Design Challenge Resource Collection

Module 5: Exhibit Design Sprints

This module is part of a Design Challenge Resource Collection, developed by a cross-functional team at the Oregon Museum of Science and Industry (OMSI) with decades of experience conceptualizing, developing and building museum exhibits. The collection is intended to support exhibit developers and designers as they work to create interactive design challenges.

These modules are designed for someone to read individually or facilitate with a team. There are great benefits derived from collaborating on the exhibit development process. Throughout the modules, activities for groups of individuals are called out in blue boxes.

Team Activity

Discussion prompts and other activities for groups are in blue boxes like this one.

Each module stands alone; there is no specific order to explore the modules, nor is there a need to read them all. However, in some cases, references are made between modules for opportunities to learn more. Finally, these resources are not meant to be prescriptive, but rather examples, tools and approaches the OMSI team has found valuable in the development of non-facilitated engineering design challenge exhibits for the museum floor that are accessible, relevant and engaging for visitors.

The entire set of resources can be found on the *Design Challenge Resource page*

1. Introduction to Design Challenges
2. Exploring Design Challenges
3. Approaches to Exhibit Accessibility
4. Testing a Design: Measures of Success
5. Exhibit Design Sprints
6. Graphic Development for Design Challenges
7. Prototyping Design Challenge Exhibits
8. Participatory Co-development of a Bilingual Exhibit
9. Documenting Exhibits: The Exhibit Record Tool

This material is based upon work supported by the National Science Foundation under Grant No. DRL-1811617. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Exhibit Design Sprints

OMSI uses the term exhibit design sprint to describe a collaborative process to quickly generate, evaluate, refine and vet ideas for an exhibit experience. For the *Creatividad silvestre | Wild Creativity* exhibit, design sprints specifically supported the development of design challenge experiences. This module is intended to help exhibit designers and developers (and other ISE professionals) conduct exhibit design sprints to support the development of engineering design challenges.

The Design Spring Process

There is no one prescription for a successful design sprint. Depending on the people and resources available, the timeline, and the topic, exhibit design sprint processes can vary greatly. That said, certain processes are commonly included in most design sprints.

- Prepare
- Generate ideas
- Refine and synthesize
- Evaluate
- Vet with larger team/audiences

These steps are explored in detail below. These steps do not necessarily follow a linear process, and the larger the project scale, the more cycles of generate, refine, synthesize, evaluate and vet a team might include.

Several design sprints were done as part of the *Creativid silvestre | Wild Creativity* exhibit; a typical agenda for a 90-minute sprint might look like this:

Warm up (5 mins)
Individual brainstorm (10 mins)
Share out (10 mins)
Discuss and narrow ideas (10 mins)
Small groups further develop and refine narrowed idea (25 mins)
Share out (10 mins)
Add comments and suggestions to ideas (5 mins)
Evaluate ideas (10 mins)
Document and wrap-up (5 mins)

Prepare: Before the Sprint

The key to a successful collaborative design sprint is to prepare. Before you start, establish the purpose of the sprint, describe success, and list your resources to help ensure an effective and efficient design sprint.

Define exhibit criteria and scope of deliverables

Talk with project or team leaders to understand the exhibit design challenge you are being asked to create and the resources available to create the design challenge.

- Identify budget constraints and get approval for the projected budget.
- Clarify what you expect to get from the design sprint process and describe success. This can be very general at this point, for example, “Ideate a <$20k design challenge about one of the top five youth identified social issues.”
- Decide who will participate. We recommend that a design sprint include people holding a variety of roles. For example, a sprint might include an educator, designer, evaluator, and fabricator—marketing and guest services might also be involved. Include people with varied familiarity with the content and those with diverse lived experiences when possible.

The team can answer questions like these to define criteria of a successful exhibit design challenge:

- What is a good design challenge?
- What do we mean by engineering?
- What does our audience want?
- What does the literature say?

Decide whether these types of questions will be answered before or during your design sprint. Take a look at some of the other modules, such as Module 1: Introduction to Design Challenges, Module 2: Exploring Design Challenges, Module 3: Approaches to Accessibility, and Module 4: Testing a Design: Measures of Success, to help you frame and develop criteria for your design challenge.

Your team can create a checklist of experience goals based on organizational priorities, by project leadership, or through collaborative activities during the sprint. This checklist could include questions such as, is this:

- Fun?
- Relevant to our chosen audience?
- Safe?
- Feasible?
- Iterative?
- Following our accessibility priorities?

These experience goals can help prompt, evaluate, and vet the ideas your team generates.

Inform yourself about relevant topics

Before developing an exhibit on a certain topic, become familiar with that topic and activities that have already been created. Provide the team with time to inform themselves as much as possible, including, but not limited to:

- Orienting to literature on the topic
- Reviewing internal documents on expectations for:
    - Learning goals
    - Accessibility priorities
    - Target audience
- Conducting front-end studies
- Researching prior activities for engaging with the topic

Other Considerations

Individual and Group Work

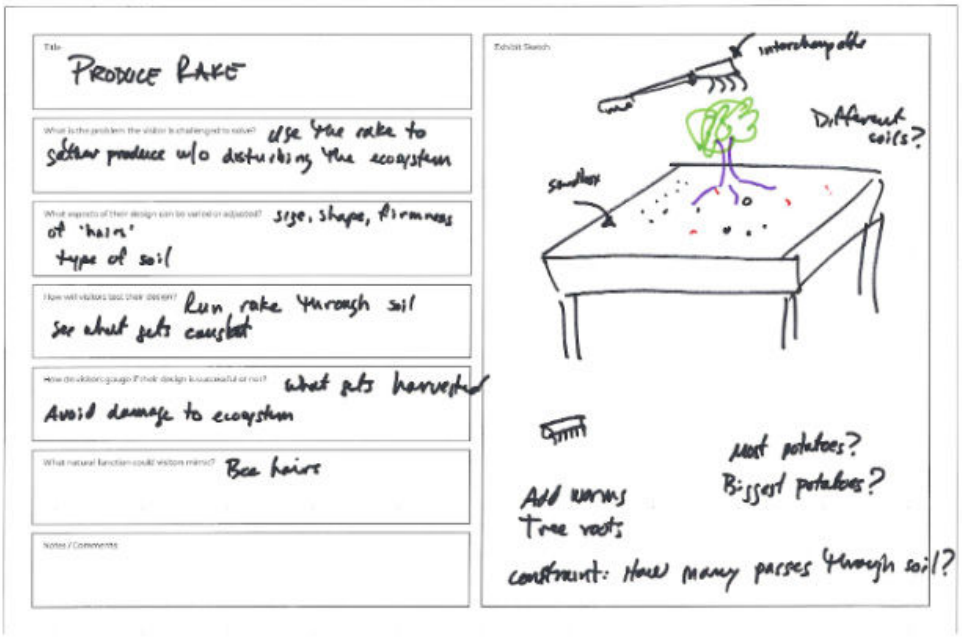
There is room in design sprints for both individual and group work; a combination of both is often effective. Consider the advantages of individual work or group/paired work and how you would like to leverage those advantages in your design sprint. In general, *Creatividad silvestre* design sprints often started with individual work, then asked individuals to contribute their ideas to paired/small group work, then asked the pairs/small group to share-out with the entire group.

Documenting and Sharing Ideas

In order to refine and vet ideas, your team must document and communicate the ideas they generate whether through hard copy or digital methods. Hard copy approaches—such as, paper and pens, sticky notes, and whiteboards —result in materials that can be filed, scanned, or photographed to document them. Online tools—such as Mural and Google Slides—make it easy to document ideas digitally.

To foster the documentation and sharing of ideas, use diverse formats to support the different ways people think, imagine, and create both collaboratively and in parallel. Both hard copy formats and digital formats provide opportunities for people to sketch or draw. Digital formats are also convenient for pulling images, sounds or videos from the Internet. Adding ideas to an online document provides a venue for sharing and also a permanent record as you go that can be referenced later. Consider your team, the format and venue for your meetings, and the resources available to decide which approach(es) work for you.

During the design sprint phase, creating tools (hard copy or digital format) can help participants focus on and document important aspects of an exhibit idea. Below are three examples used in design sprints to generate ideas for biomimicry-based engineering design challenge exhibits. Blank tools are included in the appendix of this module.

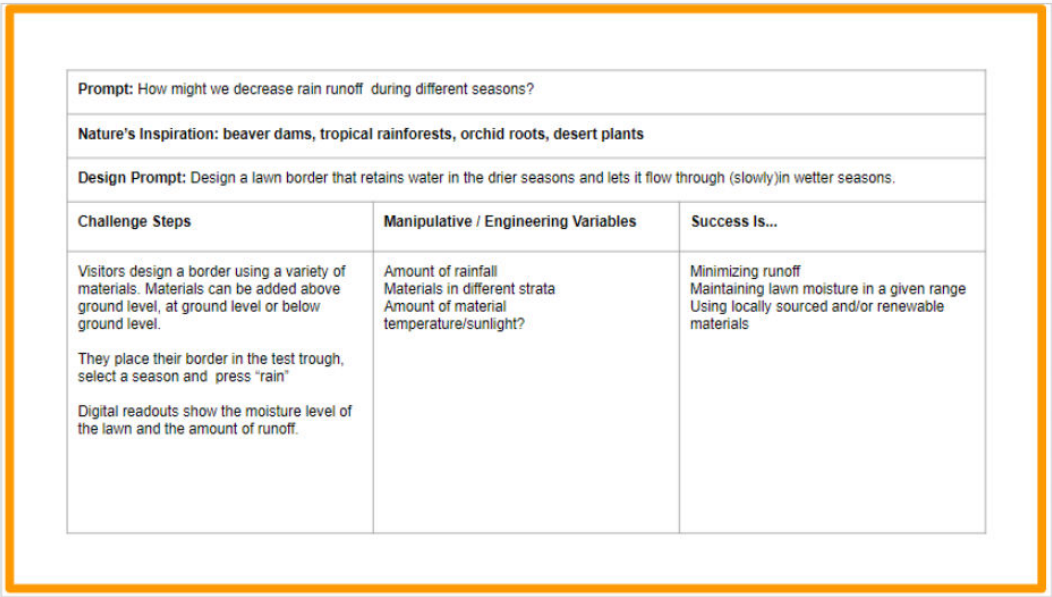


Example 1: Challenge Sketch Sheet includes fields to note the problem or challenge being addressed, aspects of the design that can be varied, a description of how visitors test their design, how they gauge success, and what natural inspiration is being mimicked.

How might we keep water from running off onto sidewalks and streets?	
Players	**Variables**
-Maintenance Crew -Suburban Residents -Commuters -Construction Workers -Local governments	-Environment / Rainfall -Drainage System -Drainage -Waterflow -Grass/Plant Type -Amount of rainfall in the area

Refined Prompts
-How might we improve drainage construction to increase the flow of water in rural communities? -How might we improve drainage construction to reduce debris build-up in suburban communities? -How might we improve drainage systems to adjust water flow during different seasons? -How might we retain rainwater in rural landscapes to prevent runoff? -How might we divert runoff to the sewage system efficiently?

Example 2: The Prompts Grid helped the team move from a general prompt to more specific and actionable versions by identifying the people or ‘players’ impacted by the challenge as well as the variables that could be manipulated.



Prompt: How might we decrease rain runoff during different seasons?		
Nature's Inspiration: beaver dams, tropical rainforests, orchid roots, desert plants		
Design Prompt: Design a lawn border that retains water in the drier seasons and lets it flow through (slowly)in wetter seasons.		
Challenge Steps	**Manipulative / Engineering Variables**	**Success Is...**
Visitors design a border using a variety of materials. Materials can be added above ground level, at ground level or below ground level. They place their border in the test trough, select a season and press "rain" Digital readouts show the moisture level of the lawn and the amount of runoff.	Amount of rainfall Materials in different strata Amount of material temperature/sunlight?	Minimizing runoff Maintaining lawn moisture in a given range Using locally sourced and/or renewable materials

Example 3: *The Challenge Grid* was a tool used after the Prompts Grid to further develop an idea for a design challenge exhibit. It includes the problem or challenge being addressed, the natural inspiration being mimicked, the design prompt for visitors, the steps visitors might take, aspects of the design that can be varied, and a description of success.

Generate ideas

A design sprint is a very creative endeavor with a primary objective to generate ideas. Perhaps the most essential factor for a creative and productive brainstorm is a good prompt. Regardless of whether you are seeking wide-open or focused ideas, your brainstorm prompt should provide enough direction that the team has something to work with, but is not too limiting.

Brainstorm wide open ideas

While it is important to know the criteria and constraints for the exhibit you are developing ahead of time, focusing too much on those at the beginning of a session can stifle creativity. Try some blue sky brainstorms early in the process to really get creative and innovative ideas flowing. With blue sky brainstorming, ideas are not constrained by the limits of practicality—don't think about what is realistic, but rather what could be amazing. Blue sky brainstorming is a great way to warm up for the design sprint and get some inspiring ideas on the table to draw from or build upon as the process moves forward.

Brainstorm focused ideas

The ultimate purpose of an exhibit design sprint is to come up with some practical design ideas for your exhibit. That means, at some point ideation needs to be focused. Start introducing some of the constraints for the project into brainstorm prompts. Get inspired by and/or build upon some of the blue sky ideas the team generated to work toward a successful concept.

Brainstorm tips and activities

Here are some tips for brainstorming:

- Focus on quantity over quality
- Selectively apply constraints to keep the session focused
- Don't prune ideas as you brainstorm
- Never finalize or commit during a brainstorming session

Below are a few brainstorm activities used by the OMSI team. Remember, a good prompt is key.

Free sketch: Give people between 3 and 10 minutes to sketch and describe an idea from a prompt (or create a digital slide with pictures, notes, etc.).

Mind mapping: This activity is great for broadening ideas around a certain topic. Each person starts with a piece of paper that has a word or short phrase in a circle at the center. Give them three to five minutes to write down as many other words or phrases they can think of that are associated with the prompt. Ask them to draw lines to make connections between the words and phrases they have written.

Popcorn: With the popcorn method, people share ideas simultaneously—typically verbally. After everyone has a minute to think about the prompt, invite them to call out their ideas or build on others.

Rapid ideation: Rapid ideation is a method to generate a lot of ideas without thinking too much about them, or trying to evaluate or improve them. Set a timer and ask everyone to write down as many ideas as they can in three to five minutes.

Crazy eights: This activity is a version of rapid ideation. Ask each person to fold a piece of paper three times (twice in one direction and once in the other) to create eight equal rectangular spaces. Give people one minute to brainstorm an idea in one of the rectangles. After that minute is up, ask them to move to the next space on their paper and brainstorm another idea for one minute. After eight minutes everyone should have eight new ideas.

Brainwriting: Brainwriting gives the team the opportunity to build on each other's ideas. Give each team member an index card, then ask them to write an idea on their card within two minutes. Then ask each team member to pass their card to the person next to them (a variation is to shuffle all the cards and redistribute them). Each person then adds to or comments on the idea on the card they received. Repeat this two or three times.

Refine and synthesize

Ideation often results in a lot of ideas—some very similar to each other, and many rough or underdeveloped. The refine and synthesize process provides an opportunity to combine ideas, build on them a little, and start filling in the details. Starting with the list of ideas generated, decide as a team which represent ideas that are conceptually congruent enough that they can be combined. Incorporate aspects of those designs, as well as other ideas that complement and build on each other. Discuss which ideas people are excited about or want to explore more (see Evaluate ideas below). Break into pairs or small groups and begin to flesh out the ideas.

Evaluate ideas

Once your team has refined and synthesized some ideas, consider which to move forward. Try not to select a single idea right away. Instead, identify a few with potential—the top three, for example—and see how those evolve as the process continues. Early in the development process, evaluation can be a little more subjective and 'loose,' using activities such as dot polling to get a sense of where the energy is. Later, as concepts become more refined, it is essential to apply the criteria for a successful experience and consider the goals for the project.

These are some activities the OMSI team has used to evaluate or filter ideas.

Dot polling: This is a straightforward process that allows people to indicate their preferred ideas using a set number of dot stickers. Ideas or sketches can be presented on chart paper, on a table, or in a slide deck. Ask participants to put dots on the ideas they think are most likely to achieve the expected criteria. You can allow people to put more than one dot on an idea they feel is particularly good. As you facilitate, you can explain that the dots will inform discussion, rather than serve as the basis for a decision based on the highest numbers. They create more of a heat map than a vote.

Consensus: This is a group discussion activity during which team members advocate for and raise concerns about different ideas. Continue the discussion until everyone can agree on a set of ideas to move forward.

Traffic light: To begin this activity, present all the ideas in a shared space. Give participants green, yellow and red sticky notes. Ask them to write pros of an idea on green notes, concerns on yellow notes, and cons, or 'deal killers,' on red notes. The result is a color-coded visualization of which ideas have promise. Instead of colored papers, you can also use a numerical rating.

Experience mapping: This activity allows the team to consider each idea with respect to the goals and criteria identified for the experience. You can create Venn diagrams or a set of ratings to see the strengths and weaknesses of each idea. This method works well for larger projects with multiple experiences as it can help the team visualize a possible overall or cumulative experience, and can show how different components of an experience can complement each other.

The example below shows a Venn diagram with overlap between Learning Goals, Cost and Fun (Figure 1).

Figure 1: Annotated Component Characteristic Venn Diagram.

Each person on the team used digital sticky notes to indicate where they thought each exhibit idea fit (Figure 2).

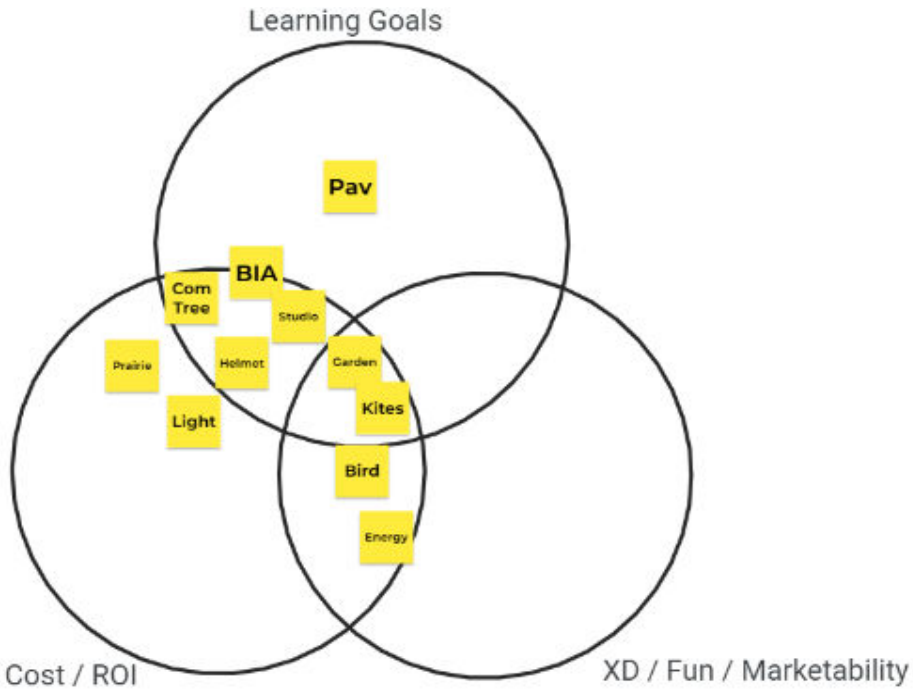


Figure 2: One team member's placement for exhibit components on the diagram.

The team looked across slides from everyone and discussed whether those most frequently seen near the middle of the diagram were the most desirable and why; they also discussed if or how ideas in the outer areas could be improved to move them toward the center.

Vet with larger team/audiences

Once your team has a few ideas that show promise, take them to a wider audience for input. Loop in project leaders and decision makers, target audiences, and stakeholders to hear their thoughts on the concepts you have imagined and also to provide input on what's missing. Provide refined sketches, brief descriptions, and alignment to criteria to help audiences assess the ideas and provide feedback. Figure 3 shows slides for one component with a brief description, sketch, photographs of prototypes and exhibit criteria ratings.

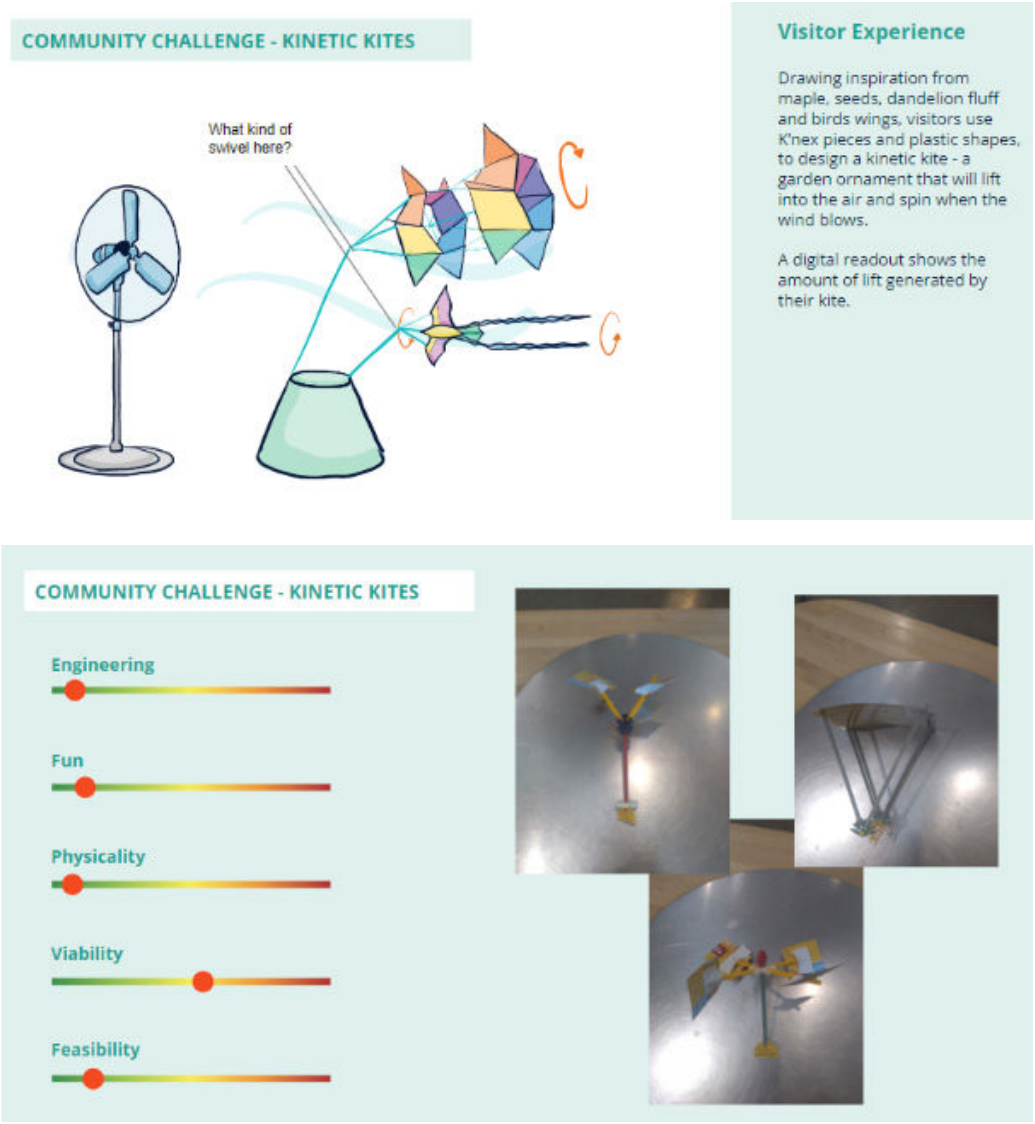


Figure 3: "Kinetic Kites" review slides.

Tips and Advice

Set expectations: Let everyone know what will happen during the design sprint, what they will do and how they can prepare. Make the goal of the sprint very clear to participants. The fewer surprises, the more productive people will be.

Be prepared: Gather the materials you will need ahead of time. Whether it is paper and markers, or a slide deck— you don't want to scramble for materials at the last minute. Set an agenda and designate the time you have for each activity. Have background resources available and/or send them out to participants a day or two before the meeting.

Be flexible: Let the creative energy lead the group (within reason), and don't let an agenda keep the team from making progress. Some things will take longer than expected and certain activities may not work at all. Don't let that stop you. Keep the overall goals in mind and keep moving forward.

Don't overdo: Limit design sprints to two hours at a time and take breaks. OMSI recommends a 5 to 10 minute break for every hour of work time. Consider a multi-part sprint. A two-part sprint with one day in between can help people look at their ideas with fresh eyes without forgetting them.

Have fun: A spirit of excitement, enthusiasm and wonder is great for creativity. Be a little silly or over the top. As Albert Einstein said: "Creativity is intelligence having fun."

Challenge Sketch Sheet

Title

What is the problem the visitor is challenged to solve?

What aspects of their design can be varied or adjusted?

How will visitors test their design?

how do visitors gauge if their design is successful or not?

What natural function could visitors mimic?

Notes / Comments

Exhibit Sketch

Prompts Grid

General Prompt: How might we…	
Players	Variables

Refined Prompts

Challenge Grid

General Prompt: How might we…	
Players	Variables

Refined Prompts