

# BUILDING BIG

Structures have parts  
that interrelate.

Parts of structures support  
and are supported by  
other parts.

Smaller structures may  
be combined to form  
larger structures.

**A structure is no  
stronger than its  
weakest component.**



**A CHAIN IS ONLY AS STRONG AS ITS  
WEAKEST LINK.**

**A STRUCTURE IS NO STRONGER  
THAN ITS WEAKEST COMPONENT.**

TURN <sup>and</sup> TALK

LOOK at your partner

LISTEN to their words

SPEAK so only your partner can hear

TURN back to the front when done

WAIT quietly



**A STRUCTURE IS NO STRONGER THAN ITS WEAKEST COMPONENT.**

# LOMA PRIETA EARTHQUAKE STRIKES



At 5:04 p.m. on October 17, 1989, a 7.1-magnitude earthquake struck the Bay Area. The upper deck at pier E9 on the Bay Bridge failed and crashed into the lower deck, also causing the lower deck to fail. The suspension bridge on the West Span is inherently more flexible and was able to withstand the earthquake. **It was the rigid structure of the truss bridge on the East Span that made it more susceptible to failure.**

# SAN FRANCISCO-OAKLAND BAY BRIDGE CORRIDOR OVERVIEW

“The seismic retrofit of the San Francisco-Oakland Bay Bridge is more than an upgrade to one of the country’s busiest bridges; it is an epic transformation into a global icon, featuring some of the most cutting-edge and innovative engineering, construction and seismic technology.”



# ELABORATE & EXTEND

## The DESIGN Process

**ASK**

What are some problems you might encounter with this challenge? What are your constraints?

**IMAGINE**

What are some possible solutions? Brainstorm a list of ideas and choose the best one.

**PLAN**

Draw a diagram on a separate sheet of paper and make a list of the steps you will take.

**CREATE**

Follow your plan to build your structure. Test and revise as needed.

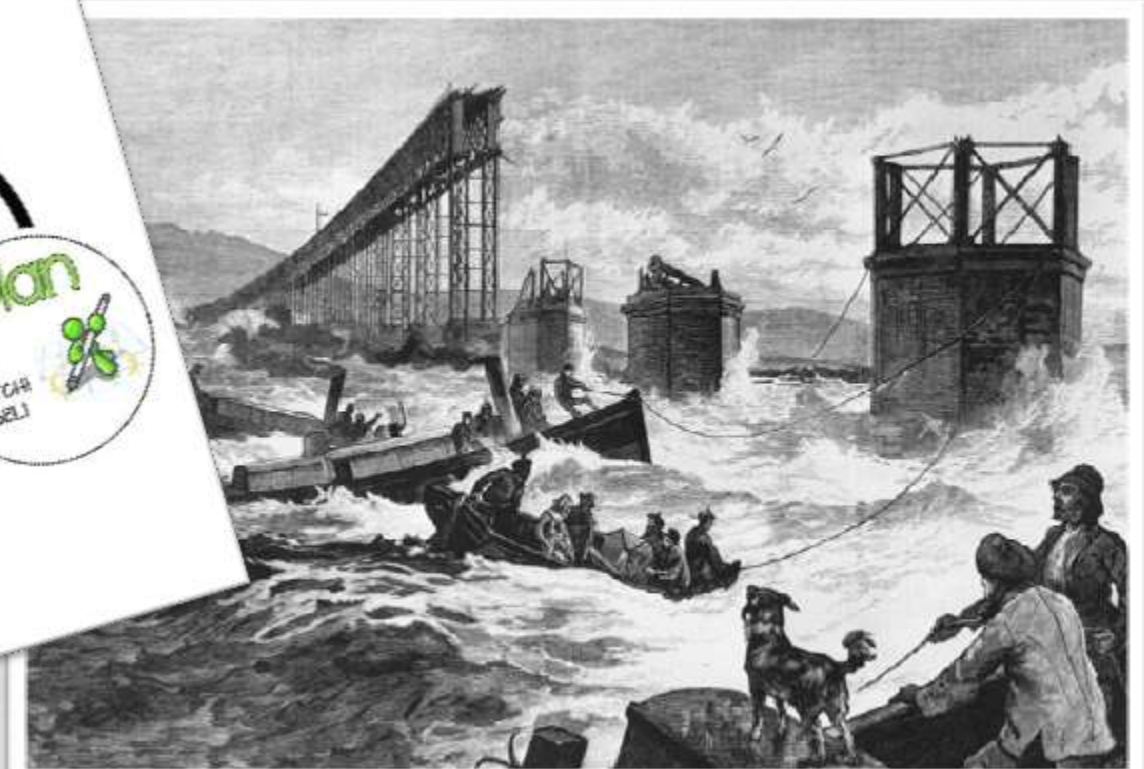
**IMPROVE**

What worked and what didn't work? How did you have to modify your design to make it better?

# WRAP-IT UP!

## TAY BRIDGE IN SCOTLAND

- **The Tay Bridge Disaster**
- Bridge Design failure: choice of materials (cast iron and wrought iron) & depth of bedrock
- Redesigned: Longer spans (less piers) and different material (steel)





# WRAP-IT UP!

## IRON TRUSS BRIDGE IN WEST MABOU



Thinking like an engineer, how would you approach the design process?



# CREDITS

- <http://www.baybridgeinfo.org/baybridge360>
- <http://www.baybridgeinfo.org/timeline#c1989>
- <http://www.siyavula.com/gr7-9-websites/technology/gr9/g9-technology-04.html>
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