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Activities

Galloping Gertie

Name: _____ Date: _____

The collapse of "Galloping Gertie" (the Tacoma Narrows Bridge) in 1940 was a spectacualar example of wave resonance. In this Planet Diary activity, you'll find out how it led to the collapse. Then you'll explore other examples of resonance.

Directions

- Why did the bridge collapse? Go to Why the Bridges Failed to find out. Click *Launch Interactive*. advance to slide 3 *Tacoma Narrows Bridge* and read the information. Answer Workspace question 1.
- The collapse of the bridge is one example of the concept of resonance, in which wave energy adds together and builds up. Pushing someone on a swing is another example. Scroll to the three animations and read the captions. Use the information to answer questions 2 through 4.
- Resonance can also shatter a wine glass. Watch the three views of the glass breaking, then read the explanation. Answer the last question.
- Experiment with waves at Resonata: A Wave Machine. You can make resonance by selecting *First Harmonic*. Let the animaton build. With the first harmonic, the wave crests line up and the oscillation grows. (See the connection to Galloping Gertie?) Try other harmonics to make other patterns.

Workspace

1. Explain why the bridge collapsed.

2. What does resonant frequency mean?

3. What happens when pushes are "in synch" with a swing's resonant frequency?

4. How is the swing situation similar to what happened to Galloping Gertie?

5. Hows does resonant frequency help explain why the glass shatters?

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