature and complexity of the content within my lessons, I expect to use a full nine weeks in order to accomplish and present the concepts properly.

PURPOSE AND APPROACH

As a graphic arts teacher, I am always searching for instructional materials that will enhance my subject matter and strengthen my teaching skills. I also try to find subject matter that enhances students' abilities through thought process and keeps the subject of art fresh and updated. I teach middle school students, ages 12, 13 and l4. In choosing educational material, I find that my students' interests play a great part in how I present the lesson. I seek stimulating material that they can relate to.

At my school I'm in contact with all types of children. My students have a wide socio-economic and ethnic diversity. They are primarily Black or Hispanic but interestingly, I have a lot of students that are Nigerian, Sudanese, African American, Vietnamese, and Hispanics from all over South America. With this combination of students, I am also conscious of levels of English comprehension. I make sure that my lessons provide a rich assortment of vocabulary and "catch-up" activities.

One of my main objectives is to provide all students with *attainable goals*. Art is very fragile to a student's "psyche" when they believe that they do not know how to draw well or fear that they will embarrass themselves. Taking this into account, I looked for a topic that would *appeal, divert,* and *enhance* my subject matter. I chose to combine art with a complimentary subject matter that I feel my students would enjoy. I chose to combine and create a unit incorporating science with visual art.

To target the *appeal* factor, I specifically chose physics as the favored category in science. In aiming to obtain interest in what they would learn, I selected to mix science fiction and art fantasy as the preferred combination in introducing and revealing the relationship between art and physics. Through learning about specific science facts, I hope to lead my students to think about what is real or illusion.

To *enhance* my objectives, I incorporated writing lessons promoting a lot of discovery, skill building, and creative thinking in both the subject areas. A lot of *diversity* in the way my students obtain information or gain skills is included. I believe this to be essential to keep students looking forward towards each lesson presented. Additionally,

these lessons are flexible so that teachers of other subject matter can utilize this unit to expand on their own teaching initiatives.

Instructional concepts and skill practices must have "hands-on" applications and are found in my lessons. Due to the language barriers, my students benefit through interactive learning activities, giving them a chance to explore, practice and create through these and/or art activities. There is another avenue, which I believe is just as important, that that this theme provides to my students. This is just as essential in any life of any one person . . . the skill of enjoying the process of using their imagination, being able to think, express one's ideas and ask the questions going beyond basic aptitude skills. We call it "critical thinking" and I hope to create the environment for it.

Because illusion and reality concepts are part of the very nature of art and science, I feel that I can mesh these into unit lessons that my students will not forget. This unit will include a sense of a timeline. The activities will encompass "Old World" practices as well as the use of technology today. Not only will a student be able to learn about how artists and scientists functioned in the past, they will get to advance with art mediums and skills. From the creating or binding of paper for their journals, to recording ideas or observations like they did in the 1400s, the students will see the difficulty of that era. Using ink from a inking well to create sci-fi cartoons like that of the 1930s, the students will be able to visualize or appreciate art skills and the accuracy it demanded. At the end of the unit, students will be processing their ideas or scanning drawings on the computer to animate. These means of expression will give a sense of arriving towards today's technological advances.

By integrating science skills, and introducing certain laws of physics, I will create situations that prepare them for the thinking part ahead. Due to the subject matter's appeal, I plan to encourage research, through presentations or critiques, provide Q&A time, and clarified discussions: all are necessary in order to have a higher level of product as well as to promote quality effort and thinking to evolve.

As complimentary topics in my lessons, physics and science fiction, along with graphic art, should provide some very interesting challenges for students of this age. The notion of reality vs. fantasy or science fiction can be intriguing and will hopefully generate eagerness in my students while exposing them to an assemblage of new concepts that are expressed especially through the scientist or artist's eye. Different strategies will be utilized and suggested depending on the students' level of comprehension.

Regardless of the level of the lessons, it should be a thought provoking and interesting subject matter. Questions like "what is real?" and "what is just fantasy?" should emerge along with "could it be some day?" and "why not?" Chosen books, artist journals, scientist notes, movies, television shows, comic books, or paintings are some of the modes to explore.

MY CONCERNS

I have observed that students in sixth, seventh, or eighth grades have varying levels of discernment when it comes to knowing what is factual, real, and what is not. There are varying levels of "naiveté." My students show that they take in a lot of information as truths. They see television, movies and cartoons believing almost all as factual. Students do not stop to think that these vehicles of entertainment are just that – entertainment. I've been aware of this situation for some time now. It is in conversations with my students in class that I've been flabbergasted at their comments. I've heard students say statements like; " But of course, Spiderman has the power to jump from building to building!" or "Yes, the X-Men are for real!" Through these lessons I hope to erase some of their very trusting attitudes, dispel conforming ideas, create curiosity for science facts, increase their level of enjoyment for science fiction, art mediums, and fantasy. I'd like to increase their comfort level to freely use their imagination and appreciate both art and science as an avenue of inquiry and wonder for the future.

I propose to my students that science fiction plays a great part of what is not currently real, but could be in the future. It is through physics that scientists have found real facts about our world and it is artists like Leonardo DaVinci, M.C. Escher and many others that have taken their imagination/theories and proposed these ideas visually to the world. These ideas have been impossible and thought improbable during their life times. Later on, scientists have found ways to make these impossible ideas into reality!

In speaking about the possibility of time travel and science fiction Stephen Hawking speaks in a foreword in Krauss's book *The Physics of Star Trek*:

> Imagine the outcry about the waste of taxpayers' money if it were known that the National Science Foundation were supporting research on time travel. For this reason, scientists working in this field have to disguise their real interest by using technical terms like "closed timelike curves" that are code for time travel. Nevertheless, today's science fiction is often tomorrow's science fact (xiii).

LET'S CALL THEM THINKERS

We know that Leonard DaVinci was interested in the possibility of flight, but not many know that he also introduced the idea of creating contact lenses, underwater gear, improving on machinery through gear action, played around with the ideas of gravity and even the air-conditioner 500 years ago! That's because the arts and sciences were together in the same guild. Art was just an extension and partner to the sciences in the Renaissance. The tradition of using the scientific process of theorizing, collecting data by observation, and using experimentation to solve problems are still very much a part of making art today. Asking questions, thinking abstractly about our world and the universe, solving problems through variables, perspective, geometry, or algebra were the ways that the science and art guilds proceeded in medieval times. Just add more math, procedures

or ways to experiment with technology and you've got the ways great thinkers go about solving problems in the present.

In the beginning of the 1900s, artists like M.C. Escher delighted in stumping mathematicians and architects in creating blueprints of 3-dimensional constructions that geometrically were correct but impossible to fabricate!

Optics and the study of refraction of the Sun's rays explaining how we see color in our world astounded the scientific world! Many artists like Claude Monet read about this and experimented with optical illusions of light and time. Monet, along with others created a new way of painting called Impressionism. It breaks down color like the refraction of the Sun's rays. Marcel Duchamp's art are experiments of time and motion. So many artists have challenged or have been challenged by many ideas from mathematicians, scientists, and yes, even architects throughout history.

Most questions that have been asked by man throughout the centuries in our search for the answers in or about our universe, have been an interest to the artistic as well as the scientific population. The understanding of our world, how and why it works, like the laws of nature or the universe, is at the very core of what makes the human race survive. Thinking and exploring these questions is what has advanced our way of living and survival tactics. Both the artist and the scientist are profound thinkers.

LANGUAGE AND VOCABULARY

Art speaks in non-verbal symbolism, and in many ways is like a visual puzzle. It's fun to try to figure out what the artist is saying to us " the viewers." Symbols are part of man's language and so are science equations. To see math as symbols or part of a language, shows students that math and science are related, thus predisposing students to a more sophisticated way of seeing science/math relationships, art symbolism as language, and all as communication.

> Both art and physics are unique forms of language. Each has a specialized lexicon of symbols that is used in a distinctive syntax. Their different and specific contexts obscure their connection to everyday language as well as to each other. Nevertheless, it is noteworthy just how often the terms of one can be applied to the concepts of the other. "Volume," "space," "mass," "force," "light," "color," "tension," "relationship," and "density" are descriptive words that are heard repeatedly if you trail along with a museum docent. They also appear in the blackboards of freshman college physics lectures (Shlain 20).

It is in middle school that you are introduced to math formulas for solving the problem and answering of what is X or N? Formulas are generally taught in math by rote and are difficult to remember. The use of geometry or algebra still involves memorization of how the functions work.

The students that come to me are generally interested in art and not mathematical equations. I think they would be more interested in geometry or algebra if they knew that it was a language in itself. Math formulas have a real purpose. To learn this language would help them in future courses like that of astronomy, chemistry, or any other course in physics.

GROUNDWORK

In order to prepare my students for the task at hand, there needs to be certain concepts reviewed and considered carefully. These are some of the principals and information that need to be shared, discussed and researched by the class. These ideas can be broken up into several days or intermixed between each lesson as pre-activities in order to increase comprehension, critical thought or personal growth to develop.

Introduction to How Science and Art in the Beginning had Crossed Paths and Have Been Interested in Many of the Same Subjects

Information about the Art and Science Guild in the Renaissance

Show numerous art and history samples of Leonardo DaVinci's journals
Examples can be found in many books showing journals and paintings; thoughts about gravity, planets, flight, machinery, atmosphere, nature and more.

Convey what Scientists Were Studying in the Following Centuries, like the Properties of Gravity

Example: Sir Issac Newton's laws of gravity and motion, or Galileo's thoughts on astronomy.

Even Today, Their Language is Similar

The use of math is still evident for both: some of the concepts use the same words or deal with the same.

Review Vocabulary Words that Are Used both in Science and Art

Examples of words: volume, space, mass, light, color, tension, density, symmetry, radial, alloys, elements, properties, contrast, variables, applications, concepts, and so much more. The use of vocabulary is essentially the same.

Science and Art have Elements in Order to Create Science or to Create Art

Scientists and artists acknowledged sometime in the 1800s that you must function through some basic elements in order to go about creating and experimenting to prove

their theories or hypotheses. Science operates with its elements of earth, wind, water and fire. Art conveys with line, color, shape, form, texture and space.

Physics Deals with the Study of Nature and the Universe, What is Real, How it Works

Physicists study things like mechanics, electricity, optics, sound, heat, and energy. They study the atom and properties of the universe. When physicists study to find a truth about an idea of theirs, they try to find out how it works. They begin with an assumption commonly called a hypothesis. Curiously, another word for hypothesis is theory. Artists prefer to use the word theory in their vocabulary.

Often, Art Deals with the Study of Nature and Many Times Artists Try to Imitate It

Sometimes the artists study nature to relate it to thoughts and theories that they are interested in, exploring along with natural subject matter. Artists strive with the knowledge of what is real, to try to imitate realism through illusion in their artwork. After all, a painting is a two dimensional surface and the art image relates to three-dimensional reality. Even today, imitating reality or going beyond it abstractly are some of the ways artists use natural subject matter.

Examples that Show Realistic Representation

Leonardo DaVinci's botanical conte crayon drawings, the Mona Lisa, most Renaissance paintings, M.C. Escher, Salvador Dali's super-realism paintings, or any "super-realism" art piece of the 1970s.

Art Deals in Substance and Encourages Methodical Thinking and So Does Physics

Art Demonstrates Theories

Realism was the first initiative that artists were asked to conquer. Throughout the centuries, artists were concerned with creating the illusion of reality by perfecting the skill of perspective and form – how to make subject matter look three-dimensionally correct on a two-dimensional surface.

It was during the Renaissance that artists employed the use of philosophy, symbolic thoughts, hidden messages, geometry and algebra to create artistic works. Art evolved little by little, adding more and more scientific and pragmatic theories, by the use of chemistry to improve the product, the inclusion of other scientific thoughts or viewpoints.

At the end of the last century, artists were being influenced by what interested them. Subject matter included anywhere from what the scientific community was researching to the latest ideas in psychology or philosophy. All kinds of scientific discoveries were being revealed. These were exciting times for all the arts and sciences. Many physical

properties were discovered that definitely impacted artists. Evidence of how we see color and light originated theories like impressionism, planar geometry influenced cubism, physics had a hand in the evolution of abstract expressionism, surrealism and yes, fantasy painting.

Examples that Show Fantasy and Surreal Representations

Any example of M.C. Escher's geometrical architecture, tessellated designs or atomic themes, Salvador Dali's surrealistic paintings or atomic theme paintings, Monet's study of light and color from the Cathedral of Notre Dame paintings, Marcel Duchamp's "Nude Descending the Staircase," any of Rene Magrite's surrealistic paintings

Science Proves its Theories

Physics has evolved from just the study of nature, science of healing, astronomy, to a science dealing with the properties, changes and interaction of matter and energy in which energy is considered to be continuous. From the knowledge of gravity, speed of sound, speed of light, time concepts, matter and energy and so much more . . . physics is constantly testing ideas.

Ideas Come from "What if . . ." "Why not?" "Suppose . . . "

The use of the imagination is crucial for any advancement for man. In physics, imagination plus wonder equals conjecture, experiments, and analysis. In art, imagination plus wonder equals illusions, fantasy and the use of theorems. You combine these two and you have visual forms of science fiction.

> I also believe that the questions that scientists and writers of science fiction wonder about are essentially universal and time invariant. They are the subject of every age's fascination, reflected in its literature, art, and drama, and its science. The specific miracles change with time, as we learn about the world; as certain mysteries are unveiled, others are born (Kraus xii).

Science Fiction or Fantasy is Currently Very Popular

Ideas that have come from science fiction have influenced scientists to explore these "wild" possibilities. Science fiction has pushed many ideas forward into reality. Many ideas that originated from the use of the imagination have come about being used today and are considered as a common commodity.

Medical inventions have come from ideas from science fiction shows like *Star Trek* or *Lost in Space*. Just think of the medical display console that was installed over a patient's bed in the 60s *Star Trek* show in sickbay. Many hospitals have displays that seem that futuristic right now. Think of how we are comfortable in thinking that robots

will take care of many of our chores. We got these ideas from shows like *The Jetsons* or *Lost in Space*. The idea that robots or computers will have the capacity of artificial intelligence like that of many of the talking computers shown in so many shows and movies is currently a theory that we know scientists have been experimenting with.

Another item that was influenced by Star Trek is the cellular phone. Think about how their communicators look very much like our flip-open cellular phone today. Even in our language we are accustomed hearing people use phrases like "beaming up," "temporal vortex," and "warp speed," as if it were normal!

LESSON PLANS

Subjects that Can be Researched by the Students, Presented and Discussed in Preparation for Lessons 2 and 3

Beaming up, Warp drive/speed of light
Motion shown in space versus what is seen in movies
How science fiction has influenced us so far today
Medical inventions, the phone/ walkie-talkies, clothes, language, robots, toys, our imaginations, technology, games
Gravity, how properties of motion and gravity compare to motion picture, cartoon creations or other fantasy games
Sound
Can planets blow up?
Laser technology – are laser swords realistic?
Aliens – What would they look like?
X-tra ordinary abilities- Mutations
Wormholes
Holodecks and Holograms
Traveling through space

Pre-Lesson Activities: Journal Drawings, Research, Hypothesis and Experimentation

Students will create a journal (much like Leonardo DaVinci's) to make use of in all of the lessons combined. They will use the journal to write notes, draw and create their ideas, story line, or cartoon frames.

- Make a brown paper cover for their journal sketchbook using grocery store paper bags and glue.
- Introduce paper-making process. Have students create at least one sheet the original way and then add modern drawing paper to the book.
- Bind the book with glue, using additional sewing or other seaming technique.

- Practice writing with pen and ink. There are various pen tips available. A size C-3 is recommended for calligraphy, a regular pointed tip is recommended for rendering drawings.
- *A fun variation* in journal recording would be to write backwards (like Leonardo DaVinci in order to keep it more secretive) A mirror placed in front will reveal the notation by reversing the message.

Lesson 1

The Objective
To understand the practice of a methodical procedure in order to improve on the skills of inventing or using the imagination in a creative way. Initially, the students are exposed to great ideas of the past, how scientists or artist have experimented or used their imaginations to think up these inventions. Could their current technology and science support their ideas?

Activity I
Review *Groundwork 1 and 2*

Students will be assigned to look up these inventors or artist, report or discuss in class their ideas, or how they helped influence our modern society and the future.
Past inventors- Leonardo Da Vinci, Galileo, Guttenburg, Alois Senfelder
Modern inventors- Thomas Edison, Alexander Tolka, Orville and Wilbur Wright, Rube Goldberg

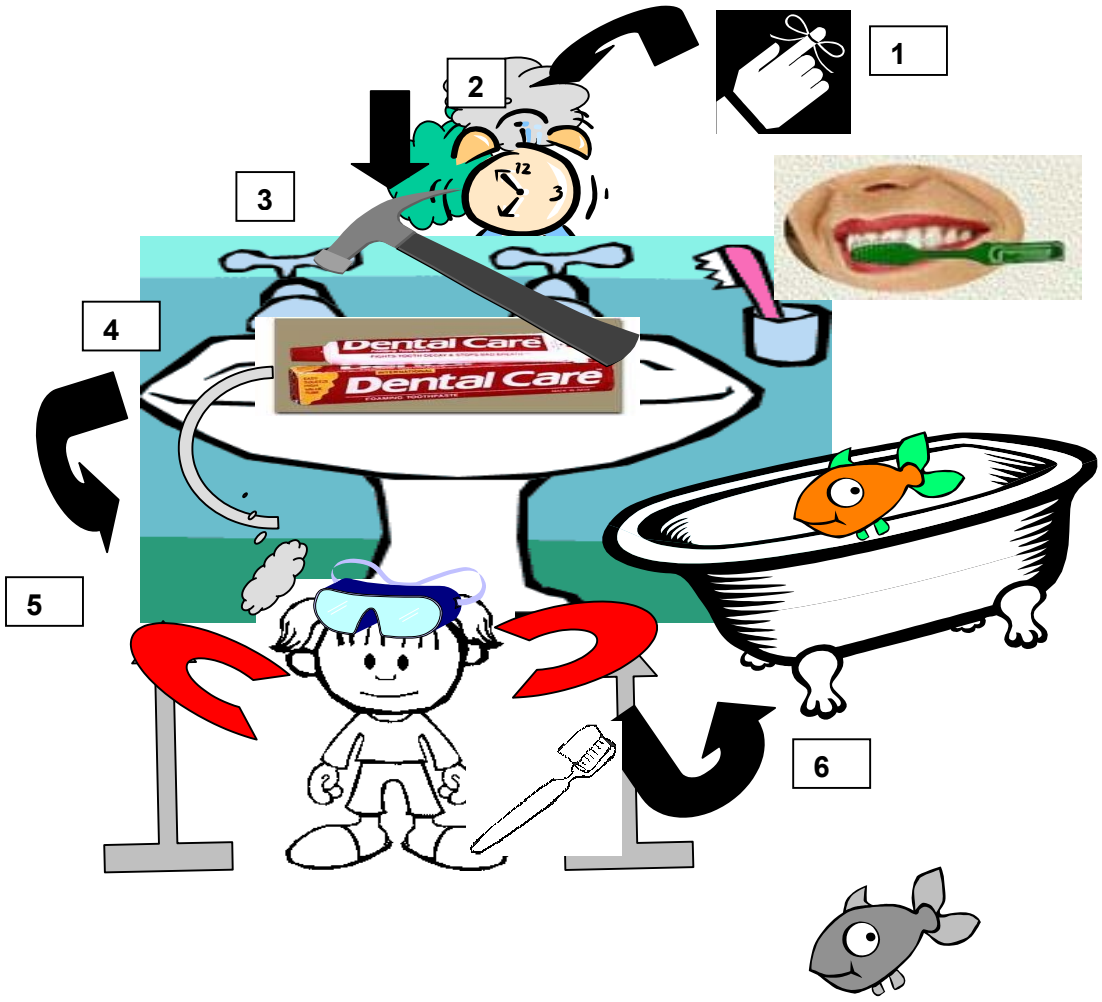
Students can study and draw in their journals, writing ideas of what could be a great new invention, using math create tesselations by hand or computer, use perspective and geometry to render by adding vanishing points or calligraphy writing a report about an inventor.

Assessment
Formal and Informal
Active participation of the curious kind is what I'm looking for.
Assigning them books that deal with inventors, artist
Testing them on the book's information and or generating a report
Discussions and introspective questions that they form to present to the classmates
Skills practice in any concept or media introduced

Activity II
Students will be asked to think of many daily functions… for example "brushing your teeth." Write down as many daily functions we do in a day. From these choose one that interests you. Record in your journal as many verbs that would relate to these functions like say; sweep, graze, flutter, pulsate, throb, vibrate, or swing. Now come up with an

idea that would revolutionize or improve on the function. Is your idea feasible? Can modern science create it with the current technology?

(Sample picture of a daily function re-invented or improved)



1. Remember to put the alarm on in the morning
2. Alarm vibrates and lowers the hammer on to the toothpaste
3. Toothpaste oozes on to the metal toothbrush
4. Child stands between the magnets and metal toothbrush does the push and pull action
5. Child is so messy with paste and is ready to take a bath
6. Cycle starts up again in the morning

Activity III

Students will draw a detailed sketch of some invention that has not been invented yet. They are to research to see if the idea can be substantially validated in today's science knowledge or technology. Present the illustration to the class, explain how it works (is it

mechanical, does it use sound, electricity, heat or atomic technology) and if it cannot be upheld by today's physical properties, specify the needs that science needs to reach in order for this invention to become reality.

Assessment
Journal writing and drawings

Lesson 2

The Objective
Students will study various art theories that have been influenced by scientists. Theories and discoveries are explained and studied. Practice of skills and techniques of perspective, use of vanishing point, and other ways to create 3-dimensional illusions will be practiced. Other types of art skills that will be employed is inking, shading and painting.

Through these activities students will increase their comprehension of how artists and scientist function. They will be doing individual investigations on assigned artists and/or scientists. They will report and discuss theories on illusions, fantasy art, impressionism, or surrealism. In studying these theories, the student will be introduced to science fiction of various mediums. Science fiction combined with the art of cartooning will allow the pupil to explore, think and create in the tradition of fiction creators.

Activity
Review *Groundwork 3, 4 and 5.*

Present how art and science relationship split yet kept its language and methodology, how science influenced artists, how subject matter is the same and evolved. Theories to explore: realism, impressionism, surrealism, abstract art, and fantasy art.

Various Choices can be employed:

- Practice skills and techniques that impact the ability to create realism or illusions. Create a drawing in 3-D effect.
- Report and discuss in class about any of these ways of thinking in painting
- View any movie available about an artist or any of these theorems
- Fieldtrips can be arranged to have students visit the Museum of Fine Arts or the Museum of Natural Sciences

Lesson 3

The Objective
To expand comprehension through research, discussion and reflection what they have studied in previous lessons.

Through their new understandings of physics and art, the students can discuss their connected practices, methodical procedures to create or investigate, their use of the imagination in order to improve on the skills of inventing or using imagination in a creative way.

Initially, the students are exposed to great ideas of the past, how scientist or artist have experimented or used their imaginations to think up these new methods. Now, the pupil should be more current about technology and what science can support as believable ideas. He/she will be able to validate what they have learned and get a chance to try out their ideas following the previous methodologies and skills.

Preparation

- Review *Groundwork 5 and 6.*
- Show some excerpts of Star Trek and other films that show science properties and realism being ignored.
- Present some fallacies from films and other examples that show how some of these imaginative futuristic ideas have been taken from science fiction and have become real today through our current technology.
- Communicate to the students that there are futuristic/conceptual ideas that intrigue physicists today. These ideas seem far-out but have been revisited by science fiction writers, and fantasy artists so much that physicist are studying, hypothesizing, or researching to see if some these ideas could come into fruition.
- Have students complete a movie or book review (See Appendix A).

Activity Materials

Journal, a computer with art capability soft ware (Hyperstudio, Morph, Tessellation, Photoshop, and scanner suggested)

Activity I

Student will prepare a computer rendered story/adventure that will comply with the general terms and knowledge that we have in physics today. They will have to include a black hole, a worm-hole, examples of going through them, motion in space, sound, fire and explosions, time and space situations, weight, the nature of gravitational force and atmosphere. The story will be as realistic as possible, breaking no law or property.

In this first adventure, I hope to emphasize that all of what we see in sci-fi cartoons, movies and fantasy are not accurate in what is plausible. They invent and stretch science facts for sensationalism, embellishment, and to add additional action in their stories. Through developing, discerning science truths, and staying within the framework of science knowledge, the student should analyze and prepare a realistic rendered story.

Activity II

The students will get a chance to develop, create and design a fantasy or science fiction of their own using any and all science rule breaking to embellish their story. They may choose to create this through computer rendering, cartooning or painting.

Assessment

They will present both Activity I and Activity II adventures in a presentation for a final grade. They are to discuss and point out fallacies and their choice in compensating reality for effect.

APPENDIX A

Name: _____

Date: _____

Movie or Book Review

Real or Unreal? That is the question. Check below if you see or read about these topics in the assigned movie or book. Tell me if its fake, why do you think so and give me your rationale. Sample: Movie: X-Men , extraordinary power of metal inside his body shooting out at will. Do you think it is believable? Why or why not?

Below are some topics your assignment may show or describe. Check below and answer if it applies.

V	***Topics***	***Rationale***
	Beaming up	
	Warp drive/speed of light	
	Androids	
	Planets blowing up	
	Aliens	
	Worm holes	
	Holodecks/ Holograms	
	Inventions influenced from Sci-Fi	
	Cool gadgets	
	Artificial gravity	
	War toys	
	Sound effects	
	Laser works	
	Mutations	
	Materials used	
	Super powers	
	Other	
	Other	

ANNOTATED BIBLIOGRAPHY

Books

Berger, Melvin. *Scholastic Science Dictionary.* Scholastics Inc., 2000.
Basic science information includes word pronunciations and illustrations for the middle school child.

Cavelos, Jeanne. *The Science of Star Wars*. New York: St. Martin's Griffin, 2000.
Could we really live elsewhere? What would aliens really look like? Is there really something called the "Force?" Do men have psychic abilities? *Star Wars* the movie is revisited through the many topics that are in many ways the myths of today's scientific world. Will we be able to achieve today's fables in the future? This publication's discourse reviews all these and more.

Davies, Paul. *How to build a Time Machine.* New York: Penguin, 2003.
With wit, logic, and amazing facts that made physicist Paul Davies believe that time travel can be theoretically possible.

Farrand, Phil. *The Nitpicker's Guide for Next Generation Trekkers.* New York: Bantam Dell Publishers Group, Inc., 1993.
From the minuscule to grand blunders, bloopers and discrepancies that laymen may dismiss but technically and scientifically aware audiences are disturbed by. Awareness of many unrealistic plots or discourse is observed.

First Science Encyclopedia. New York: Larousse Kingfisher Chambers, Inc., 1997.
Great starter book that assists in basic science, vocabulary and comprehension. Gives step-by-step introduction to experiments and science properties.

Gresh, Lois and Robert Weinberg. *The Computers of Star Trek.* New York: Basic Books, 1999.
The 24th century is envisioned. A small book with a lot of punch. This vignette piece of information talks about future navigation, battles, artificial intelligence and holodecks.

Hanley, Richard. *The Metaphysics of Star Trek*. New York: HarperCollins Publishers, Inc., 1997.
A thinking man's way to Star Trek ideology. Some of the topics that are brought up have to do with the classic "Prime directive." Pro-creation, survival, transportation, and temporal distortions are all included in discussion of man's possible future.

Hawking, Stephen. *The Universe in a Nutshell*. New York: Bantam Books, 2001.

Clarity of theories about the universe. A guide that instructs and explains ideas such as supergravity, supersymmetry, holography, quantum and the theory of mass.

Krauss, Lawrence. *Beyond Star Trek*. New York: Harper Perrenial Publishers, Inc., 1997.
As the subtitle heading this book includes information that gives answers from "Alien Life to the End of Time." I found that the information includes references of time travel, energy from the sun, questions like "Can we really survive an atom bomb?" and so much more.

Krauss, Lawrence. *The Physics of Star Trek*. New York: HarperCollins Publishers, Inc., l995.
Suggested text that covers ideas from the great scientist such as Newton and Einstein, speaking of matter, energy, and light. Is there space travel? Can we travel through wormholes? Does warp drive look promising? Or could a holodeck exist in the future? These are some of the topics covered.

Shlain, Leonard. *Art & Physics, Parallel Visions in Space, Time and Light*. New York: William Morrow & Company, Inc., 1991.
The main book that got my attention. Evocative ideas that involve art and physics, proposing that physics and art are not so farfetched subject matters. They are not so strange a joining for discussion and comparing. They are very related in imagery and theory.

Thomas, Roy and Howard Chaykin. *The Marvel Comics Illustrated Version of Star Wars*. New York: Ballantine Books, 1977.
A cartoon screenplay of Star Wars made into a book. Great for preparing and showing false or correct science information that has been drawn initially for young people's diversion.

Teacher Web Sites

Brain Juice. June 2003. <www.Brain-juice.com>.
Site that lets you enter in a name of an artist, movement, or era and gives you pertinent information about concepts or thoughts that led to the artist's work.

The Official Rube Goldberg Site. 2003. Rube Goldberg Inc. June 2003. <www.Rube-Goldberg.com>.
A wonderful collection of Rube Goldberg's crazy proposals (inventions) that generated 10-20 irrational steps before the initial action (idea) is completed. Great way to introduce creativity in the process of inventing.

Teacher and Student Web Sites

The following web sites may be of interest to teachers and students:

<http://www.eg.bucknell.edu/physics/211/funstuff/scifiphys.html>.

<http://www.geocities.com/naran500/infamy/index.html>.

<http://www.curiouser.co.uk>.

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