

# SEISMIC WAVES

What is inside our Earth? It would make sense to simply say that the rock inside the Earth is exactly the same as the stuff you walked on this morning on your way to school. Scientists study **seismic waves**, which travel through Earth, as a tool to discover what might be hiding beneath our feet. Is the rock exactly the same composition, Density and colors throughout? Or are there differences? Be ready for an AMAZING Journey!

## Task 1 – What are Seismic Waves?

Go to the following link and check out the information on seismic waves. Then, answer the questions.

BBC Animation ([http://www.bbc.co.uk/schools/gcsebitesize/science/edexcel/waves\\_earth/seismicwavesact.shtml](http://www.bbc.co.uk/schools/gcsebitesize/science/edexcel/waves_earth/seismicwavesact.shtml))

1. What is a big difference between the properties of the crust and those of the mantle?
2. Describe the similarities and differences of the inner and outer core.
3. What kind of characteristics does a longitudinal wave have?
4. What is the difference between amplitude and frequency?

Go to the following link to find information about seismic waves. Read the information and play with the animations **on steps 1-5** to learn about seismic waves. Answer the questions on each step (there will be 6 total questions to answer.)

([https://www.classzone.com/books/earth\\_science/terc/content/investigations/es0402/es0402page01.cfm](https://www.classzone.com/books/earth_science/terc/content/investigations/es0402/es0402page01.cfm))

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

## Task 2 – Mapping the Earth’s Interior

Use the amazing book of knowledge (red science textbook) page **172**, to learn a little more about seismic waves and how they help scientists determine what it is like under our feet.

1. What are seismic waves?
2. Depending on the \_\_\_\_\_ and \_\_\_\_\_ of material they pass through, seismic waves travel at \_\_\_\_\_ speeds.
3. How does density affect the speed of the seismic wave?
4. How do scientists calculate the density and thickness of the physical layers?

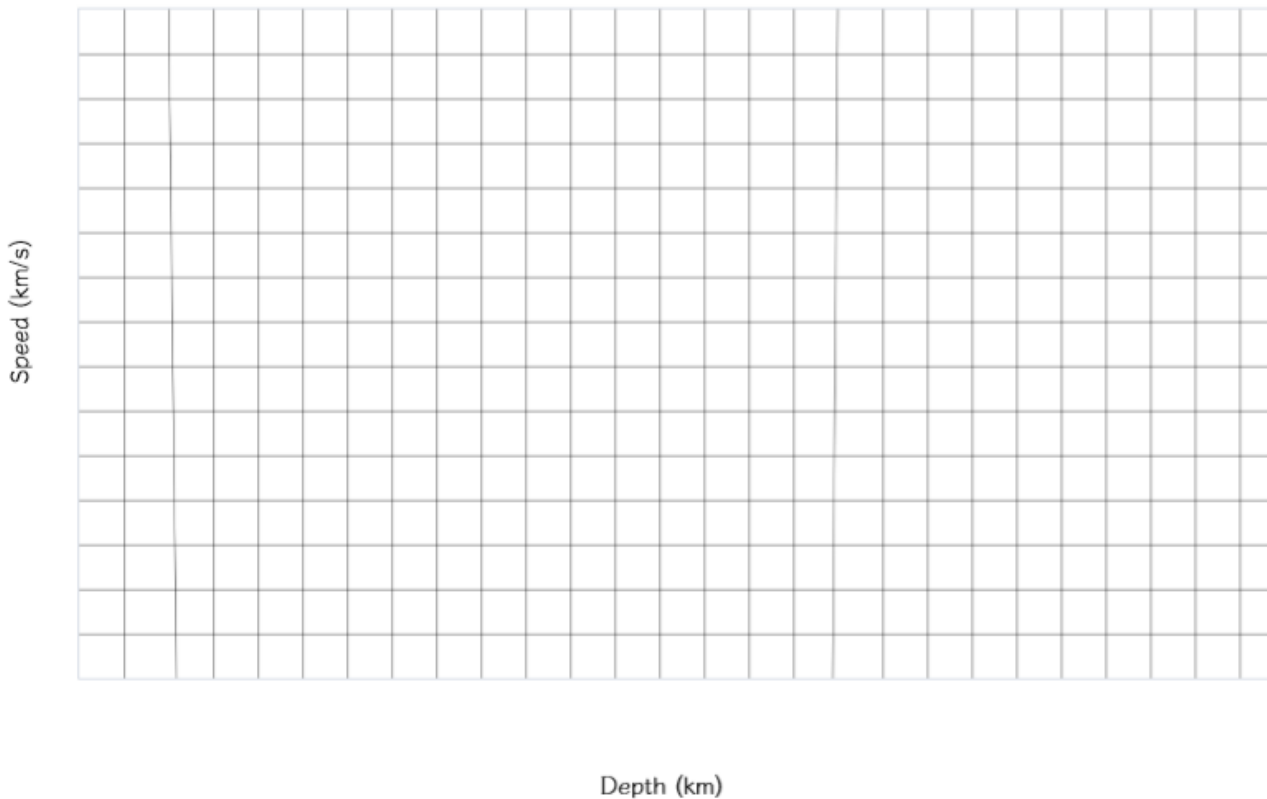
## Task 3 – Graphing Seismic Waves

We know that seismic waves travel about **one km/s** through solid rock. If Earth is made entirely of solid rock with the same density-- seismic waves should travel at a consistent speed through Earth’s interior to its core. Complete the following activity to determine if it is solid rock with the same density or if changes occur.

Wave Type	Depth (km)	Speed (km/s)
P	0	6
P	50	9
P	200	8
P	500	9
P	1000	11
P	2000	13
P	2900	14
P	2950	8
P	4000	9
P	5200	10
P	5250	11
P	5500	11
P	6000	11
P	6400	11

Wave Type	Depth (km)	Speed (km/s)
S	0	3.5
S	50	5
S	200	4
S	500	5
S	1000	6
S	2000	7
S	2900	7.5
S	2950	0
S	4000	0
S	5200	0
S	5250	3.5
S	5500	4
S	6000	4
S	6400	4

### Changes in the Speed of P and S-Waves As Depth Increases



## **ANALYSIS QUESTIONS**

5. Draw two arrows pointing to changes you see on the graph.
6. Describe 2 differences you see on the graph between s- waves and p-waves.
  
7. Describe 2 similarities you see on the graph between s- waves and p-waves
  
8. Did the s-wave and p-wave travel at a constant rate through the Earth's interior? Explain.
  
9. Why do you think the S - Wave disappeared between 3,000 to 5,000 km?
  
10. Write a 3 to 5 sentence summary to explain how this activity shows what it is like inside the Earth?  
Provide details from all three activities to support your answer.