

**Through the looking glass, what scientists can see when they use the right tools.**

*"What we observe is not nature itself but nature exposed to our method of questioning."* Werner Heisenberg

**Contact Information:**

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**Mission Statement:**

What we know about living things is made possible by the devices that we have made to discern life processes. Students will understand that our ability to understand is limited by our ability to detect and measure.

**Abstract:** 150 Words or Less

My students will solve plant pathogen problems using an evolving set of information and tools. First observations will be unaided externally observable characteristics simulating pre-scientific conditions. To jump to the point in history where the disease state was understood post microscope, I will then introduce basic microbiological methods utilizing selective media to determine a broad class of pathogen. Following this we will jump to the time in history that DNA was understood and utilize an ICORE kit to perform PCR testing. The last "tool" to be introduced will be DNA microarrays. In this case a simulation will be performed that will suggest to the students were we might be able to take the understanding of specific genetic markers that they learned about during the PCR testing.

**Description of Teaching unit & Expected outcomes.**

*"What we observe is not nature itself but nature exposed to our method of questioning."* Werner Heisenberg

The above quote served as the inspiration for this collection of student activities. This unit is designed to have students make scientific observations for the purpose of identifying a pathogen.

In order to give students a basic grasp of what science is, I have taught them an extremely simple definition. -Science is the search for difference and or causation. Determining differences and causes can only be done through careful measurement and observation.

The earliest scientific observations were made using only the raw human senses. Over time, the accumulation of scientific thought has been punctuated by leaps in materials science. Tools constructed using these materials have allowed us to make leaps in what we consider the observable world.

Just as the casually observed shadow appears to be the sharp demarcation between light and dark, closer observation reveals fringes that also suggest the wave like character of light.

The early Greek philosopher Democritus posited a theory that we were able to see because objects radiated eidola. (tiny replicas) Although we now know that this theory is false, the theory did, in fact, account for the observations and data available at the time. Later scientists were not necessarily smarter than Democritus but they did have at their disposal much better observations. These observations were made possible by the systematic improvements in tool construction and in measurement.

**The objectives of the project are:**

- 1- My students will solve real world plant pathogen problems using an evolving set of information and tools.
- 2- Students will understand that observations are constrained by the resolution of the measurement tool.
- 3-Advances in materials science allow the construction and use of new tools that allow observations in previously inaccessible realms.
- 4- Increases in measurement resolution allow us to detect and respond to previously unperceived disease states.
- 5- Understand that the following major eras in pathogen detection are dependant upon the tools that are available to researchers. **Observational biology, microbiology, microscale molecular biology, macroscale molecular biology**

**The Student Will:**

- 1- For Observational Biology- The first lab will task students with determining the causative agent in distressed citrus leaves. They will be presented with leaves bearing; yellow streaks, uniform yellowing and normal condition. This task represents the period of early agriculture prior to understanding of germ theory or more advanced diagnostic tests.
- 2- For the Microbiological Era- The task will be for the students to isolate a mixture of two different bacterial strains on agar plates by using selective media. The students will then use dissection scopes to differentiate colonies using only the observations made possible by the use of a stereoscope.
- 3- For the Microscale Molecular Biology Era- The task will be for students to perform a PCR test to positively identify the tomato spotted wilt virus. This test will be done using the test kit available through the ICORE program. This represents the time period after the discovery and basic understanding of genetic material.
- 4-For the forth task involving Macroscale Molecular Biology, the students will perform simulated DNA microarray testing to identify a specific agricultural pathogen from segments of all known ag. pathogens.
- 5- As a synthesis activity, student groups will create a hypothetical company that will design and market a future biomedical device or process. The students will have to draw upon all that they have learned about the eras identified above in order to create what they imagine the next step in biomedical science to be.

**Indications of Expertise of the PI**

The Principal Instructor for this instructional unit is Mr. Thomas Fritz. Mr. Fritz is uniquely qualified to guide students through these modules due to his rigorous science background and diverse laboratory experience.

Prior to teaching Mr. Fritz was the laboratory director at Hydrosphere Research, an aquatic toxicology laboratory. Mr. Fritz has a Bachelors of Science in Zoology, a Masters in Gifted Science Education and a Certificate in Biomedical Engineering.

Mr. Fritz has taught in public and military dependants schools and possesses the following certifications: Gifted Education, Middle Grades Science, Secondary Physics, Secondary Biology and has attained the National Board Certification for Teaching Science to Young Adults.

**Budget and Budget Justification.**

Procurement of citrus leaves positive and negative for citrus greening.	\$60
Fischer Petri Dishes	\$47
Agar	\$33
Selective Media Mix	\$60
Specimen A	\$20
Speciment B	\$20
ICORE PCR kit	\$500
MicroArray simulation kits and printing	\$40
Total:	\$780

**Through the looking glass, what scientists can see when they use the right tools.  
Lesson Plan Timeline**

**Contact Information:**

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**Mission Statement:**

What we know about living things is made possible by the devices that we have made to discern life processes. Students will understand that our ability to understand is limited by our ability to detect and measure.

**Description of Teaching unit & Expected outcomes.**

As a final synthesis activity, student groups will create a hypothetical company that will design and market a future Genetic service or process. The students will have to draw upon all that they have learned in the areas of: **Observational biology, microbiology, microscale molecular biology and macroscale molecular biology** in order to create what they imagine the next step in biomedical science to be.

**The time required for this project is:**

1-Class period- The project is introduced to the students and the presentation rubric is presented.

2-Class periods- Instructor presents basic information to students as they complete their outlines of the major classes of intellectual property using the prepared intellectual property guidelines.

1-Class period- Students divide into teams and fill out the "Genetic Invention IP Plan" sheet.

3-4 Class periods- Students are taken to the media center or computer lab to do research and prepare for their final product presentation. Students document their time using the "Genetic Invention Lab Notes" form and the "Genetic Research Sheet".

2-Class periods- Students will present their Genetic Product business plan and be graded according to the "Genetic Project Final Presentation Rubric".

### **A Review of Intellectual Property**

*Subjects-* Scientific method, Business, Social development

*Grade Level-* Middle and High School

*Purpose-* Citizens are exposed to intellectual property over and over everyday. Most people are constantly making use of IP and students are exposed to opportunities to violate IP law via the internet and computers. Business owners must constantly make decisions regarding IP and their property or services offered. With these things in mind it is valuable to give students an understanding of intellectual property.

*Student Objectives-* Students will gain an understanding of the value of intellectual property, its different types and the advantages and disadvantages of each.

*Student Assessment-* Student activity sheets are in appendix A with point values and scoring guides. These can be modified as appropriate by the teacher.

*Time Required-* The supplemental materials can be picked and chosen to encompass the time that the teacher wishes from a single 50 minute class to a two week research/creation group project.

*Required Materials-* A method for students to research information. Preferably a computer lab with internet access.

*Supplemental Materials-*

Appendix A, student worksheets

Appendix B, teacher resources summarized from Wikipedia

*Accommodations for students with special needs-* The classroom teacher should not need to make any accommodations above or beyond the accommodations in place during the student's regular classroom activities.

*Sunshine State Standards-*

#### **The Nature of Science**

**The student uses the scientific processes and habits of mind to solve problems.**

##### **(SC.H.1.3)**

1. knows that scientific knowledge is subject to modification as new information challenges prevailing theories and as a new theory leads to looking at old observations in a new way.
2. knows that the study of the events that led scientists to discoveries can provide information about the inquiry process and its effects.
3. knows that science disciplines differ from one another in topic, techniques, and outcomes, but that they share a common purpose, philosophy, and enterprise.
4. knows that accurate record keeping, openness, and replication are essential to maintaining an investigator's credibility with other scientists and society.
5. knows that a change in one or more variables may alter the outcome of an investigation.
6. recognizes the scientific contributions that are made by individuals of diverse backgrounds, interests, talents, and motivations.
7. knows that when similar investigations give different results, the scientific challenge is to verify whether the differences are significant by further study.

#### **The Nature of Science**

**The student uses the scientific processes and habits of mind to solve problems.**

**(SC.H.1.4)**

1. knows that investigations are conducted to explore new phenomena, to check on previous results, to test how well a theory predicts, and to compare different theories.
2. knows that from time to time, major shifts occur in the scientific view of how the world works, but that more often the changes that take place in the body of scientific knowledge are small modifications of prior knowledge.
3. understands that no matter how well one theory fits observations, a new theory might fit them as well or better, or might fit a wider range of observations, because in science, the testing, revising, and occasional discarding of theories, new and old, never ends and leads to an increasingly better understanding of how things work in the world, but not to absolute truth.
4. knows that scientists in any one research group tend to see things alike and that therefore scientific teams are expected to seek out the possible sources of bias in the design of their investigations and in their data analysis.
5. understands that new ideas in science are limited by the context in which they are conceived, are often rejected by the scientific establishment, sometimes spring from unexpected findings, and usually grow slowly from many contributors.
6. understands that, in the short run, new ideas that do not mesh well with mainstream ideas in science often encounter vigorous criticism and that, in the long run, theories are judged by how they fit with other theories, the range of observations they explain, how well they explain observations, and how effective they are in predicting new findings.
7. understands the importance of a sense of responsibility, a commitment to peer review, truthful reporting of the methods and outcomes of investigations, and making the public aware of the findings.

**The student understands that science, technology, and society are interwoven and interdependent. (SC.H.3.4)**

1. knows that performance testing is often conducted using small-scale models, computer simulations, or analogous systems to reduce the chance of system failure.
2. knows that technological problems often create a demand for new scientific knowledge and that new technologies make it possible for scientists to extend their research in a way that advances science.
3. knows that scientists can bring information, insights, and analytical skills to matters of public concern and help people understand the possible causes and effects of events.
4. knows that funds for science research come from federal government agencies, industry, and private foundations and that this funding often influences the areas of discovery.
5. knows that the value of a technology may differ for different people and at different times.
6. knows that scientific knowledge is used by those who engage in design and technology to solve practical problems, taking human values and limitations into account.

*Teaching Tips/Hints-* (Answer Key) The following information is excerpted predominantly from Wikipedia.com and represents inclusive information that the students will find while searching the site on the web.

The rights of all IP come from the following section of the constitution. I.1.8:  
Congress has the power to promote the progress of science and the useful arts, by securing for limited times, to authors and inventors, the exclusive rights to their ideas. ....

**Intellectual property** or *IP* refers to a legal entitlement which sometimes attaches to the expressed form of an [idea](#), or to some other [intangible](#) subject matter. In general terms this legal entitlement sometimes enables its holder to exercise exclusive control over the use of the IP. The term *intellectual property* reflects the idea that the subject matter of IP is the product of the [mind](#) or the intellect, and that once established; such entitlements are generally treated as equivalent to tangible property, and may be enforced as such by the [courts](#).

The most well known forms of intellectual property include [copyrights](#), [patents](#), [trademarks](#), and [trade secrets](#). Patents and trademarks fall into a particular subset of intellectual property known as [industrial property](#).

*Teaching Tips/Hints- **Copyright:***

A copyright is a set of [exclusive rights](#) granted by [government](#) for a limited time to protect the particular form, way or manner in which an idea or information is expressed. Copyright may subsist in a wide range of creative or artistic forms or "works", including [literary works](#), [movies](#), [musical works](#), [sound recordings](#), [paintings](#), [photographs](#), [software](#), and [industrial designs](#). Copyright is a type of [intellectual property](#).

- ❖ How to get a Copyright: Copyright protection exists from the moment of creation. Proper government registration occurs through the Library of Congress in the USA.

Put into one envelope or package:

- ❖ A completed application form for the type of work to be copyrighted. (choose [which form](#) to use)
- ❖ A \$30 payment to "Register of Copyrights."
- ❖ Non-returnable copy(ies) of the material to be registered. Read details on [deposit requirements](#).

- ❖ Copyright Rights:

- to produce copies of the work and to sell those copies (including, typically, electronic copies)
- to import or export the work
- to create derivative works
- to perform or display the work publicly
- to sell or assign these rights to others

The phrase "exclusive right" means that only the copyright holder is free to exercise the attendant rights, and others are prohibited from doing them without the consent of the copyright holder. Copyright is often called a "negative right", as it serves to prohibit people (e.g. readers, viewers, or listeners) from doing something, rather than permit people (e.g. authors) to do something.

Copyright law only protects the particular form or manner in which ideas or information have been manifested, and is not designed or intended to protect the actual concepts, facts, styles or techniques which may be embodied in or represented by the ideas or information.

For example, the copyright which subsists in relation to the [Mickey Mouse](#) cartoon prohibits third parties from distributing the cartoon or creating derivative works which copy or mimic [Disney's](#) particular talking mouse, but does not prohibit the creation of artistic works about talking mice in general. Other forms of intellectual property may provide legal protection where copyright does not.

- ❖ Copyright Duration:

95 years from publication or 120 years from creation, whichever is shorter, for corporations or works for hire. 70 years after the death of an individual.

- ❖ Copyright Disadvantages:

Small changes can easily sidestep your protection.  
Narrowly defines what is protected.

- ❖ Copyright Advantages:

Great duration.

Low cost  
Ease of filing

*Teaching Tips/Hints-* **Trademark:**

A trademark ([Commonwealth English](#) :trade mark )<sup>[1]</sup> is a distinctive [sign](#) of some kind which is used by a [business](#) to identify itself and its [products](#) or [services](#) to [consumers](#) , and to set the business and its products or services apart from those of other businesses. A trademark is a type of [intellectual property](#), and in particular, a type of [industrial property](#).

A trademark may comprise a name, word, phrase, [logo](#), [symbol](#), design, image, or a combination of one or more of these elements. There are also a range of [non-conventional trademarks](#) which do not fall into these standard categories.

The essential function of a trademark is to uniquely identify the commercial source or origin of products or services, such that a trademark, properly called, *indicates source* or acts as a *badge of origin*. The use of a trademark in this way is known as *trademark use* and a trademark owner seeks to *enforce* its rights or interests in a trademark by preventing unauthorized trademark use.

❖ How to get a Trademark:

A trademark may be *registrable* (i.e. be eligible for registration) if amongst other things it satisfies the essential trademark function, and is not generic or descriptive. A trademark may have "distinctive character" without being registrable.

Registrability can be perceived as a continuum, with generic and descriptive marks at one end of this continuum, "fanciful" or "invented" marks (e.g. [Kodak](#) ) at the other end, and *suggestive* marks and *arbitrary* marks laying somewhere in between these two points. *Suggestive* marks are marks which have some descriptive quality but which require imagination on the part of the consumer to identify this quality (e.g. the Mercury image for FTD suggesting delivery speed) and *arbitrary* marks are usually common words which are used in a meaningless context (e.g. [Apple](#) for computers).

- ❖ A completed application form for the type of work to be trademarked.
- ❖ A \$375 payment to "U. S. Patent and Trademark Office."

❖ Trademark Rights:

The trademark holder has the power to exclude others from using that trademark or substantially similar marks in the course of business. Trademark enforcement can take place whether the infringement was intentional or not.

❖ Trademark Duration:

A trademark registration may remain in force indefinitely if the trademark is periodically used and renewal fees continue to be duly paid to the relevant jurisdiction's trade marks office or [registry](#).

❖ Trademark Disadvantages:

Trademarks can be lost in cases where the manufacturer fails to maintain consistent quality or consistency.

Trademarks are considered abandoned if unused in business for a period of 5 years.

Trademarks are usually only granted in certain markets. Infinti is a manufacturer of luxury cars while Infinity is a manufacturer of premium speakers. Trademark infringement cannot be enforced as the public is not likely to confuse one for the other while shopping.



Trademarks can be lost through success. Once a mark is so well known that the public no longer identifies the product with a certain company it may be ruled generic. This was the case with the Bayer company's Aspirin.

❖ Trademark Advantages:

Trademark enforcement prevents other businesses from misleading the public about the origin of products, goods and services.

Trademarks prevent businesses from stealing sales based on a company's mark recognition.

Companies that harass other companies by claiming trademark infringement on a groundless basis can themselves be sued under wrongful or groundless threats of infringement statutes. This is designed to protect small companies from intimidation by large companies.

*Teaching Tips/Hints-* **Trade Secret:**

A trade secret is a confidential [practice](#), [method](#), [process](#), [design](#), or other [information](#) used by a company to [compete](#) with other businesses. a trade secret is some sort of information that (a) is not generally known to the relevant portion of the public, (b) confers some sort of economic benefit on its holder (where, note well, this benefit must derive *specifically* from the fact that it is not generally known, not just from the value of the information itself), and (c) is the subject of reasonable efforts to maintain its secrecy.

Trade secrets are not protected by law in the same manner as [trademarks](#) or [patents](#). Probably one of the most significant differences is that a trade secret is protected *without* disclosure of the secret. Provides a way to seek action against employees that reveal secret. Gives legal support to the secret and its maintenance.

❖ How to get a Trade Secret:

Discover something unique and economically valuable. Take steps to maintain the secrecy of that knowledge. If the information is not protected and released the public it no longer enjoys trade secret status.

❖ Trade Secret Rights:

In exchange for the opportunity to be employed by the holder of secrets, a worker will sign an agreement not to reveal his prospective employer's proprietary information. Often, he will also sign over rights to the ownership of his own intellectual production during the course (or as a condition) of his employment. Violation of the agreement generally carries stiff financial penalties, agreed to in writing by the worker and designed to operate as a disincentive to going back on his word. Similar agreements are often signed by representatives of other companies with whom the trade secret holder is e.g. engaged in licensing talks or other business negotiations.

If a trade secret is acquired by improper means (a somewhat wider concept than "illegal means" but inclusive of such means), the secret is generally deemed to have been *misappropriated*. Thus if a trade secret has been acquired via industrial espionage, its acquirer will probably be subject to legal liability for acquiring it improperly. (The holder of the trade secret is nevertheless obliged to protect against such espionage to some degree in order to safeguard the secret. As noted above, under most trade secret regimes, a trade secret is not deemed to exist unless its purported holder takes reasonable steps to maintain its secrecy.)

Another significant development in U.S. law is the [Economic Espionage Act of 1996](#) (18 U.S.C. §§ 1831-1839), which makes the theft or misappropriation of a trade secret a federal crime. This law contains two provisions criminalizing two sorts of activity. The first, 18 U.S.C. § 1831(a), criminalizes the theft of trade secrets to benefit foreign powers; the second, 18 U.S.C. § 1832, criminalizes their theft for commercial or economic purposes.

❖ Trade Secret Duration:

Trade secret protection *can*, in principle, extend indefinitely and in this respect offers an advantage over patent protection (which lasts only for a specifically delimited period -- currently twenty years in the U.S.). (One company that has no patent for its formula and has been very effective in protecting it for many more years than a patent would have is [Coca Cola](#).) However, the "down side" of such protection is that it is comparatively easy to lose (for example, to reverse engineering, which a patent will withstand but a trade secret will not) and comes equipped with no *minimum* guaranteed period of years.

❖ Trade Secret Disadvantages:

Can be legally reverse engineered with no protection.

- ❖ Trade Secret Advantages:
  - No disclosure of any type.
  - No outside expense to register or maintain.
  - Federal laws provide punishment for violators.

*Teaching Tips/Hints- **Patent:***

Requires Novel, Useful, and Nonobvious, full disclosure of technology, process, A **patent** is a set of exclusive [rights](#) granted by a [government](#) to a person for a fixed period of time in exchange for the regulated, public disclosure of certain details of an [invention](#). In the United States, a patent application must be applied for in the name of the true inventor(s), although the application can be assigned to another party (typically the company the inventors work for).

Per the word's original definition, one theory of patent legislation is to induce the inventor to disclose knowledge for the advancement of society in exchange for a limited period of exclusivity. Since a patent grants the right to exclude others from practicing the invention, it would seem to give the owner a [monopoly](#) in the economic sense. This is however only true if there is no viable substitute product for the same market.

Also, ownership of a patent does not confer the right to actually make, use, or sell the invention, as practicing the invention may still infringe another patent (e.g. the invention is an improvement of an existing invention patented by another), and other laws and regulations may apply. There is an ongoing debate about whether the benefits of patents outweigh the costs, particularly with respect to [software patents](#) and [business method patents](#).

Patent Duration: The maximum term of an issued patent is 20 years from earliest claimed filing date. In the United States, for applications filed after to [June 8, 1995](#), the patent term is 20 years from the earliest claimed filing date (see also: [Term of patent in the United States](#)).

Also, in several countries there are multiple types of patents, and the 20 year term frequently only applies to utility patents and not design, petit, or other kinds of less heavily examined patents. For example, the term of a U.S. design patent, which protects the ornamental shape of objects, lasts 14 years from its issue date.

Specialty Patents: Patents usually refers to utility patents, something that does something useful. There are however, special kinds of patents which can be defined below.

Design Patent: In the [United States](#), a **design patent** is a [patent](#) granted on the unique appearance or concept of an item. Designs patents are a type of [industrial design right](#). Design patents typically apply to jewelry, furniture, and other items with substantial decorative features.

Protections: Design patents provide a broader protection than [copyright](#), as similar (non-identical) designs are considered to infringe upon a patented design. Unlike a [utility patent](#), the protected features do not have to be a functional part of the item. For example, assume that the idea of a [cigarette lighter](#) shaped like a [handgun](#) were something new to the world. The creative designer who came up with this concept could rely on copyright to protect the design, which would restrain competitors from making handgun-shaped lighters that are very similar in appearance; however, a very differently-shaped handgun lighter could still be made without infringing on the designer's work. A design patent would restrain competitors from making any handgun-shaped lighters at all.

Biological Patent: Is a [patent](#) relating to an [invention](#) in [biology](#). Whether or not patents can be validly obtained for certain parts of the [DNA](#) of an organism depends on the patent [law](#).

Business Method Patent: "*Schemes, rule and methods for (...) doing business*", "*as such*", or in other words business methods as such, are not regarded as being [inventions](#) and are not [patentable](#) under the [European Patent Convention](#) (Article 52(2)(c) and (3)). The legal situation is very different under [US patent law](#) and [case law](#), especially after the [State Street Bank decision](#).

**Business-method patents** are among the most controversial forms of [legal](#) protection for some [Internet](#) companies. But they can also be among the most important assets. Internet business method patent applications call upon two areas of [patent](#) law namely algorithms and business methods.

As of 2001, the USPTO has required that business method inventions must apply, involve, use or advance the "technological arts". This requirement can be met by merely requiring that the invention be carried out on a computer.

**Chemical Patent:** A **chemical patent** is an important source of technical and bibliographic information. Chemical [patents](#) are different from other sources of technical information because of the generic, [Markush structures](#) contained within them, named after the inventor [Eugene Markush](#) who won a claim in the US in [1925](#) to allow such structures to be used in patent claims. These generic structures are used to make the patent claim as broad as possible.

Chemical patents are particularly important in the [pharmaceuticals industry](#) where they are used to protect the large investments that are necessary to develop [drugs](#).

**Software Patent:** [Free On-line Dictionary of Computing](#) provides a general definition of a "software patent" as "a patent intended to prevent others from using some programming technique", while the [European Patent Office](#) (EPO) provides a general definition of a "computer-implemented invention": "an expression intended to cover claims which involve computers, computer networks or other conventional programmable apparatus whereby prima facie the [novel](#) features of the claimed invention are realized by means of a program or programs"

Software patents are sometimes confused with [software copyright](#). Under international agreements, such as the Two's [Trips Agreement](#), any software written is automatically covered by copyright. This regulates the direct copying of the program code.

Applying for, and being granted a [patent](#) gives stronger protection. It covers the programming method itself, independently of any implementation in code. Thus usually reimplementing a program will avoid copyright infringement, but not [patent infringement](#). Like all patents, software patents are enforceable regardless of whether the competitors were aware of the patent (patents are kept secret for at least 18 months) and the software was completely independently developed.

It should be noted that no one "buys" software. You license it. This way software companies cannot be held to normal product liability laws. In addition you cannot legally resell or even give away the software license.

❖ How to get a patent:

- 1) Filing a patent application by inventor or applicant- \$300 basic filing fee.
- 2) Formalizing of application (signatures by inventors or applicant), often filed at the same time as the application.
- 3) Establishing of a [prior art](#) search report by the patent office \$500 basic search fee.
- 4) Publication at 18 months from earliest claimed filing date. US applicants can request non-publication if the application is not filed outside the United States.
- 5) Review by the examiner or the Examining Division, including communication with applicant to modify the [claim](#) language, if needed \$200 examination fee.
  - a) Verifying that claims are for a patentable subject matter.
  - b) Ensuring [unity of invention](#), since each patent application can only be for one invention (called "restriction" practice in the United States).
  - c) Formalities. Ensure that the drawings, description, and claims meet all formal requirements.

- d) [Utility](#) or [industrial applicability](#).
  - e) [Novelty](#) (newness)
  - f) [Non-obviousness](#) or [inventive step](#).
- 6) Grant of the patent (if it the patentability criteria are met) and publication of the issued patent \$1400 issue fee.
- 7) [Opposition](#) period, during which anybody (e.g., other companies) can challenge the patent grant. This is not applicable for the US where other procedures are available, namely the [reissue](#) and [reexamination](#) procedure. In several countries, oppositions can be filed before the grant of the patent.
- ❖ Patent Disadvantages:
    - Must disclose and have published everything about the "art".
    - Allows competitors to design around your patent.
    - Expensive to file and maintain (around \$300/year).
  - ❖ Patent Advantages:
    - Strongest protection against infringers.

Quotes from past architects of intellectual property:

*If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of everyone, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me. That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density at any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation. Inventions then cannot, in nature, be a subject of property.*

- [Thomas Jefferson](#)

*Before then [the Constitution], any man might instantly use what another had invented; so that the inventor had no special advantage from his own invention. The patent system changed this; secured to the inventor, for a limited time, the exclusive use of his invention; and thereby added the fuel of interest to the fire of genius, in the discovery and production of new and useful things.*

-[Abraham Lincoln](#)

*A country without a patent office and good patent laws is just a crab and can't travel any way but sideways and backwards.*

-[Mark Twain](#),

*Bibliography of Resources-*

Weblinks:

[http://en.wikipedia.org/wiki/Intellectual\\_property](http://en.wikipedia.org/wiki/Intellectual_property)

Links to comprehensive information on intellectual property.

<http://www.copyright.gov/>

Homepage of the Office of Copyright of the Library of Congress

<http://www.uspto.gov>

Homepage of the U.S. Patent & Trademark office

<http://www.uspto.gov/web/offices/tac/doc/basic/>

Introductory information on patents from the patent office.

<http://www.uspto.gov/web/offices/ac/qs/ope/fee2005jul01.htm#tmsvc>

Patent and trademark fee schedules.

Name \_\_\_\_\_  
Date \_\_\_\_\_ Period \_\_\_\_\_

**A review of Intellectual Property**

You will be going to the library to research and describe each of the following. <http://en.wikipedia.org> is suggested as your most concise source. Books and other web resources will also be needed.

**Copyright:**

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❖ How to Get a Copyright Right:

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❖ Copyright Rights:

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❖ Copyright Duration:

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❖ Copyright Disadvantages:

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❖ Copyright Advantages:

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Name \_\_\_\_\_

**Trademark:**

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❖ How to get a Trademark:

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❖ Trademark Rights:

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❖ Trademark Duration:

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❖ Trademark Disadvantages:

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❖ Trademark Advantages:

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Name \_\_\_\_\_

**Trade Secret:**

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❖ How to get a Trade Secret:

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❖ Trade Secret Rights:

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❖ Trade Secret Duration:

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❖ Trade Secret Disadvantages:

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❖ Trade Secret Advantages:

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Name \_\_\_\_\_

**Patent:**

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➤ Specialty Patents:

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➤ Design Patent:

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➤ Biological Patent:

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➤ Business Method Patent:

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➤ Chemical Patent:

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➤ Software Patent:

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Name \_\_\_\_\_

❖ How to get a patent:

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❖ Patent Disadvantages:

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❖ Patent Advantages:

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**What is Intellectual Property?**

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**Why is Intellectual Property Important?**

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**Describe one of the people who helped promote Intellectual Property in the U.S.A.**

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**Describe some Intellectual Property that you have last made use of.**

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**Genetic Invention**

The scientific method is the search for difference and or causation.

**Invention Name:** \_\_\_\_\_

Project leader: \_\_\_\_\_

Team Members:

\_\_\_\_\_

\_\_\_\_\_

Description of your invention:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ /4

1. What technology is required for your invention to work? \_\_\_\_\_/1

\_\_\_\_\_

2. What is the size and appearance of this invention? \_\_\_\_\_/1

\_\_\_\_\_

3. How will you protect your manufacturing process? (Give specifics) \_\_\_\_\_/2

\_\_\_\_\_

4. What method of IP protection will be utilized? \_\_\_\_\_/1

\_\_\_\_\_

5. What is the primary competition for your invention? (List 3) \_\_\_\_\_/3

\_\_\_\_\_

6. How does your invention do its job? \_\_\_\_\_/1

\_\_\_\_\_

7. How will this invention be marketed? \_\_\_\_\_/2

\_\_\_\_\_

**Total: \_\_\_\_\_/15**

Names: \_\_\_\_\_

Date: \_\_\_\_\_

Per: \_\_\_\_\_

Genetic Invention Daily Lab Notes

The scientific method is the search for difference and or causation.

Anatomy & Physiology

Mr. Fritz

Circle which group you are: Design, Research, Manufacture, Marketing, Legal, Artwork.

**Product Name.** \_\_\_\_\_

Yesterday's accomplishments? \_\_\_\_\_

\_\_\_\_\_

Today's goals? \_\_\_\_\_

\_\_\_\_\_

**Tools or Equipment** used? \_\_\_\_\_

**Materials** used? \_\_\_\_\_

**Account for your time in 1/4 hour blocks. Document that you should be paid for your time.**

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**Tomorrow's Needs from group members,** \_\_\_\_\_

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**Tomorrow's goal for your group,** \_\_\_\_\_

\_\_\_\_\_

Rubric: Yesterday's Accomplishment-1pt, Goal-1pt, Tools or Equipment-1pt, Materials-1pt, Time 1<sup>st</sup> qtr-3pts, 2<sup>nd</sup> qtr-3pts, 3<sup>rd</sup> qtr-3pts, Tomorrow's Needs- 1 pt, Tomorrow's Goals-1pt

Get Mr. Fritz's initials Daily: \_\_\_\_\_

\_\_\_\_\_/15

Thomas Fritz Action Proposal ICORE 2008  
Genetic Invention Final Presentation Rubric  
 The scientific method is the search for difference and or causation.

**Invention Name:** \_\_\_\_\_

Project leader: \_\_\_\_\_

TeamMembers: \_\_\_\_\_

**Content Points**

1. Students will make correct use of anatomical terms to properly describe their inventions method of function, use, benefits, consequences and interactions with other organ systems. \_\_\_\_\_/3
2. Properly describes the application and use of genetics and biotechnology to the service being proposed. \_\_\_\_\_/3
3. Properly identifies technology required to place this Genetic service into practice. \_\_\_\_\_/3
4. Presents a plan for the protection of new and innovative intellectual property associated with this service. \_\_\_\_\_/3
5. Presents the major ethical issues and methods of possible abuse that will arise from the application of this technology. \_\_\_\_\_/3
6. Will present a reasonable marketing plan for this technology to include professional and public campaigns. \_\_\_\_\_/3
7. Will predict what society's response will be when given access to this technology in the marketplace. \_\_\_\_\_/3

**Style Points**

			Pts earned	Total
Facts	Properly Referenced	Includes who and when		/10
Benefits	Presents positive aspects	Clear / Concise		/5
Liabilities	Presents negative aspects	Clear / Concise		/5
Organization	Logical order and flow	See below		/5
Creativity	Uses modes other than verbal	See below		/5

- Organization; 5 pts- presentation is striking in its attention to detail  
 4 pts- presentation is generally organized but might have 1 or 2 areas for improvement  
 3 pts- presentation seems hastily put together no real effort shown
- Creativity;  
 5 pts- presentation is very clever and original  
 4 pts- presentation is interesting  
 3 pts- presentation is merely reciting facts and info

\_\_\_\_ / 51 total points

Thomas Fritz Action Proposal ICORE 2008  
Library Research Record Sheet

Name \_\_\_\_\_  
 Date \_\_\_\_\_  
 Period: \_\_\_\_\_

Science  
 Mr. Fritz

Please complete this sheet while you are doing research. The purpose of this form is to provide YOU with a tool to track your Library research. It is very easy to find something and then lose it later, therefore you must use this AS you research.

<b>Written Sources Record of Research</b>					
Call # of Reference & Page #s used	Title & Author	Publisher & Date	1 Word Summary or Fact Found	Credentials of Author	What is the ref's physical location (required)