robo™ wunderkind

Math Projects: Arithmetic Worksheets Answer Key

with Robo Wunderkind Robotics Kit

NAME / DATE

Project 1: Robo Sends Light Signals

Robo's Story:

Some robots can speak and some cannot, but there are many different types of communication between robots, such as different light signals, secret codes or ciphers. Can our Robo speak? Can we teach it to create a cipher using the light signals?

Project Goal: Build and program Robo-Encoder

Keywords Cipher, encoder; even and odd numbers

1 Robo -Encoder

Modules Main Block, (RGB) Light

2 Program different light signals

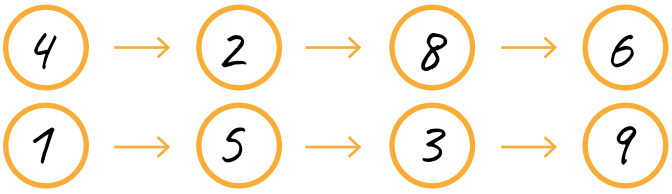
= 2, 4, 6, 8, 10 => even numbers

= 1, 3, 5, 7, 9 => odd numbers

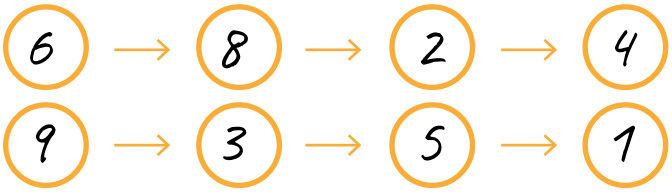
3 / Create a code with light signals

= only even numbers

= only odd numbers



- Reverse the code



- How did you do that?
- Red, blue, = Even numbers
- Yellow, green = Odd numbers

4 Encode a message

Cipher Key

1. How are you?
2. Hi!
3. What is your name?
4. I am Robo!
5. Do you want to play together?
6. I want to be friends with you!
7. What kind of robot are you?
8. I want to play together!
9. Do you want to learn math?
10. I am a very friendly robot.

Messages

1. Hi! I am Robo! What is your name? → 2 → 4 → 3
2. How are you? What is your name? I want to play together! Do you want to learn math? → 1 → 3 → 8 → 9
3. I am a very friendly robot. I want to be friends with you! Do you want to play together? → 10 → 6 → 5
4. I am Robo. I am a very friendly robot. What is your name? What kind of robot are you? → 4 → 10 → 3 → 7
5. Your message *Hi! How are you? Do you want to play together?* → 2 → 1 → 5

5 / Create own cipher

Cipher Key

1. *do you like icecream?*
2. *I love icecream!*
3. *Let's grab an icecream?!*

Messages

2 → 1 → 3

What did I learn?

How to create a cipher.
Even and odd numbers

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Project 2: Robo Decodes a Secret Message

Robo's Story:

Robo received a cipher – a message from the other robots. There is a key for decoding it but Robo will need our help to do it.

Project Goal: Build and program Robo-Decoder

Keywords Decoder, cipher, addition, subtraction

1 Robo -decoder

Modules Main Block, RGB Light

2 Number of blinks

1+3 = 4	7+1 = 8	10−1= 9	2−1 = 1
2+3 = 5	4+2 = 6	9−3 = 6	7−4 = 3

3 / Calculate and program

4 times + 2 times + 1 time + 3 times =	4 6 7 10
10 times − 3 times − 2 times − 2 times =	10 7 5 3
4 times + 1 time − 2 times + 5 times + 2 times − 5 times =	4 5 3 8 10 5
each Action + 2 sec =	1 3 5 7 9
each Action − 2 sec =	10 8 6 4 2

= 3 + 1 + 6 - 1 = 3 → 4 → 10 → 9

= 7 - 3 - 1 - 2 = 7 → 4 → 3 → 1

4 Decode a message

Cipher Key

2. We are friendly robots.
4. Do you like traveling?
6. Visit us in Robot City!
8. Can you drive?
10. Do you know other robots?
1. We live in Robot City.
3. Do you want to be our new friend?
5. Hello Robo!
7. We want to be your new friends.
9. We hope to see you soon!

Messages

1. 2+3 = 5 1+1 = 2 6−5 = 1 → Hello Robo! We are friendly robots. We live in Robot City.

2. 3+4 = 7 10−7 = 3 3+3 = 6 → We want to be your new friends. Do you want to be our new friend? Visit us in Robot City!

3. 10−7+1 = 4 3+4−1 = 6 10−1−1 = 8 → Do you like traveling? Visit us in Robot City! Can you drive?

4. 2+2−2 = 2 1+1+8 = 10 5−1+5 = 9 → We are friendly robots. Do you know other robots? We hope to see you soon!

5. Your message 4 + 1 = 5 10-8 = 2 → Hello Robo! We are friendly robots. Visit us in Robot City.
6 + 4 - 3= 7 2 + 2 + 2 = 6

5 / Create own cipher

Cipher Key

1. I will visit you in Robot City!
2. I want to be your friend!
3. I am Robo
4. Hi Robots!

Messages

10 - 6 = 4 1 + 2 = 3
10 - 2 - 6= 2 6 + 2 - 7= 1

What did I learn?

What is decoder, cipher.
Addition, subtraction

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Project 3: Robo Decodes a Secret Map

Robo's Story:

Robo received a secret message from the other robots - it's a map to Robot City. It is written in a special cipher and Robo needs to decode it.

Project Goal: build and program Robo to decode a map

Keywords decode, code, multiplication

1 Robo

Robo -vehicle

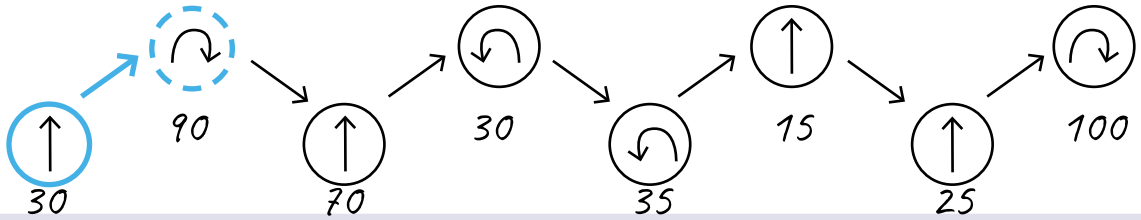
Modules Main Block, 2 DC Motors, 2 Big Wheels, 1 Small Wheel

2

Distance **Angle**

3×5 =	15	5×5 =	25	5×6 =	30	7×5 =	35
7×10 =	70	10×3 =	30	10×9 =	90	10×10 =	100

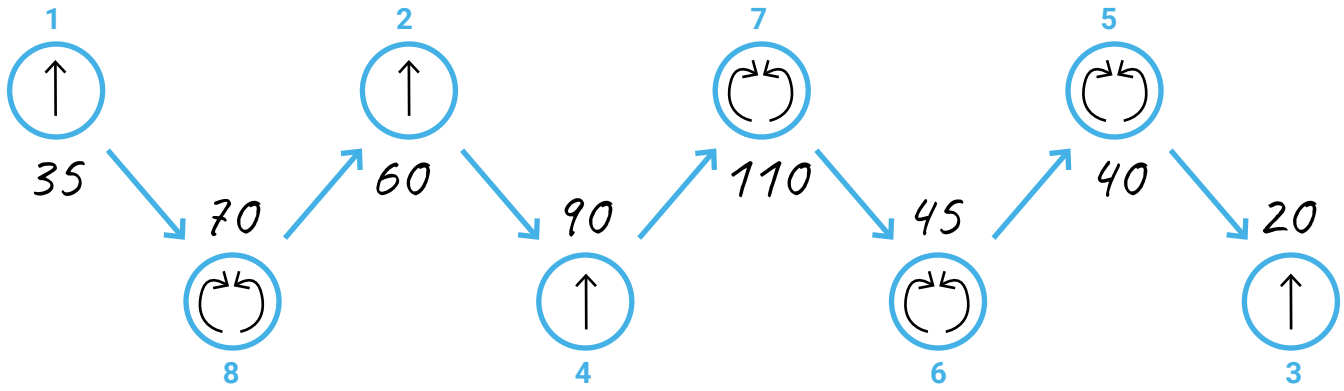
• **Connect** all Movement Actions into one code, draw a code



3 / Decode a map

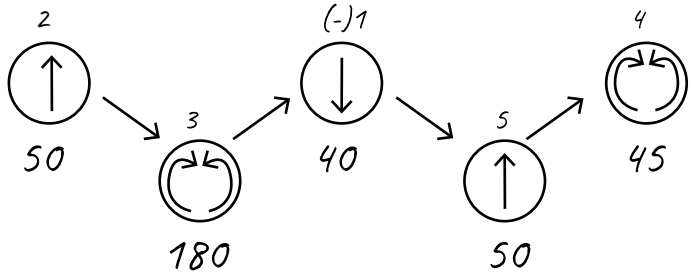
7×5 =	35	10×6 =	60	5×8 =	40	9×5 =	45
	1		3		5		7
5×4 =	20	9×10 =	90	11×10 =	110	10×7 =	70
	2		4		6		8

4 Draw a map you decoded, program a Robo-vehicle to perform it



5 / Create own map

Map



Cipher

1. $20 \times 2 = 40$
2. $90 \times 2 = 180$
3. $25 \times 2 = 50$
4. $4 \times 5 = 20$
5. $10 \times 5 = 50$

What did I learn?

How to decode a map.
Multiplication

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Project 4: Robo Travels to Robot City

Robo's Story:

Robo wants to travel to Robot City and meet other robots

Project Goal: build and program Robo to travel to Robot City

Keywords map, code, division

1 Robo

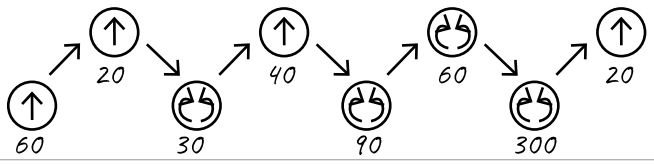
Robo -traveller

Modules Main Block, 2 DC Motors, 2 Big Wheels, 1 Small Wheel, RGB Light

2 Distance Angle

	80÷2 = 40	180÷3 = 60		90÷3 = 30	280÷4 = 60
	100÷5 = 20	1200÷60 = 20		180÷2 = 90	6000÷20 = 300

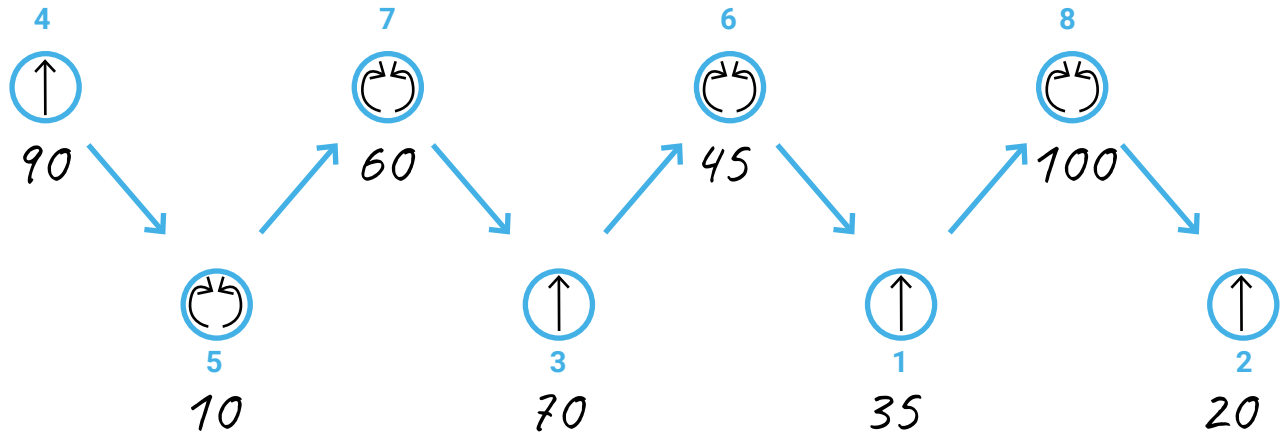
• **Connect** all Movement Actions into one code, draw a code



3 / Decode a map and travel

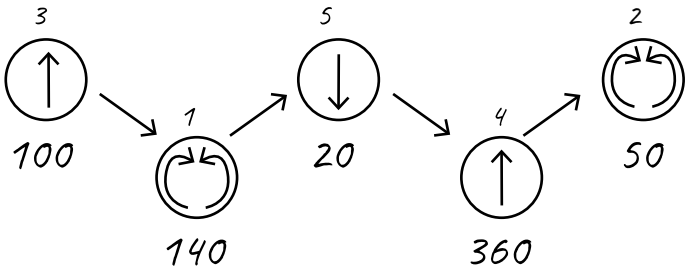
	70÷2 = 35 (1)	1400÷20 = 70 (3)		80÷8 = 10 (5)	1800÷30 = 60 (7)
	100÷4 = 20 (2)	9000÷100 = 90 (4)		90÷2 = 45 (6)	1000÷10 = 100 (8)

4 Draw a map you decoded, program your Robo to perform it



5 / Create your own map

Map



Cipher

1. 280 : 2 = 140
2. 200 : 4 = 50
3. 300 : 3 = 100
4. 720 : 2 = 360
5. 100 : 5 = 20

What did I learn?

Map code, division

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Project 5: Robo Travels to Robot City

Robo's Story:

Robo arrives in Robot City, ready to meet other robots. It will need to make different light signals, sounds and movements to decode and encode ciphers and communicate with other robots.

Project Goal: build and program Robo to communicate with other robots

Keywords communication, signals, addition, subtraction, multiplicaion, division

1

Robo can communicate

Modules Main Block, 2 DC Motors, 2 Big Wheels, 1 Small Wheel, RGB Light

2

= Ordinal Number = Lifespan

= Distance = Angle

3+4 = 7	7+1 = 8	50+30 = 80	10+60 = 70
15−6 = 9	18−17 = 1	100−40 = 60	90−75 = 15
2×2 = 4	3×3 = 9	11×5 = 55	10×10 = 100
15÷5 = 3	45/7 = 5	90÷9 = 10	150÷3 = 50

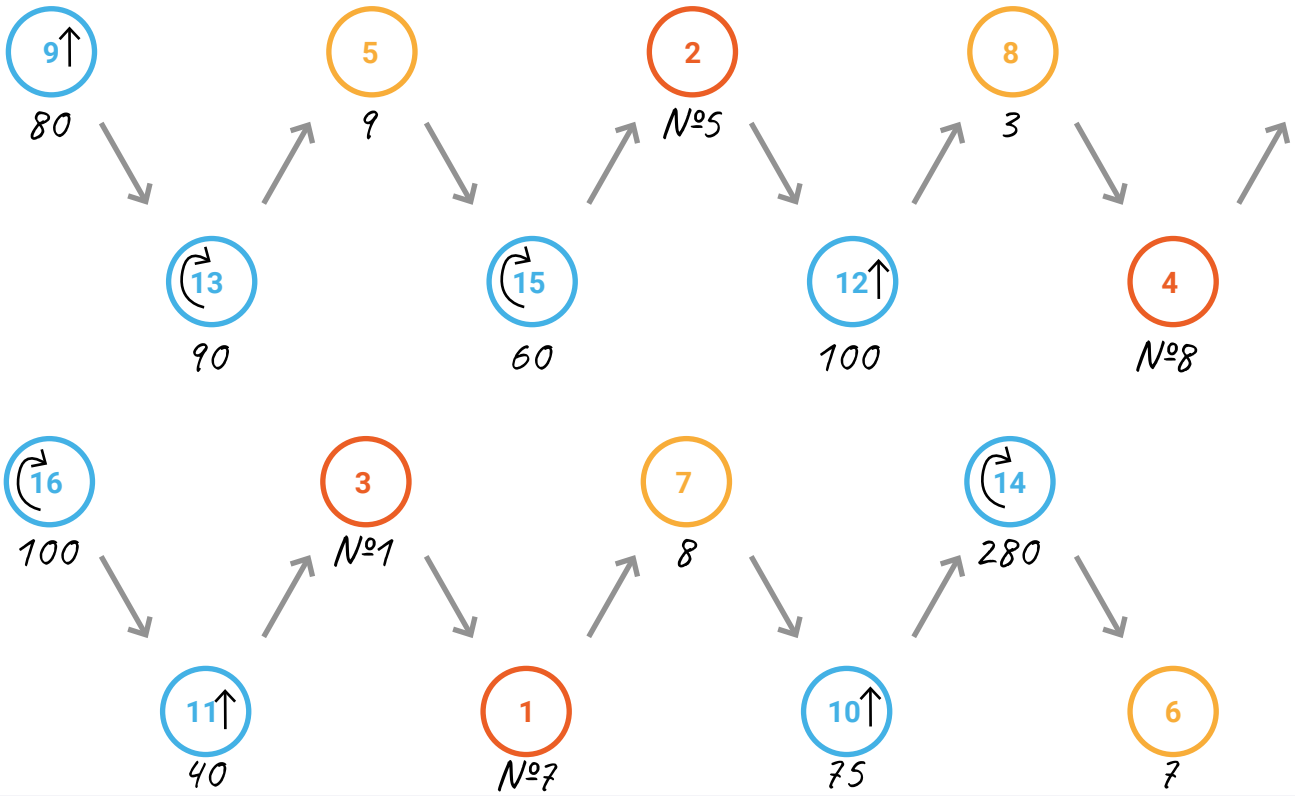
- **Connect** all Actions into one code.

3

Solve all challenges and complete Robo cipher

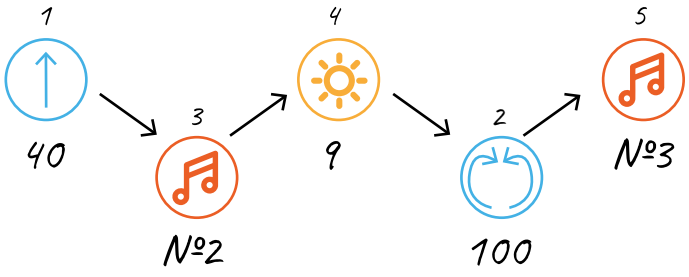
6+1 = 7 (1)	6+4−1 = 9 (5)	90−5−5 = 80 (9)	50+20+20 = 90 (13)
10−5 = 5 (2)	3−2+6 = 7 (6)	45+5+25 = 75 (10)	300−40+20 = 280 (14)
1×1 = 1 (3)	2×2×2 = 8 (7)	4×5×2 = 40 (11)	12÷2×10 = 60 (15)
16÷2 = 8 (4)	90÷3÷10 = 3 (8)	600÷3÷2 = 100 (12)	150×2÷3 = 100 (16)

4 Complete the Robo cipher and program your Robo to perform it



5 / Create your own map

Map



Cipher

1. 280 : 2 = 140
2. 200 : 4 = 50
3. 300 : 3 = 100
4. 720 : 2 = 360
5. 100 : 5 = 20

What did I learn?

How to communicate with different robots.
Addition, subtraction, multiplicaion, division.