613-0005 (55-110) Resonance Demonstrator

Introduction: What is resonance? In physics, resonance is the tendency for materials to oscillate at maximum amplitude at certain frequencies. In other words, under the right conditions, materials will vibrate at their maximum rate. A simple and familiar example of this is a common playground swing. If you were to push a person on the swing in time with the natural interval, the swing would go higher and faster. This is because you are adding energy at the 'resonance frequency' of the swing. Push at a faster or slower rate than the swing, and you will cause it to slow. This is because the pushes are out of 'phase' with the motion of the swing, causing interference and robbing the system of energy.

Description: Our set provides a simple and fun demonstration of resonance. The device consists of an aluminum tube bolted to a steel base. Attached to the tube are six spring steel rod in three lengths, with an equal brass weight on the end of each. They are arranged with the shorter rods near the center and the longer rods on the outside.

Operation: this set is easy to use. Start by selecting one of the rods. Gently pull it back and release it. It will oscillate back and forth. Interestingly, the other rod of this length will also move. The other four rods will remain still. After the first two rods have stopped, try this experiment with the other rod lengths. They will exhibit the same behavior. What is going on?

Explanation: to explain this, reexamine the concepts of resonance. In physics, resonance is the tendency of materials to oscillate at their maximum amplitude when exposed to certain frequencies. Each of the bars in our set has a different resonance value, because they are of different lengths. When one bar is made to oscillate, it produces a certain frequency which is carried along the aluminum tube. Any bar with a resonance frequency equal to this will oscillate as well. This is what causes the bar of the same length to move as well. The other bars are unaffected by this frequency because they are of different lengths, and thus require different frequencies to resonate.

Warranty and Parts:
We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.

Other Science First Products

613-0000 Resonance Apparatus: A tuning fork of known frequency is made to vibrate at the mouth of a vertical column of air. The column of air is located in a clear graduated tube that is partially filled with water. The length of the air column is adjusted by regulating the water level in the tube until the column of air resonates with the same frequency as the sounded tuning fork. By locating several resonance positions and measuring their average distance apart, it is possible to compute the wavelength of sound in air, as well as its velocity.

613-0030 Tuning Fork set/8: Aluminum, 256 C, 288 D, 320 E, 341 F, 384 G, 440 A, 480 B, and 512 C.

613-0035 5 Frequency Adjustable Tuning Fork: Re-create the C-major tone set with just one tuning fork. Tine markings show where to place weights to match the frequencies of 128C, 144D, 160E, 170.7F and 192G. Aluminum, with weights. 210 mm in length.

613-0110 Sonometer: This is a great introduction to the science of sound. Have your entire class find notes and hear the difference when the length and tension of a string is altered. Includes: sonometer base, 22 cm long; two strings; tension adjusters; three bridges, (one thick and two thin); two spring scales.