

# Patent Overview for Science Fair Participants



For the:  
**Bay Area Science and  
Engineering Fair**



# Patent Overview for Science Fair Participants

## Acknowledgements

The material in this booklet has been kindly provided to the Bay Area Science and Engineering Fair (BASEF) by:

**Alex Ross**  
Partner  
Gowling WLG (Canada) LLP  
905.540.3243  
[alex.ross@gowlings.com](mailto:alex.ross@gowlings.com)

## Disclaimer

This document is a broad overview of the patent process for students who are preparing for a science fair or similar competition. It is intended to provide general information, and should not be considered legal advice. Students should consult a patent lawyer or registered patent agent regarding their specific facts and circumstances.

Web references were valid as of the publication date.

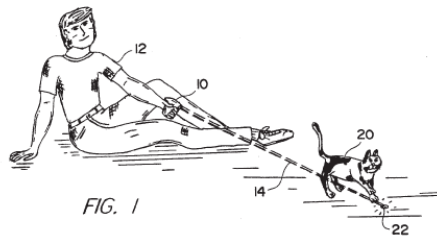
### Method of exercising a cat US 5443036 A Abstract

A method for inducing cats to exercise consists of directing a beam of invisible light produced by a hand-held laser apparatus onto the floor or wall or other opaque surface in the vicinity of the cat, then moving the laser so as to cause the bright pattern of light to move in an irregular way fascinating to cats, and to any other animal with a chase instinct.

U.S. Patent

Aug. 22, 1995

5,443,036



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## Introduction to Intellectual Property

Intellectual property is a field of law that recognizes legal property rights in respect of creations of the mind, both artistic and commercial. Under intellectual property law, owners are granted certain exclusive rights to a variety of intangible assets, such as musical, literary, and artistic

*Five main types of intellectual property: trade-marks, copyrights, design protection, trade secrets and patents*

works, ideas, discoveries and inventions, and words, phrases, symbols, and designs. There are five main types of intellectual property that you can utilize to protect your work: trade-marks, copyrights, design protection, trade secrets and patents.

### **Trade-Marks**

A trade-mark is an indication of source for wares or services. A trade-mark can be a letter, word, phrase, sound, smell, shape (called a “distinguishing guise”), logo, picture, aspect of

packaging (called “trade dress”) or any combination of these, so long as it is an indication of source for a particular individual or corporation.

### **Copyright**

Copyright provides protection against copying for expression in such forms as writing, music, sculpture, visual images, moving images and computer programs. Copyright arises automatically upon the fixation of the work (e.g. writing or drawing on paper or saving to electronic storage). Copyright only protects the way an idea is expressed, and not the underlying idea itself.

For example, copyright would protect against copying the text of an academic paper, but would not prevent people from using the ideas in the paper or expressing those ideas in their own words. In addition, copyright only protects against *copying*, and does not prevent someone else from independently creating the same thing.

Copyright is not the same as academic integrity. If you express someone else's ideas using your own words without citing the original source, this would not be considered copyright infringement but it could be considered

*PLAGIARISM: it's an act of fraud. Know what it is and **Don't do it!***

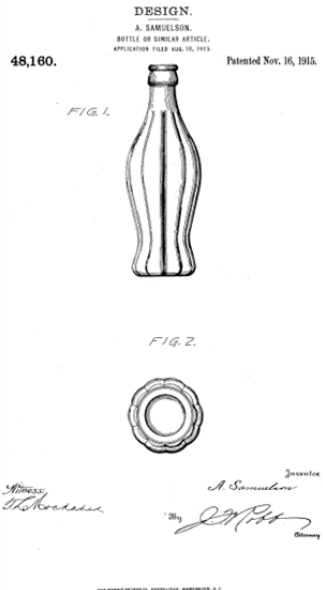
**plagiarism.** Conversely, reproducing someone else's work, even with appropriate citation, may amount to copyright infringement even if it is consistent with the requirements of academic integrity.

### Trade Secrets

A trade secret is information which is known only within a business, is not ascertainable by others and through which a business can maintain an economic advantage over its competitors. The Coca-Cola®<sup>1</sup> formula is a well-known example of a trade secret.

### Design Protection

Design protection applies to ornamental features (how a product looks), rather than functional features (how the product works). Functional features may be protected by a patent. In the United States, design protection is referred to as a "design patent", which can be confusing to some; the U.S. uses the term "utility patent" to describe protection for functional features whereas most other countries simply use the term "patent" to describe this type of protection. The Coca-Cola®<sup>1</sup> bottle shape is a good example of design protection.



<sup>1</sup> Coca-Cola is a registered trademark of Coca-Cola Ltd. The bottle design patent 48,160 was issued November 16, 1915.

## Patents

A patent is a government-granted monopoly for any device, substance, method or process, which is new, inventive and useful. Patents are described in more detail below.

### Basic Requirements for a Patent

A patent can be obtained in Canada, the United States and many other countries for an invention, which may be a machine, a method of doing something (including some types of software and methods of operating a computer), or a composition of matter (e.g. a new chemical). It is possible that your science fair project may include a valuable invention, but if you don't patent it, others can just copy your idea without giving you any compensation.

The first "Canadian" patent was granted in 1791 by the *Legislature of Lower Canada* "to reward **Samuel Hopkins**, and **Angus MacDonnell** and others, for their inventions of two new and improved methods of making pot and pearl ashes." **Samuel Hopkins** also received the first US patent on July 31, 1790 for his invention. [https://en.wikipedia.org/wiki/Samuel\\_Hopkins\\_\(inventor\)](https://en.wikipedia.org/wiki/Samuel_Hopkins_(inventor))

The first patent issued in Canada was to **William Hamilton** for "*A Machine For Measuring Liquids*" on August 18, 1869.

<https://www.collections.canada.gc.ca/innovation/s/023020-2700-e.html>

In order to obtain a patent, the invention must be new and useful, and must not be "obvious". By "new" it is meant that, in general, the invention must not have been disclosed in a previous patent or patent application or otherwise made public, including through the inventor's own activities. To be useful, an invention must simply work for its intended purpose. The term "obvious" refers to simple and straightforward modifications of known technology that do not involve

an inventive step; because inventions often seem obvious in hindsight, one should never assume that an idea is obvious but should instead consult a qualified patent agent.

## Public Disclosure

In most countries, patent protection cannot be obtained if the invention was publicly disclosed anywhere in the world before a first patent application is filed. There are exceptions to this general rule in Canada and the United States where an invention may be disclosed by the inventor up to one year before the filing of a patent application. In general, it is better to keep an invention secret until after a patent application is filed.

*Presenting an invention at science fairs and competitions would be considered a public disclosure*

Presenting an invention at science fairs and competitions would be considered a public disclosure if the presentation enables another person to practice the invention.

Therefore, you should consider whether you want to seek patent protection and consult with a patent lawyer or patent agent before submitting your project to the science fair. The first step to deciding whether your science project is patentable is to carry out a search to see if it seems to be novel and non-obvious.

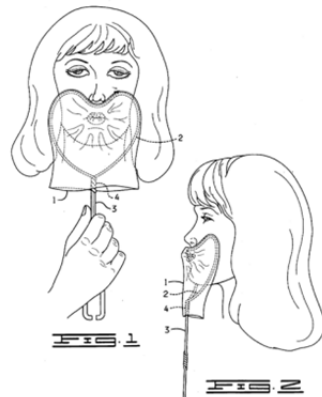
### Kissing shield

#### US 5727565 A ABSTRACT

A kissing shield comprised of a thin, flexible membrane and a frame or holder. The membrane is closed on three sides, a fourth side remaining open so that the membrane can be stretched over the frame or holder. Using the handle portion of the frame or holder, the user places the kissing shield under his nose, so that it covers his lips, cheeks and chin. The user then positions the kissing shield between his lips and the lips or cheek of the individual he plans to kiss and kisses the intended recipient of his affection.

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U.S. Patent Mar. 17, 1998 Sheet 1 of 4 5,727,565



## Searching

Typically, it is recommended to conduct a search for relevant issued patents and published patent applications before preparation of a patent application in order to better define what has been invented. In general, searching on the web is not an adequate substitute for a comprehensive search at the Patent Office, but it is a very useful starting point to understand what information is required in a patent application to fully define an invention and to find out whether the invention is in a “crowded art” where broad protection may be difficult to obtain.

A good place to start your search is the Google Patents

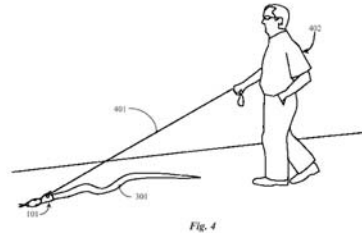
database at [www.google.com/patents](http://www.google.com/patents). However, since search terms are tracked, you should make sure that your search term is not so specific that it would enable others to practice your invention.

If you have done a thorough search and you think your science fair project may relate to a patentable invention, you should contact a patent lawyer or patent agent to discuss whether to file a US provisional application (described below) before submitting to the science fair. Filing a provisional application can preserve your ability to later seek a patent despite disclosure at the science fair.

### Collar apparatus enabling secure handling of a snake by tether

#### US 6,490,999B1 Abstract

A collar for collaring a snake has an elongated collar section forming a physical collar when wrapped around the body portion of the snake. The collar further has a support section for supporting an attachment mechanism for accepting attachment of a tether and a connector system comprising at least two components affixed to strategic portions of the collar section for securing the collar in place around the body portion of the snake.



U.S. Patent No. 6,490,999 B1





## US Provisional Application

A US provisional patent application is an informal patent application that may be filed to establish an early filing date without all of the formal requirements required in a regular patent application. A US provisional patent application is not examined and no patent will issue from it. Rather, it establishes a filing date for the invention. You must file a corresponding regular patent application, within 12 months from the date the US provisional patent application is filed in order to claim the benefit from the earlier filing date (otherwise the provisional application will simply expire and your ability to obtain a patent may be lost). This regular patent application will be examined and a patent may issue from it.

To file a US provisional application, you must provide:

- a written description of the invention
- drawings (if applicable)

- a cover sheet (the U.S. Patent and Trademark Office has a special form) identifying:
  - the application as a provisional application for patent
  - the name(s) of all inventors;
  - inventor residence(s); and
  - title of the invention;
- pay a filing fee.

Although a provisional application does not get examined, or published on expiry, it is best to include as much information regarding the invention as possible in the application's description and drawings.

While you can file a US provisional application by yourself through an online service, it is highly recommended that you hire a patent agent to prepare the application for you.

### Who invented Peanut Butter?

Marcellus Gilmore Edson of Montreal was the first person to patent peanut butter. His patent "*Manufacture of Peanut-Candy*", U.S. Patent 306727, granted October 21, 1884, used heated grinding surfaces to grind peanuts into a "flavoring paste ... to form sweetmeats and candy therewith."

## Sufficiency of Disclosure (Enablement)

When filing a patent application (including a provisional application), the invention must be described in such a way that a person skilled in the area of the invention would be able to practice and/or recreate the invention. Accordingly, it is important to provide as much information as possible

regarding the invention, including examples of alternative ways of practicing the invention (e.g. alternative components). As well, it is best practice to describe the invention in high level terms of its broad concept and then provide specific example embodiments of the invention.

## Examination

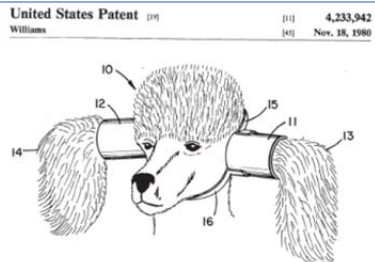
Once a regular patent application is prepared, it is filed in a patent office. After filing, the patent application is assigned for examination. The Examiner will conduct a search for previously issued patents and previously published patent applications and possibly a search for articles in academic or other literature which appear to be relevant,

and reject or accept the claims as proposed. The applicant has an opportunity to respond to the Examiner's comments, and may choose to modify the claims to address the Examiner's concerns. Again, it is highly recommended that you work with a patent lawyer or patent agent throughout this process.

### Animal ear protectors US 4,233,942 Abstract

This invention provides a device for protecting the ears of animals, especially long-haired dogs, from becoming soiled by the animal's food while the animal is eating.

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## Timing

In Canada, after a patent application is filed, examination will not take place until it has been requested. Examination can be requested upon filing, or at any time up to five years from the filing date (the new rules will reduce this to four years when they come into force).

In the United States, the cost of examination is included in the filing fee and examination will

take place automatically, without filing a special request. After examination has been requested, a delay of several months and sometimes years may pass before an Examiner provides comments on the application, in an “office action”. Because of this, it is not uncommon for patent applications to remain pending for two years or longer before resulting in an issued patent.

## Pre-Grant Publication

In most countries, a patent application is “laid open” for inspection by the public 18 months after filing, or earlier in certain circumstances. If a patent ultimately issues, the patent owner can prevent others from making, using, or

selling the invention as defined in the granted claims until the date which is 20 years after the filing date, assuming that maintenance fees are paid as they fall due over the life of the patent application and the patent.

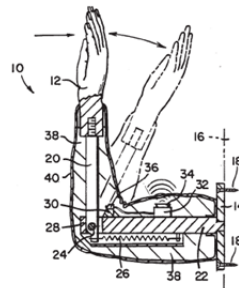
### Apparatus for simulating a "high five"

#### US 5356330 Abstract

An apparatus for simulating a "high-five" including a lower arm portion having a simulated hand removably attached thereto, an upper arm portion, an elbow joint for pivotally securing the lower arm portion to the upper arm portion, and a spring biasing element for biasing the upper and lower arm portions towards a predetermined alignment.

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U.S. Patent Oct. 18, 1994 Sheet 1 of 3 5,356,330



## Issuance

The Patent Office will notify the applicant when the Examiner is satisfied that the claims and the balance of the application satisfy the requirements for patentability. It is possible that a patent may

issue for an invention which itself infringes a prior patent, but the new patent must define certain improvements over the old patent. The Patent Office does not concern itself with issues of infringement.

## International Patent Protection

Patent protection is national in scope. For example, a Canadian patent will generally not apply to activities in the U.S. and a U.S. patent will generally not apply to activities in Canada. Therefore, you must apply for a patent in each country (or region) where you want protection.

If patent protection can be obtained outside the country where the first patent application is filed (typically the U.S. or Canada), it is usually available only by filing a patent application in each country of interest within one year following that first filing date (where a US provisional

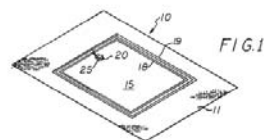
application is filed, the one-year period is measured from the date of filing the provisional application). This one-year period from the first filing date should be used to assess the commercial prospects of the invention in the countries of interest, to the extent possible.

A patent issued on an application filed after the one-year period has expired may be invalid if the invention has become public by way of sales, promotion, and non-confidential written or oral disclosures during the one-year period.

### Electrified table cloth US Patent 5107620 Abstract

An electrified table cloth for preventing crawling insects from gaining access to the consumer's food or drink comprises a cloth formed of electrically insulated material which has at least one pair of parallel electrically conductive strips secured to the edge or border of the cloth to completely encircle the cloth and which are connected to a low voltage DC battery •••

U.S. Patent Apr. 28, 1992 5,107,620



## Patent Enforcement

Enforcement of a patent is the responsibility of the patent owner. A patent must have been granted before steps may be taken in a court action to attempt to prevent a competitor from making, using or selling an item similar to the applicant's invention. After a patent has been granted, if a competitor is producing an article similar to the invention, the patent

owner typically will bring the patent to the competitor's attention, and request that the competitor cease and desist making, using or selling the allegedly infringing article or process. If the competitor refuses, then the patent owner ultimately must start a patent infringement lawsuit against the competitor seeking appropriate relief, for example, an injunction.

## Commercial Success

Filing for a patent application and ultimately obtaining a patent do not necessarily result in the invention achieving commercial success. In other words, even if a patent is granted, the invention may not be profitable. Commercial success is the result of a number of circumstances and factors, only one of which is obtaining the appropriate patent protection.

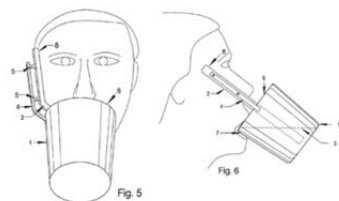
It is up to the applicant/patent owner to use personal and professional contacts and resources in order to achieve commercial success with the invention. Often the applicant would be well advised to do a considerable amount of work before applying for a patent to determine whether the invention, if patented, would likely be profitable.

### Device for the treatment of hiccups US 7062320 B2 Abstract

A device for the treatment of hiccups, and more specifically, to a method and apparatus for the treatment of hiccups involving galvanic stimulation of the Superficial Phrenetic and Vagus nerves using an electric current.

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U.S. Patent Jan. 13, 2006 Sheet 2 of 2 US 7,062,320 B2



## Assignment or Licensing

A patent application or a patent may be assigned or licensed. Typically, assignment results in a transfer or sale of the entire ownership of the application or patent, although this is not necessarily the case. On the other hand, if the patent

owner chooses to enter into a licence agreement, ownership of the patent remains with the patent owner, as well as certain obligations. Licensing is effected by way of a written licence agreement negotiated between the parties.

## What Your Patent Agent Needs From You

In order to prepare a patent application, the patent agent requires a full description of the invention, including drawings. Preferably, a history of the development of the invention should also be provided<sup>2</sup>, as this information can be important.

*a history of the development of the invention should also be provided*

or should be patented. If your product is not able to receive patent protection, then you may want to consider other forms of protection.

All of the inventors who worked on the invention need to be identified. If ownership of the invention is to be held by one or more entities other than the inventors, assignment documents will need to be prepared accordingly. Finally, while the focus of this document was on the patent process, it is important to note that not all developments can

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For more information, please contact:

**Alex Ross**  
Partner  
Gowling WLG (Canada) LLP  
905.540.3243  
[alex.ross@gowlings.com](mailto:alex.ross@gowlings.com)

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<sup>2</sup> The project log book may be organized chronologically to provide a development history.

## External Resources

Canadian Intellectual Property Office:

<http://www.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/Home>

(Note: as of January 31, 2017 this website is in the process of being moved to a new address. It remains available during the move.)

United States Patent and Trademark Office:

<https://www.uspto.gov/>

## BASEF Resources

BASEF website:

[Basef.ca](http://Basef.ca)

BASEF “*Science Success!*” documents:

<http://www.basef.ca/science-success/>

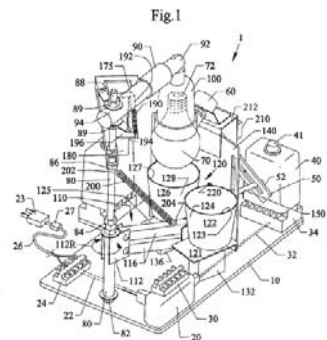
### Light bulb changer

#### US 6,826,983B1 Abstract

A light bulb changer method and apparatus that contains components that allows for instantly detecting a burned out light, automatically removing the burned out light, and automatically replacing the burned out light with a replacement bulb. The changer operates without human intervention, and can be assembled from a kit

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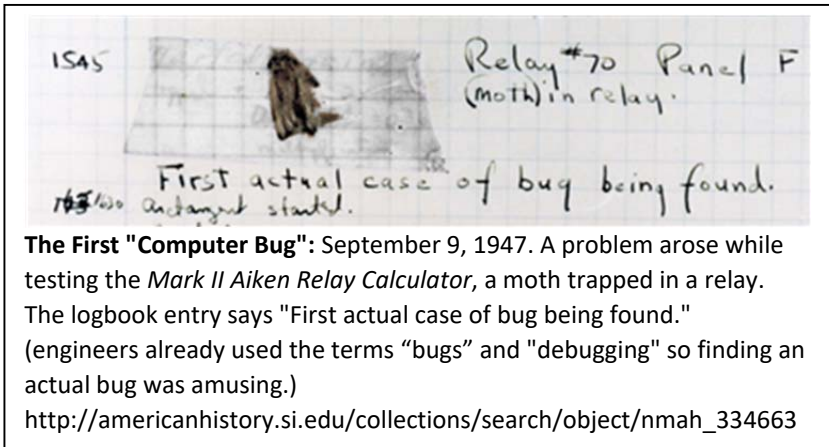
U.S. Patent Dec. 7, 2004 Sheet 1 of 17 US 6,826,983 B1



## Research Guidelines<sup>3</sup>

Here are some guidelines for developing your project taken from the "Science Success!" material on the BASEF website.

1. Project Logbook
2. Keeping track of Resources
3. Acknowledge Other Peoples Work
4. Prepare a Reference List
5. Plagiarism



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<sup>3</sup> This section has been extracted from the BASEF [Science Success!](http://www.basef.ca/science-success/) documents, <http://www.basef.ca/science-success/>



## **Project Logbook**

The project logbook, possibly the most important part of your project, is the place where all of your notes are kept. For example:

1. a detailed plan for your projects, including an outline of procedures, a schedule, detailed materials list, costs, etc.;
2. thoughts and ideas you have during the project;
3. contacts and references;
4. detailed notes of every experiment and measurement;
5. notes and observations (using prepared worksheets);
6. changes made to procedures, failures, or mistakes (failure is a valuable learning tool, fail often to be successful);

### ***Project Notebook Guidelines***

- Use a durable, hard-bound notebook. Spiral bound notebook pages are too easily removed or torn out and 3-ring binders encourage you to remove pages.
- Label your logbook with your name, project name, phone number, email address, and teachers name (if appropriate)
- Number the pages – you will appreciate this later on.
- Always use pen – logbook entries are never erased.
- ALWAYS date each entry, or each page, as appropriate.
- Organize your logbook; reserve the first couple of pages for a table of contents and start an index on the last few pages, Adding tabs for major sections speeds up access.
- Remember to document all aspects of the project. Learn to do this succinctly.
- Keep glue sticks and tape handy for fastening loose notes and other bits of paper into your logbook.

Remember – the logbook is a working document that records your work as it happens. Don't rewrite material just because it's sloppy – it's your personal diary of the project. Quality is defined by how well it documents the progress of your project, not how pretty it is.

## Keeping Track of Resources

The more resources you have used, the better your project will be. Judges are impressed by background research and you will be more likely to find interesting things about your topic that will help you write a really good question or potential problem for investigation.

People are excellent resources. Experts in your topic can provide valuable advice. If you don't know anyone who is an expert about your topic, maybe your teacher can suggest someone. Keep track of people resources; although they are not listed in the resource list, they should be given credit in the acknowledgements section of your report. In addition, you will also want to write a brief note thanking them for their time.

### **A suggestion:**

Include at least as many resources as your grade level, and make sure they are from a variety of different sources. For example, if you are in grade 8, you might have 4 book sources, 2 websites, 1 magazine article, and one newspaper article.

## *Acknowledge Other Peoples Work!*

You will be reading a number of books as well as searching information on the web. Remember to record resources and give credit where it is due. If you borrow or take ideas belonging to others it may be illegal, as this information and concept may be someone else's protected **Intellectual Property** (page 3). Keep track of where information came from, and remember that even if you write something in your own words, or if the idea came from another source, make sure you show a reference. Using other people's words extensively is **Plagiarism** (page 18).

Some ideas and inventions may be your personal creation that you want to protect before showing it to the general public. This can become your **Intellectual Property** as discussed previously.

## *Preparing a Reference List*

A reference list is an alphabetical list of all the resources you used to complete your project. Only resources you quote or take ideas from go in this list. You can easily create this list from your notes. List other 'Background Reading' sources separately.

## Plagiarism

According to the Merriam-Webster Online Dictionary, to "Plagiarize"<sup>4</sup> means:

- "to steal and pass off (the ideas or words of another) as one's own
- to use (another's production) without crediting the source
- to commit literary theft
- to present as new and original an idea or product derived from an existing source"

In other words, plagiarism is an act of fraud. It involves both stealing someone else's work and lying about it afterward.

### But Can Words and Ideas Really Be Stolen?

**YES!** Under Canadian and U.S. law, the expression of original ideas is considered **intellectual property** (page 3) and is protected by copyright laws, just like original inventions. Almost all forms of expression fall under copyright protection as long as they are recorded in some way (such as a book or a computer file). See the Copyright definition on page 3.

### All of The Following Are Considered Plagiarism:

- turning in someone else's work as your own
- copying words/ideas from someone else without giving credit
- failing to put a quotation in quotation marks
- giving incorrect information about the source of a quotation
- changing words but copying the sentence structure of a source without giving credit
- copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not

Most cases of plagiarism can be avoided by simply acknowledging that certain material has been borrowed and providing your audience with the information necessary to find that source.

### What About Images, Videos, and Music?

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<sup>4</sup> <https://www.merriam-webster.com/dictionary/plagiarize>

Using an image, video or piece of music in a work you have produced without receiving proper permission or providing appropriate citation is plagiarism. The following activities are very common in today's society. Despite their popularity, they still count as plagiarism.

- Copying media (images, videos, etc.) from other websites to paste them into your own papers or websites.
- Making a video using footage from others' videos or using copyrighted music as part of the soundtrack.
- Performing another person's copyrighted music.
- Composing a piece of music that borrows heavily from another composition.

Certainly, these media pose situations in which it can be challenging to determine whether or not the copyrights of a work are being violated. For example:

- A photograph or scan of a copyrighted image (ex: using a photograph of a book cover to represent that book on one's website)
- Recording audio or video in which copyrighted music or video is playing in the background.
- Re-creating a visual work in the same medium. (for example: shooting a photograph that uses the same composition and subject matter as someone else's photograph)
- Re-creating a visual work in a different medium (ex: making a painting that closely resembles another person's photograph).
- Re-mixing or altering copyrighted images, video or audio, even if done so in an original way.

The legality of these situations, and others, would be dependent upon the intent and context within which they are produced. The two safest approaches to take in regards to these situations is:

- Avoid them altogether or
- Confirm the works' usage permissions and cite them properly.