

1. Brainstorm a lesson idea.

- **Standards.** What do you want students to be able to do after completing this lesson/unit?
- **Problem/Need Statement.** What is a real-world problem/need students could solve/meet by developing/improving an object, tool, or process using the knowledge and skills listed in the standards you identified? WHO needs WHAT because WHY? Is the problem open-ended? Who is the client? Who is the user?
- **Criteria.** What are the measurable attributes that will let students know if their model/prototype/process is successful?
- **Constraints.** What limits do the problem, client, and user put on the design?
- **Model/Prototype/Process.** What artifact(s) will students create to test their solution to the problem?
- **Materials.** What materials will be provided to students to solve the problem?

2. Create a lesson sketch.

- **What's the Problem?** How will the client communicate his/her problem or need? What experience(s) will I provide my students to practice key science/mathematical knowledge/skills or to introduce a new practice/tool? How will I connect this/these experience(s) to informational texts?
- **Plan Ways to Solve the Problem.** What data/information do students need in order to make thoughtful design choices? What hands-on investigations will I provide students to collect the data they need? How will I support individuals/teams that get stuck during brainstorming and planning? What information do I want students to include in their plan? Are there multiple reasonable solutions? Are there tradeoffs students will have to consider?
- **Make a Model/Prototype/Process.** Attempt constructing several solutions. How long does it take to construct a model/prototype/process? Does the material list, criteria, or constraints need to be adjusted? Are there things you could prep to save time but not take away from the open-endedness of the problem? How will you distribute the materials?
- **Test the Model/Prototype/Process.** How will students test their model/prototype/process? Is it feasible to have everyone test at the same time? Will you need to move to another location for testing? Do the materials selected create (quantitative and qualitative) data that students can use to make design choices?
- **Think and Plan Again.** How will you support students in analyzing their individual and class test results and making claims? What format will you ask students to share their results? Will you allow students time to improve their plan, improve their model/prototype/process, and/or retest?
- **Ask Yourself:** Where will students record their observations, plans, findings, etc.? How will you group students throughout the lesson/unit? Are there any potential safety issues? How and when will you assess students and provide feedback?

3. Write your lesson plan.