My STEM & Innovation Fair Journal:

Title (My Question):

_____

By:

_____

Grade/Teacher:

_____

2018-19 CHVE STEM & Innovation Fair

Overview – STEM & Innovation Projects

Calling all scientists, engineers, techies, inventors, and problem-solvers! The STEM & Innovation Fair is a chance to invent something to solve a specific problem through the engineering design process. All grades can work solo or with a partner (siblings or classmates).

KEY STEPS:

- Registration: we need to know how many projects we have and assign Project Numbers. Please turn in a Registration Form (see www.chve.org website under Academics, drop down to STEM) to your teacher by 11-20-2018.

- STEM & Innovation Fair Journal: Participants fill out this Packet as a guide for the process.

- Project Display Boards: Your project "product" is a Project Display Board to show your project. It will display the Engineering Design Process. The Display Board shows your Title, Problem, Research, Design, Creation, Testing, How it Could be Made Better, Share project with a professional. The layout for your Display Board is at the end of this packet. You can include photos of your experiments, fun facts, etc.

- Presentation: Practice explaining your project (2-5 minutes). Even though we are not judging this year, members of the community will still be eager to hear about your project and may ask questions.

- Technology: We encourage older children to type their final sections for their Display Board, analyze the data from their experiment or invention testing, and create tables or bar graphs to show their results. It is perfectly fine however, to handwrite your final project. Remember, your project board should reflect YOUR work!
-Also, we have MakeyMakey Kits available for check out. Talk to Mr. Krulish.
-Mr. Krulish is always available to help - nkrulish@cherrycreekschools.org

STEM Fair Links to help get you started:

http://www.sciencekids.co.nz/projects.html

https://www.pinterest.com/explore/stem-projects/

http://www.cool-science-projects.com/elementaryScienceProjects.html

http://thestemlaboratory.com/stem-activities-for-kids/

http://stem-works.com/activities

http://littlebinsforlittlehands.com/a-year-of-the-best-stem-activities/

https://leftbraincraftbrain.com/28-days-hands-on-stem-activities-kids/

Engineering Design Process

The ENGINEERING DESIGN PROCESS develops a question, brainstorms ideas, designs solutions, builds it, tests it, improves upon it, and seeks an audience. You need to identify a specific problem or question, then design and build a solution.

<u>The Engineering Design Process:</u>

1. **WHAT'S THE PROBLEM?** (Examples: I want a marble to run on its own around a track; Bread gets moldy to quickly, I want to see if I can make bread last longer; In a volcano experiment, the "eruption" never lasts very long. Can I make it last longer? I want to make a doorbell ring on its own when someone arrives at the door) -Ask!! Why is it a problem? What are the constraints? What is the challenge?

2. **EXPLORE**: What are some possible solutions? Find out what others have done. Gather materials and play with them. Brainstorm ideas and pick the best one - why do you think this is the best solution?

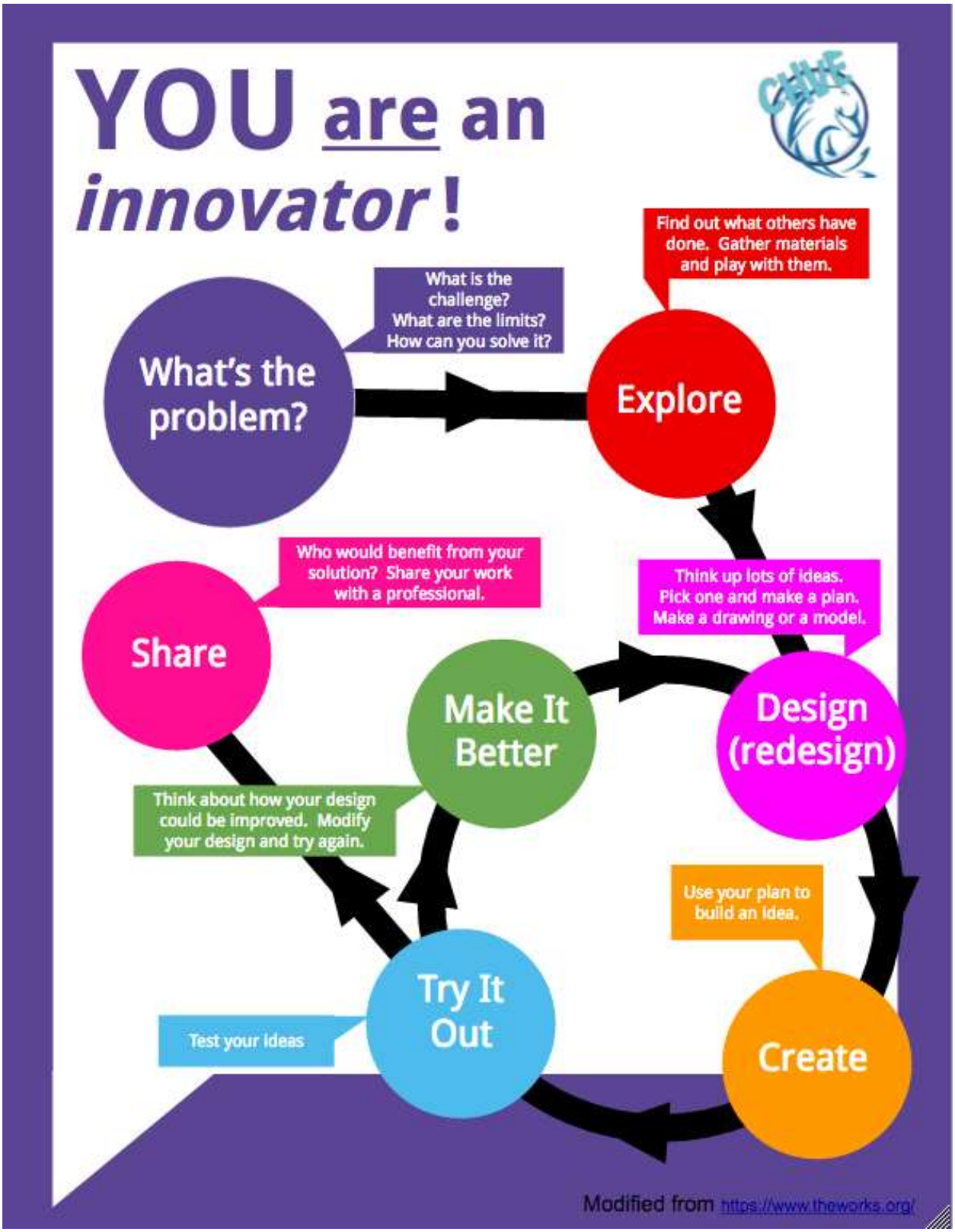
3. **DESIGN**: Draw a diagram or make a model. Make a list of materials you will need. What variables will you need to control, if any?

4. **CREATE**: Follow your plan and build/create your solution.

5. **TRY IT OUT**: Test it out!

6. **MAKE IT BETTER**: Talk about what works, what doesn't, and what could work better. Modify your designs to make it better.

7. **WHO CARES?** – Who is your audience? Who would benefit from the solution to this problem? Is there an individual or group in the real world that is connected to this problem in some way?


YOU are an innovator!
What's the problem?
What is the challenge? What are the limits? How can you solve it?
Explore
Find out what others have done. Gather materials and play with them.
Design (redesign)
Think up lots of ideas. Pick one and make a plan. Make a drawing or a model.
Create
Use your plan to build an idea.
Try It Out
Test your ideas
Make It Better
Think about how your design could be improved. Modify your design and try again.
Share
Who would benefit from your solution? Share your work with a professional.
Modified from https://www.theworks.org/

1. What's the Problem?

Ask!! Why is it a problem? What are the constraints/limits? What is the challenge?

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Why do you want to improve upon this problem? What is your purpose? What led you to want to make the problem better?

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Your question becomes the Title of your project.

2. Explore

What are some possible solutions? Find out what others have done. Gather materials and play with them. Brainstorm ideas and pick the best one - why do you think this is the best solution?

3. Design

Draw a diagram or make a model. Make a list of materials you will need. What variables will you need to control, if any?

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4. Create

Follow your plan and build/create your solution. This is a continuum. Start as simple as you can, and then improve on it. This will give you the opportunity to try ideas out and validate them.

Sketch and Flow Map

You can use this space to sketch out your creation. You can also use it to create a Flow Map, of the steps taken to arrive at your creation/invention.

5. Try it Out

Test it out!

Describe what happens and keep a record of the results here.

Data Log

Now it's time to collect and analyze your data!

1. How did you collect your data?

2. How often will you improve upon your creation/invention?

3. What changes did you need to make to improve your invention?

4. How will you share your data on your display board? (Type of graph, charts, diagrams…)

5. What data helped most to improve or solve your problem? Why?

6. Which variable was the most important to improve or solve your problem? Why?

6. Make It Better

Talk about what works, what doesn't work, and what could work better. How would you modify your designs to make it better? You can sketch out a different design. Would other materials/resources make it better? What do you think you need to learn more about, to help you improve your design?

7. Who Cares?

Who would care about your solution? Who is your audience? Who would benefit from your solution? If possible, try to share what you have done with an individual or group from the real world that might be connected to your problem. Ex: If you designed a bridge, share it with an architectural firm or a college student. If you used a MakeyKit (remember, you can borrow one from Mr. Krulish), post your project to the MakeyKit website. If you were able to share, use the lines below to describe how you shared this and what feedback you received.

- Other possible ways to share: take a short video clip and share it through DropBox or GoogleDrive

Remember: The Engineering Design Process is just that. A process. It is not a single solution or a single right answer. We learn from what worked AND what *didn't* work.

STEM Fair Display Board Format