

# Number Decoder



## Strand:

Number & Quantity	X
Algebra	
Functions	
Geometry	
Statistics & Probability	

Use your number skills and vocabulary to decode the Code Number in this game for 2 or more players!

### Materials Needed:

- White board or page protector over blank paper, dry erase markers, and eraser
- Scratch paper and pencils (optional)
- Vocabulary cards

## Where:

Outside	
Inside	X
On-line	
On-site	



### Set-Up:

- Choose one player to be the “Number Generator.” The other players are the “Decoders.”
- Lay the vocabulary cards face up so all Decoders can read them.
- The Number Generator chooses a 2-digit number and keeps it hidden from the Decoders. This number is called the “Code Number.”
- The player to the left of the Number Generator starts.

**Object of the Game:** Use vocabulary words to formulate questions that help identify a hidden 2-digit number within a 20-question limit.

### Decoders, On Your Turn:

1. After the Number Generator has chosen a Code Number, choose one vocabulary card. Use the word on the card in a yes or no question to help determine the Code Number. Ask the Number Generator your question. Hand the vocabulary card to the Number Generator; that card is out of play for the rest of the round.
  - When asking about a particular digit in the Code Number, you must use the terminology “ones digit” or “tens digit.”
  - Vocabulary cards that say “Freebie” allow you to ask a question that does not contain any of the words listed on the remaining vocabulary cards.
  - You can ask questions like the following only when you are ready to identify the exact Code Number: Is the number 17? Is the ones digit 3?
  - If you believe you know the Code Number, ask the Number Generator if the Code Number is your number. This counts as one of the 20 questions. *Each Decoder may guess the Code Number exactly once.*
2. Once you ask your question, the Number Generator answers the question with “yes” or “no,” collects the vocabulary card, and tells the Decoders how many questions have been asked so far.
3. Your turn ends. Play moves to the left if the Code Number is still unknown.
4. Play continues until 20 questions have been asked or the Code Number is determined.
5. You may work with fellow Decoders. You may write down what you learn to keep track of it. You can discuss the questions and resulting answers with other Decoders and help each other determine which question to ask next.

**To Win:** If the Code Number is identified within the 20-question limit, the Decoders win. Otherwise the Number Generator wins.

### Think About It:

- What vocabulary words helped you eliminate the most number possibilities for the Code Number?
- Are some vocabulary words best used at the beginning of the round? At the end of the round?

### Variations:

**Assigned Vocabulary Cards:** Instead of laying the vocabulary cards out for everyone to use, deal them out to the Decoders. The Decoders may only use the vocabulary words that are in their hands.

### Helpful Hints:

- Try eliminating the number possibilities for the ones digit or tens digit. How can you determine which numbers these digits are not?

<b>Odd</b>	<b>Composite</b>	<b>Multiple</b>
<b>Even</b>	<b>Perfect Square</b>	<b>Factor</b>
<b>Sum</b>	<b>Less than</b>	<b>Factor</b>
<b>Difference</b>	<b>Greater than</b>	<b>Prime Factor</b>
<b>Product</b>	<b>Less than or equal to</b>	<b>Greatest Common Factor</b>
<b>Quotient</b>	<b>Greater than or equal to</b>	<b>Freebie</b>
<b>Prime</b>	<b>Multiple</b>	<b>Freebie</b>

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