



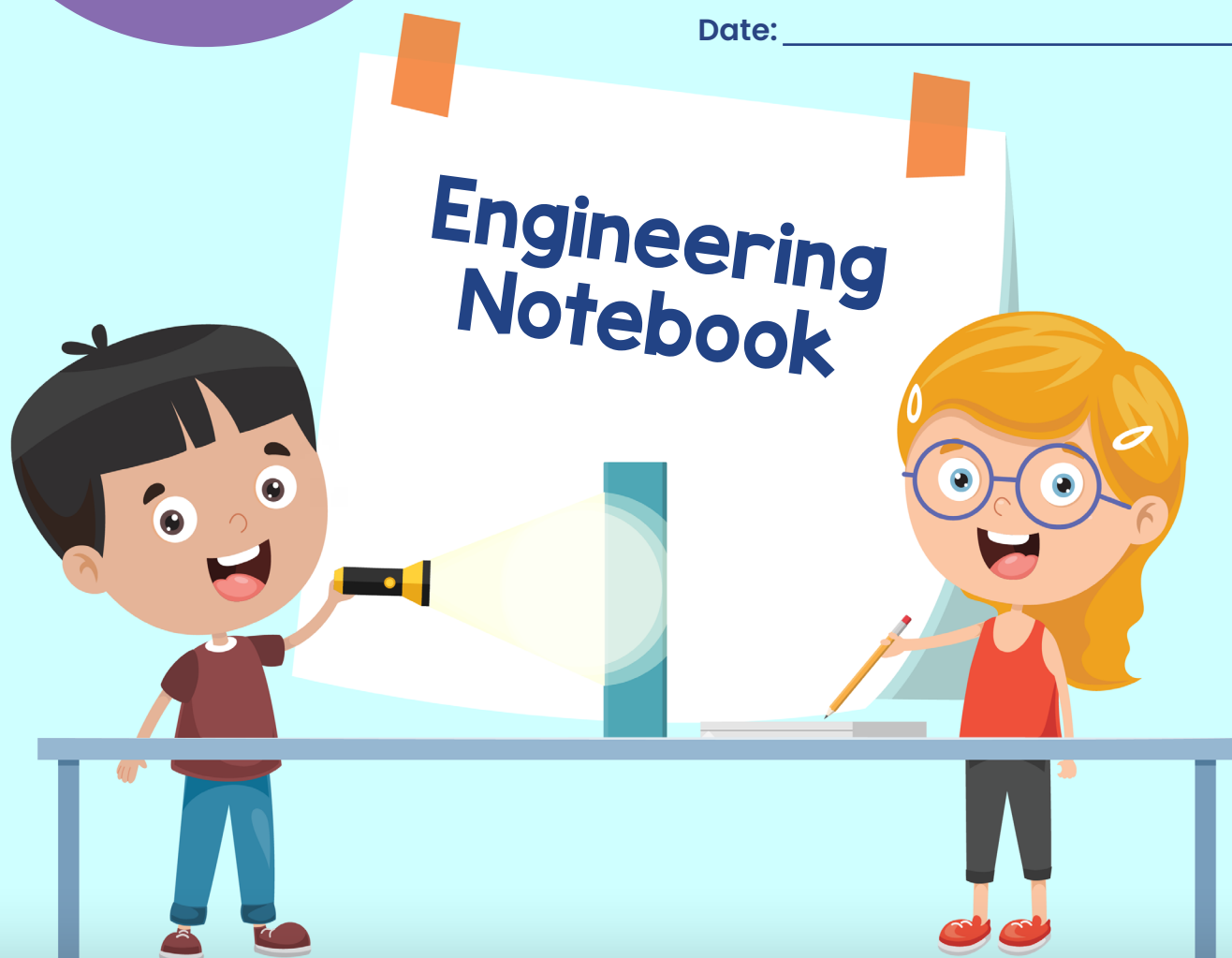
**Grades  
3-5**

# Morse Telephone

**Student Activity Workbook**

Name: \_\_\_\_\_

Date: \_\_\_\_\_



**Seaworthy STEM™ in a Box Series**

# Morse Telephone

Use the following Morse code chart below to create secret messages with your team!

A	• —
B	— • • •
C	— • — •
D	— • •
E	•
F	• • — •
G	— — •
H	• • • •
I	• •
J	• — — —
K	— • —
L	• — • •
M	— —
N	— •
O	— — —
P	• — — •
R	• — •
S	• • •
T	—
U	• • —
V	• • • —
W	• — —
X	— • • —
Y	— • — —
Z	— — • •

1	• — — —
2	• • — —
3	• • • — —
4	• • • • —
5	• • • • •
6	— • • • •
7	— — • • •
8	— — — • •
9	— — — — •
0	— — — — —

1

Let's practice some coding!

In the box below, think of a 4-5 letter word. Write down the word below in the blank letter slots. Then transfer that word into Morse code using the chart.

2

Now with your secret word from question # 1, test your ability to decode by transferring your word into sound and light code. Use the key below to guide you.

Morse Symbol	Coder of Light	Coder of Sound
●	Short Flash (1 second)	Knock
■	Long Flash (2-3 seconds)	Clap

3

Time to code!

With your team, have the Code creator make a new 4-5 letter word. When the Code creator is ready, start the game by transmitting the secret word to the next line of communication, the Coder of light. Remember, the Code creator cannot share their secret word with anyone in the group! All coders can use the text box below to help solve the secret word!

\_\_\_\_\_

#### Fun Fact!

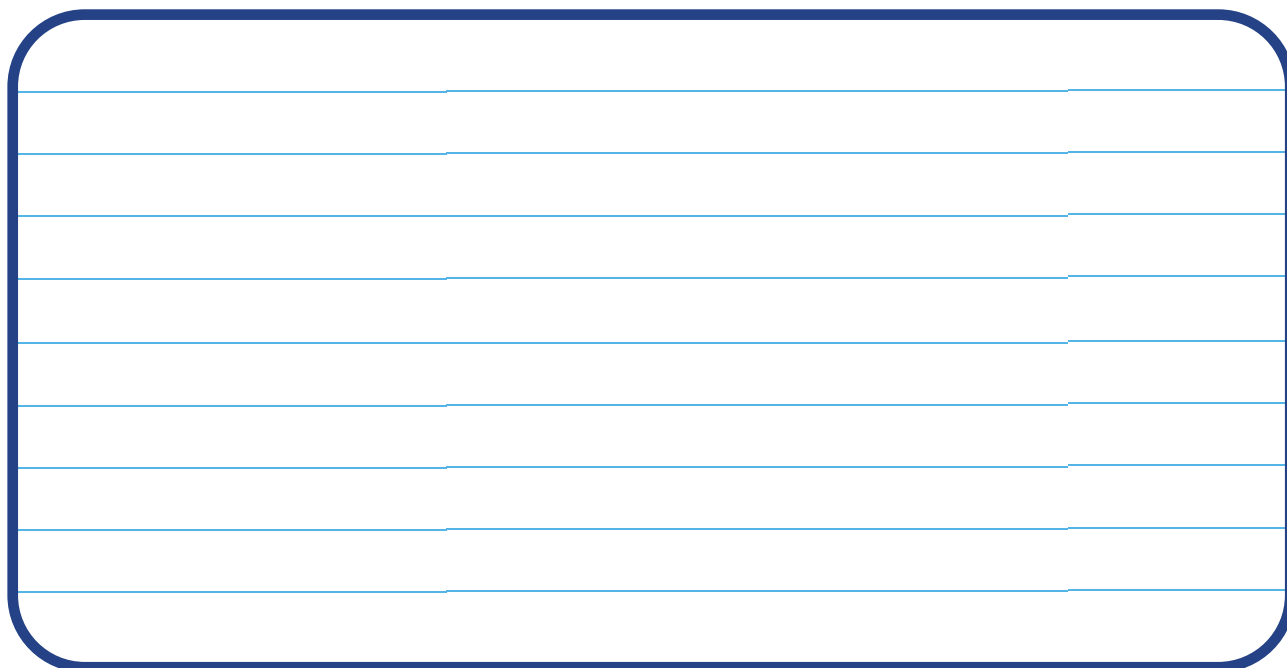
Radio telegraphy using Morse code was used in the early part of the twentieth century for marine communication. In the 1970's a system was put into place where ship-to-ship or ship-to-shore communication was put into action instead of the use of a 24/7 radio operator. Marine communication between ships or with the shore was carried with the help of on board systems through shore stations and even satellites.



- 4 Did your team solve the code? Use the following text box to describe what strengths and weaknesses your team had when solving the secret word.



- 5 For ships at sea, why do you think it is crucial for the line of communication to be sent correctly?



- 6 What kind of important information would ship-to-ship or ship-to-land need to communicate about?

A large, empty, lined notebook page with a dark blue border and light blue horizontal ruling. The page is designed for taking notes and is currently blank.

## Computer Science Extension:

Binary code allows us to give instructions to computers. Binary is a code just like Morse code but uses only 1's & 0's. Binary is based in math and increases in powers of 2. Ex: 1, 2, 4, 8, 16, 32, 64...Just like in regular math, the numbers further to the left have a greater value.

See examples below:

If you were to type 11 in binary, the computer would understand it as one number 2 and one number 1, so it would read it as  $2+1= 3$

64	32	16	8	4	2	1
					1	1

If you were to type 101 binary, the computer would understand it as one number 4, zero number 2's and one number 1, so it would read it as  $4+0+1= 5$

64	32	16	8	4	2	1
				1	0	1

If you were to type in the number 11101 in binary, the computer would understand it as one number 16, one number 8, one number 4, zero number 2's, and one number 1, so it would read it as  $16+8+4+0+1= 29$

64	32	16	8	4	2	1
		1	1	1	0	1

## 7 Computer coding challenge!

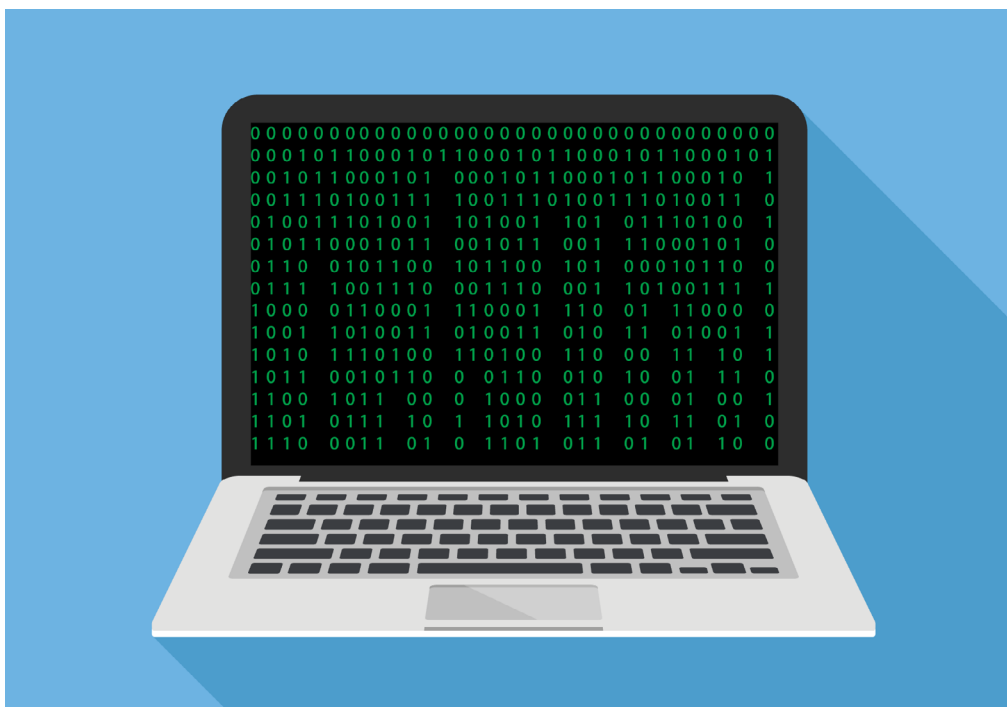
Pick a number between 1-100 to write in binary code. Write your number in binary below. \*Check your math with a calculator. Remember that all of the numbers that have a 1 below them should add up to equal your number when you are done.

64	32	16	8	4	2	1

## 8 Have a partner play the role of a computer and read your code. You have just communicated using binary code!

### Fun Fact!

A singular binary digit, a single 0 or 1, is referred to as a bit. 8 bits are called a byte!



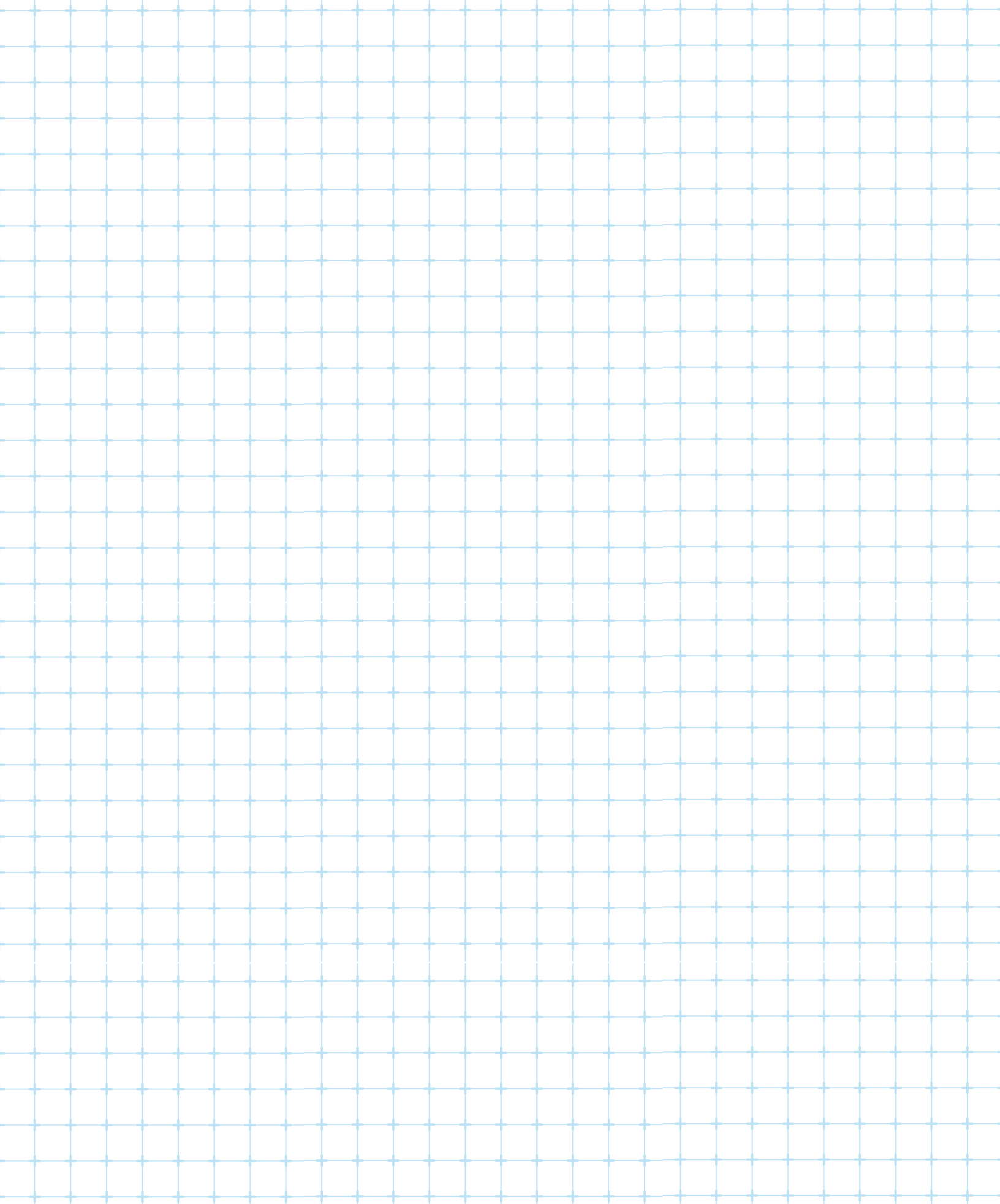


## Did You Know?

Presently, the Navy still uses code in a line of communication. Below is a chart of a phonetic alphabet chart. The chart is a list of words used to identify letters in a message transmitted by radio or telephone. Spoken words from an approved list are substituted for letters. For example, the word “Navy” would be “November Alfa Victor Yankee” when spelled in the phonetic alphabet. This practice helps to prevent confusion between similar sounding letters, such as “m” and “n”, and to clarify communications that may be garbled during transmission.

Letter	World War II	1957-Present
A	Afirm (Able)	Alfa
B	Baker	Bravo
C	Charlie	Charlie
D	Dog	Delta
E	Easy	Echo
F	Fox	Foxtrot
G	George	Golf
H	How	Hotel
I	Int (Item)	India
J	Jig	Juliett
K	King	Kilo
L	Love	Lima
M	Mike	Mike
N	Negat (Nan)	November
O	Option (Oboe)	Oscar
P	Prep (Peter)	Papa
Q	Queen	Quebec
R	Roger	Romeo
S	Sugar	Sierra
T	Tare	Tango
U	Uncle	Uniform
V	Victor	Victor
W	William	Whiskey
X	X-ray	X-ray
Y	Yoke	Yankee
Z	Zebra	Zulu





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# Morse Telephone Engineering Notebook



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