
Coding Theory Game

How to play:

1. **(Create and Encode the Message)** Each student comes up with a word of length at most 10 letters, and encodes it using the Encoder / Decoder given. (each letter of the word will become a point (a, b) , where a and b are integers. So the encoded word will be a list of points $(a_1, b_1), (a_2, b_2), \dots$). They then write the original word and the encoded word on one of their notecards.
2. **(Send the Message Into the Channel)** Each student passes the notecard with their original word and encoded word to the student behind them. Each student verifies that the word was encoded correctly.
3. **(Add Noise)** For each letter of the encoded word, which will be a point (a, b) , the student rolls a die twice. The first number determines the amount of noise you may add to the y coordinate of the encoded letter, according to the below table. The second number determines the amount of noise you may add to the x coordinate of the encoded letter, again according to the below table. The student writes their resulting “encoded word with noise” on their remaining notecard (be sure to **NOT** write the original codeword).

Number on the Die	Noise
1	No Noise
2	Add or subtract 1
3	Add or subtract 1
4	Add or subtract 1
5	Add or subtract 2
6	Add or subtract 2

4. **(Exit the Channel)** After each student has finished adding noise to the encoded word they received, they pass their notecard with the “encoded word with noise” to the student behind them.
5. **(Decode)** Finally each student decodes the word given to them.

Encoder / Decoder:

