

Human Arch



Grade Level

Grades 5 and up

Materials

Five students and a little floor space

Time

10 minutes

Discussion

Ask the group to describe what an arch looks like. (They may say a curve or rainbow.) See if they can site examples of arches in your community. If not, try to mention something very recognizable. Ask what

they think holds up the arch. Explain that this activity explores how arches work.

During the activity introduce the terms force (a push or pull on an object) and compression (a squeezing force pushing the material together.)

Activity

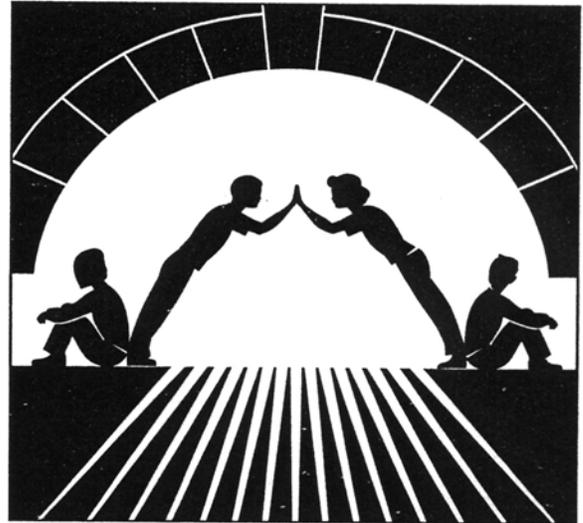
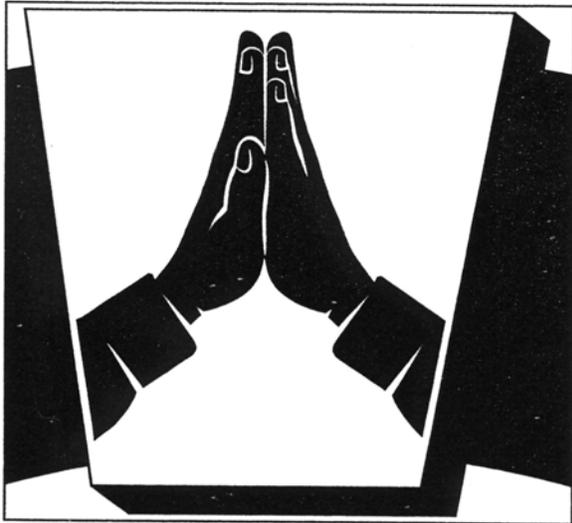
1. Have two students form an arch by placing their palms together and leaning toward each other, sliding their feet back as far as they can.

2. Ask the arch-makers where they feel pushing or pulling (the hands). Ask

what would happen if they stopped pushing. (Without compression the arch would collapse.)

3. Have a third student gently pull down on the arch-makers' arms to test the strength of the arch. Ask: How difficult is it to break the arch? Where does the arch need support?

4. Ask two more students to join the arch. Invite the group to brainstorm ways for the two new members to make the arch stronger. Test each suggestion with the same person pulling down each time. Ask: Is it easier or harder to break the arch this time?



Additional Challenges

Ask why it is important to have the same person pull on the arch each time. (This gives a "fair test" by making sure the same pull is used and the same person judges how hard it is to break the arch each time.)

Have students suggest and carry out follow-up investigations such as testing the effect of an arch's width on its strength.

Credits

Excerpted from *Building Big Activity Guide*. *Building Big* is a PBS television series exploring the world's greatest engineering feats. For other activities visit pbs.org/buildingbig. Funded by The National Science Foundation, National Endowment for the Humanities, The Arthur Vining Davis Foundations, the Corporation for Public Broadcasting, public television viewers, the American Society of Civil Engineers and Siemens.