Lift-Off

Energy

Objectives

You will be able to

- Explain how a flashlight is a system.
- Design, build, and create a model of a working flashlight.
- Create a model of an electrical system.
- Give reasons for your design suggestions.
- Communicate your ideas and listen actively.

How do we use and control thermal energy in a system?

Evaluation and Feedback

To evaluate your work, you will

- Use the "Developing and Using Models" row of the Science and Engineering Practices Rubric.

Lift-Off Task
Build a Working System

As a group:

- Gather your materials.
- Brainstorm (share ideas for) a definition of a system.
- Build a working flashlight.
- Draw a model of your flashlight system.
- Revise your model using different flashlight requirements.
- Discuss the group questions.

Vocabulary

- collection
- construct
- design
- energy
- function
- model
- system

Connect to the Culminating Project

- Read the letter from the president of TET, the client list, and the criteria for the project.
- Choose a client.
- Individually complete the Lift-Off Task section in your Individual Project Organizer.

Part I • Introduction to Systems

Whole-Class Discussion

1. Brainstorm how you would define a system.
2. What is the difference between a collection and a system?

Part II • Build a Flashlight

1. As a group, use the provided materials to construct a working flashlight.
2. Create and draw a **model** of your flashlight system in the box below. **Label** the parts of your model.

3. Draw your group's final model design in your science notebook.

4. Select one of the following ways to improve your flashlight:

   - ❑ Make the light brighter.
   - ❑ Make an on/off switch.
   - ❑ Create a flashlight that works without batteries.

   a. **What** changes would you make?
   b. **Why** did you make each change?
   c. **Draw** your new model in your science notebook to represent the changes you made.

Part III • Debrief the Flashlight System

Group Discussion

1. How is the flashlight a system?
2. What are all the parts of the flashlight system?

Part IV • Connect to the Culminating Project and Assessment

Complete the Individual Project Organizer for this task.