



Inventor's Journal

for grades 4-8



PRESENTED BY



ACADEMY OF APPLIED SCIENCE

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Hello Inventor!

Welcome to the Young Inventors' Program and the world of invention. As you begin your journey, we encourage you to take positive risks. Ask questions. Be creative. Most important, do not be afraid to fail. Innovation is all about testing and re-testing and pushing boundaries to make the world a better place. No matter where your journey takes you, you will learn new things, challenge yourself, and ultimately be successful.

Tell the Story of Your Invention

This Inventor's Journal is a place for you to record your ideas, activities, research, and discoveries as you create your own invention. The journal is not a book report that is created after you are done. It is a diary that is continuously filled in as you work. The purpose of the journal is to tell the story of your invention. For every step, you will record what you did, why you did it, and how you did it. Invention journals are important because they provide a complete and accurate record of your ideas, plans and processes by which your invention was created. It is proof that you came up with the ideas and the invention on your own.

About the Inventor's Journal

Your YIP Inventor's Journal is divided into three sections to help organize your logbook. The "My Workbook" section includes worksheets that you may use as you go through the YIP program and complete YIP invention activities. The "My Notebook" section of the journal is an open space for you to take notes as you learn the invention process. And finally, in the "My Invention Journal" section, you will record your invention story- identify your problem, complete your research, develop a design, draw sketches, and document your activities as you complete them. You may also insert any photographs of yourself working on different parts of the invention. Each time you begin an activity or record an entry, at the end, be sure to sign and date the page at the bottom. If you are working with a team, each team member will keep their own journal, but all team members should sign each other's journals each time you work together. You may insert any additional pages as needed.

When your YIP Inventor's Journal is complete, it will become part of your final project presentation. Your teacher may give you more guidelines and requirements for your Young Inventor's Journal, so be sure to follow them.

Have fun and good luck!

The YIP Team



a program of The Academy of Applied Science

Inventor's Journal

This Journal tracks the innovations by

Inventor Name:

Grade: _____

School/Organization Name:

Teacher/Leader Name:



a program of The Academy of Applied Science

INVENTOR'S CHECKLIST

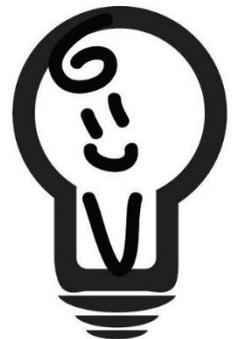
Checklist of the Process of Invention

Inventor's Name

- Identify the problem to be solved
- List ways to solve the problem
- Choose the solution
- Sketch ideas
- Make a model (prototype) of your invention
- Decide if your invention solves the problem
- Improve your invention and prototype as needed
- Make your display board
- Present your ideas

 Have fun!

This journal is a guideline for your creative process. Do not feel limited by this format. Please complete required sections needed for your assignments and Invention Fair.



SECTION 1: MY WORKBOOK

Problems All Around Me

Ask other people what problems they have around their homes, neighborhoods, or that could be solved with a new invention. List their responses below.

Family

Friends

Neighbors

Yourself

To pick the best idea pick the best idea. To make your selection, ask yourself which idea is most interesting to you, most needed, most original, and one you think you can make using the materials around your home.

Best Idea: _____



Invention Comic Strip Worksheet

Describe what life would be like without an invention of your choice in the 3-frame comic strip below. Use the first two frames to show life with the invention and the last frame to show life without the invention. You may use words and pictures in your comic strip.

“Life without a _____”

Steps of the Invention Process Worksheet



IDENTIFY – Ask questions and determine what the problem is



UNDERSTAND- Research the problem fully. Who does it affect? What may cause the problem? What might be possible solutions?



IDEATE- Use creative problem-solving to turn an idea into a solution.



DESIGN- Sketch a drawing of the solution and its design. Label the parts. out their prototype designs.



BUILD- Put your plans in action and build a model (a prototype).



TEST- Test the model to collect data and receive feedback.



REDESIGN- Make adjustments and improvements to their porotype. The Test and Re-Design steps may repeat several (or many) times until the inventor is satisfied with the results.



COMMUNICATE- Present your idea and your solution.

In small groups or as a class, discuss the following from the video: The Soccer Ball that Generates Energy. Record your responses:

What steps of the Invention Process were highlighted in the video?

How did Jessica approach the Invention Process? What did she do for each step used?

Do You Know Who Invented the Telephone? Worksheet

Documentation of an invention is an important step in the creative process. Without documentation, an inventor can lose his creative process. Without documentation, an invention can lose his right to claim a patent if someone contests the date of creation. Throughout history, there are stories of inventors who have fought to prove that they were the first. Perhaps no story is more illustrative of this than that of the invention of the telephone.

We are taught that Alexander Graham Bell invented the telephone and the law upholds that fact. It is Bell who claimed the rights to the patent, a patent that was upheld in numerous court cases. However, a search on the Internet querying “who invented the telephone” returns a wide variety of other answers – Elisha Gray, Phillip Reis, Bourseul, Antonia Meucci, and many more.

So what is the answer? The truth lies with who holds the patent- Bell. Bell was the first to apply and complete the patent process. Meucci is credited with having applied also, but he apparently had been too poor to pursue a patent years before. Meucci died before his court case came up and the case was eventually dropped when the patent expired. A Reis machine was presented in one court case against Bell, but would transmit little more than a squeak. Elisha Gray’s claim was even closer- he had filed a patent caveat the same day that Bell applied for his patent. On September 12, 1878, Bell and Gray entered a lengthy patent litigation. As it usually goes in court cases, documentation is what saved Bell’s case.

In all, the Bell Company fought out thirteen lawsuits that were of national interest, and five that were carried to the Supreme Court of the United States. It fought out 587 other lawsuits of various nature; and with exception of two unrelated contract suits, IT NEVER LOST A CASE.

Bell, and the story of the invention of the telephone, is all about how multiple people can develop and work on an invention independently of each other. This story demonstrates that the one to go down in history as the inventor, is the one who gets the patent and can prove his or her case.



Questions:

1. Why did Bells patent hold up through time?

2. What other items do you associate with their famous inventors?

3. Are they the “real” inventors?

Source: https://www.uspto.gov/sites/default/files/kids/icreatm_guide_ms.pdf



SCAMPER Worksheet

1. SCAMPER with Ice Cream Cone

As your teacher reads the series of SCAMPER cues and related questions about the ice cream cone, record your ideas below.

SCAMPER CUE	NOTES AND IDEAS
S= SUBSTITUTE	
C= COMBINE	
A= ADAPT	
M= MODIFY	
P= PUT TO USE	

SCAMPER CUE	NOTES AND IDEAS
E= ELIMINATE	
R= REVERSE OR REARRANGE	

Now, select one idea you have written above. **Draw an illustration** of this new idea for using the ice cream cone.

2. SCAMPER On Your Own

Your teacher will show you (or you will choose) an item you may use every day...or not! Try to look at this item in different ways. Use the SCAMPER technique to help you think of different ways to look at this item. If you do not know what the item is, that is ok. You can still do SCAMPER, because whatever the object is, you are looking at it differently! **Record your ideas** in the chart below.

What could you do?	How would it change and what can you do with it now? Draw out your new ideas.
<p style="text-align: center;">Substitute</p> <p>Think of a scenario. How could you use this item?</p> <p>Could you use different materials to make it?</p>	
<p style="text-align: center;">Combine</p> <p>Think of a scenario. How could you use this item?</p> <p>Could you use different materials to make it?</p>	
<p style="text-align: center;">Adapt</p> <p>Can you change a small part of the item to use it for something else? Can you think of another product and make the item more similar to it?</p>	

What could you do?	How would it change and what can you do with it now? Draw out your new ideas.
<p style="text-align: center;">Modify Add parts or change the shape.</p> <p style="text-align: center;">Magnify Make it bigger, higher, longer, or stronger.</p> <p style="text-align: center;">Minimize Make it smaller or take parts away.</p>	
<p style="text-align: center;">Put to Other Use Can you use this item as it is for anything else?</p>	
<p style="text-align: center;">Eliminate What happens if you take parts or pieces away?</p>	
<p style="text-align: center;">Reverse Switch the direction of the item.</p> <p style="text-align: center;">Rearrange Move parts around or change their order.</p>	



Take Apart Worksheet

1. Draw your ideas of how the wind-up toy works below:

A large, empty rectangular box with a black border, intended for students to draw their ideas of how a wind-up toy works.

2. What Makes Me Go?

Directions: First, look at the wind-up toy. Watch it move. Why does it move that way? Then, take your toy apart. What parts help the wind-up toy move?

What parts do you see?	
What does the toy do? Not all of its parts move.	

Draw a model (a picture) of what you think is happening inside the toy to make it move:

How do you think the wind-up toy performs all of these movements?

It's TAKE APART time!

Let's see the insides of your mechanical toy. Take it apart! As you are dismantling it, pay close attention to how your toy was performing all of its motions.

Use the correct tools to carefully take the toy apart. Find the important parts that make this invention work and record them in the inventory below.

How many...?

What did you find while taking the toy apart? Separate all of the pieces into piles and count how many of each part you find.

Screws: ____

Coils: ____

Wheels: ____

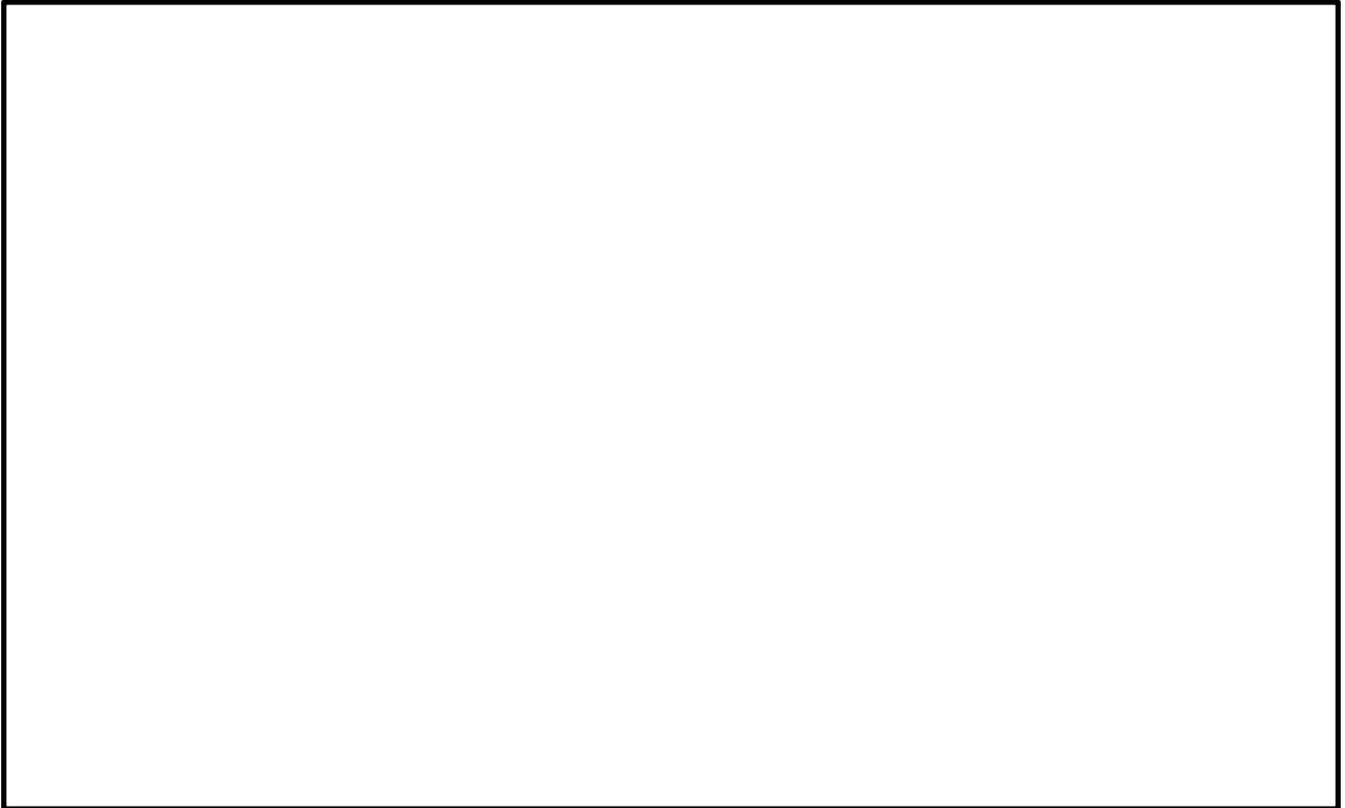
Gears: ____

How did you sort your pieces?

Explain how you think the wind-up toy moves.

After Take Apart

Draw a model (a picture) of what you saw when you opened up your toy. How did it move?



How was your original model similar to what was actually happening? How was it different?

Creative Problem Solving Worksheet

STEP	DESCRIPTION	EXAMPLE
MESS FINDING 	Make a list of things that are problems for you. Select the one that seems most interesting to take to the next step, <i>Data-Finding</i> .	<ul style="list-style-type: none"> • Feeding the dog.
DATA FINDING 	Make a list of all of the components that contribute to the "mess." Decide which of these facts are the most important to you in solving the problem. Go to step, <i>Problem-Finding</i> .	<ul style="list-style-type: none"> • There are dirty dishes to clean. • The food smells gross. • The cat gets into the dog's food. • Ants get into the food. • The food gets too warm on hot days.
PROBLEM FINDING 	Generate a list of statements that begin with "How might I..." Select the one that seems most interesting to you, and go on to <i>Idea-Finding</i> .	<ul style="list-style-type: none"> • How might I keep the dog food from getting warm? • How might I refrigerate the food for the dog, but make it accessible? • How might I eliminate the need to feed the dog when it is hot?
IDEA FINDING 	Think of alternative ways to approach the problem. Use a brainstorming technique to come up with a variety of strategies. Look for your most promising possibilities to carry on to <i>Solution-Finding</i> .	<ul style="list-style-type: none"> • Freeze the food. • Only feed the dog at night when it is cool. • Refrigerate the bowl. • Make a doggie door in the refrigerator.
SOLUTION FINDING 	Generate a list of criteria to help you select which idea you are going to work on. For your best ideas, list their advantages, limitations and unique aspects. Examine the advantages, limitations and unique aspects of each of the ideas and select the one you are going to take with you to <i>Acceptance-Finding</i> .	For a refrigerated bowl using freezer packs: Advantages: It would keep the food cool. <ul style="list-style-type: none"> • It might fit under the bowl I already have. Limitations: It might not stay cold all day. <ul style="list-style-type: none"> • The dog could chew/eat the packs! Unique Aspects: It might discourage ants. <ul style="list-style-type: none"> • It should help with odor.
ACCEPTANCE FINDING 	Make a list of people and things that will help you and those that will make your task more difficult. Develop a plan of action that describes how you are going to implement your idea.	<ul style="list-style-type: none"> • Mom might help me by letting me use the blue ice from the cooler. • My sister will probably get in the way. • The dog will be nervous if I am doing something to his bowl. • I am going to try freezing the blue ice and putting it in a pan under the dog's dish. After I feed him, I will check the temperature of the food every half hour, rate the smell, and check for ants.



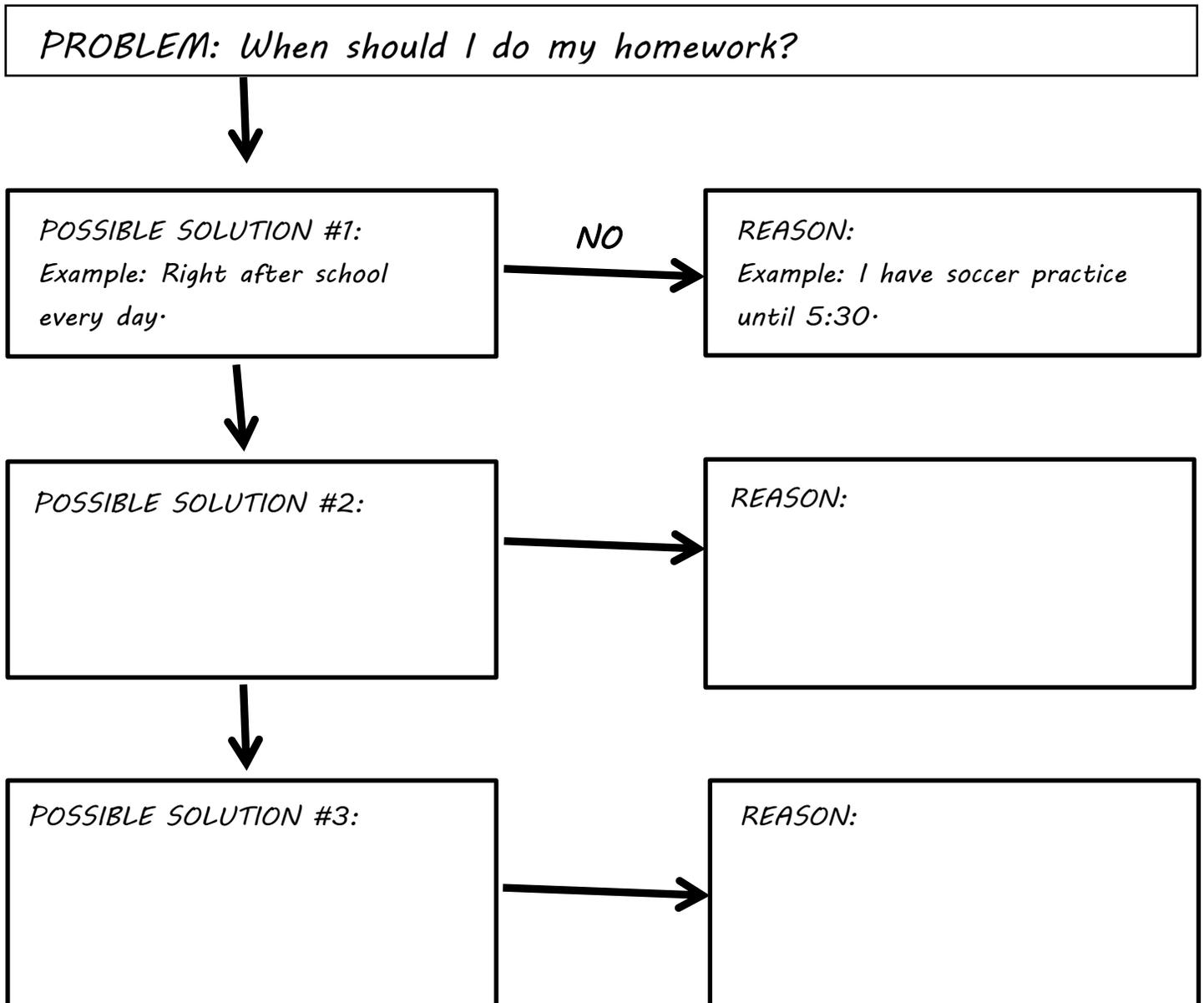
Lunch Line Redesign Worksheet

Draw a sketch of your Lunch Line Redesign, or just one part of the redesign below.

A large, empty rectangular box with a black border, intended for students to draw their Lunch Line Redesign or a part of it.

What's Your Problem? Worksheet

Use this flow chart to help you identify the problem: "When should I do my homework?" and map out possible solutions. Above each arrow, write YES or NO to indicate whether each solution could be successful, or not, and then outline the reason why or why not in the space provided. If needed, add more boxes or arrows.



Does Your Invention Already Exist? Worksheet

Part 1: Starting to Make Plans

Now that you have an idea for your invention, you must determine if it meets certain standards. Some criteria, necessary for evaluation, are included in the chart below. You may not be able to complete each question now, so use it as a guide and complete it as you continue to conduct research.

Is My Idea...	Yes	No	Needs Improvement
Going to work?			
New and original, or an improvement on an existing invention? (Research by asking others, checking the library, and calling stores that would sell your product.)			
Creative and unusual?			
Useful to all age groups?			
Cleverly named?			
Too complex?			
Too simple?			
Designed to improve the environment?			
Able to be mass-produced?			
Easily damaged?			
Made from recycled materials?			

Part 2: Researching Your Invention Idea

Record the results of your criteria as well as the results from your research below. Be sure to record this information in the “My Invention Log” section of your **YIP Inventor’s Journal**.

Notes from Internet Research:

Notes from Library Research:

Notes from Interviews with People:

Part 3: Patent Research

How do you find out more about your problem and solution? You perform research. Take notes on your patent search. You will likely need an adult to help with this as each patent contains a lot of information. This is an important activity because you will be asked at your school Invention Fair and other Invention Convention events how your solution is different from other solutions. Your research will lead you to a well thought out answer.

Patent Sites



Use the UPTO site to search for patents that already exist. The results that come up can be difficult to go through, so you may need to ask an adult for help.

Websites: uspto.gov and uspto.gov/go/kids

- Type in your keywords. Search.
- Look over the patents that come up. Click on items that might be relevant to your invention to learn more.
- There is a lot to read in the patent. Record some notes on the Abstract, Background, and Summary. These will help inform the design of your invention.
- At the bottom of the page click on "Images" to see what the invention looks like.

Patents that relate to my invention:

Patent Number/Title: _____

Notes on Abstract, Background, Summary:

How is your design solution different or an improvement?

What adjustments are you going to make based on this research?

Patent Number/Title: _____

Notes on Abstract, Background, Summary:

How is your design solution different or an improvement?

What adjustments are you going to make based on this research?

Be sure to record this information in the “My Invention Log” section of your **YIP Inventor’s Journal**.

Part 4: Let's Go Shopping

Before you can say you have an invention, you need to look at what is already in stores. You can visit stores or go to online stores to look up products. Ask an adult to help if needed.

Keywords!



Write down 5 key words to describe your invention. Use these words when doing your search.

- 1.
- 2.
- 3.
- 4.
- 5.

Shopping Sites



With an adult, go to Amazon.com to begin a search for products that already exist. How are these products similar to your invention? Do not be discouraged if your idea already exists; instead think about how your idea is or can be different from or an improvement to the existing product.

- Type in your keywords. Search.
- Look over the products that come up. Click on items that might be relevant to your invention to learn more.
- Record some notes that are relevant to your invention ideas.

Products that relate to my invention:

Draw what you see:

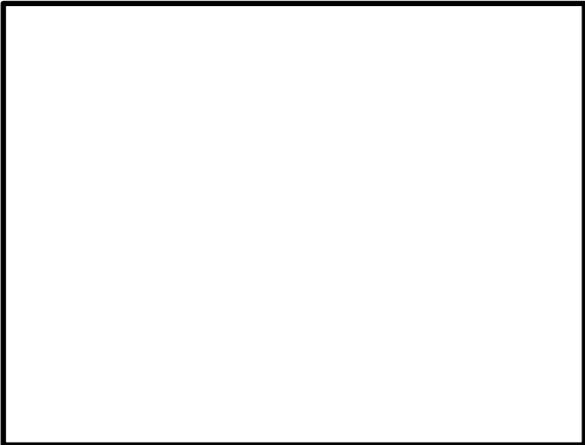
A large, empty rectangular box with a black border, intended for drawing the products seen during the shopping activity.

How is this like your invention?

Four horizontal black lines stacked vertically, providing space for writing answers to the question about how the products relate to the invention.

How is your invention different?

Draw what you see:



How is this like your invention?

How is your invention different?

Search other shopping sites too! The more you know the better your explanation will be. Be sure to record this information in the "My Invention Log" section of your YIP Inventor's Journal.



Partner Meetings Worksheet

Today you will meet with at least 3 classmates. You will explain your invention and review your Intent to Invent Worksheet with your partners. Record their feedback so that you can evaluate whether or not you can use it to make improvements on your design.

Partner 1: _____

STRENGTHS	SUGGESTIONS TO CONSIDER
Things my partner liked about my invention:	Things my partner suggested I could think about to make improvements:

Partner 2: _____

STRENGTHS	SUGGESTIONS TO CONSIDER
Things my partner liked about my invention:	Things my partner suggested I could think about to make improvements:

Partner 3: _____

STRENGTHS	SUGGESTIONS TO CONSIDER
Things my partner liked about my invention:	Things my partner suggested I could think about to make improvements:

Evaluation and Reflection:

You do not have to act on every suggestion, but you should reflect on each suggestion and evaluate how it could help you improve your design. Think about each suggestion offered. Could it help improve your invention? How? Write down reflections on how your partners' suggestions could help your design.

Record your Partner Meeting notes in your **YIP Inventor's Journal**.



Invention Name Word Ideas Worksheet

Pick one word/prefix/phrase from Group A and one word/suffix/phrase from Group B that seem to really “fit” your invention. Now put them together. Try saying them quickly, and then reverse the word order. Add other words and try several different combinations to see if you can come up with something you like. Ask your friends what they think. List some of your ideas in your **YIP Inventor’s Journal**.

GROUP A		GROUP B	
Aqua	Photo	Mister	Away
Travel	Handi	-lzer	Minder
Thermo	Micro	2000	N’ Go
Medi	Pet	Meter	Buster
Ele-	Sleep	-Ator	A-tron
Opti-	Auto	Aid	Ease
Work	Accu	Saver	Alarm
Pest	Compu-	Mate	- O
Mega	Saftey	Be-gone	Feeder
Baby	Farmer’s	Max	Glow
Audio	Quick	Buddy	Flex
E-Z	Info	Tote	Freeze
Presto	Super	Rider	Shovel
Tele	Step	No-More	Helper
All-in-one	Pro	Finder	Sure
Nite	Cozy	Shield	Alert
Kiddie	Mini	Pal	Tech



My Invention W's

Answer the W's in complete sentences to describe your own invention.

WHAT does it do?	
WHEN would I use it?	
WHY is it helpful? OR WHAT problem does it solve?	
WHO would I sell it to?	
HOW much would I sell it for?	



My Invention Commercial Storyboard Worksheet

Questions to consider when creating your commercial:

1. What is the name of your invention?

2. What is your invention?

3. What does your invention do?

4. How does it make life easier?

5. Who should buy it?

6. Where can you buy it?

7. How much does it cost?

Scene 1	Scene 2
Drawing or Description of Scene:	Drawing or Description of Scene:
Script	Script

Scene 3	Scene 4
Drawing or Description of Scene:	Drawing or Description of Scene:
Script	Script

SECTION 2: MY NOTEBOOK

Place to brainstorm ideas / collect sketches / catalogue ideas as you start your invention journey.

From the Problems All Around Me page, what problem(s) stand out as things you want to solve?

What are three ways that you can solve these problems?

Sketch Your Ideas

More Ideas / Notes / Sketches

More Ideas / Notes / Sketches

Are you ready to invent? Start Your Journal Next

SECTION 3: MY INVENTION JOURNAL



STATEMENT OF ORIGINALITY

I promise that the ideas in this Inventor's Journal are my own. (If a team project, all members of the team should have their own logbook, but complete this statement together and all members should sign.)

Inventor Name(s): _____

Signature(s): _____

Date: _____

Grade: _____

School/Program: _____

Town: _____



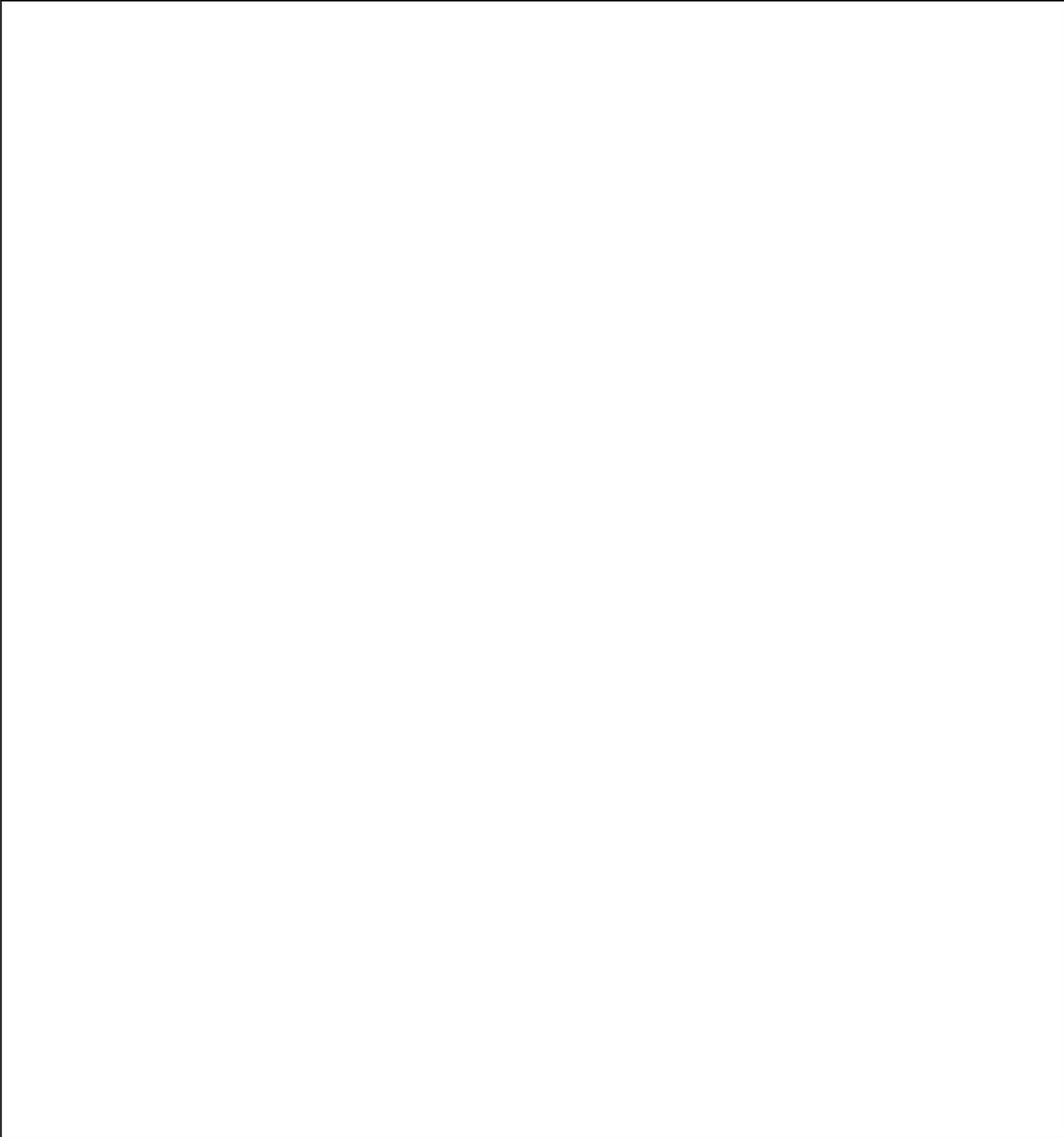
INTENT TO INVENT

File this form with your teacher/leader to share that you have identified a problem and a solution to that problem.

Student Inventor:	Grade:
Teacher:	Date:
I intend to invent:	
The problem it will solve is:	
I have determined to the best of my ability that my invention will be original by taking these steps:	
I will use the following materials in my invention:	

Invention Diagram

Draw a diagram of your proposed invention. Explain how it will work. All inventors make drawings of their inventions to show how they will work. Draw some quick sketches of your idea in your YIP Inventor Journal and pick what you think will look and work the best. All diagrams should be labeled, dated, and briefly explained.



Inventor's signature: _____

Date: _____

Invention Journal Page

Record steps to develop ideas, research and notes as you build your invention.

Inventor's signature: _____

Date: _____

Invention Journal Page

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Invention Journal Page

Record steps to develop ideas, research and notes as you build your invention.

Inventor's signature: _____

Date: _____

Preparing Your Presentation

Inventors need good ideas and good communications skills. Part of YIP is to present your invention to your peers at your school or program and present to judges at your Invention Fair and other competitions. When doing these presentations, be sure to:

1. Be prepared and practice.
2. Ensure your presentation is within time limits set by your teacher.
3. If you are part of team, make sure each team member has a part of the presentation.
4. Speak clearly and loud enough for judges to hear you.

We have a few tips to prepare for your invention presentation:*

- **Practice Out Loud:** Practice your presentation in front of a friend or family member at least 5 times so you are more familiar with your speech and are comfortable speaking in front of someone.
- **Take a Deep Breath:** If you lose your place or get nervous, take a deep breath, pause and restart. There is no rush when speaking and the audience appreciates time to think about what you are saying as well.
- **Practice in Front of a Mirror:** Stand in front of a mirror and give your presentation. Be careful not to wiggle, twitch, or shift. Practice how you will stand, sit, move or point as you present.
- **Time Yourself:** Time yourself as you give your entire speech from start to finish. Speak at a normal pace, which will probably seem slower than you think it should.
- **Make Eye Contact:** Look up at your audience at least 3 times when you present.
- **Expect the Unexpected:** It is okay if things do not go as planned. Stay positive and follow through.
- **Summarize & Restate:** At the end of your presentation, repeat your most important points to summarize your project.
- **SMILE!:** When you smile, your whole body relaxes. And smiling is contagious- if you smile, your audience will too.

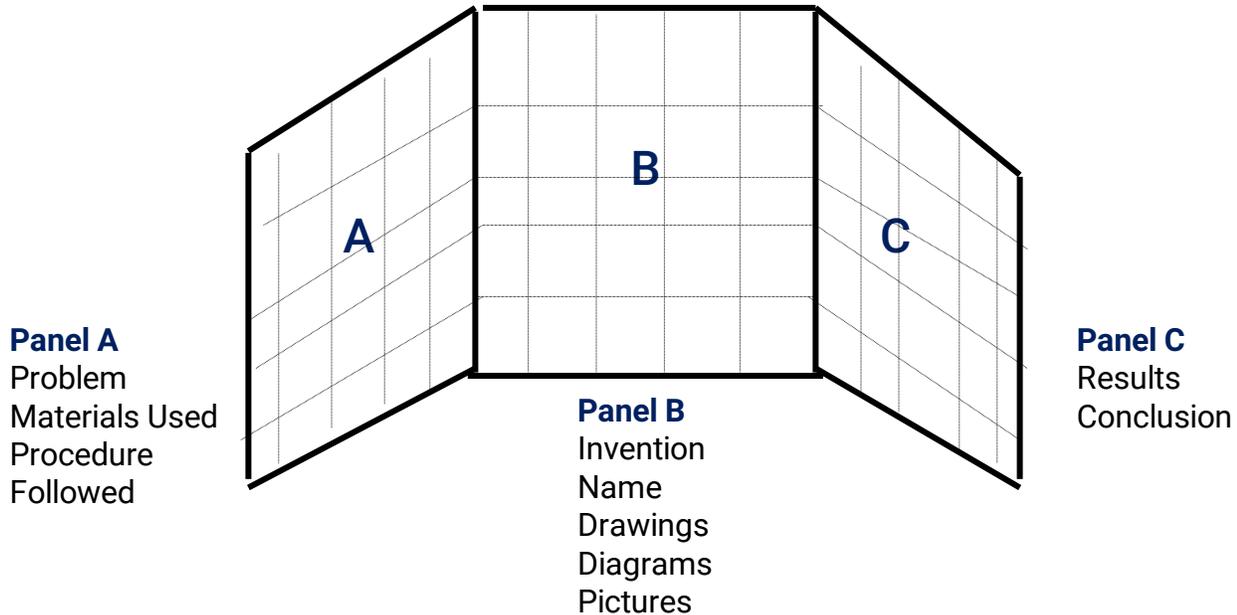
* Adapted from *Science Buddies*, "Science Fair Project Presentation Speech Tips".

Questions Judges May Ask You

- How did you come up with your invention idea?
- Did you work on the first idea you thought of?
- What disappointments/hurdles did you have while working on your invention?
- Did you build any prototypes before this invention?
- What was more fun for you: thinking up your invention or building it and making it work?
- Where did you get your materials/supplies?
- Have you thought of ways to make your invention even better?
- If you could have this invention built using any material, what would you choose?
- Did you have fun inventing?
- What else would you like to tell us about your invention?

Display Board Requirements

Your display board is an opportunity for you to highlight the most important aspects of your invention process, show off your creativity, and market your product. This is an example of what a Display Board might look like, but you can be creative and make it your own.



Maximum size: A tri-fold display board may be a maximum of 48" wide and 36" tall (the board should be 24" with both 12" sides folded in.)

Display boards must have the following information in one consolidated place on the poster:

- Student(s) Name(s)
- Name of Invention
- Student(s) Grade(s)
- Student(s) School
- School City, State
- Statement of the problem
- Explanation of the invention as a solution to the problem
- Details of model construction
- Diagrams of design

Your display may also include many items, such as:

- How you thought up your idea
- Your research on if your invention already exists
- A statement of the problem solved
- Other brainstormed idea solutions which were unsuccessful and/or improvements
- Other people's impressions about the usefulness of the invention
- Personal testimonies of your own uses
- A short autobiography
- Photographs and/or diagrams

Helpful Hints:

- Materials for the poster may be pre-printed or hand written
- Photographs, illustrations/drawings, charts are encouraged
- Use font or handwriting that is readable (in style, color and size)
- Use colors that pop and look good together
- Use correct spelling and grammar
- Use proper punctuation



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