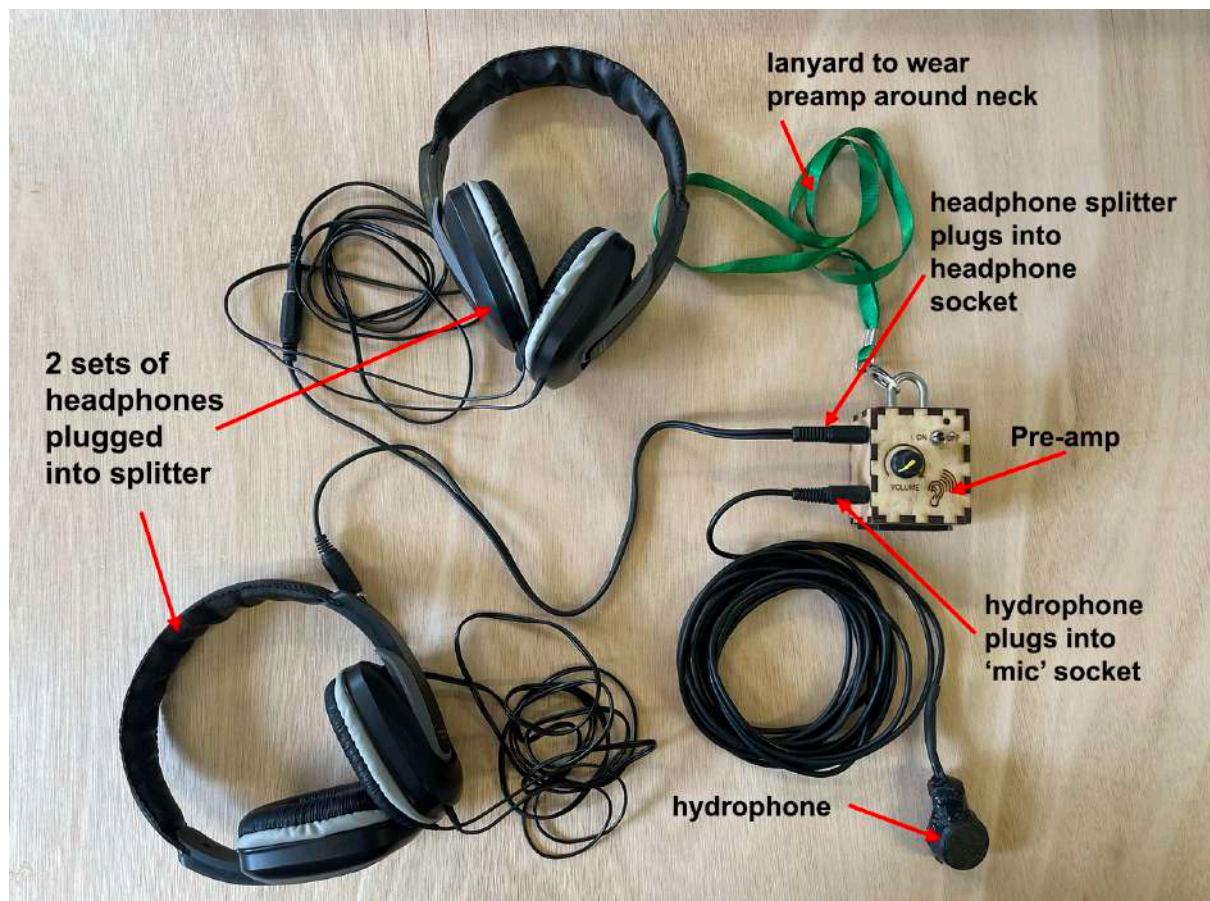


## HEAR WATER : Guide to Listening / recording underwater sounds

### RECORDING UNDERWATER SOUNDS

Each set of equipment is enough for 16 children to explore underwater listening and includes 8 x pre-amps, 16 x pairs of headphones , 8 x headphone splitters, Many hydrophones

Picture of listening equipment below, showing how it is plugged together



Children work in pairs with 2 sets of headphones, a headphone splitter, 1 pre-amp and 1 hydrophone. Help them manage the cables and not get in a tangle. Often it can be a good idea to put the headphone splitter into a pocket so it doesn't trail on the ground. Remind the children they are working as a pair and are 'joined' by some cables.

Before embarking on an underwater listening excursion, check the pre-amp and hydrophone work by switching the pre-amp ON (red light illuminates) then turn up the volume just a LITTLE BIT, then scratch the hydrophone to check there is a sound going to both sets of headphones. After testing, switch off again and TURN VOLUME DOWN FULLY

Warm up with some listening exercises. In pairs ask the children to decide where they want to listen first, and make sure they are in a safe position, and also be able to launch their hydrophone into a stream / river / body of water.

Switch on the pre-amp but leave the volume down. Gently lower, or carefully throw the hydrophone into water. After it is submerged, slowly turn up the volume until it is a comfortable level to listen to the underwater sounds. The hydrophone is very sensitive, so turn the volume DOWN again if you want to move it to a new location.

Encourage the children to listen for a few minutes (or longer) at each location. Ask them to make observations about the kinds of sounds they hear, and to compare the sounds from different locations.

In still water it may be possible to hear creatures. Most underwater creatures are quiet, so encourage the children to be very quiet and to move slowly to be able to turn up the volume and listen to underwater creatures. They also need to be aware of each other and try not to disturb others recording.

In moving water, the sounds will predominantly be the sound of the water moving. The volume level will probably need to be set lower. It is interesting to place the hydrophone in many different locations in moving water to notice the differences. Always fully turn down the volume when moving the hydrophone.

## RECORDING UNDERWATER SOUNDS

When the children have got the hang of listening with the hydrophone and pre-amp, they can take it in turns to make recordings using the TASCAM audio recorder - in place of the pre-amp. The Tascam records onto a microSD card - please put the Micro SD card holder in a safe place.



The Tascam will have a lanyard on it, please wear around neck when using. Keep the tascam in the waterproof case when not using.

The wind-jammer is provided to make it possible to record sounds outdoors using the built in microphones (as well as using the hydrophones).

When the hydrophone is plugged in, the Tascam automatically selects the hydrophone input. When the hydrophone is not plugged in, the Tascam automatically selects the built in microphones.



Switch on with the power button (left picture).



To listen to sounds through the hydrophone, press the red record button once. This sets it to 'PAUSE RECORD'. The right hand red LED will start flashing.

The amplified sounds are now audible, but the Tascam is not yet recording.

This mode makes it possible to SET THE RECORDING LEVELS and make a decision about where to place the hydrophone to make a recording



Set headphone level using + - buttons

Set the hydrophone input recording level using right and left double arrow buttons

When setting the recording input level, watch the left / right fluctuation of the sound level coming in on the display.

Set the level so it reaches about 2 thirds of the way along the display as a maximum. Avoid letting it hit 'peak'. (left LED next to record button)



To record, press the red record button again. The red LED will now stay on and the timer will start counting. To stop recording press STOP.

When recording, encourage the children to stay very still, not to talk and try to record for a few minutes without interrupting their recording. Afterwards, sounds can be transferred to computers from the micro-SD card, or by using a USB cable to connect the Tascam to the computer.

## BATTERIES

The Tascam takes 2 x AA batteries. Please use rechargeable when the existing ones are used.

The Pre-amp takes a 9 Volt PP3 battery which is rechargeable.

To recharge, open the battery holder by pushing the slot 'upwards'. It may be necessary to use a tool to do this. After unlocking, the battery holder drawer slides out. The battery has a micro USB charging slot. A multiple charger is provided with multi-charging USB cables.

Special thanks to Tom Bugs at [Bugbrand](#) Bristol for designing and building the pre-amp circuits.

