

ENGLISH

EUREKA! THE ART OF INVENTION



GRADE 4 UNIT 2 | INVENTOR'S NOTEBOOK

EDITION 1



This book belongs to:



Grade 4

Unit 2

Eureka!
The Art of Invention

Activity Book

Acknowledgement:

Thank you to all the Texas educators and stakeholders who supported the review process and provided feedback. These materials are the result of the work of numerous individuals, and we are deeply grateful for their contributions.

Notice: These learning resources have been built for Texas students, aligned to the Texas Essential Knowledge and Skills, and are made available pursuant to Chapter 31, Subchapter B-1 of the Texas Education Code.

If you have further product questions or to report an error, please email **openeducationresources@tea.texas.gov**.

Contents

INVENTOR'S NOTEBOOK

Eureka! The Art of Invention

Wheel of Invention	1
Episode 1	3
Episode 3	15
Episode 4	25
Episode 5	35
Episode 6	41
Episode 7	57
Episode 8	63
Episode 9	75
Episode 10	81

WHEEL OF INVENTION

RESEARCH

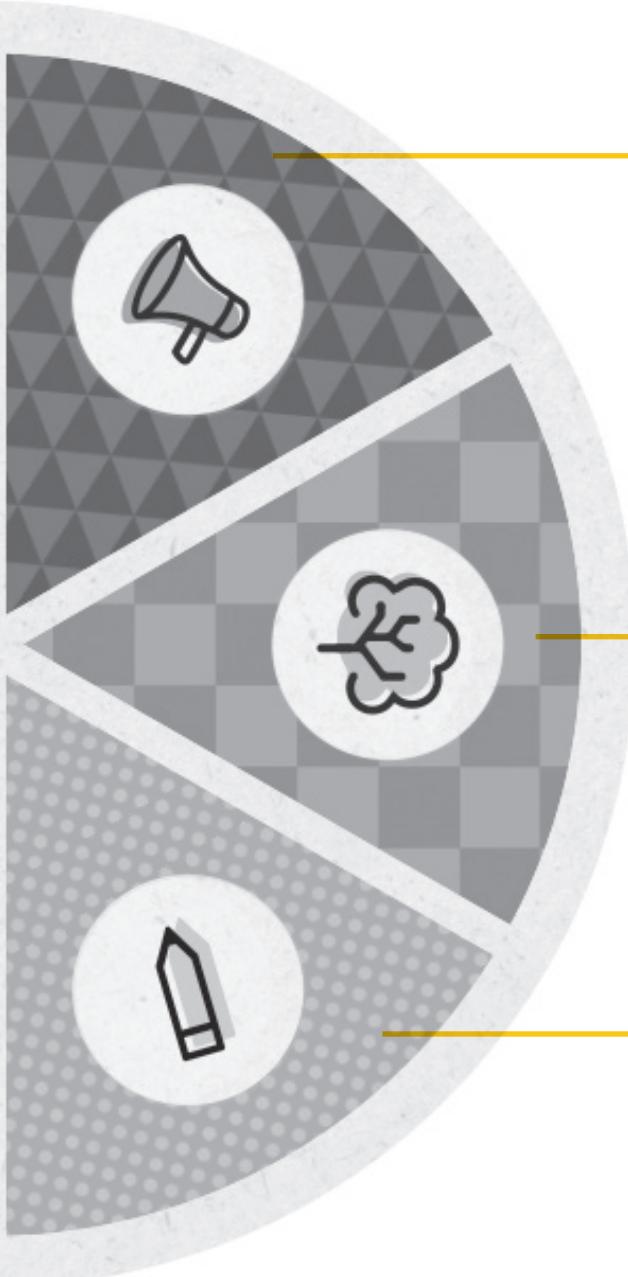


COLLABORATION



FAILURE





PITCHING

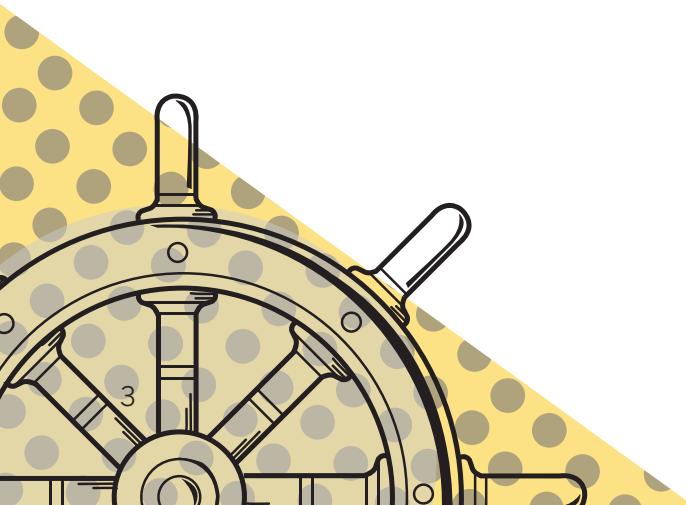
KNOWLEDGE

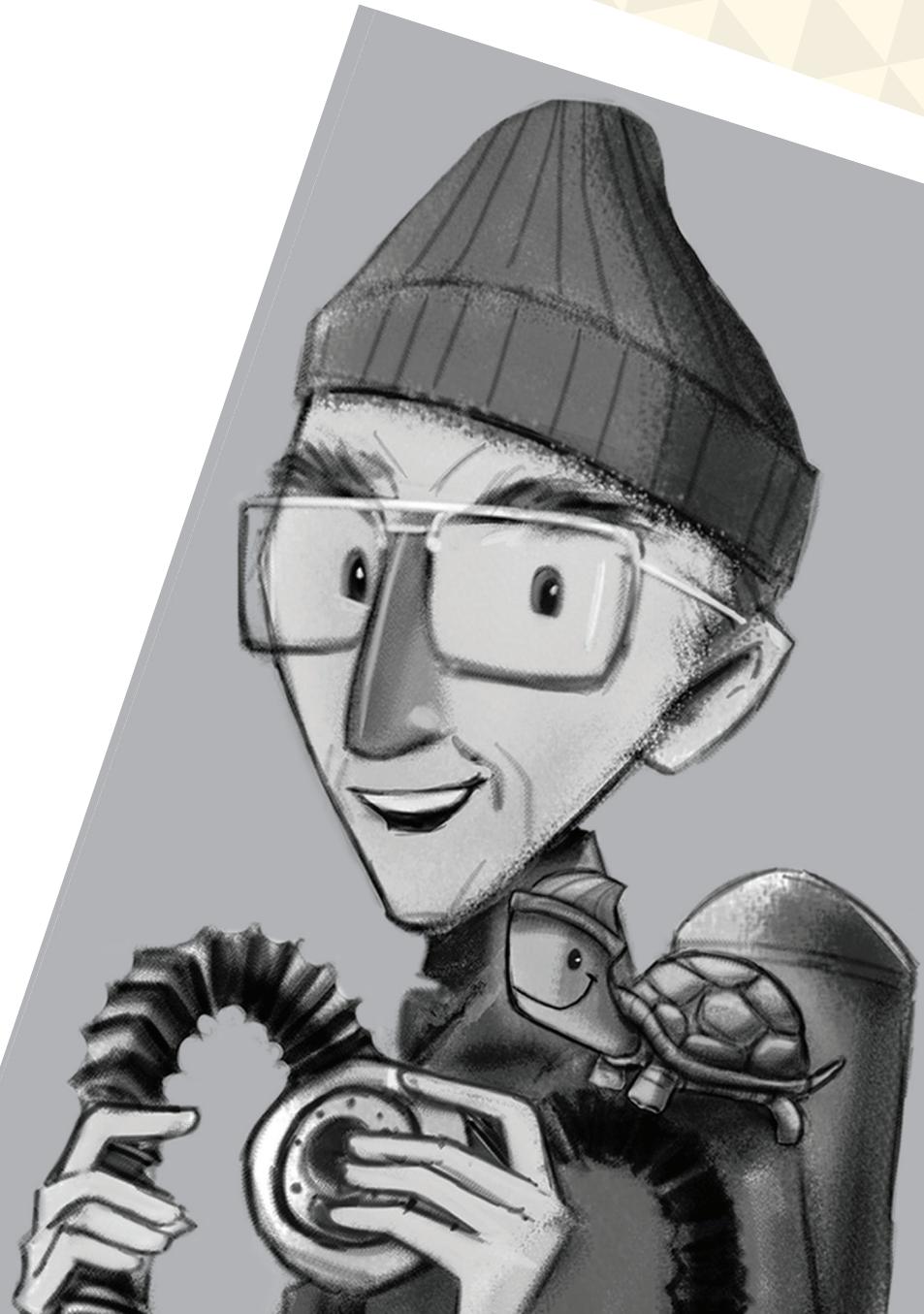
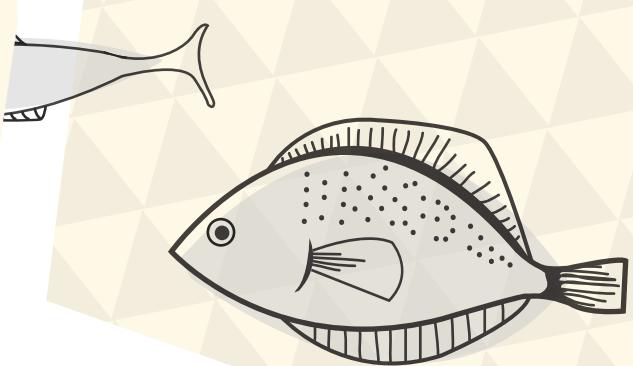
DOCUMENTATION

JACQUES'S COLLABORATION

RULES
FOR

- Take turns talking and listening.
- Stay on task.
- Ask good questions.
- Make suggestions in a positive, constructive way.
- Consider everyone's ideas.
- Everyone contributes. Help others and ask for help when you need it.



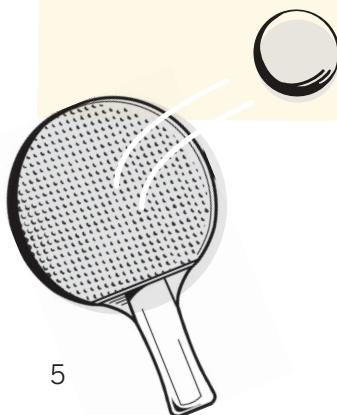


! JACQUES'S COLLABORATION BUILDING CHALLENGE

Devise a way to pick up a standard table tennis ball from the table, pass it around among the group (each lab member must be in control of it for three seconds), and then put it in the basket.

- Do not touch it with your hands. That includes covering your hands with any kind of glove-like item!
- Do not drop it.
- You may use up to two pencils, ten pieces of tissue, and a box of rubber bands.

You may use trial and error and test your experiment or components of your experiment as you build. Keep your table tennis ball under control at all times!!



Notes on group work:

You will work in your lab to complete this building challenge. In order to be successful, you will need to work together! Ensure that all lab members are given an opportunity to express their opinion and that everyone is contributing to the process. Listen carefully to what the other members of your group have to say. Their ideas may help you come up with a new idea of your own.

For this challenge, one team member will be assigned the role of building manager.

The building manager leads the decision-making process. This does not mean that the building manager has to do all of the work, or that the group uses all of the building manager's ideas! But sometimes, when a group has many ideas, it can be hard to decide which one to try first. The building manager should listen to the lab and help make that decision. They can call for a vote, or, if there's a tie, break the tie. If there are several tasks to be accomplished at the same time, the building manager can assign them. If you don't know what you should be doing to help, ask the building manager.



INVENTION BRAINSTORMING!

Idea #: _____ Date: _____

Invention problem:

Materials:

Questions:

How does it work?

Draw your invention here:



INVENTION BRAINSTORMING!

Idea #: _____ Date: _____

Invention problem:

Materials:

Questions:

How does it work?

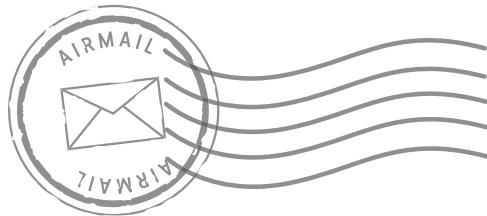
Draw your invention here:



COLLABORATION WEDGE CHALLENGE: LETTER TO JACQUES

Think back on the group work rules that Jacques introduced and that we addressed as a class in the “Learn from Last Season” transcript and the building prompt.

Prove to Jacques that you were paying attention. Pick one rule and write him a letter explaining how you used that rule during the building activity.



Dear Jacques,

I believe the most important rule for collaboration is:

If you ignore this rule:

I used this rule during the building activity when:

Another one of my lab mates used this rule when:

Sincerely,





EDISON'S INVENTION EVIDENCE

Invention: Light Bulb

1. What this invention does:

2. What came before this invention:

3. How did this invention change things? Give two examples and include quotes from the article as evidence.

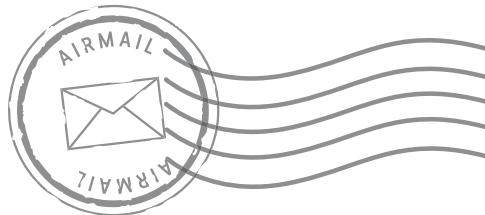
4. Imagine the world if this invention had never existed. Describe one situation in modern life that would be very different.



RESEARCH WEDGE CHALLENGE: LETTER TO MR. EDISON

Write a letter to Thomas Edison extolling the virtues of the light bulb.

Your letter should be about two paragraphs long. That means you might not have time to cover all the arguments and evidence you gathered earlier, so choose your material judiciously. Think about the story of the light bulb you want to tell. As you develop your letter, you may also want to think about information you learned about Mr. Edison's personality and life from his inventor card.

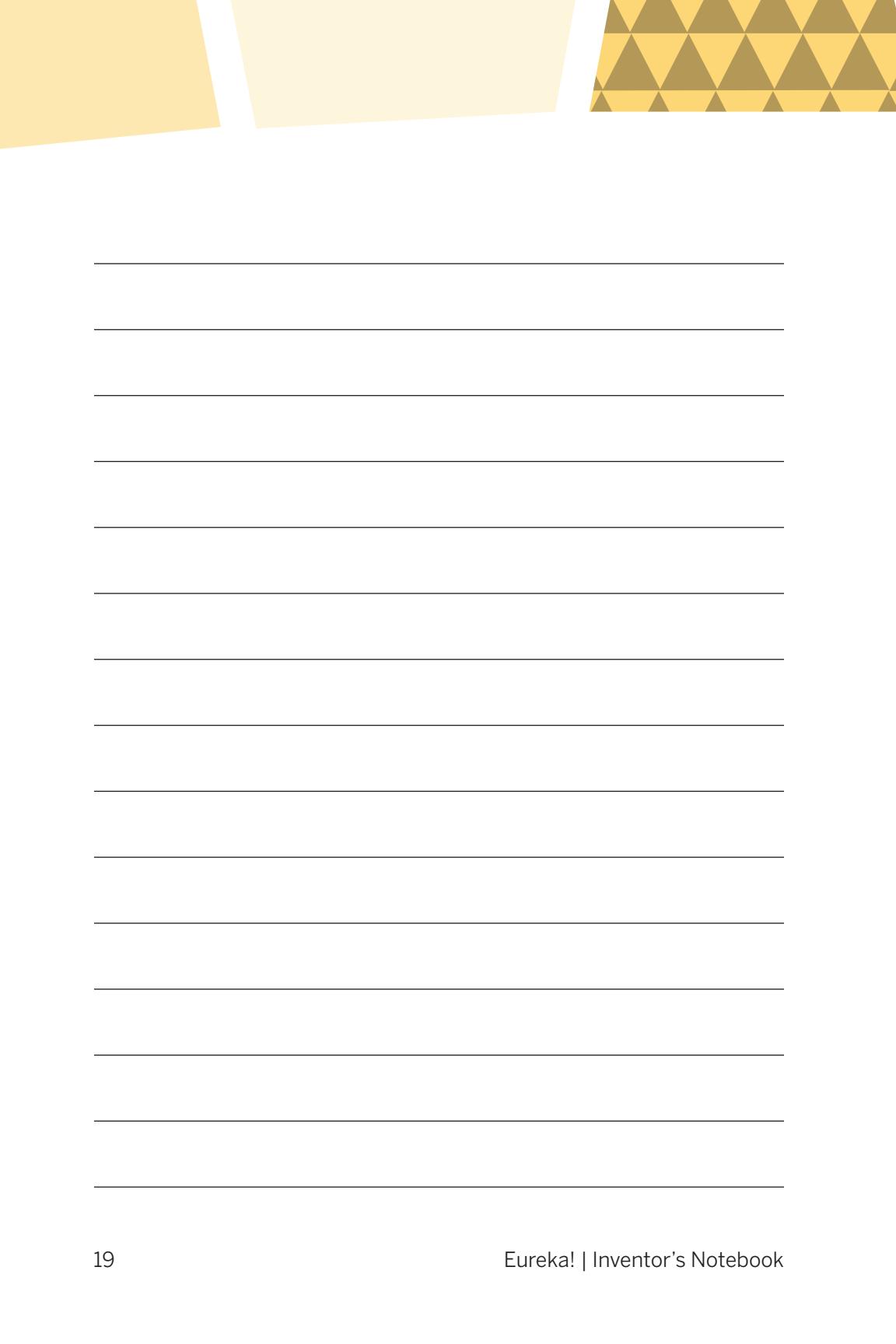


Here's an opening to get you started:

Dear Mr. Edison,

Eureka! Student Inventor could not possibly succeed without you as a judge. What show about invention can be taken seriously if it doesn't include the inventor of the light bulb, one of the greatest inventions of all time?

The light bulb is a truly great invention because:



Sincerely,





EDISON'S INVENTION EVIDENCE

Invention: _____

1. What this invention does:

2. What came before this invention:

3. How did this invention change things? Give two examples and include quotes from the article as evidence:

4. Imagine the world if this invention had never existed. Describe one situation in modern life that would be very different.

HEDY LAMARR'S PITCHING

RULES
FOR

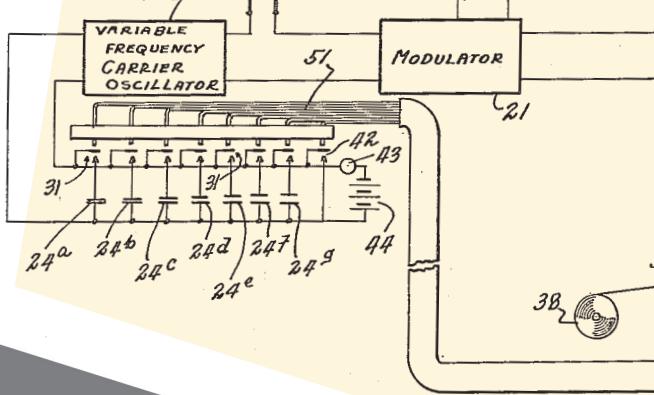
WHAT YOU SAY:

- Be focused on your topic.
- Be specific.
- Be interesting.

HOW YOU SAY IT:

- Make eye contact.
(Look at your audience!)
- Show energy and passion.
- Watch your volume and speed.







HEDY LAMARR'S SAMPLE PITCH PLANNER

Using the evidence you pulled for “Edison’s Invention Evidence,” plan the pitch your lab will present for your invention. This pitch will explain why your invention deserves to be on the back cover of Edison’s new book! All members of your lab should participate in the pitch.

Introduction (15–30 sec.):

1. The name of your invention:

2. The date (approximate is OK) of your invention:

3. A sentence briefly explaining how it was invented:

4. A sentence explaining how it improved life:

5. Your slogan—a catchy sentence that will grab your audience's attention (the slogan can be the one you created in Episode 1, or you can revise it):

Skit (1–2 min.):

1. Create a skit to demonstrate the importance of your invention. Choose one of the following ideas for your skit:
 - Demonstrate how people lived before and after your invention was invented.
OR
 - Interview the inventor.



Characters:

Setting:

Summary (what happens in your skit):

Conclusion (15 sec.):

1. Sign off with your slogan.



HEDY LAMARR'S PITCH PLANNER

Using the evidence you pulled for “Edison’s Invention Evidence,” plan the pitch your lab will present for your invention. This pitch will explain why your invention deserves to be on the back cover of Edison’s new book! All members of your lab should participate in the pitch.

Introduction (15–30 sec.):

1. The name of your invention:

2. The date (approximate is OK) of your invention:

3. A sentence briefly explaining how it was invented:

4. A sentence explaining how it improved life:

5. Your slogan—a catchy sentence that will grab your audience's attention (the slogan can be the one you created in Episode 1, or you can revise it):

Skit (1–2 min.):

1. Create a skit to demonstrate the importance of your invention. Choose one of the following ideas for your skit:
 - Demonstrate how people lived before and after your invention was invented.
OR
 - Interview the inventor.



Characters:

Setting:

Summary (what happens in your skit):

Conclusion (15 sec.):

1. Sign off with your slogan.



HEDY LAMARR'S NOTES FOR KNOWLEDGE

Invention:	What is it used for?

Why is it important?

1.

2.

1.

2.

1.

2.

1.

2.

1.

2.

1.

2.

 **SIMPLE MACHINE
DANCE PARTY CHALLENGE****Simple Machine:** _____

1. List an invention from the article that uses this simple machine:

2. List another invention, not in the article, that uses this simple machine:

3. Find three descriptions of action or movement from the article that refer to the simple machine:

4. In your own words, simply describe how this simple machine works:

Now, with your group, prepare a short dance or movement that demonstrates how this simple machine works.

- Your dance must last 30 seconds.
- All members of your lab must participate!
- You can all do the same movement, or you can do different movements.
- Feel free to create musical or rhythmic accompaniment.



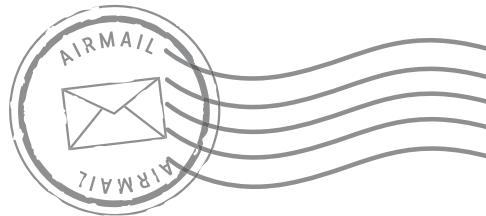


KNOWLEDGE WEDGE CHALLENGE: LETTER TO MI-SHELL

Mi-Shell needs to get from his terrarium in the *Eureka!* production office in Brooklyn to the network headquarters in midtown Manhattan (about eight miles away), while transporting two dozen cookies and a message of friendship and respect to save the show.

He may use ANY of the simple machines or inventions you have learned about so far, and you should encourage him to be creative, so he will impress the executives! He must use one simple machine and one additional invention we have studied (it can be another simple machine, but doesn't have to be) to make his journey easier. He can use inventions to ask people for help, and he can build his own inventions as long as they include the ones we have studied.

Please write him a letter to help him achieve his task.



Dear Mi-Shell,

Thank you for agreeing to deliver cookies to the network and save the show! You should use

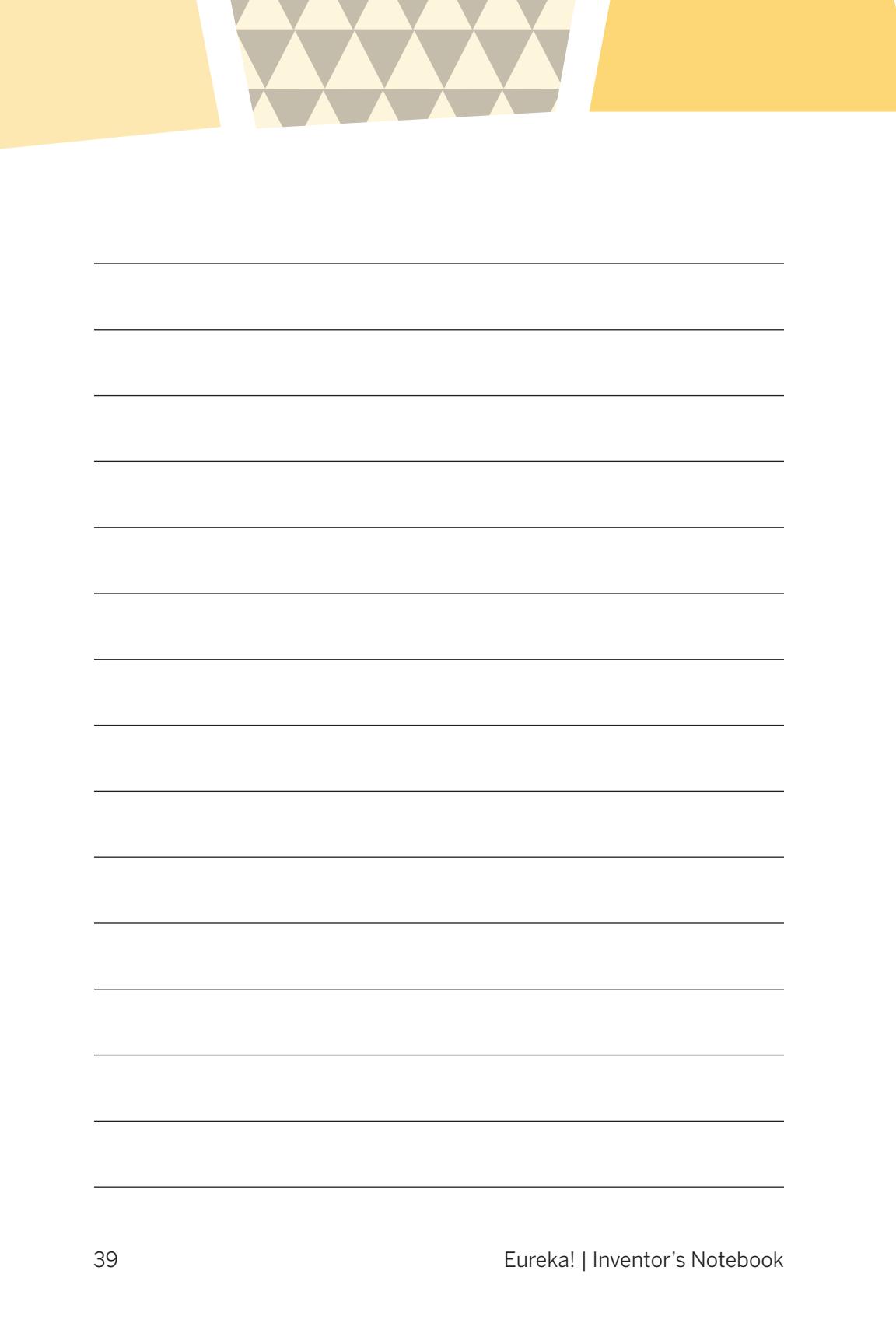
and

(a simple machine)

(a second invention)

to make your journey easier.

Here is how you should do it:

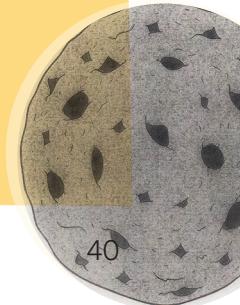


Sincerely,



Checklist:

- Does your letter include a simple machine?
- Does your letter include another invention?
- Does your letter explain how Mi-Shell should transport the cookies?
- Does your letter explain how Mi-Shell should travel?





HOW MANY WAYS CAN YOU SOLVE IT?

Round 1	Round 2

Round 3	Round 4

 **PROFESSOR CARVER'S GUIDE
TO DOCUMENTING MATERIALS**

Name of object: Pencil

Description of object

Sight:

Touch:

Smell:

Sound:

What is the object usually used for?

What else can you do with it?

 **PROFESSOR CARVER'S GUIDE
TO DOCUMENTING MATERIALS****Name of object:** _____**Description of object**

Sight:

Touch:

Smell:

Sound:

What is the object usually used for?

What else can you do with it?

! PROFESSOR CARVER'S DOCUMENTATION BUILDING CHALLENGE

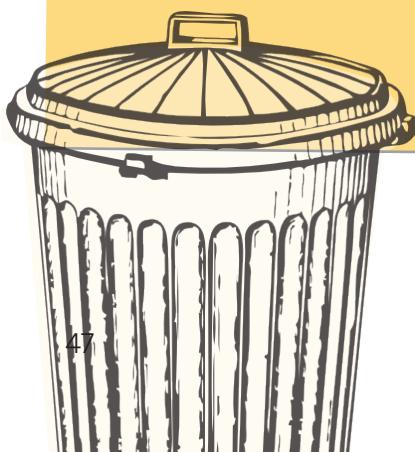
Building prompt:

You are building an invention the judges can use to throw out trash!

Challenge requirements:

- The trash can is two feet away.
- The user is sitting down.
- You can use anything in the building materials box.
- You cannot just throw the trash.
- Your invention must work 75% of the time.

You may practice using your invention and make changes to it as time allows. You are allowed to get out of your seat to build!



Notes on group work:

You will work in a group to complete this building challenge. In order to be successful, you will need to work together! Be sure that everyone is given an opportunity to express their opinion, and that everyone is contributing to the process. Listen carefully to what the other members of your group have to say. Their ideas may help you come up with a new idea of your own.

One member of your lab will be assigned to be the building manager.

The building manager leads the decision-making process. This does not mean that the building manager has to do all of the work, or that the group uses all of the building manager's ideas! But sometimes, when a group has many ideas, it can be hard to decide which one to try first. The building manager should listen to the lab and help make that decision. They can call for a vote, or, if there's a tie, break the tie. If there are several tasks to be accomplished at the same time, the building manager can assign them. If you don't know what you should be doing to help, ask the building manager.



INVENTION BRAINSTORMING!

Idea #: _____ Date: _____

Invention problem:

Materials:

Questions:

How does it work?

Draw your invention here:



INVENTION BRAINSTORMING!

Idea #: _____ Date: _____

Invention problem:

Materials:

Questions:

How does it work?

Draw your invention here:



DOCUMENTATION WEDGE CHALLENGE

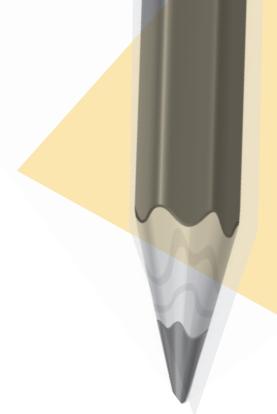
1. On the next page, label a diagram for the judges so they can use your clever design in their office-cleaning project.
2. List of materials used:

3. Write three sentences explaining how you made your invention.

Draw and label your invention here:

Labeled Diagram of Invention:

- Indicate what materials are used in various parts of your invention.
- Draw a star where the trash is placed.



- Label the parts of your invention. (handle, basket, slingshot, ramp—whatever you've included).
- Draw an arrow that shows us where the trash goes when the invention is being used.



EDISON'S INVENTION EVALUATION

Check two areas where you think your invention failed/ could be improved:

- Accuracy**
- Easy to build**
- Easy to use**
- Sturdiness** (how long your invention will last before it falls apart)
- Flexibility** (how well your invention could handle ANY trash, not just a wad of paper)

How would you revise your invention to improve it in the areas you checked?



FAILURE WEDGE CHALLENGE: LETTER TO NETWORK EXECUTIVES

Write a letter to the network explaining how failure can be a useful tool in invention.

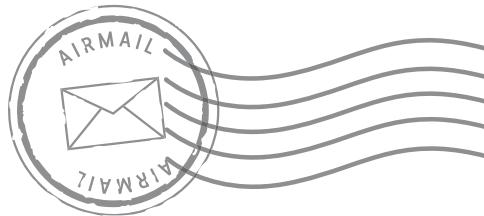
Give two examples of failure in your letter.

First, give an example of a failure you've experienced during the Quest so far. It can be a building failure, a collaboration failure, or any other kind of failure.

1. Explain how you failed.
2. Explain how you would change your actions in the future.

Second, give an example of an inventor's failure you learned about during the Quest from inventor cards or other reading.

3. Explain how the inventor failed.
4. Explain what they learned from that failure.



Dear network executives,

Don't cancel Eureka! Student Inventor just because last season was a failure! On the program this year, we have learned that failure is an important tool in invention. The judges and our host have used their failures from last season to learn how to make the show better. Learning from failure works!

This season I learned by failing. Here's how:

I also learned about _____, a famous inventor who failed, too.

Save Eureka! Let us fail some more!

Sincerely,





PROBLEM RESEARCH: INTERVIEWS

Select three questions from the question bank. First interview yourself. Then interview one of your lab mates.

Question 1:

My answer:

Lab mate's answer:

Question 2:

My answer:

Lab mate's answer:

Question 3:

My answer:

Lab mate's answer:

**PICK A PROBLEM
CHALLENGE**

1. What problem will you solve with your invention?

2. Why did you choose that problem?

3. What criteria does it meet?

4. How does it meet those criteria?

Introduction to Professor Carver's Inventing-from-scratch Tips:

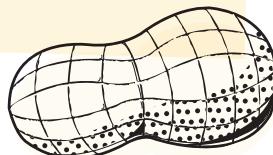


Inventing is fun, but inventing is also hard work. Sometimes you have more ideas than you can write down. This note is not about those times.

This is for those days when you are stuck. We have all had those days. All two hundred uses for the peanut did not come to me in a burst of lightning inspiration from on high. Neither did all hundred-plus uses for the sweet potato! (Why does no one care about the sweet potato? Please, I beg of you, ask your cafeteria workers to see if they can provide you with some nutritious and delicious sweet potatoes!)

I know that it can be very scary to be brainstorming and find yourself out of ideas. When you are stuck, think back to Round 1.

George Washington Carver



PROFESSOR CARVER'S INVENTING-FROM-SCRATCH TIPS



- Think about the inventors you read about—where did their inspirations come from?
- Think about the inventions you studied and how invention breeds invention—is there an invention that already exists that could solve your problem if you built on it or changed it?
- Think about simple machines and give yourself a challenge: if you were going to solve your problem using one of the simple machines, how could you do it?



INVENTION BRAINSTORMING!

Idea #: _____ Date: _____

Invention problem:

Materials:

Questions:

How does it work?

Draw your invention here:



INVENTION BRAINSTORMING!

Idea #: _____ Date: _____

Invention problem:

Materials:

Questions:

How does it work?

Draw your invention here:



ROUND 2 INVENTION DRAFT

Draw a diagram of your draft and label as much of it as possible.

Draw your invention here:



Specs:

1. What does your invention do?

2. Who uses your invention? Where?

3. How big is your invention?



4. What materials are used to build your invention?

Lab feedback (wait to complete this until directed)



HEDY LAMARR'S PITCH PLANNER: ROUND 2

1. The name of your invention:

2. What problem it solves:

3. How it works:

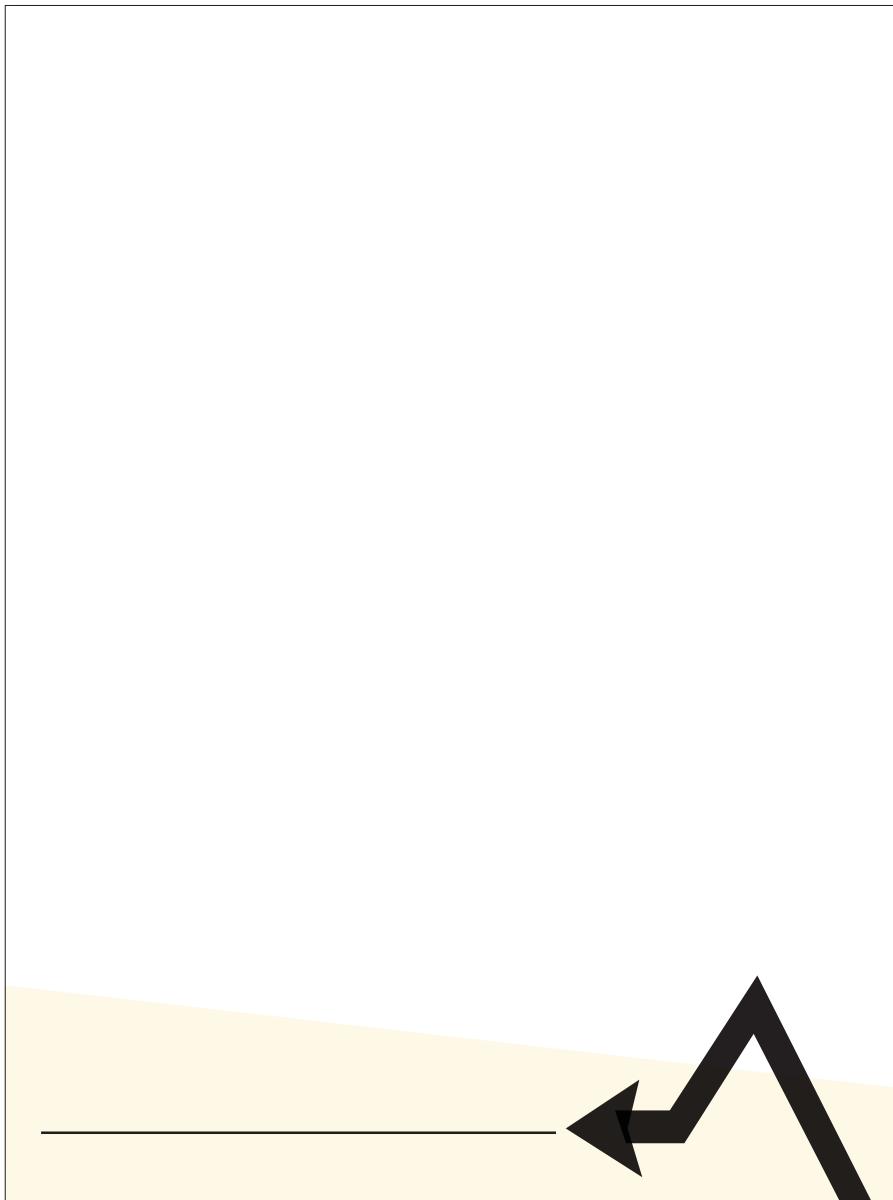
4. Why is it an important invention? Include at least one example of a scenario in which your invention is needed.

5. A slogan for your invention—a catchy sentence that will grab your audience's attention and help people remember your invention:



MAKE YOUR OWN INVENTOR CARD

Draw a picture of yourself...



Name: _____

Birth date: _____

Birthplace: _____

Invention(s):

Describe a challenge that you overcame.

ISBN 979-8-89072-954-5

© 2024. Texas Education Agency. Portions of this work are adapted, with permission, from originals created by Amplify Education, Inc. (amplify.com) and the Core Knowledge Foundation (coreknowledge.org).

This work is licensed under a

Creative Commons Attribution-NonCommercial-ShareAlike

4.0 International License.

You are free:

to Share—to copy, distribute, and transmit the work

to Remix—to adapt the work

Under the following conditions:

Attribution—You must attribute any adaptations of the work in the following manner:

This work is based on original works of the Texas Education Agency, as well as prior works by Amplify Education, Inc. (amplify.com) and the Core Knowledge Foundation (coreknowledge.org) and is made available under a Creative Commons Attribution- NonCommercial- ShareAlike 4.0 International License. This does not in any way imply endorsement by those authors of this work.

Noncommercial—You may not use this work for commercial purposes.

Share Alike—if you alter, transform, or build upon this work, you may distribute the resulting work only under the same or similar license to this one.

With the understanding that:

For any reuse or distribution, you must make clear to others the license terms of this work. The best way to do this is with a link to this web page:

<https://creativecommons.org/licenses/by-nc-sa/4.0/>

Trademarks and trade names are shown in this book strictly for illustrative and educational purposes and are the property of their respective owners. References herein should not be regarded as affecting the validity of said trademarks and trade names.

This work is based on prior works of Amplify Education, Inc. (amplify.com) and the Core Knowledge Foundation (coreknowledge.org) made available under a Creative Commons Attribution- NonCommercial- ShareAlike 4.0 International License. This does not in any way imply endorsement by those authors of this work.

Printed in the USA