



Invention Project[®]



WEAR
IT OUT



Innovation Exploration Kit[™], Invention Project[®] Series

Read prior to using the product.

SAFETY & HYGIENE



Warning: Choking hazard—small parts.
Not for children under 3 years.

- Activities require adult supervision.
- Ages 10+.
- Read and follow all instructions.
- For safety and hygiene purposes, please wash your hands after each activity.
- Do not put materials in or near anyone's eyes, mouths, and ears.
- If anyone has an allergy, remove any materials that may trigger an allergic reaction for them. Note: The feathers can be allergenic.
- Do not play with or place plastic bags near the face or mouth.
- Ventilate the room when using markers.
- Use caution when handling objects with a point, such as sewing needles.
- Remove the batteries during long periods of non-use. Always remove exhausted batteries. Battery leakage and corrosion can cause damage.
- Never short-circuit the battery terminals.
- Dispose of batteries safely. Do not dispose of batteries in fire. The batteries may explode or leak.
- Button and coin batteries can be harmful if swallowed. Please take precautions to make sure they are not placed near the mouth.
- Do not allow coin batteries to touch when not in use.



Use this password to access your
Wear It Out experience:

waterproof



A digital version of your Activity Guide
can be found online at
invent.org/Invention-Project/Wear-It-Out

WEARABLE TECHNOLOGY

Combine creative ideas and maker materials to invent clothing and accessories that are both fashionable and functional!

MATERIALS

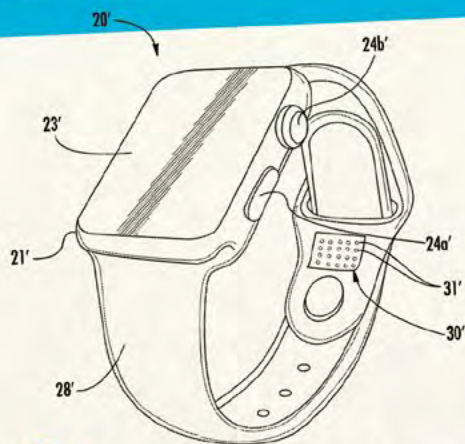
Pencil | Wear It Out sheet

U.S. Patent

Sep. 3, 2019

Sheet 6 of 8

US 10,398,370 B2



From fitness watches that track your body's changes during exercise, to devices that allow individuals with visual impairments to hear color, wearable technology is opening up possibilities that were once only featured in science fiction stories.

In addition to technology worn on or near the skin, textiles used to make clothing are also considered technology. Not all technology has a cord or battery!

Clothing or gear that is waterproof, tearproof, or stretchy all include advancements in materials technology.

1. Look around your home for examples of wearable technology.
2. Research other types of wearable technology.
3. Make a list of these wearable technology examples on your **Wear It Out sheet**.



MORE TO EXPLORE

Many scientists, designers, and engineers turn to nature for inspiration and insights. For many challenges that require design solutions, such as developing adhesives and storing energy, nature already has solutions. As we study those solutions, we can glean ideas for designing and making new technologies, including wearables.

BRAIN STORM

Generate and select ideas
for wearable technology
of the future!

MATERIALS

Adhesive notepad | Copy paper | Markers



IDEA GENERATION

Clothing can protect
people in different
climates and extreme
weather. It can also
help people express
their culture, style,
and personality.

Divergent Thinking is
the act of generating
ideas. Brainstorming
is a Divergent
Thinking tool to help
in this process.

Explore your innovative
ideas about clothing and
accessories of the future
by brainstorming.

U.S. Patent

Mar. 16, 1993

5,194,299

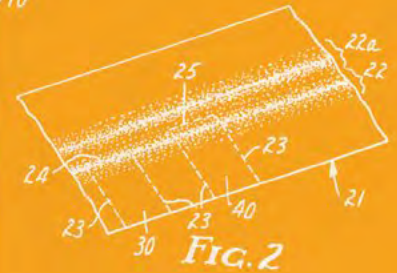


FIG. 2

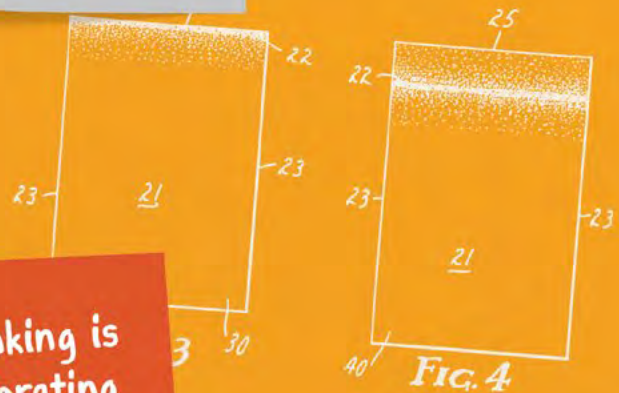
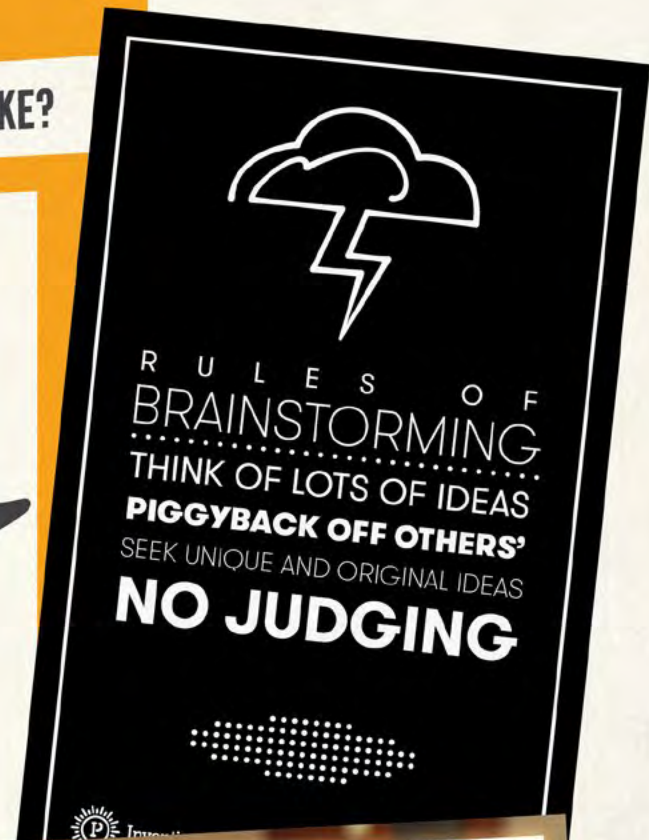


FIG. 4

WHAT MIGHT A NEW TYPE OF WEARABLE TECHNOLOGY LOOK LIKE?

1. Review the Rules of Brainstorming.
2. Grab your adhesive notepad and a marker.
3. Take at least 3 minutes to generate ideas for future wearable technology by writing each idea on an adhesive note. Keep ideas brief. One to five words is best.
4. Stick the adhesive notes on copy paper. Six notes fit on a sheet.
5. Look at some of the available materials to inspire your thinking!



?

How might nature inspire your design?



IDEA SELECTION

Convergent Thinking is the opposite of Divergent Thinking. Convergent Thinking is the act of narrowing down and selecting one or more ideas. Look for ideas that stand out, shine, and have the most potential!



1. Check to see if you have any similar ideas that you may want to cluster together into categories. Categories can be based on what is common, such as "watches."

2. Using a marker, place a star on the three ideas or categories that stand out to you as the ones with the most potential.

3. Ask a family member or call a friend for their opinion.

4. Finally, look at your starred options and select the one you are most excited to turn into a prototype.



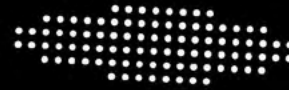
IDEA SELECTION

LOOK AT IDEAS WITH A POSITIVE MINDSET

SEEK ORIGINALITY

RE-CHECK THE GOAL OF THE CHALLENGE

STAY FOCUSED



 Invention Project

IDEA SELECTION POSTER
© 2017 Invention Project, Inc.

MORE TO EXPLORE

It can be very exciting to have endless options and the freedom to choose any project you would like to explore. It can also be difficult to figure out which topic to choose and where to begin. Whether you are feeling enthusiastic or a little nervous, trust yourself to choose a starting point and let curiosity and imagination lead the way.

IDEAS TAKE FORM

Design a wearable
technology prototype!

MATERIALS

Coin batteries | Conductive thread | Fabric
| Feathers | Felt | LEDs | Markers |
Masking tape | Pencil | Pipe cleaners
| Recyclables | Scissors |
Sewable sequin lights
| Sewing needle with cork
Threader | Umbrella | Wear It Out sheet

AN EXTREME TWIST

Before you begin sketching and prototyping your wearable tech idea, get ready for the next twist!

How did you decide
what to wear today?

Did the weather
or the day's activities
influence you?

May 1, 1962
Filed March 1, 1961
O. WENDORF
STURM UMBRELLA
3,032,047
3 Sheets-Sheet 1



Weather and activity
needs have prompted
the invention of many
new materials.

1.

Take inspiration from GORE-TEX** and Kevlar*** and put a twist on your wearable technology that makes it useful in extreme weather.

*GORE-TEX is a registered trademark of W. L. Gore & Associates, Inc.

**Kevlar is a registered trademark of E. I. du Pont de Nemours and Company.



GORE-TEX®* and **Kevlar®**** are both highly industrious materials that are widely used for outdoor recreation, athletics, and even military and police operations.

GORE-TEX®* is known for its breathable yet waterproof characteristics.

The strength-to-weight ratio of **Kevlar®**** fibers, being five times stronger than the same weight of steel, make it a functional choice for protective gear.

2.

Think about extreme weather scenarios, such as high heats, freezing temperatures, gusting winds, heavy rains, and thunderous skies.

3.

Consider some of the materials that are available to you, such as LED lights and an umbrella. The umbrella can be used whole or disassembled and used for its parts.

What special features might your wearable tech have to stay functional and be useful in one or more of these scenarios?



MEET A HALL OF FAMER

National Inventors Hall of Fame® (NIHF) Inductee Robert W. Gore invented a new form of polytetrafluoroethylene (PTFE), more commonly known by the **GORE-TEX®*** brand name. This highly porous yet very strong material functions within a wide range of temperatures and is weatherproof. It is valued by outdoor enthusiasts due to its durable, wind-resistant, waterproof, and breathable characteristics.

Because it is also chemically inert, **GORE-TEX®*** materials are also used in hundreds of medical, industrial, electrical, and textile products.



If possible, learn more about Gore here: invent.org/inductees/robert-w-gore



SKETCH

Bring your wearable technology ideas to life by sketching them on your Wear It Out sheet.



Be sure to explore various features and details that make it durable in and useful for extreme weather.

LET THE PENCIL LEAD THE WAY

BE OPEN TO FLOW

TAKE RISKS

DON'T OVERTHINK IT

ALLOW FOR MESSY LINES AND IMPERFECTION

SKIP THE DETAILS

Select the sketch you would like to use for your prototype.

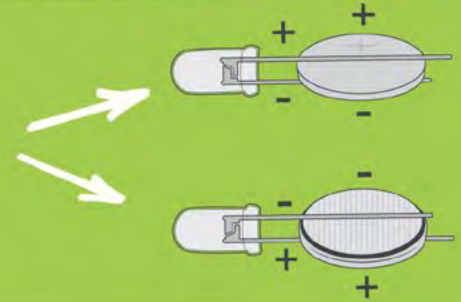
PROTOTYPE

It's time to transform your 2D sketch into a 3D prototype.

Might your invention include or benefit from a light-up feature?

Check out the illustration on your Wear It Out sheet for tips on threading sewable LEDs with conductive thread.

Alternatively, connect one or more LEDs using the coin batteries.



To take your prototype to the next level, it helps to...

EXPLORE
OPTIONS

STRETCH
YOUR MIND

GAIN INSIGHTS
AS YOU BUILD

ASK OTHERS
WHAT THEY
THINK

APPLY DISCOVERIES
FROM REFLECTION,
FEEDBACK, AND
TESTING

GATHER THE PROVIDED MATERIALS, PLUS ADDITIONAL ITEMS FROM AROUND YOUR HOME, TO MAKE YOUR PROTOTYPE.

U.S. Patent Jul 26, 2011 Sheet 1 of 5 US D641,973 S



Be sure
your design
is original.

Consider how
it will be worn.

Remember to think
about making it
durable and useful for
extreme weather.

MORE TO EXPLORE

Making prototypes, or models, is an important part of the design process. Designers and engineers experiment with simple materials to help them put their ideas into a visual form. When people can see ideas in a physical form, it is sometimes easier to morph, change, enhance, and bring them to the next level.

PROTECT AND PITCH

Protect your idea, draft a business plan, and launch it with a powerful pitch!

MATERIALS

Business Basics sheet
| Go-to-Market sheet | Pencil |
Prototype (from previous activity)
| The Creator's Key to Intellectual Property poster

PROTECT YOUR WORK

Your ideas have value! They are your Intellectual Property and it is important to protect them.

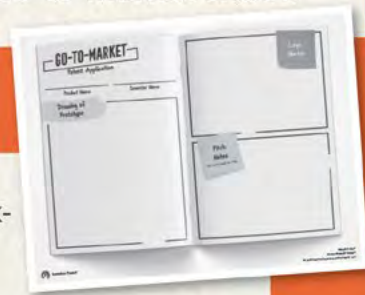
Before you drop your product, or make it known to the world, you will want to protect your idea by filing for a patent.

**PATENT
PENDING**

A patent is a protection granted by the United States Patent and Trademark Office (USPTO) that gives the inventor the right to exclude others from making or using the invention without permission or a license from the inventor.

1. Fill out the Patent Application for your invention on your **Go-to-Market sheet**.

2. Design a trademark-worthy logo for your wearable technology invention, or a company that would sell the invention, on your **Go-to-Market sheet**.



Logos and branding are key to building a unique identity for your product.

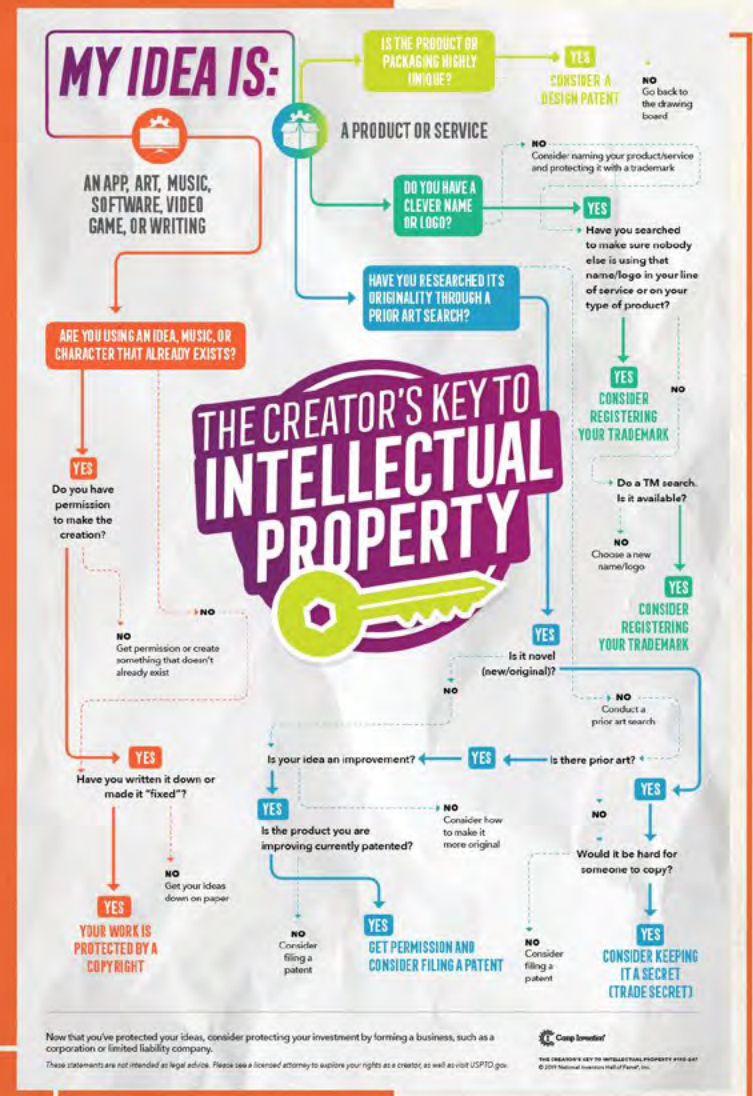
Trademarks are another type of protection that are commonly found on logos.



When you see a ® on a product, it means the creator filed a trademark application, paid a fee to the government, and was successful in federally registering their unique mark for use in commerce. Any item with a ™ has not yet been registered by the USPTO.

3.

Check out **The Creator's Key to Intellectual Property** poster to see what other protection you might consider for your wearable technology.



Now that you've protected your ideas, consider protecting your investment by forming a business, such as a corporation or limited liability company. These statements are not intended as legal advice. Please see a licensed attorney to explore your rights as a creator, as well as visit USPTO.gov.

Comp Innovator
THE CREATOR'S KEY TO INTELLECTUAL PROPERTY POSTER
© 2017 National Inventor Hall of Fame, Inc.

TELL THE WORLD

Now that you have protected your invention, it's time to drop your product! Streetwear fashion designers use this term to mean when and how they share their latest product. Create a powerful pitch as you prepare for your product drop!



A pitch is a short story or presentation about your invention that tells others how it solves a problem and why it is unique and valuable. A pitch tries to hook or draw a person in to want to buy or invest in an invention.

Marketing experts suggest packing the most punch into your pitch by aiming to share a maximum of eight words in 6 seconds.

1. Write down notes for your pitch on your **Go-to-Market sheet**, highlighting the most unique features of your invention. Start with the following:
 - Write eight words that highlight what makes your product unique.
 - Create two phrases that best describe your product, and see if you can include these words/phrases in the first 6 seconds of your pitch.
2. As you are writing ideas for your pitch, remember to keep it exciting and energetic!

! If available, use a timer or the second hand on a clock to time yourself.

MORE TO EXPLORE

Being an entrepreneur can be both exciting and scary. Entrepreneurs have to be willing to take risks. There are new programs popping up around the country that provide training on entrepreneurship. Business incubators, for example, offer new entrepreneurs many great resources, such as mentorship, office space, and advice on going from idea to product to market.

BUSINESS BASICS

As you refine your wearable tech invention, you may be ready to attract investors who can fund major purchases necessary for production.

One way to demonstrate to investors that you have a well-thought-out invention idea is to present them with a business plan.

Some topics covered in business plans include areas such as cost to produce, expected retail cost, target market, and expected retail outlet.

1. Fill in the **Business Basics sheet** to get an idea of the type of information and data that any investor will expect you to know when pitching your invention idea.



CONGRATULATIONS!

You have just embarked on an entrepreneurship adventure from idea generation to bringing your idea to market.

Keep the ideas flowing—you just might invent the next big thing!

MEET A HALL OF FAMER

As NIHF Inductee Stephanie Kwolek carried out experiments to make stronger and stiffer fibers, she discovered a branch of polymer science, liquid crystalline polymers. The most famous product of her discovery was Kevlar®* Fiber, a polymer fiber that is five times stronger than the same weight of steel.

The fruits of her inventiveness can be found in mooring ropes, fiber-optic cables, aircraft parts, canoes, and lightweight bullet-resistant vests. Thousands of police can attest to the value of Kwolek's breakthrough research.



If possible, learn more about Kwolek here: invent.org/inductees/stephanie-louise-kwolek

*Kevlar is a registered trademark of E.I. du Pont de Nemours and Company.



**National Inventors
Hall of Fame®**



Invention Project®

**Invention Project is an educational program from
the National Inventors Hall of Fame.**

Learn more at [invent.org](https://www.invent.org)

978-1-61823-118-5

© 2020 National Inventors Hall of Fame, Inc.