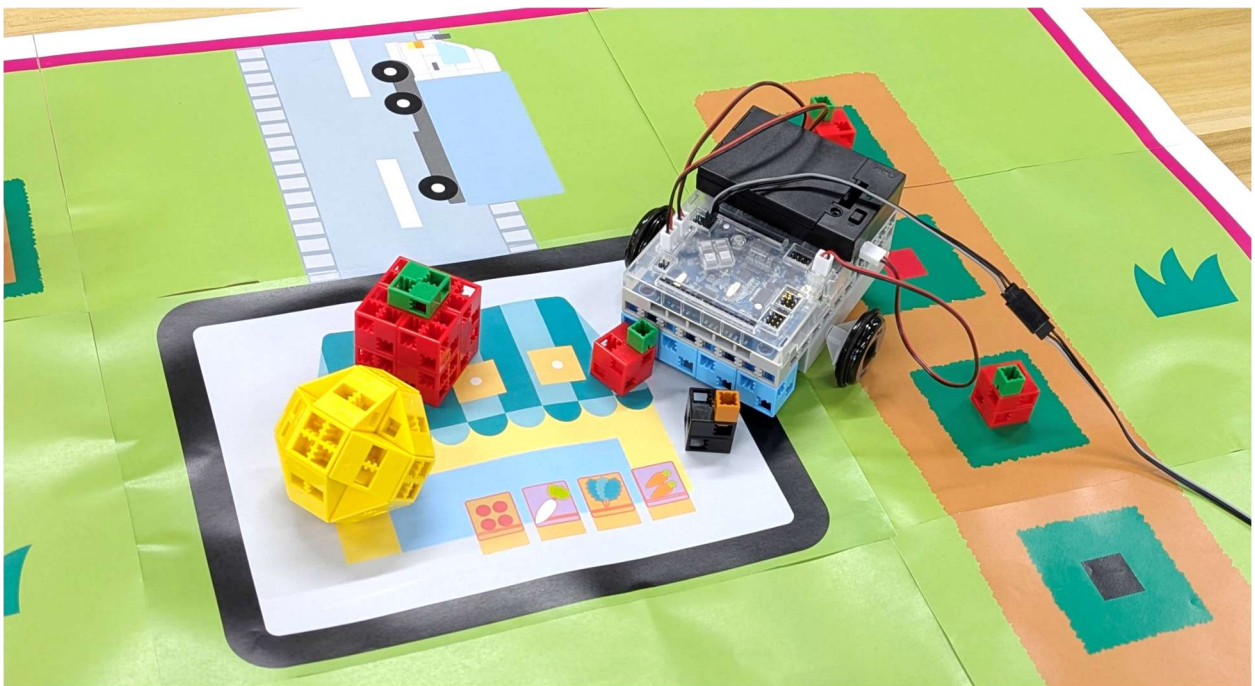


# Universal Robotics Challenge 2025

## Real Robotics Early Division Rulebook

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# Competition Overview

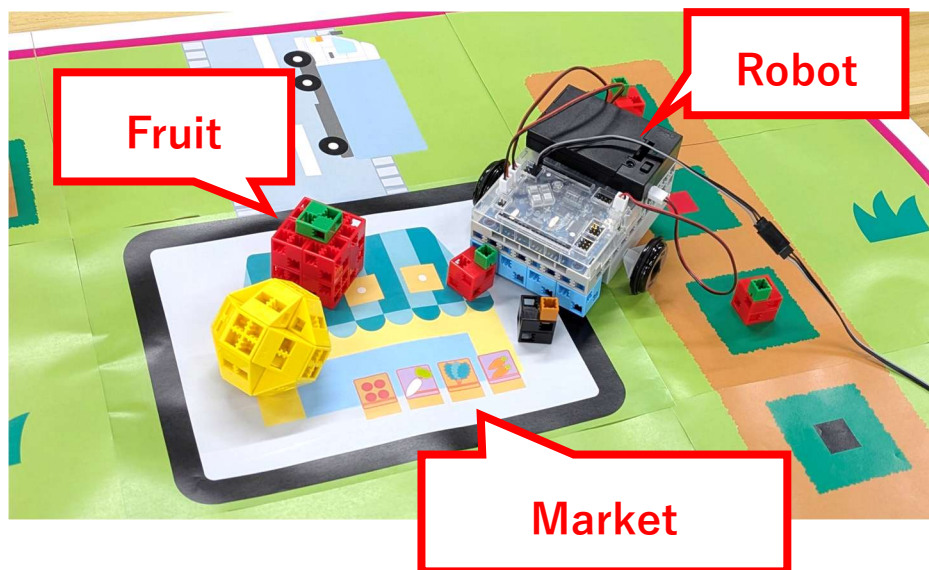
In this competition, you'll use a computer, ArtecRobo, and Artec Blocks to make a robot. You'll then program it any way you want to and try to win the competition!

## 1. Robots on the Farm

The world we live in is full of robots which help make our lives easier and more convenient. Think of huge tractors on farms, which help humans pick lots of fruits and vegetables at high speeds with no trouble.

In this competition, you're going to make a robot which can pick fruit on a farm! You'll get points when your robot delivers the fruit to the market.


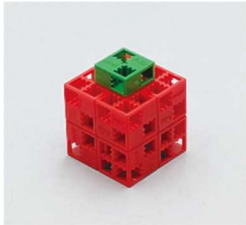




Try picking lots of fruit within the time limit to get the highest score you can!



## 2. Fruits and Trees

There are **6 different objects** on the field!

You get different points for the different kinds of fruits you deliver to the market!

Redfruit (small)	Redfruit (large)	Goldfruit
 <p>50 points</p>	 <p>100 points</p>	 <p>300 points</p>
Badfruit (small)	Badfruit (large)	Tree
 <p>-100 points</p>	 <p>-100 points</p>	 <p>0 points</p>

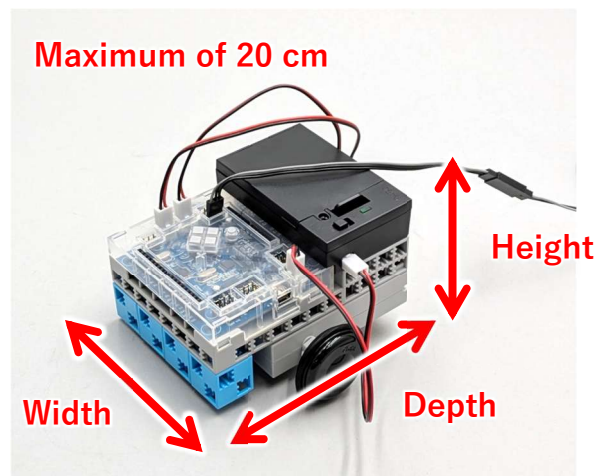
### 3. Competition Robots

Each team has to make their own robot.

Each team can have **1 robot** per round!

#### ○ Robot Rules

- Your robot can be up to 20 cm tall, 20 cm wide, and 20 cm in depth. The controller you use to control your robot and the cables you use to connect it can be any size!



- Your robot can transform to become bigger after the round starts.
- You won't be able to use any parts which come off of the robot during the round. You also won't be able to add motors to them to make them run separately.
- You can only use the **ArtecRobo power sources** or **Power Bank** listed in Appendix 3 to power your robot.
- Your robot can move by itself using its program, or you can use a controller to move it.
- When you connect the robot and the controller, use a cable. Don't use wireless controllers.



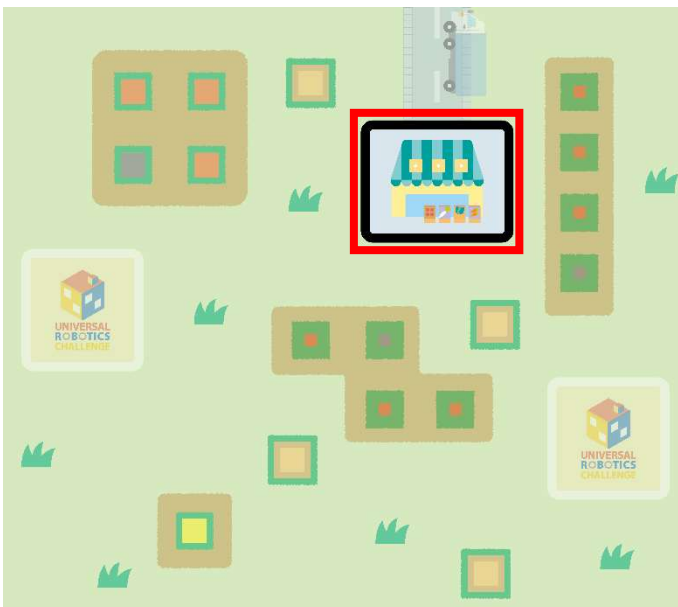
## ① Starting Area



Your robot starts from a Starting Area outlined in white.

There are 2 Starting Areas on the field.

## ② The Market



Your robot will deliver the fruit on the field to the market outlined in black.

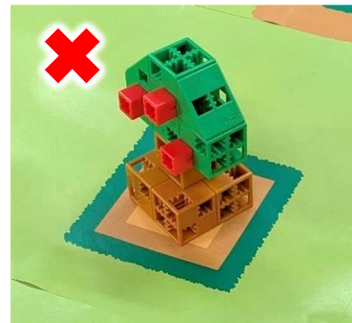


### ③ Placing Fruit

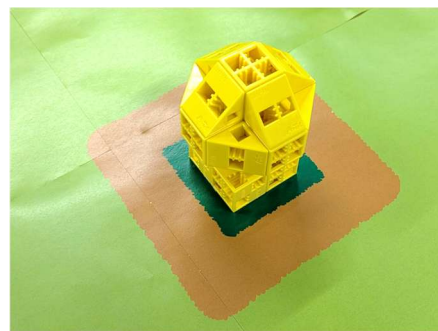
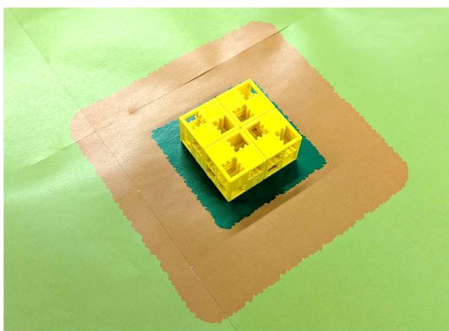
- Place your fruits on the spots of the same color **outlined in green** before starting the round.



- ★ Place the trees right in the middle of the boxes with the thin green outlines!



- ★ Place the goldfruit on stands made of 4 Artec Blocks. Tape the stands in place to make sure they don't move!





# Competition Flow

## 1. Before the Round

Place your fruit and trees on the field before the round starts.

Once you place everything and the round has started, you can't touch the fruit or trees until the round is over.

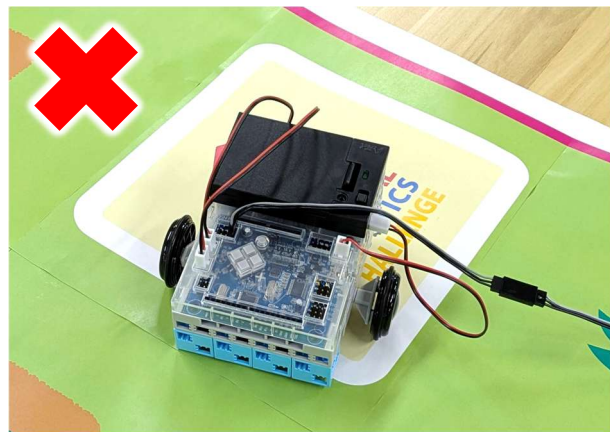
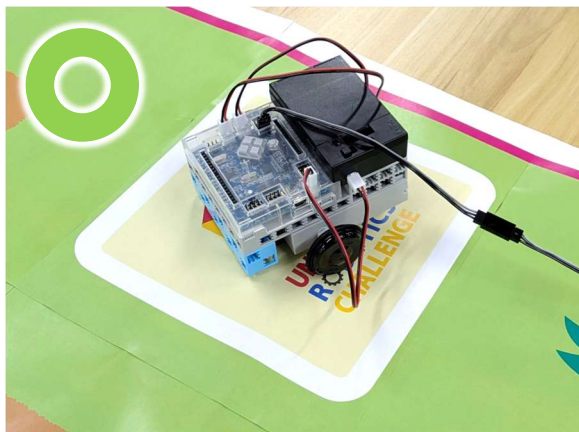
When everything is placed, set down your robot and wait until the round begins!

### ○ Placing the Robot

Place your robot in one of the **Starting Areas** before the round starts.

The robot can be placed facing any direction anywhere within the Starting Area.

- You can set your robot in either Starting Area.
- Your robot can't stick out of the **Starting Area** including any parts that are in the air!
- **Don't power on your** robot until the round starts.
- It also can't transform to be over 20 cm when you set it down.



## 2. Starting the Round

At the signal, power on your robot to start the round.

- **Only 1 team member** can hold the controller.
- If you want to give the controller to another team member, move your robot back to the Starting Area first.
- When the robot is in the Starting Area, **only 1 team member** is allowed to move or control it.
- Your robot should always be in the Starting Area before it starts moving again.
- **No team members can enter the field once the round starts!**

### ○ Retries

If you use a **retry** during the round, **1 team member** can enter the field to touch the robot outside of the Starting Area.

- During a retry, you can reset any parts of the robot which have transformed or fallen off.
- During a retry, leave any fruit which your robot has grabbed in the same spot.
- If you move any fruit during a retry, move it back to where it was!
- You can use as many retries as you want.
- The clock for the round will keep going during a retry.
- Once your retry is over, move your robot back to the Starting Area before continuing the round!

### 3. Ending the Round

The time limit for each round is **3 minutes**.

- You can also end the round early if your robot finishes before the time limit is up.
- Once the round is over, stop your robot right away and leave the field!

### 4. Scoring

Once the round is over, we'll count the fruit at the market to find your score.

You can also get bonus points for the round!

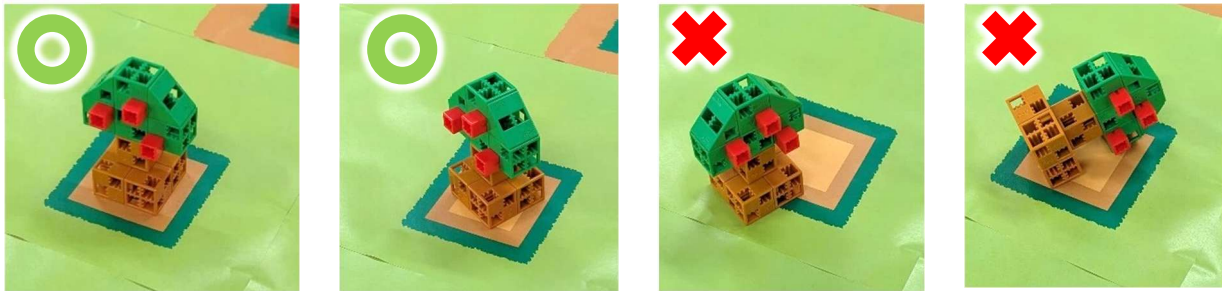
- ★ Any redfruit which is over the black line will only get **half points**.
- ★ Any fruit delivered to the market after the round ends will get 0 points.



### ○ Green Bonus

Any teams which have every tree inside of a brown square **by the end of the round** get a **100-point** Green Bonus!

- You won't get any bonus points if the trees fall over or move out of the square.
- If your robot moves a tree during the round, you can use the robot to move it back!



### ○ Tech Bonus

If your robot completes the round using **only its program and no controller**, your team gets **100 bonus points**.

### ○ Ranking

Scores are used to find the ranking of each team like 1st, 2nd, and 3rd.

If multiple teams have the same score, their rank is chosen by who has more fruit at the market.

If they have the same number of fruits, rank will be chosen by the lowest number of retries and the shortest round time.

★ If everything is the same, it will be a draw!

Example)

Team	Score	Fruit Delivered	Retries	Remaining Time	Rank
A	700	7	0	0:59	2nd
B	550	9	2	0:47	4th
C	550	9	1	1:18	3rd
D	900	8	2	0:00	1st
E	425	8	0	1:30	5th

## 5. Other Notes

- Only bring what you need for the competition. You aren't allowed to bring **extra parts or blocks**.
- **You aren't allowed to pull on your controller to make your robot move.**
- You **aren't allowed to use the controller cable** to move fruit or trees.
- Aside from retries, you aren't allowed to touch the robot outside of the Starting Area.
- Teams which break the rules may be disqualified. **If you're disqualified, you won't get a ranking!**

## Video Preliminaries

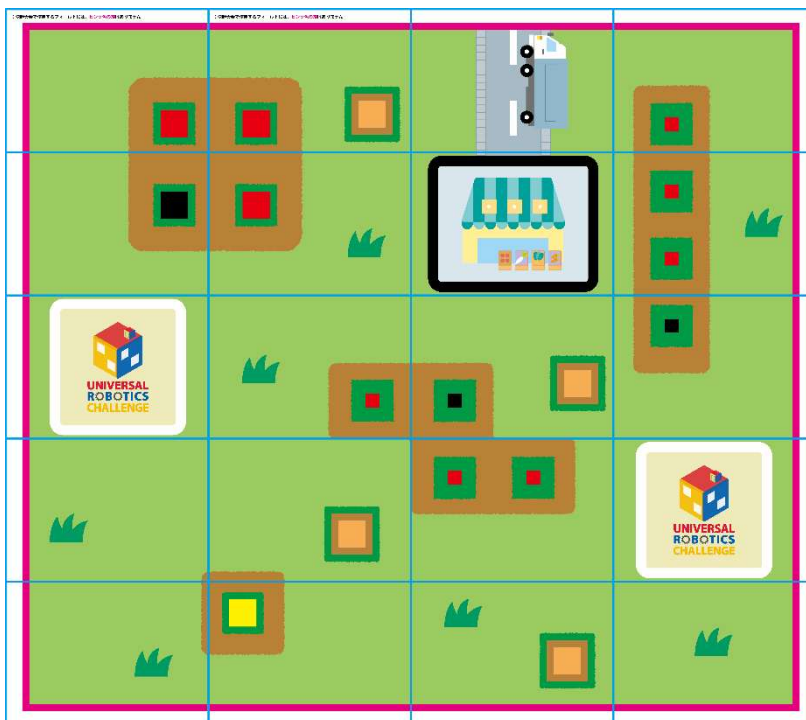
### 1. Preparing the Videos

For the preliminaries, you'll need to make the field, fruit, and trees yourself.

You'll also need to prepare anything else you might need!

#### ○ The Field

You can download the PDF of the field from the official website.



You'll need **20 sheets** of size A4 paper to print it out!

- You can print it out on any kind of paper you want.
- If the ink gets smudged or there are any blank spots when you print it, fix or fill them in with markers of the same color.
- Make sure to lay your field on a flat surface and tape it in place. It shouldn't have any bumps or slopes!



## ○ The Fruit

Read **Appendix 1** to find out how to make your fruit and trees.

- You can make them using any color blocks you want, but each type of object should be one unique color!
- You don't need to use mini cubes to make them.

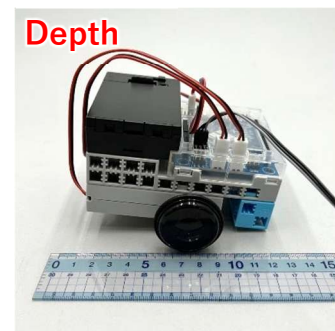
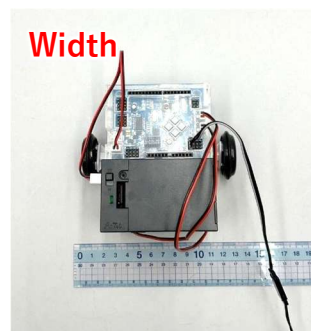
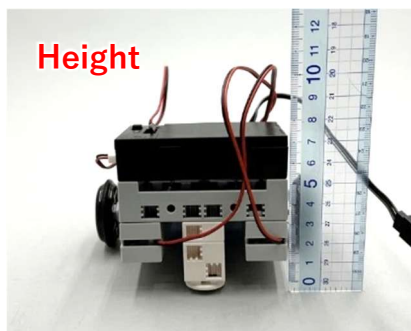


## 2. Making the Video

You'll need to have three things in your video:

### ① Robot Size (photo or video)

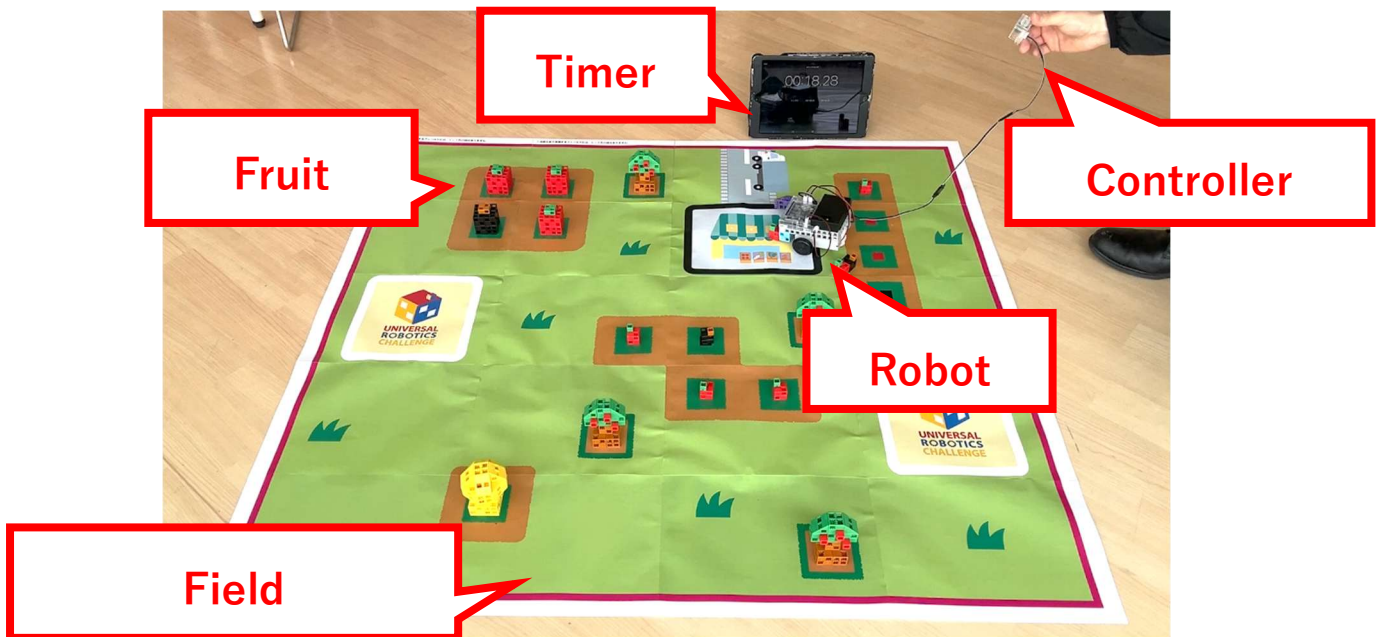
- Use a ruler or tape measure to measure the **height, width, and depth** of your robot.
- Each measurement should be shown for **at least 3 seconds**!



## ② Round Footage (video)

After placing your robot, fruit, and trees, start the timer to start the round.

The video should show the **whole field, your robot, fruit, trees, timer, and controller** at the same time!



- The video doesn't need to show you placing your robot, fruit, and trees.
- The timer should show the time in seconds. You can even use a smartphone app!
- If you want to use a retry, say retry or show a piece of paper with the word written on it to the camera.
- When you want to continue the round, say continue or show your retry paper again.
- When the 3-minute time limit is up, stop the timer and say stop or raise your hand to show that the round is over!

### ③ Scoring (photo or video)

When the round is over, show a closeup of the market to show how many fruit your robot delivered.

- If it's hard to see, try recording from other angles.
- If your robot moved any trees, show those too!

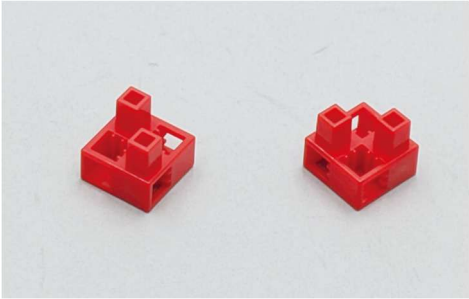

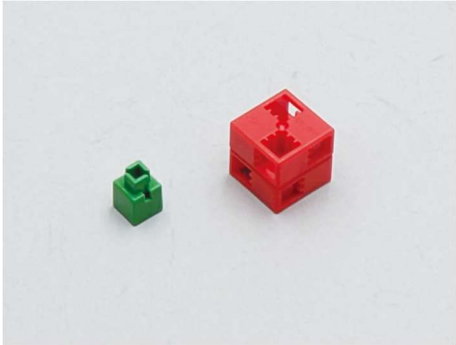
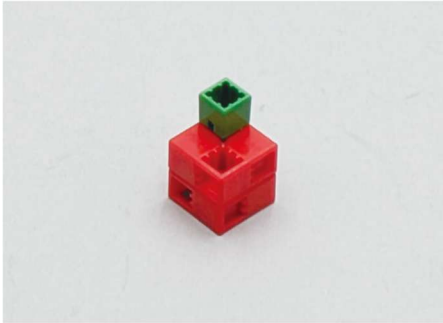


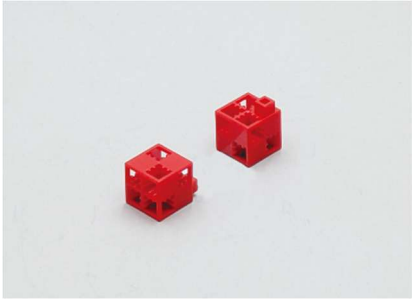
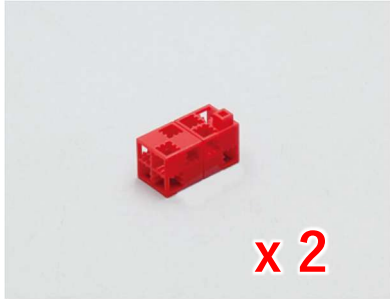

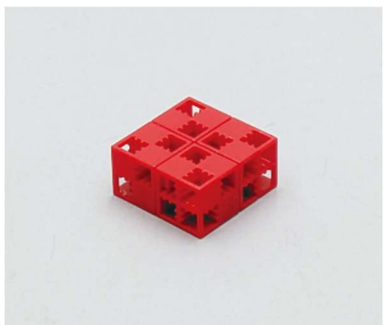
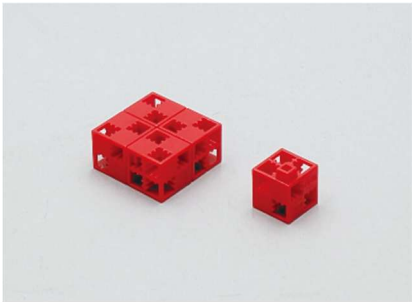

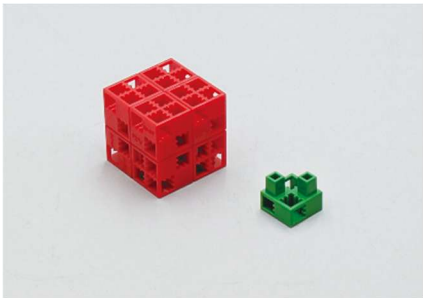
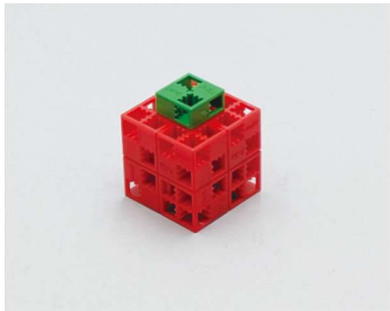
### 3. Notes on the Preliminaries

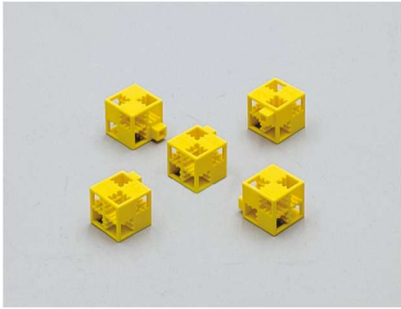
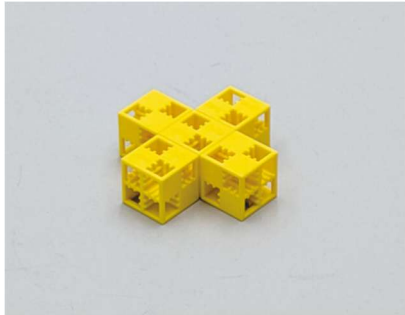
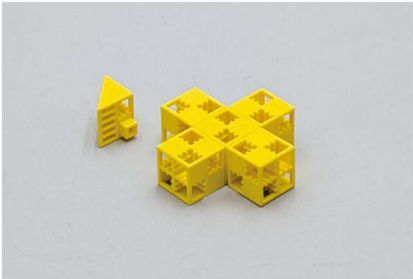

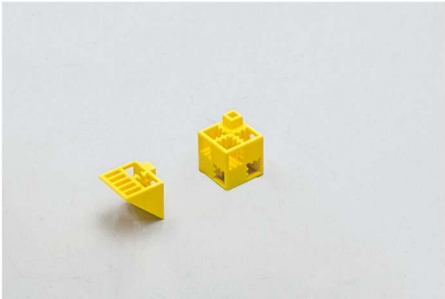
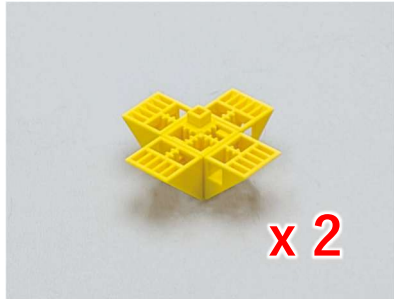
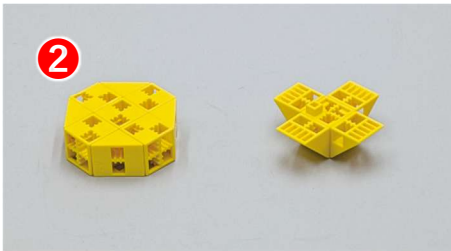

- You can edit your videos, but make sure not to fast forward, cut, or put together clips because this can make it hard to score your round!
- Fruit won't be scored if we can't tell it's inside of the market!

## Appendices

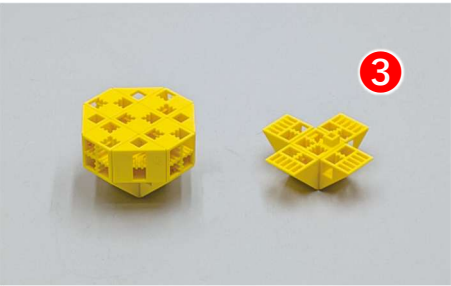

### Appendix 1. Making Fruit and Trees


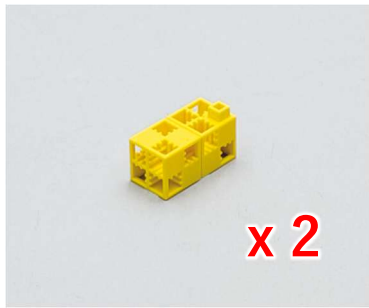
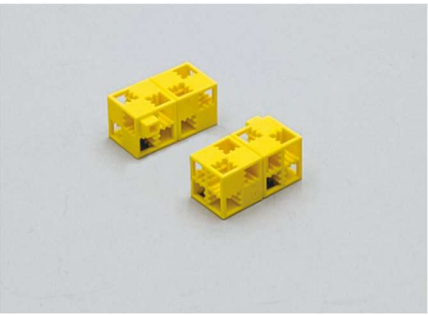
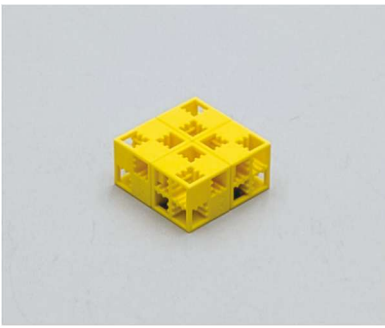
Redfruit / Badfruit (small)		
1		
2		


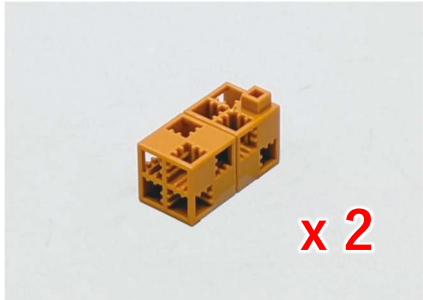
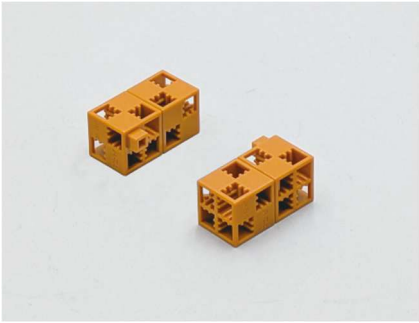
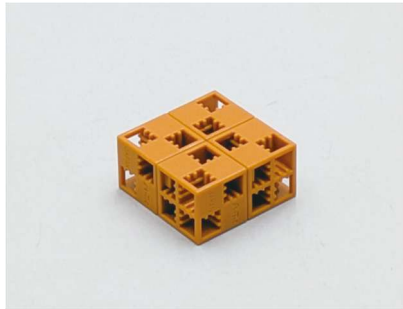

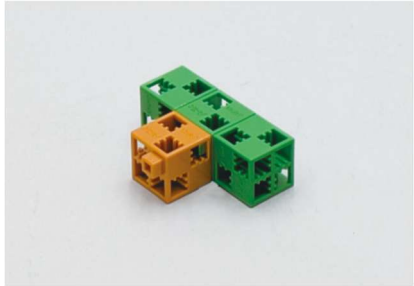
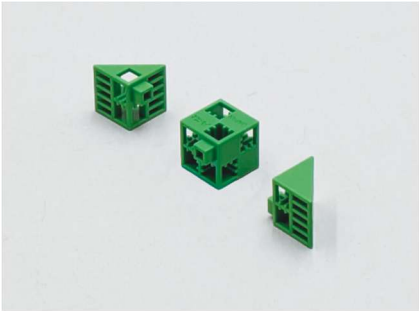
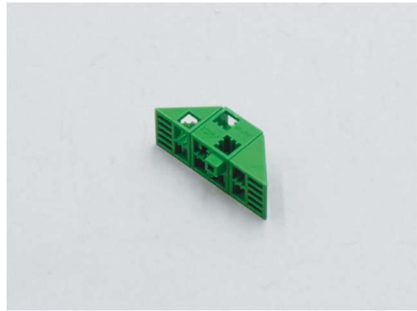
Redfruit / Badfruit (large)		
1		
2		
3		
4		

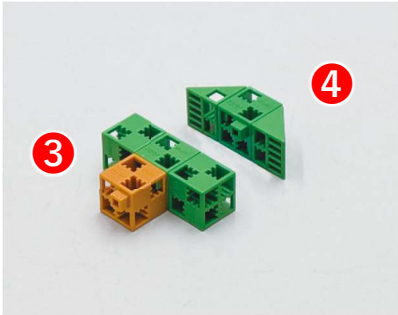
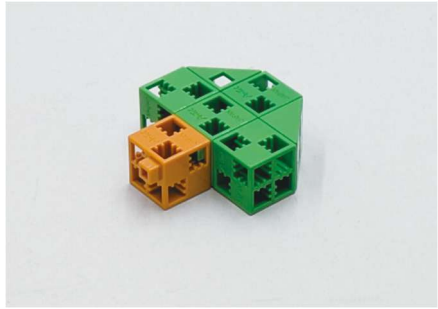
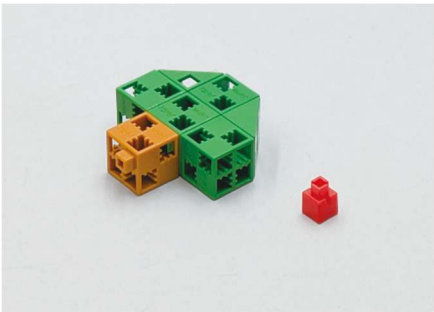
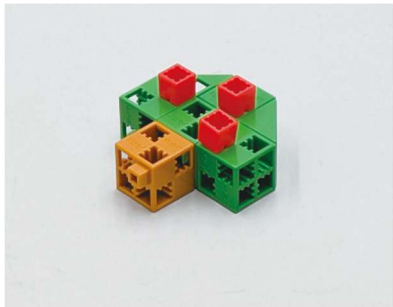
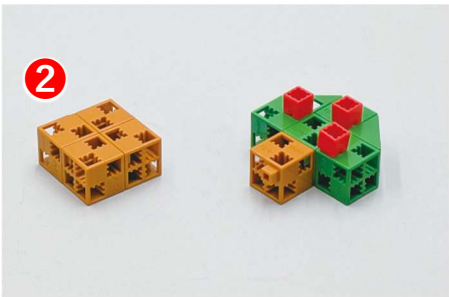
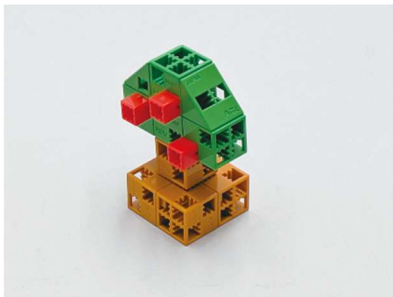
Goldfruit		
1		
2		
3		 x 2
4		



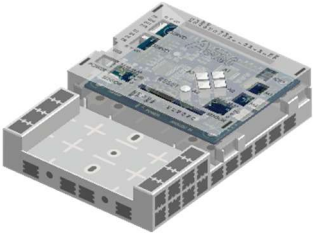
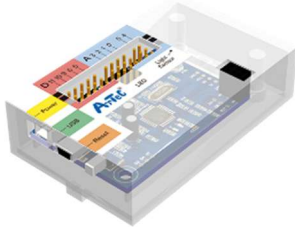


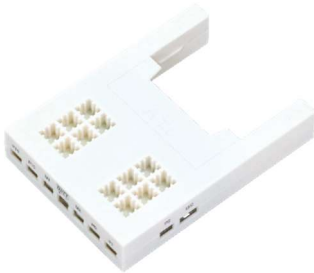
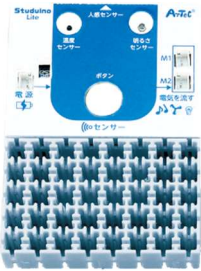
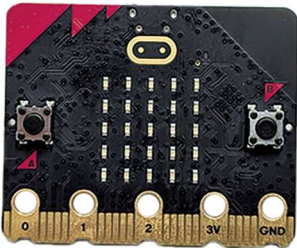
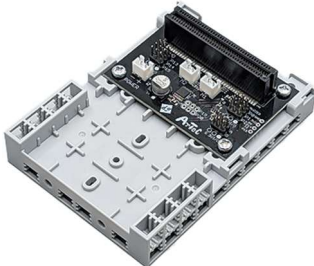

Goldfruit	
5	 

Goldfruit Stand	
1	 
2	 

Tree		
1		
2		
3		
4		


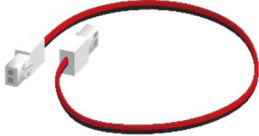


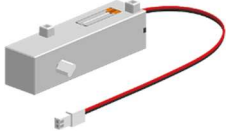
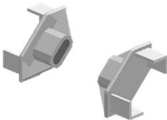
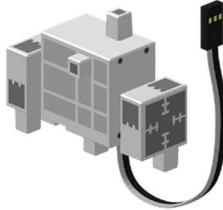
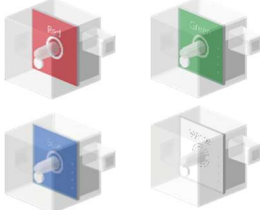
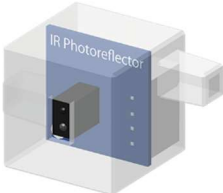
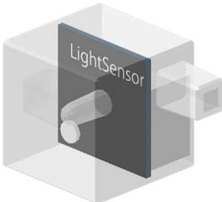
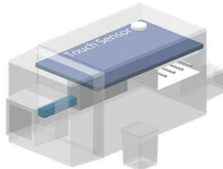
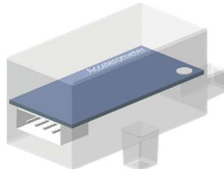
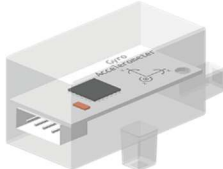


Tree		
5		
6		
7		

## Appendix 2. Competition Boards

Studuino	Studuino:mini	Studuino:mini DC Motor Expansion Board
		
Studuino:bit Core Unit	Robot Expansion Unit	StuduinoLite
		
micro:bit	micro:bit Expansion Board	Artec Links (including expansion units)
		



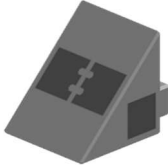
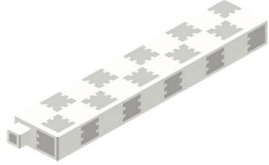






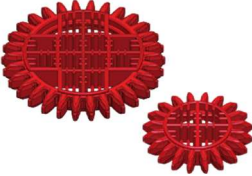
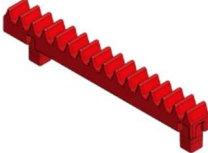



★ You don't need to use stands, covers, or stickers!

## Appendix 3. Electronic Parts

Battery Box	Battery Box Cable	Power Bank	USB Cable
			
DC Motor	DC Motor Parts	Servomotor	LED
			
IR Photorelector	Light Sensor	Touch Sensor	Accelerometer
			
Gyroscope	Sensor Connecting Cable	Sensor Extension Cable	
			

★ You don't need to use covers. Feel free to use stickers to tell your parts apart!

## Appendix 4. Artec Blocks

Basic Cube	Mini Cube	Triangle	Beam
			
Half A	Half B	Half C	Half D
			
Base	Axle	Gears (S and L)	Rack
			
Wheels	O-ring	Disks	
			


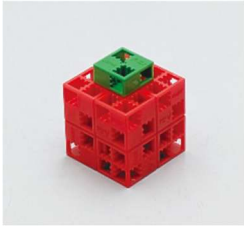




★ The blocks can be any color!



## Appendix 5. Scoring

Example 1)

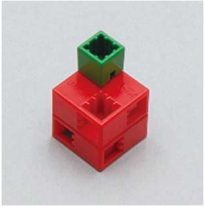


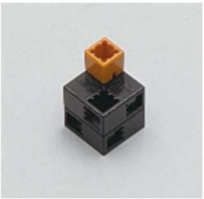

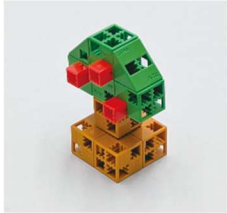


Redfruit (small)	Redfruit (large)	Goldfruit
 <p>50 points <math>\times</math> 4 = 200 points</p>	 <p>100 points <math>\times</math> 3 = 300 points</p>	 <p>300 points <math>\times</math> 1 = 300 points</p>
Badfruit (small)	Badfruit (large)	Tree
 <p>-100 points <math>\times</math> 0 = 0 points</p>	 <p>-100 points <math>\times</math> 0 = 0 points</p>	 <p>0 points</p>

200 points + 300 points + 300 points = 800 points

Example 2)

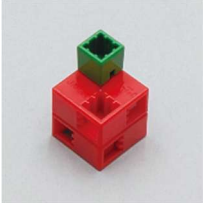







Redfruit (small)	Redfruit (large)	Goldfruit
 <p>50 points <math>\times</math> 3 = 150 points</p>	 <p>100 points <math>\times</math> 0 = 0 points</p> <p>50 points <math>\times</math> 1 = 50 points</p>	 <p>300 points <math>\times</math> 1 = 300 points</p>
Badfruit (small)	Badfruit (large)	Tree
 <p>-100 points <math>\times</math> 1 = -100 points</p>	 <p>-100 points <math>\times</math> 1 = -100 points</p>	 <p>0 points</p>

150 points + 50 points + 300 points - 100 points - 100 points = 300 points

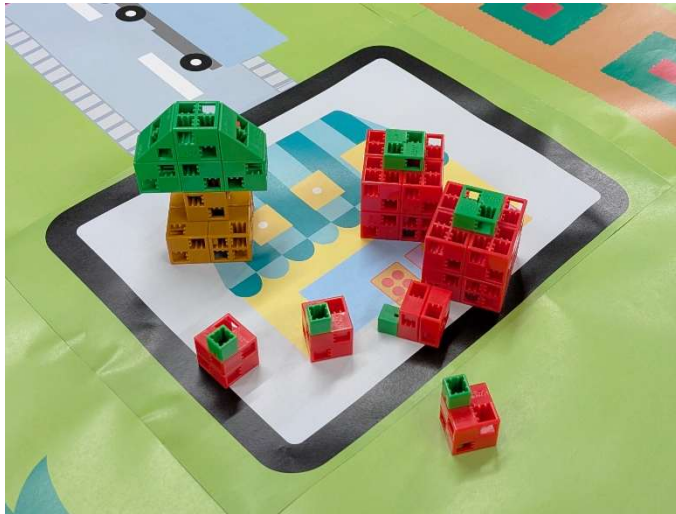
Example 3)

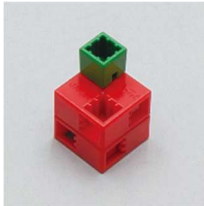


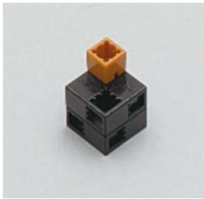




Redfruit (small)	Redfruit (large)	Goldfruit
 <p>50 points <math>\times</math> 3 = 150 points</p>	 <p>100 points <math>\times</math> 0 = 0 points</p>	 <p>300 points <math>\times</math> 1 = 300 points</p>
Badfruit (small)	Badfruit (large)	Tree
 <p>-100 points <math>\times</math> 1 = -100 points</p>	 <p>-100 points <math>\times</math> 1 = -100 points</p>	 <p>0 points</p>

150 points + 300 points - 100 points - 100 points = 250 points

Example 4)



Redfruit (small)	Redfruit (large)	Goldfruit
 <p>50 points <math>\times</math> 1 = 50 points</p> <p>25 points <math>\times</math> 2 = 50 points</p>	 <p>100 points <math>\times</math> 1 = 100 points</p> <p>50 points <math>\times</math> 1 = 50 points</p>	 <p>300 points <math>\times</math> 0 = 0 points</p>
Badfruit (small)	Badfruit (large)	Tree
 <p>-100 points <math>\times</math> 0 = 0 points</p>	 <p>-100 points <math>\times</math> 0 = 0 points</p>	 <p>0 points</p>

50 points + 50 points + 100 points + 50 points = 250 points

## ◆ Updates

June 6 (Fri), 2025

- Page 04: Added more information about how to connect the robot and the controller.
- Page 05: Added more information about the parts you can use for your controller.