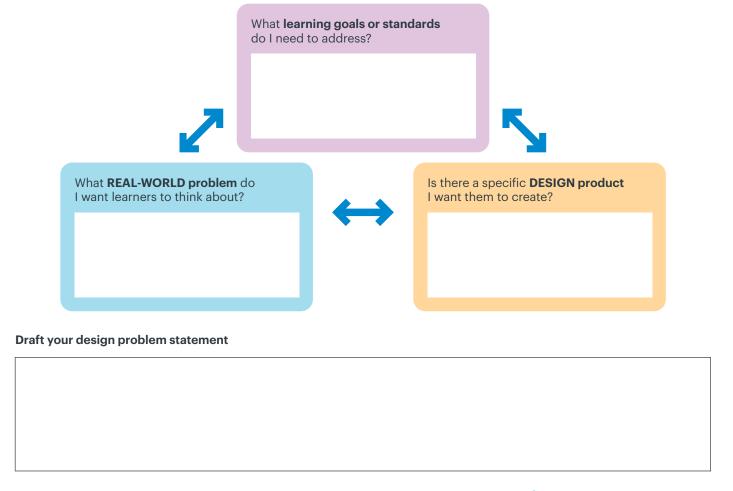


### 1 Developing your Design Problem

**Reflect** on your learners and setting.

| Learners | <ul> <li>Areas of strength</li> <li>Areas of interest</li> <li>Areas for growth</li> </ul>  |
|----------|---|
| Setting  | <ul> <li>Learning goals and standards</li> <li>Additional program/organizational goals</li> <li>Allotted time</li> <li>Opportunities for connecting to curriculum or current projects</li> <li>Constraints</li> </ul> |

Brainstorm what will influence your design challenge and develop your design problem statement.





| _ |       |           |                        |         |         |
|---|-------|-----------|------------------------|---------|---------|
|   | 74064 | Critoria  | <b>Constraints and</b> | Tooting | Mothodo |
|   | Jrail | Criteria. | Constraints and        | resuma  | wemous  |

Criteria (determines success of the design, ex: holds 3 passengers)

Constraints (design limitations, ex: can only be 3 inches tall)

Double check that your design problem aligns with the four key elements:



Solvable by multiple solutions



Opportunity for iteration



Participant interest



Real-world/career connections

#### **Testing methods**

Where and how will students test their solutions?

What data or feedback will students collect? When and how will students collect it?

Do you need to build a 'test rig'? Or develop a mechanism for getting students feedback? If so, plan them here.

Materials for Engineering Design Challenge (What categories of materials and specific items will learners need?)

| Category                      |  |  |
|-------------------------------|--|--|
| List<br>items per<br>category |  |  |



### Materials management strategies

#### **Resource type**

|               | Details | Notes |
|---------------|---------|-------|
| Media         |         |       |
| Technology    |         |       |
| Expert guests |         |       |



### **3** Test your Design Challenge and Iterate

| Test that:   | Take note of:   |
|--|---|
| <ul> <li>The design problem is clear.</li> <li>Materials allow for multiple ways to solve the problem.</li> <li>Materials provide an appropriate level of difficulty for the participants.</li> <li>Testing procedure generates useful data for iteration.</li> <li>Testing procedure is accessible for all participants.</li> </ul> | Length of time it takes to build and test. (This will help inform your lesson flow.)  Is your test group engaged?  What questions arise as people do the challenge? |
| Testing notes:   |   |

#### **Revise**

Check back on your initial thoughts on the goals for your learners and setting.

Are you meeting those goals?

Do you need to adjust any aspects of your challenge?



## **4** Create your Lesson Flow

| Use your own planning tools to draft a lesson. Try to include:  |
|---|
| Introduce the Challenge   |
| • Frame   |
| <ul> <li>Define the Problem</li> <li>Criteria and Constraints</li> </ul>                                      |
| Brainstorming   |
| Prototyping: Create, Test and Reflect (timing and structure for building, testing and iterating)              |
| Sharing Solutions (timing and format for sharing design products and process)                                 |
| Assessment  |
|   |
| Consider student group size and processes. Recommendations: Groups of 2-4 students for engineering challenges |
| and 4-6 students for systems challenges.  |
| For sample design challenges and problems see the following lessons:  |
| Solve the Fall - Engineering Design Challenge   |
| <u>Vaccine Distribution Challenge</u> - Systems Design Challenge  |
|   |
| 5 Do the Challenge!   |
| Record how it went! What went well? What would you adjust?  |
|   |
|   |
|   |
|   |
|   |
| Share out   |
| Share your process and successes with others in person or via social media                                    |