Lesson Overview

In this lesson, students present their first draft apparatus to representatives from Soft Landing Systems (community volunteers) and receive important feedback from volunteers and classmates. As students present their apparatus, they must present an argument based on evidence for why their design is safe, cost-effective, and reliable. Students can use this feedback to make adjustments and improvements to their model prior to testing in the next lesson.

Connecting to the Next Generation Science Standards

On Day 8, students demonstrate understanding of the performance expectations and three dimensions developed throughout the entire module. These lessons serve as a performance assessment in which all of the performance expectations and dimensions are addressed in the final presentation. Revisit the performance expectations, disciplinary core ideas, science and engineering practices, and crosscutting concepts referenced in this module’s front matter. In addition, students dive more deeply into the engineering design performance expectations interwoven throughout the module.

Basic Teacher Preparation

In today’s lesson, students receive feedback from representatives from Soft Landing Systems and from their classmates. Recruit volunteer community members to serve as representatives from Soft Landing Systems. Train observers to ask probing questions while students are presenting.

Refer to the Soft Landing Student Handbook ahead of time so you can address any questions students might have. All documents for this lesson can be found on pages 3–7 and 19–21 in the Soft Landing Student Handbook. The documents used in this lesson are:

- Student Reflections and New Questions (page 3)
- Soft Landing Design Problem (pages 4–6)
- KLEWS Chart (page 7)
- Presentation Rubric (pages 19 and 20)
- Apparatus Feedback Reflection (page 21)
### Required Preparation

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<th>Required Preparation</th>
<th>Links/Additional Information</th>
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<tr>
<td>Review suggested teacher preparation resources</td>
<td>Refer to the Suggested Teacher Resources section at the end of this lesson</td>
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<tr>
<td>Recruit community volunteers to serve as representatives from <em>Soft Landing Systems</em></td>
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### Materials List

No additional materials are needed for this lesson.
Day 8: Feedback

Introduction (15 minutes)

Today, students present their apparatus to representatives from Soft Landing Systems (community volunteers) and their classmates. Students are expected to present an argument for why they believe their astronaut will survive and why the testing apparatus is safe, cost-effective, and reliable. All arguments should be grounded in evidence and should include some explanation of the science ideas involved.

After students present their arguments, their classmates and representatives from Soft Landing Systems provide feedback. Explain to the class that in engineering settings, engineers often get feedback from their teammates and other stakeholders to ensure they are creating high quality projects.

Allow students several minutes to prepare their arguments. Students should not need a great deal of time to prepare their arguments if they have adequately justified design decisions and revisions over the course of Days 5 through 7.

Design Work: Team Presentations (15 minutes)

In small groups or as a whole class (depending on the number of community volunteers and time constraints), have students present their arguments for why the astronaut will survive and why they believe their testing apparatus is safe, cost-effective, and reliable. Arguments should be grounded in evidence and should incorporate key science ideas. Consider having students and community partners use the presentation rubric on pages 19 and 20 in the Soft Landing Student Handbook to evaluate presenting groups.

After presenting, representatives from Soft Landing Systems (community volunteers) and classmates should ask probing questions and provide feedback.

Design Work: Revising the Apparatus (15 minutes)

Have the teams discuss the feedback they received. After teams receive feedback, they should complete the Apparatus Feedback Reflection on page 21 in the Soft Landing Student Handbook.

Instruct teams to start making any desired changes. Teams will have 10 minutes at the beginning of the next lesson to finish making any changes.
Student Reflection (5 minutes)

Refer students to the growing KLEWS Chart, and ask them to add to any of the columns.

Have students write a reflection in their science notebooks or on Day 8 in Student Reflections and New Questions. Possible questions to address include:

- What was challenging about today?
- What are you going to do tonight to ensure your team is on track to be done by Day 9?

Homework

Ask students to think about ways to modify their apparatus and how they plan to use their ideas to guide their team on Day 9.

Assessment

Several opportunities for formative assessment exist in this lesson:

- Use the KLEWS Chart gather data to determine student progress.
- Listen to or record student presentations. Use the content of student presentations to gage student progress on core disciplinary ideas, science and engineering practices, and crosscutting concepts. Consider using the Presentation Rubric on pages 19 and 20 in the Soft Landing Student Handbook and in Appendix D.
- Use the Apparatus Feedback Reflection form on page 21 in the Soft Landing Student Handbook to monitor student reflections after feedback sessions.

Use the identified assessment opportunities to monitor student progress on disciplinary core ideas, science and engineering practices, and crosscutting concepts. Provide appropriate supports or extensions when necessary. Reference Appendix B for suggestions for meeting the needs of all learners.

Community Connections

This lesson relies heavily on community involvement. Invite community volunteers to serve as representatives from Soft Landing Systems. Community volunteers should be prepared to listen to student arguments, ask probing questions, and provide feedback.
### Suggested Teacher Resources

<table>
<thead>
<tr>
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<tr>
<td>KLEWS Chart</td>
<td>Ongoing from earlier lessons</td>
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<tr>
<td>Meeting the Needs of All Learners</td>
<td>Soft Landing Teacher Handbook, Appendix B</td>
</tr>
<tr>
<td>Presentation Rubric</td>
<td>Soft Landing Teacher Handbook, Appendix D</td>
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