Los Alamos STEM Challenge

STEM DESIGN TOOL

Guidelines

STAGE ONE: BRAINSTORM

Brainstorm on your own and as a team to come up with ideas for your project. In this phase, you may need to sketch, doodle, or start a journal. Think big, and let all the ideas you have hit the page without editing them. Get in the flow, and write or draw in your journal any ideas that come up. Great
scientists such as Leonardo Da Vinci kept detailed journals. They can be essential for honing in on those abstract thoughts.

1. Explore **Discover LANL** and read about the projects happening at the lab.
2. Be sure to click on the three **LANL Scientist** pages to get an inside view.
3. Visit the **STEM Wikis** to see tutorials, activity ideas, and other resources to help you find something that peaks your interest.
4. Read through some of the ideas in **Explore Ideas.**
5. The **15 Global Challenges Facing Humanity** Chart provides facts and statistics on global challenges that may give you ideas.
6. Work individually on some ideas and then get together as a team to share and brainstorm together.
7. Think big and let all the ideas you have hit the page without editing them.
8. Use sticky pads and large sheets of paper to start getting your ideas on paper.

STAGE TWO: RESEARCH

Now that you have brainstormed and come up with an original idea it is time to do the research. This is where the rubber hits the pavement. Ask questions as a team to analyze your idea and determine the problem and proposed solution. What local or global challenge does it solve? How will it work? Who will need it and why? How do you propose it should be built? Why should LANL work on this project? Why is it important? In your journal make a list of questions like this and research the answers. Talk to friends and experts. Remember to post your findings on your Pinterest Board. The more documentation you show, the more points you get. The winning design will be judged by the level of research and thoughtfulness that went into the proposed design solution.

1. Once you have an idea, search online using related key words and see what is already out there. For example, if your idea is to design a flying car, search “flying car” and related search terms.
2. Research thoroughly what has currently been developed to be sure your idea is original.
3. Search our STEM WIKI, the LANL site, as well as on YouTube, Pinterest, TeacherTube, etc.
4. Think carefully what our “STEM” component will be. What Science principles are being explored? i.e. Quantum mechanics for your transporter? Show that you have read and explored these concepts by posting your links on your Pinterest board. These could be YouTube videos, links to other sites, Google images, your own drawings, etc.
5. What is the technology that you’re proposing? Are you proposing a new energy source for cars? What about drawing diagrams that show the technology and how it is unique?

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STAGE THREE: DESIGN THE FUTURE

Once you and your team have done the research, the next step is to communicate that idea to your audience. If you have not chosen your media yet, this is the time to do it. Will it be a poster, video, app design, or essay? Decide which would be the best medium for your specific idea, then start to give it
structure. If it's a video, create your storyboard, if it's a poster or App, design the layout, and if it's
an essay, write your outline. Now is the time to craft your message and visualize your proposed design. It must be inspiring to win the hearts of the audience and judges, and it must be well designed or written to
powerfully communicate your message.

1. Visit **Choose Media** on the Challenge website and read about the choices; Poster, Video, Essay or App.
2. Visit the **Student Tools** page and print out the **Media Rubrics** which shows you the criteria and points that you receive for each category.
3. Print out the **Media Checklist** (one for each member of your team) and use this guideline to help with your designing.
4. Print out the **Media Template** for the media you have chosen to see the specific design requirements. i.e. Poster Template
5. Check out the links in the **STEM-WIKI** for design tips.
6. Search online for design examples. For example, if you are going to do a video, search for how-to videos and examples of great videos to use as models.

STAGE FOUR: TROUBLESHOOT

A good design involves testing and building prototypes to see if it works. If LANL
were to build or work on your design, how would they test it? Since this is a design that will be built in the future, possibly with materials that have not been invented, you will have to think through possible scenarios. Perhaps you could do some drawings, or collect images online that show how it might be built. Think of creative ways to show us how your idea will be tested for its effectiveness and how it would work in the real world. Document these test scenarios on your Pinterest board to demonstrate that you have thought this through.

1. Try to find some YouTube videos that demonstrate the science behind your idea and how it would work. Pin them to your Pinterest board.
2. Perhaps you and your team could create a prototype using simple household items.
3. Imagine possible problems you could encounter and how you would solve them.

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STAGE FIVE: FEEDBACK

One of the most important stages of the design process is knowing when to step back and get feedback. That could be from your friends, family, teachers, or from experts in your community. You want to be sure that a) the STEM concept is well researched, and b) it is being explained clearly and visually through your chosen media platform.

1. Review the **Feedback Survey** to get ideas on how to prepare yourself for feedback.
2. Observe carefully how others react and respond to your design.
3. Consider asking for feedback on an online forum that relates to your idea.

STAGE SEVEN: SUBMIT DESIGN

Once you have done the dreaming, brainstorming, researching, and designing and it has passed the feedback test of family, friends, and experts, it's time to cross your T's and I's, again. Ask someone from outside your team to review the spelling and grammar. Once you find yourself working too closely on a text document, it is important to get fresh eyes on it. Finally, work with your teacher, who is responsible for submitting your design, to upload your project for the Los Alamos STEM
Challenge. Good luck!

1. Review the all the steps above to be sure you have met all the Challenge requirements.
2. Fill out the online STEM Challenge Survey (required).
3. Cross your fingers!