Key topic areas	Equipment and resources required
• Sustainability	Litter survey
• Pollution	Clipboard
• Resources	Map of the survey sites
• Environmental stewardship	

Context

From a young age, students are encouraged not to drop litter and their understanding of the damage it can do (such as becoming a choking hazard for wildlife) and the way it can negatively change the character of a place is generally well developed and may require little reinforcement. While litter surveys have traditionally focused on the raw amount of litter in different locations as packaging, particularly around food, has become more eco-conscious there is a growing need to rethink this fieldwork method. Investigating not just the quantity of litter, but also the nature of its constituent materials, means that students can gauge decomposition times and any potential secondary effects of some items being discarded.

Investigations into litter are also inherently spatial. In the 1950s, when Disneyland, California was being built, in order to reduce littering the '30 step rule' was established. It is said that Walt Disney himself counted the number of steps he took from a hot dog kiosk to the moment he was finished with its wrapper and decided that spatially this (30 steps away) was where a litter bin should be sited, a practice which has continued in all Disney parks. Similarly today, litter is often not found at the place of production or vending, but rather it can accumulate in other spots - be this at a point of consumption or at a place where other factors have a role such as wind blowing litter into a sheltered area, or areas where socially people tend to congregate.

Classroom set up

Students can begin by discussing what images come to mind when they think of litter. Many students will talk about food and drink packaging and it may be interesting to ask students to consider whether dropping or dumping other things, such as car tyres or old furniture, would still be thought of as littering. With encouragement, students can recognise that litter almost always comprises of items associated with a single use, making them quickly and easily disposable.

It is then useful for students, in pairs and then as a class, to mind map all the ways in which litter can be seen as harmful or negative. Older, more experienced students will be able to produce more complex mind maps that may link different areas of the curriculum together (for example, associating a clean, litter-free environment with the potential to attract commercial investment) while younger and less experienced geographers may focus solely on the impact litter has on wildlife.

Material	Decomposition time
Organic	~ 1 month
Paper	~ 6 weeks
Soft plastic	~ 20 years
Metal	~200 years
Hard plastic	~ 500 years
Glass	~ 4000 years

This can neatly lead into a further discussion about whether some types of litter are more harmful than others and students may be able to make the connection between various grades of material and their relative decomposition times. Placing these in order (from quickest to decompose to slowest) students can appreciate the impact that the kind of litter they see every day may have if it is not picked up.

In the field

While theoretically this enquiry could take place within the school grounds, it is unlikely to yield the kind of quantities of data that would make the further presentation and analysis of data workable. Therefore in this example, a hypothetical area has been chosen outside of some school gates. Three or four sites should be chosen in two transects that each start at the school gate and extend out away from them, totalling between six and eight data collection points. In small groups, and with one group allocated to each data collection point, students complete a litter survey where both the amount and the litter's material is recorded.

Date		Time		Site number and description	
Tally: Type of litter found					
Paper/Card	Soft plastic	Hard Plastic	Metals	Organic	Glass	Other

Students should only record litter that is visible within a five metre radius of their standing position to avoid any double counting with other groups. Where the litter is made up of more than one material, students should record it under the category that represents the majority of that piece of litter.

Suggested data presentation

Given that two corresponding forms of data are being collected (quantity and material type), students could create a composite column chart, with the height of the column showing the total volume of litter items and this being split relatively according to the amount of different materials observed.

This technique could be extended to include the spatial element of the data more clearly, with students creating a map with sited composite column charts in the appropriate places according to the data collection site. Likewise, students could use proportionally sized pie charts to show the total amount of litter seen at each site with the different sectors of the pie charts representing the amount of litter of different materials.
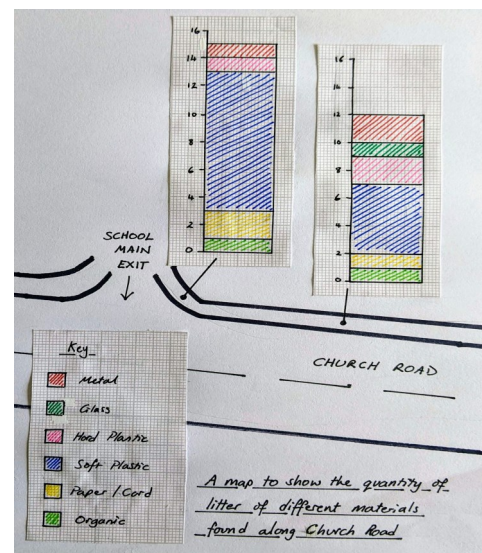
Key questions for reflection and analysis

- How do litter levels change with distance from the school gates?
- Which material is most litter made from? What impact might this have on the environment?
- How might time of day affect the amount of litter one might have seen?
- Where would be the best place to put a new litter bin?
- Is it better to see many pieces of more decomposable litter, or fewer pieces of less decomposable litter?
- What other aspects of the litter could have been recorded?
- How did the data collection method create fair and accurate data?
- What potential problems are there with this data presentation method?

Taking it further

Students might want to combine this data with secondary data about wind speed and direction to give reasons why litter may have accumulated in some areas.