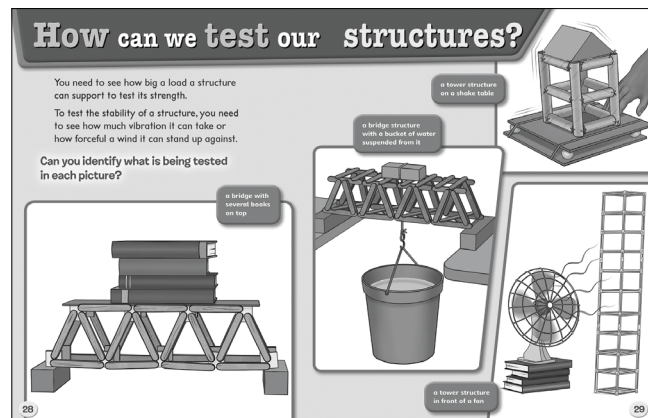


How Can We Test Our Structures?



Focus: Students test and evaluate their structures for strength and stability.

Specific Curriculum Outcomes

Students will be expected to:

- 33.0 test the strength and stability of personally built structures [GCO 1/3]
- 34.0 pose new questions that arise from what was learned [GCO 2]
- 35.0 compare and evaluate personally constructed objects [GCO 2]

Performance Indicators

Students who achieve these outcomes will be able to:

- establish testing criteria for their structure
- evaluate and modify their structure
- give useful feedback to others

NOTES:

Attitude Outcome Statements

Encourage students to:

- be open-minded in their explorations and investigations [GCO 4]
- be sensitive to the needs of other people, other living things, and the local environment [GCO 4]

Cross-Curricular Connections

English Language Arts

Students will be expected to:

- interact with sensitivity and respect, considering the situation, audience, and purpose [GCO 3]
- create texts collaboratively and independently, using a variety of forms for a range of audiences and purposes [GCO 9]

Getting Organized

Components	Materials	Before You Begin	Vocabulary
• Student Magazine pages 28–29 • BLM <i>TAG Feedback</i> (1 per group)	• students' Science Journals • binder covers or squares of plywood (2 per group) • large elastic bands (2 per group) • same-sized large marbles or small balls (4 per group) • poster-making materials		

Science Background

- The ability of a structure to carry a load and maintain stability depends on its design, its materials, and its joints.

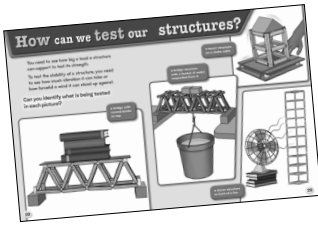
ACTIVATE

Bridge-Building Contest Video

Remind students that the structures they are building need to be strong and stable. Tell them you are going to show a video about a bridge-building contest. One of the ways the bridges are evaluated is to see how much of a load can be held in a bucket suspended from the bridge. Show students the second half of the video (beginning at about 4:00 minutes) at https://www.youtube.com/watch?v=clHqbMBdn_E. This section shows several structures that fail the load-bearing test. You can stop the video at various points to discuss what part of each structure failed.

Note: You may wish to mute or lower the volume on the video.

CONNECT



Testing Structures

Have students look at the illustrations on pages 28–29 of the Student Magazine and read the text. Discuss the methods of testing shown, and which types of structures they are best suited for.

Tell students that they will now work in their groups to decide how they will test the strength and stability of their own structures. Allow time for groups to decide on their method of testing. Ideas may include any of the methods shown on pages 28–29 of the magazine.

CONSOLIDATE

Build a Structure (continued)

Step 3: Test your solution. Evaluate your solution.

Groups continue to follow the design process by testing, evaluating, and modifying their structure as necessary. Encourage students to test their structure to the point of breaking so that they have an opportunity to consider how to modify and improve it. Prompts for discussion might include:

- Did your structure work the way you intended?
- Did your structure perform as well as you planned?
- Are there things you could do better?



Make sure students are taking notes on their actions and observations in their Science Journals. Encourage students to add any new questions to the I Wonder Wall.

Shake Tables

Groups may choose to build a simple “shake table” to test the stability of their structure. Students place two same-sized boards or binder covers on top of one another. Then they stretch a large elastic band over each end, about 2 cm from the edges. Students can then carefully insert a large marble or small ball between the boards in each corner, about 2.5 cm from the edge. Encourage students to refer to the illustrated shake table on page 29 of the Student Magazine as they build their own.

If students need more help building their shake table, see the video at <http://www.raftbayarea.org/ideas/Shake%20Table.pdf#> for a demonstration.

Gallery Walk

Near the end of class time, have students do a Gallery Walk to examine the ongoing work of other groups. Each group should travel together, moving clockwise around the room. At its first stop, have each group fill out a copy of BLM *TAG Feedback* (Tell the group something good, Ask the group a question, Give the group a way to improve the structure) and leave the completed sheet for the designers. Have each group give you the feedback sheet that was left for their structure before they leave the class.

A form titled "TAG Feedback" with three sections: "Tell the group something you like about their structure", "Ask the group a question about their structure", and "Give the group a way to improve their structure". Each section has lines for writing.

EXPLORE MORE

Safety Poster

Students can create a safety poster outlining the safety procedures and rules they followed for the design challenge. The completed posters can be displayed within the classroom.

TAG Feedback

Name: _____

T = Tell the group something you like about the structure.

A = Ask the group a question about the structure.

G = Give the group a way to make the structure better.
