This lessons recaps syllabus content about waves, and links this knowledge to seismic waves produced by Earthquakes. Students also learn about seismometers (instruments used to record the motion of the ground caused by earthquake waves) and build their own basic seismometer using cardboard, paper and a pen. An accompanying powerpoint presentation, pupil worksheet and instructions for building the seismometer are included in the lesson 1 resource pack.

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| **Cycle** | **Aims** | **Teacher instructions** | **Pupil focus** | **Timing/ mins** |
| Starter/ recap | - Assess what pupils know/ remember about waves  - Remind pupils of key wave ideas | Begin the lesson with the introductory ppt slide on the board. Reveal the answer.  Split pupils into groups of about 4. Ask them to brainstorm what they remember about waves for up to 5 mins. While they do this, draw two unlabelled waveform diagrams on the whiteboard (amplitude against position and against time). Get the groups to feedback and help label the diagrams. Make sure they have a good understanding of what they already know about waves. Spend about 5 mins on feeding back. If you think they will need a longer refresher on waves this could be done before the lesson in the form of homework, or in a previous lesson. | Recapping and reminding themselves and each other what they already know about waves. | 10 |
| Introducing new ideas | - Introducing students to seismic waves and their properties | Use the ppt slides to present the initial information. Show the video, but only up until 1min30secs, because after this time types of surface waves are discussed. A worksheet with the table for them to fill in can be found with the resources, but to save printing you could get students to draw their own from a template on the board. Watch the short clip of waves on the slinky and get students to tell you which is transverse (S) /longitudinal (P). | Listening to new information, getting information from a video | 5 |
| Activity: Building a seismometer | - Introduce seismometers  - Students build their own cardboard box seismometer and produce a seismogram | Give out or put on the board the instructions which are part of the resource pack. To complete this activity in the time, it is suggested that the boxes are prepared with a viewing hole on one side prior to the lesson. Even more than this could be pre-prepared if necessary, for timings. The materials should be relatively common, but the thin roll of paper may have to be made beforehand but cutting and sticking together normal paper if you can’t get adding machine paper. The dowel should be smooth, for example we used straight metal and glass straws. Un-dried out felt tip pens with lots of ink are best to make sure they leave a mark with light contact. The students can be split into teams depending on the amount of materials you can get, and can have different jobs, like preparing the cup, cutting holes in the box, putting the paper round the dowel and inserting it. Aim for groups of between 3 and 5.  When pulling the paper out, it works best if the roll is oriented as in the diagram, and the paper is pulled out at a slightly upwards angle.  When the seismometers are made, the students can produce their seismograms. How much they get to experiment depends on the length of paper they have, and each time one person pulls out the paper at a constant rate while one gently shakes the seismometer in the direction shown on the diagram. It works well to give a small pulse and see the wave amplitude die out.  If any group finishes early you can ask them to consider how they would improve the design. | Working in a team to build a seismometer out of common materials. A practical activity, solving problems as they come along. Following instructions. When using the seismometer, students experiment and see how the representation of a waveform is related to real observable motion. | 30 |
| Summing up | - Final slide | Show the final slide and ask students to turn to the person next to them and tell them three things they have learned. | Reflecting on what they have learned. Communicating this verbally. | 5 |