Title of physical enquiry

How does biodiversity and plant cover change from the strand line at Talacre, Wales?

Justification of Location (4 marks)

Talacre was chosen due to its well-developed sand dune system, including embryo, yellow, grey, and mature dunes. This allows for clear observation of ecological succession and changes in biodiversity. It is a publicly accessible site, meaning no special permissions were required, making it a practical and appropriate location for fieldwork.

Risk Management (4 marks)

Several risks were identified and mitigated during the fieldwork:

- **Ankle injuries** from uneven terrain and rabbit holes were reduced by assigning a group member as a spotter to guide safe movement.
- **Adder bites** were a potential hazard; we wore long trousers and made noise to deter snakes.
- **Drowning risk** was managed by conducting fieldwork during low tide and maintaining a safe distance from the shoreline.
- **Scratches or injuries** from thorny vegetation were avoided by careful route planning and wearing appropriate clothing.

Justification of Data Presentation (4 marks)

We used **kite diagrams** to present plant species data along our transect. This method effectively illustrated changes in species type and abundance every 10 meters. It clearly showed ecological succession, with pioneer species like marram grass dominating near the strand line and non-pioneer species such as daisies and dandelions appearing further inland. This visual format made patterns in biodiversity and plant cover easy to interpret.

Validity of Conclusions (9 marks + 3 SPaG)

The conclusions drawn from our enquiry were **partially valid**, but several limitations affected reliability:

- **Systematic sampling** every 10 meters may have missed key species, especially those indicating transitions between dune types.
- **Estimating percentage cover** was problematic; plants were flattened under the quadrat, leading to overestimation (e.g., 100% cover on yellow dunes).
- **Species identification** was challenging due to similarities between species like marram and sand couch grass, and the presence of garden escapees not listed in our ID guide.
- **Transect deviation** occurred to avoid dense vegetation, meaning the line was not perfectly straight and may not have represented a true cross-section of the dune system.

- **Access limitations** prevented study of mature dunes, which had been developed for tourism, reducing the completeness of our data.

Overall, while some patterns were observed, these issues reduced the reliability and validity of our conclusions regarding biodiversity and plant cover changes.

Effectiveness of Data Collection Methods (6 marks)

Our data collection was **partially effective**:

- **Systematic sampling** every 10 meters allowed us to track changes in species and % cover from the beach inland.
- However, this method may have missed transitional zones and non-pioneer species.
- **Species identification** was generally effective due to the use of ID booklets and a plant identification app.
- **Estimating % cover** was less reliable due to plant flattening under the quadrat. Attempts to improve accuracy by pulling plants through were difficult to implement consistently.
- The transect ended at the boardwalk, limiting our ability to study the full dune system due to human interference.

Effectiveness of Data Collection Methods (6 marks)

Our methods were **partly effective**:

- **Systematic sampling** every 10 metres helped us track changes in plant types and cover.
- **Species identification** was supported by using ID booklets and a plant app, which improved accuracy.
- **Percentage cover estimates** were less reliable due to plants being flattened under the quadrat. We tried to improve this by pulling plants through, but it was difficult.
- **Stopping at the boardwalk** meant we didn't collect data from the full dune system, limiting our results.

Reliability of Methods and Results (6 marks)

The reliability of our methods and results was mixed:

- **Reliable aspects**:
    - We used consistent sampling intervals and tools, which helped us compare data fairly.
    - Using both a plant ID guide and an app improved the accuracy of species identification.
- **Less reliable aspects**:
    - Quadrat readings were sometimes inaccurate due to plant flattening.
    - Our transect wasn't perfectly straight, which may have affected the data.
    - We couldn't access the mature dunes, so our results didn't cover the full dune system.
    - Some species were misidentified, especially garden plants not listed in our guide.

Overall, while our methods gave us useful data, the results were not fully reliable due to these limitations.