



# Classroom Activity

## 10 Big Question: How does the Earth work?

### Resonance Explained

Resonance is the tendency of a system to oscillate with greater amplitude at one frequency more than others. This “preferred” frequency is that systems natural or resonance frequency. In this experiment we observe the natural resonance of two pendulums of differing sizes.

For this activity you will need:

- A block of dry florists’ foam or polystyrene
- Plasticine
- Florists’ wire

1. Roll plasticine into two balls of different sizes.
2. Take two equal lengths of florists’ wire and thread one into the centre of each ball. It’s important to get the wires in the very centre of the balls or the experiment won’t work as well.
3. Spear the other end of each wire into the block of foam so that you have two upright pendulums an equal distance apart. Make sure the balls are approximately the same height.
4. Gently pull the bigger ball back a few centimetres and let it go. Take a note of its frequency of swing. It may help to tap out the rhythm of it on the table.
5. Now gently push the foam block backwards and forwards at the same frequency as the ball’s swing.
6. Repeat for the smaller ball.

When you move the block in time with the frequency of the ball’s swing, what happens? What happens to the other ball? Why?

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**What is happening?**

When you match the natural frequency of the larger ball, the larger ball will move while the smaller one will hardly move at all. The larger ball is resonating because the frequency of motion is the same as its natural frequency. When you match the natural frequency of the smaller ball, the larger ball will hardly move.