

Beams

Materials

Two computers with SAM animation

Box of LEGO bricks

LEGO string or some other kind of string

Weighted LEGO bricks or hanging weights(these work better)

Problem

Students need to build a beam that spans two desks and can support 200g from a string at its' center.

As a demonstration at the beginning, have two volunteers stand arms length apart at the front with their arms together, mimicking the beam. We then asked the students where the weakest point was because that is the point that you should test. This demonstrates why we were testing the center of the beam with the weights. We pushed closed to their shoulders and the "beam" did not bend much but when we pushed near their hands, the "beam" broke.

Procedure

Present students with the problem. Then set up the computers with the SAM animation on the desks so that it displayed a horizontal view of the beams. As students finish building their beams, they line up to test the weights. As each weight is added, SAM animation was activated to capture the potential breaking point of the beams. Set SAM to the most rapid picture taking setting possible. If the beam does not break add more weight in 50g increments. If the beam breaks, play back SAM animation and pause to highlight the breaking point. Then have students make note of the breaking point in their design and ask how they can strengthen that point. If time permits have students redesign and retest.