Science

Year 8: Sound

Assessment Opportunities	Literacy/Reading opportunities	CEIAG Links
• Regular low stakes quizzing of AO1- self marked. • In class past paper questions where – self / peer marked • Extended writing is teacher marked with personalised feedback provided. • End of unit assessment self & teacher marked with collective feedback provided.	**Reciprocal reading:** **Key vocab is highlighted in the SOL**	**Spotlight on careers: Sound engineer** Other careers: • Sound technician. • Audio engineer • Production (TV and Film) • DJ/producer

Curriculum vision:

"Our aim is to deliver a curriculum that is inclusive, relevant and progressive for all learners."

- **KS3 Sound**

Big Picture: In this KS3 science unit, we will explore the fascinating world of acoustics, uncovering the secrets of how sound is produced, transmitted, and received. We'll investigate the properties of sound waves, the human ear's anatomy, and the principles behind musical instruments and everyday noises. Through engaging experiments and interactive lessons, you'll gain a deeper understanding of concepts such as frequency, amplitude, and pitch, and see how sound plays a crucial role in our lives.

Lesson sequence	**Learning outcomes / Key knowledge (including NC KS3)** Interleave / review. Scaffold	**Skills development:** Reading / writing / data / numeracy / graph work	**Spec / book reference**
1. **TBAT: Describe wave motion as a way of transferring energy.**	• State that waves transfer energy but not matter. • Describe transverse and longitudinal motion. • Identify the wavelength and amplitude of a wave from a diagram. • Describe wave reflections in terms of wavefronts. • Describe superposition of water waves causing increases and decreases of amplitude. ○ Use visual aids – and pictures to prompt discussion. ○ Provide knowledge organisers / key vocab with definitions.		**Spec NC pos here pg11** **Boost book 2 pg 125-153** **Spec NC pos here pg11** **Boost book 2 pg 125-153**
2. TBAT: Describe how sound is produced and travels	○ State that sound travels through a medium as a longitudinal wave. • Sketch a sound wave pattern. • Identify the wavelength of a sound wave as the distance between compressions. ○ Use visual aids – and pictures to prompt discussion. ○ Provide knowledge organisers / key vocab with definitions.		**Spec NC pos here pg11** **Boost book 2**

	○ Chunked learning with regular tasks between learning.		**pg 125-153**
3. **TBAT: Describe the transmission of a sound wave through a medium.**	○ Compare the speed of sound in a range of media. ○ Describe the motion of individual particles in a longitudinal wave. ○ Link the speed of sound in a medium to the physical properties of the medium. ○ Use of modelled examples ○ EVERY (Equation, Values, Enter, Results, Units) to answer equation based problems	○ **Calculations** ○ **Using and rearranging equations** ○ **Numeracy practice**	**Spec NC pos here pg11** **Boost book 2 pg 125-153**
4. **TBAT: Identify a range of sources of sound.**	○ Describe some sources of sound and state that these sounds are caused by vibrations. ○ State the effects of frequency of vibration on the pitch of a sound. ○ Link the amplitude of vibration with the loudness of the sound. ○ Use visual aids – and pictures to prompt discussion. ○ Provide knowledge organisers / key vocab with definitions. ○ Chunked learning with regular tasks between learning.		**Spec NC pos here pg11** **Boost book 2 pg 125-153**
5. TBAT: Investigate the operation of loudspeakers, microphones and oscilloscopes.	○ Describe the basic functions of a loudspeaker and microphone. ○ Compare waveforms displayed on an oscilloscope. ○ Recall lesson 5 when they used the microphone and what they observed on the oscilloscope. ○ Focus on specific measurements of amplitude, time base, frequency of waveforms. ○ Use visual aids – and pictures to prompt discussion. ○ Provide knowledge organisers / key vocab with definitions. ○ Chunked learning with regular tasks between learning.	○ **Using loudspeakers and oscilloscopes** ○ **Analysing oscilloscope traces** ○ **Practical skills**	**Spec NC pos here pg11** **Boost book 2 pg 125-153**
6. TBAT: Evaluate how	○ Label and describe the operation of key part of the ear.		**Spec NC pos**

sound is detected by the ear.	○ State that noise is unwanted sound ○ Compare noise levels in dB. ○ Calculate corrected sound level values. ○ Give approximations for the hearing range of the human ear (20 Hz to 20kHz). ○ Describe how frequency of human hearing range decreases over time. ○ Explain reduction in sound in terms of loss of energy. ○ Use visual aids – and pictures to prompt discussion. ○ Provide knowledge organisers / key vocab with definitions. ○ Chunked learning with regular tasks between learning.		**here pg11** **Boost book 2 pg 125-153**
7. TBAT: Describe how auditory range changes with age.	○ Compare the auditory range of different animals ○ Graphically represent data on the hearing range od people of different ages. ○ Extrapolate date on a graph to make a prediction ○ Modelling of graph drawing using visualiser ○ Template for graph can be provided.	○ **Graph drawing from a table of data** ○ **Extrapolating data** ○ **Writing conclusions based on data**	**Spec NC pos here pg11** **Boost book 2 pg 125-153**
8. TBAT: Engage with a scientific article.	○ Extract information from a scientific article ○ Use the information to answer questions about the article ○ Reading rulers, tracking as teacher reads ○ Larger text chunked as needed. ○ Modelling highlighting & annotation of text	○ **Reciprocal reading**	**Spec NC pos here pg11** **Boost book 2 pg 125-153**

9. **TBAT: Identify and evaluate the uses of sound and ultrasound (writing task).**	○ List some uses of sound waves. ○ Describe applications of sound waves (including ultrasound). ○ Use sound data to calculate distances. ○ Describe how sound waves transfer energy. ○ Use visual aids – including pictures and examples to prompt discussion about energy stores. ○ Chunked learning with tasks spread throughout the lesson ○ Structure and style or writing task	○ **Planning of extended writing piece** ○ **Extended writing in science** ○ **Using science vocabulary**	**Spec NC pos here pg11** **Boost book 2 pg 125-153**

Vocab				**Links to previous learning / interleaving**	**Assessment & homework**
L3 Vocab Vibration Frequency Amplitude Wavelength Pitch Volume Echo Decibel Oscillation Sound wave	Medium Hertz (Hz) Reflection Absorption Transmission Speed of sound Ultrasound Infrasound Resonance Hearing	**L2 Vocab** Wave sound pitch volume amplitude energy echo reflection frequency	**Command words focus** Label Plot Measure Predict Identify Estimate Observe Justify Evaluate Compare construct	**KS3 light** ○ Transverse and longitudinal waves ○ **KS2** ○ Forces ○ Electricity ○ Magnets	• Regular low stakes quizzing of AO1 • In class assessment of AO1, AO2, AO3 using past paper questions where appropriate • Written word is assessed with personalised feedback provided. • End of unit assessment marked with collective feedback provided. Homework is set weekly and is outlined in the half-termly homework booklet. Homework includes • online quizzes on Carousel • Learning of content for in-class quizzes • Completion of written questions.

Independent learning	Misconceptions / common errors
Waves (youtube.com) Sound (youtube.com) Loudness and Pitch (youtube.com) Detecting sound (The Ear) (youtube.com) Echoes and Ultrasound (youtube.com)	○ Sound Travels Faster in Air than in Water: ○ Sound Cannot Travel Through Solids ○ Sound Travels in a Vacuum ○ Human Hearing Range Covers All Sounds ○ Loudness and Pitch are the Same