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THE PAUL STREET BOYS PLAYING WITH MARBLES EINSTAND (T2)

S3 T2 D9 L1 P3

Focus on:
•Creativity, talent development (D9)

Task4: Play with marbles!

Students plan and build their own marble run course or maze.
They create their own set of rules and play with it together or teach the rules to their classmates and organize a championship.
Every solution is good!
Any kind of tool and material can be used!
You can use the ideas and the list of materials from the Idea Bazaar, use your own ideas or just let the children to solve the problem using their creativity.

Idea Bazaar – some ideas:

- Building a marble run out of ArTeC Blocks
- Building a marble run out of recycled materials
- Building a maze out of cardboard, straws, pencils, recycled materials, etc.
- Steering marbles together by tilting a huge maze

For details of the different solutions, see the Idea sheets!

Developmental fields:

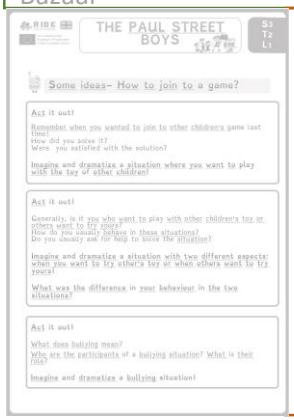
In focus:
- Spatial orientation
- Fine motor skills
- Social competencies

In addition:
- Attention concentration
- Subject concentration – Physics

Task5: How to join a game?

Students talk about acceptance, exclusion, ostracism, sharing toys and opportunities, bullying. They dramatize and act out the given situation.
Focus on
- Social skills
- Communication strategies
- Social relationships

You can use the Act it out! cards from the Idea Bazaar



Developmental fields:

In focus:
- Social competencies
- Text comprehension

In addition:
- Attention concentration
- Life skills
- Talent development

Idea Bazaar – some ideas:

- Find out and dramatize a situation where you want to play with other children!
- Dramatize a situation with 2 different aspects: when you want to try someone else's toy, and vice versa!
- Imagine and dramatize a bullying situation!

For details of the different solutions, see the Idea sheets!
Cut out the situation cards!
Choose the focus that you want the children to deal with! Give them the appropriate situation card!
Help them to build the situation if needed!

How to manage output:

Take a video recording of the dramatized situation!

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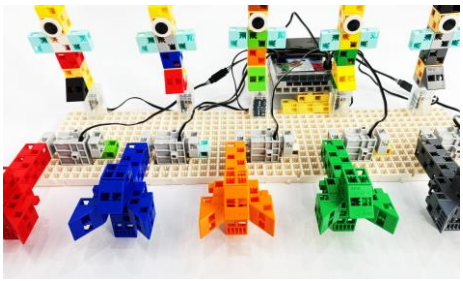
THE PAUL STREET BOYS PLAYING WITH MARBLES EINSTAND (T2)

S3 T2 D9 L2 P3



Focus on:
- Creativity, talent development (D9)

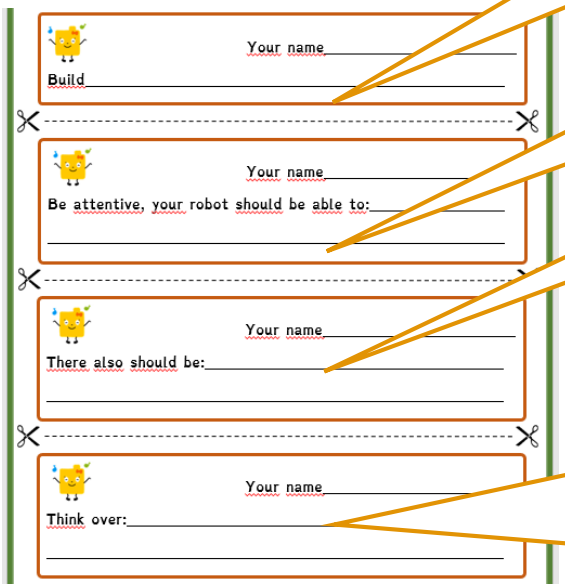
Goals of the lesson:
- text comprehension
- problem solving
- decision making
- organizing group work

And all of us did play marbles against the wall. Everyone had a chance to roll a marble and the fellow whose ball struck one already rolled took the whole pot.
The game had gone around several times. There must have been at least fifteen marbles at the wall. I think two of them were glassies. Suddenly we heard Richter yell: 'That finishes it, here come the Pásztor boys!' The Pásztor boys were just coming around the corner, with hands stuck in their pockets and their heads down low. They came so slowly that all of us got scared. What difference did it make that we were five against the two of them? They are strong enough to lick ten of us.
So, as I say, they kept coming nearer and nearer and had their eves on the marbles all the time. Said I to Kolnay: 'They seem to have taken a liking to our marbles.' Weisz was the smartest of us because he had said right away: 'They're coming, all right. There, einstand in the air!' Honestly, I didn't think they would hurt us, because we had never bothered them.
And at first they really didn't do anything to us. They only watched the game. Then Kolnay whispered to me: 'Let's stop now.' And I said: 'I should say not, not right after you've rolled a blank! It's my turn. If I win, we'll stop.' Meanwhile, Richter had to roll, but I saw his hand tremble with fear. He kept one eye on the Pásztors and, of course, he missed. But the Pásztors did not budge. They only stood there with hands stuck into their pockets.
Then I rolled. It was a strike. That made me the winner of all the marbles. I was about to go over to gather them up. There must have been about thirty in all. Just then one of the Pásztor boys jumped in front of me. It was the younger one, and he cried 'EINSTAND!' I turned my head and saw Kolnay and Barabas beating it away. Weisz stood near the wall. He was very pale. Richter was deliberating what to do. I tried to reason with them. I remember saying: 'Excuse me, but you have no right to this.' By this time, the older Pásztor had nearly finished picking up the marbles and putting them in his pocket. The younger one grabbed the front of my jacket and shouted: 'Didn't you hear me say EINSTAND?' After that, of course, I didn't say another word. Weisz began to bawl. Kolnay and Kende peeped back from around the corner of the museum to see what was happening. And the Pásztor boys picked up all the marbles. Then, without another murmur, they went away. That's all."

Main features and interactions of the characters		
Character	Features	Interactions
Nemecsek	Small, blond, speaks, rolls marble,	Play Argue with the Pásztor boys
Other boys	Roll marble, cry, tremble	
Pásztor boys	Approach, collect marbles, big, strong	Threaten the other boys, shout

How to use the character card:
Each student fills in his/her own Character card:
- writes the name of the character
- their features, movements, reactions, etc.
- collects the elements of the environment, other accessories, things to be built
- thinks over the phases, tools and materials of the robot's building

Students can use more pieces of each part of the Character card if needed!



Nemecsek
Other boys
Pásztor boys
Marble run track

Roll marbles
Be directed
Collect marbles

Trees
Other boys

The main actions of the story
Divide the text segment into pieces
Make a list about things needed
Media files needed

Suggestions
- Discuss the rules of playing marbles in the text! Make your students try it!
- Discuss what keeping the rules and fair play means.
- Talk about bullying in the text and in the students' real life. (bullying, abuse of power, behaviour of the victim, bullying in school and on the internet)
- Gather experiences: try colliding marbles, build a simple ramp and try rolling marbles

Suggested materials
- ArTeC robot and Blocks (at least the 112 pcs set)
- Marbles
- white paper, pencil, folder

RIDE
Robotics for the Inclusive Development of Atypical and Typical Children
Co-funded by the Erasmus+ Programme of the European Union

THE PAUL STREET BOYS PLAYING WITH MARBLES EINSTAND (T2)

S3
T2
D9
L3–4
P4

Focus on:
- Creativity, talent development (D9)

Goals of the lesson:
- fine motor skills,
- problem solving,
- decision making
- simple machines

Suggested materials
- ArTeC Blocks (at least the 112 pcs set, base plate or multybase) and ArTeC robotics set (at least Studuino motherboard, 2 DC motors, wheels, 1, 2 or 6 servo motors, 1, 2 or 6 Touch sensor, 1 IR Photoreflector)
- Marbles (min. 10 pcs)
- Photos, videos about different types of sweeping, collecting mechanisms
- Mindmap or Chart draft , Storyline
- Character cards and Robotic task card template
- Pencil

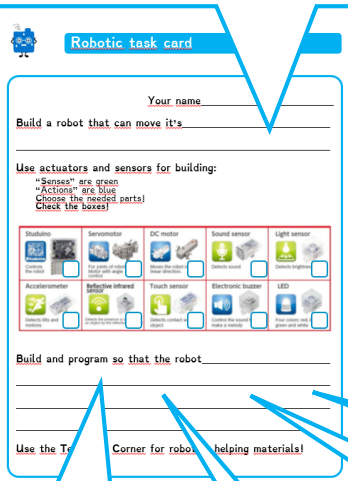
How to fill in the Robotic card?
- Choose robot's „activity" and its programming complexity according to the Character task card, the developmental aim and the programming level that fits the child's skills.
- More Robotic cards can be filled in if needed (for clarification or for differentiation).

Suggestions

Rolling marbles
- Discuss the movements of rolling and directing marbles
- Discuss how a ramp functions
- Discuss the collision of marbles
- Discuss simple machines, like a catapult
- Build simple models of catapults with different techniques

Collecting marbles
- Research different solutions for collecting things (snowplow, street sweeper car, combine harvester, etc.)
- Plan different solutions for collecting marbles

Provide marble run path
Rolling arm
Approach objects
Collecting arm



Related topics in the Technical corner
- Programming DC motor
  - Winding the motor a number of times (2.a, 2.b)
  - Winding the motor until a sensor detects change (4.b, 4.c, 4.d)
- Programming servo motor
  - Moving the arm to a given angle (3.a)
  - Stepping the servo motor (3.c)
- Testing and programming Touch sensor (4.a, 4.b, 4.c)
- Testing and programming IR Photoreflector (7.a, 7.c, 7.e)
  - Using an IR Photoreflector for detecting an object (7.d, 7.e)
- Using variables, programming increasing value, counting (11.c)

PROG1

Marble run ramp with mechanical boom barrier

The Pásztor boys approach to collect the marbles

PROG2

Marble run ramp with motorized boom barrier

The Pásztor boys approach the marbles directed by a remote to collect the marbles

PROG3

Marble run ramp with motorized boom barrier
OR
Boys throw the marbles

The Pásztor boys approach the marbles directed by a remote to collect the marbles with a special arm

PROG4

Marble run ramp with automatic boom barrier OR
Boys aim and throw the marbles
The Pásztor boys approach the marbles directed by a remote to collect the marbles with an automatic arm

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THE PAUL STREET BOYS PLAYING WITH MARBLES (T2)

S3
T2
D9
L3–4
P5

Ideas for robots on different programming levels

PROG1	PROG2	PROG3	PROG4
Marble run ramp with mechanical boom barrier The Pásztor boys approach to collect the marbles	Marble run ramp with motorized boom barrier The Pásztor boys approach the marbles directed by a remote to collect the marbles	Marble run ramp with motorized boom barrier OR Boys throw the marbles The Pásztor boys approach the marbles directed by a remote to collect the marbles with a special arm	Marble run ramp with automatic boom barrier OR Boys aim and throw the marbles The Pásztor boys approach the marbles directed by a remote to collect the marbles with an automatic arm

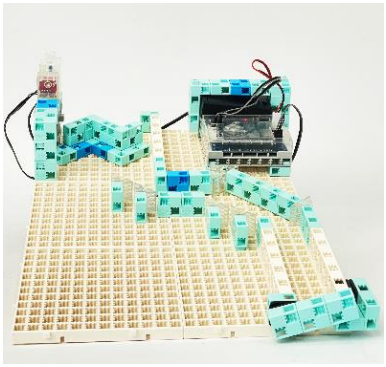
Rolling marbles

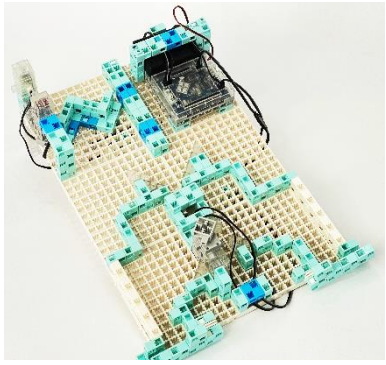
P1 Build a ramp with a marble run path
- It can be achieved by movable parts without robotics
- Baseplate, multibase or beams can be used for building
- Build a mechanical boom barrier (axle) to close/open the way of the marble

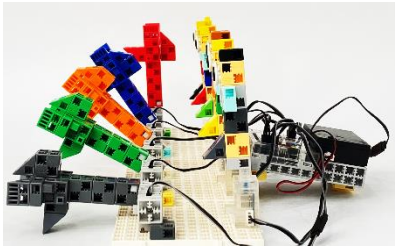
P2 Build a ramp with a marble run path and a motorized boom barrier
- Baseplate, multibase or beams can be used for building
- Build a boom barrier moved by servo motor to close/open the way of the marble
- The barrier should open when a Touch Sensor is pressed. A LED sould signal the moment of starting the marble

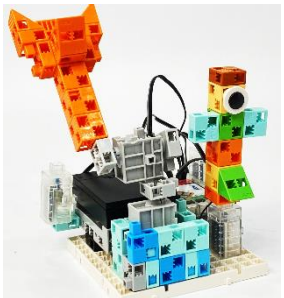
P3 Build a ramp with a random marble run path and a motorized boom barrier
- Baseplate, multibase or beams can be used for building
- Build 2 barriers moved by servo motors to close/open the way of the marble.
- Randomly chosen, one of the barriers should open when the Touch Sensor is pressed. A LED should signal the chosen barrier and the moment of starting the marble

P4 Build a ramp with random automatic junction and a motorized boom barrier
- Baseplate, multibase or beams can be used for building
- Build and program the barrier at the beginning of the path as in P1
- On its path the marble hits another barrier that is equipped with an IR Photoreflector and opens the path for the marble when it detects it.
- When the barrier opens, it should randomly choose between 2 paths.









Rolling marbles - catapult

P1 Build a mechanical marble catapult
- Use beams and axles for building
- Try to launch the marble by affixing the axle to different points of the beam

P2 Build a robotic catapult
- Use a servo motor for launching
- The movement begins at the press of a button

P3 Build 5 boys playing with marbles
- Build 5 small figures standing on the button of 5 Touch sensors
- Use 5 servo motors for launching
- Each figure should launch a marble when its Touch sensor is pressed

P4 Build a directed catapult
- Use 2 servo motors: 1 for launching and 1 for aiming
- The movement begins at the press of a button
- The launching structure should rotate left and right with 2 more Touch sensors

RIDE

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THE PAUL STREET BOYS EINSTAND (T2)

S3
T2
D9
L3–4
P6

Ideas for robots on different programming levels

PROG1	PROG2	PROG3	PROG4
Marble run ramp with mechanical boom barrier The Pásztor boys approach to collect the marbles	Marble run ramp with motorized boom barrier The Pásztor boys approach the marbles directed by a remote to collect the marbles	Marble run ramp with motorized boom barrier OR Boys throw the marbles The Pásztor boys approach the marbles directed by a remote to collect the marbles with a special arm	Marble run ramp with automatic boom barrier OR Boys aim and throw the marbles The Pásztor boys approach the marbles directed by a remote to collect the marbles with an automatic arm

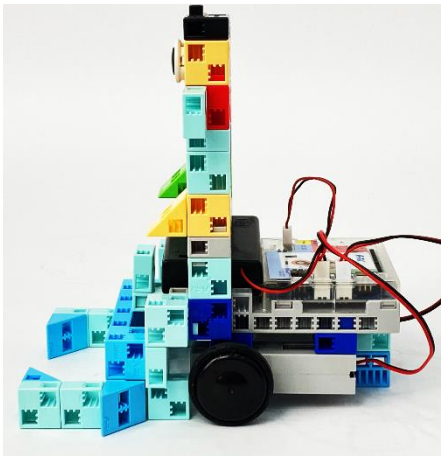
Einstand - Collecting marbles

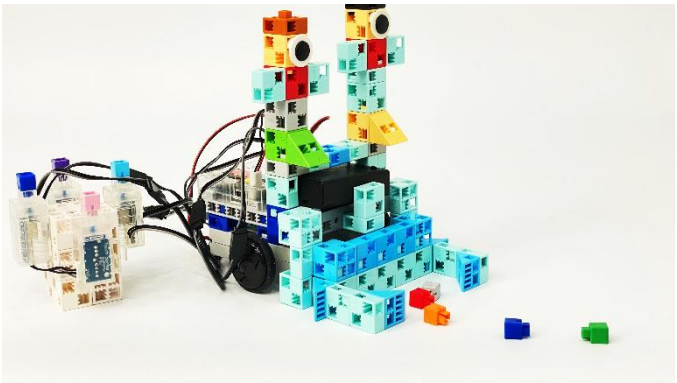
P1 Build a „marble sweeper" with two figures on it
- Build a car with 2 DC motors
- Add a scoop and two boys to it
- The „marble sweeper" should move automatically

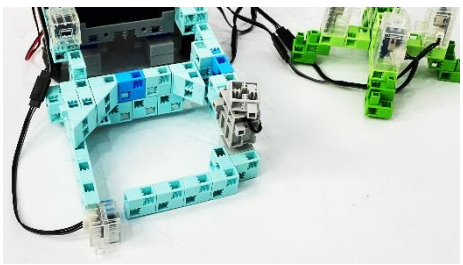
P2 Build a directable „marble sweeper"
- Build a car with 2 DC motors
- Add a 4-Touch sensor remote control to it
- Add a scoop and two boys to it

P3 Build a directable marble collector
- Build a car with 2 DC motors and add two boys to it
- Add a 4-Touch sensor remote control to it
- It should have a marble collector arm moved by a servo motor and controlled by a 5th Touch sensor
- A Buzzer should make a sound every time the arm collects a marble

P4 Build a „smart" marble collector
- Build a car with 2 DC motors and add two boys to it
- Add a 4-Touch sensor remote control to it
- It should have a marble collector arm moved by a servo motor and controlled by an IR Photoreflector (the arm should make the collecting movement when the IR Photoreflector detects a marble)
- A Buzzer should make a sound every time the arm collects a marble
- The robot should count the collected marbles. The robot should stop when 5 marbles have been collected.







RIDEX

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THE PAUL STREET BOYS
PLAYING WITH MARBLES
EINSTAND (T2)

S3 T2 D10 L1 P3

Focus on:

•Creativity (D10)

Task4: Play with marbles!

Students plan and build their own marble run course or maze.

They create their own set of rules and play with it together or teach the rules to their classmates and organize a championship.

Every solution is good!

Any kind of tool and material can be used!

You can use the ideas and the list of materials from the Idea Bazaar, use your own ideas or just let the children to solve the problem using their creativity.

Idea Bazaar – some ideas:

- Building a marble run out of ArTeC Blocks
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- Building a maze out of cardboard, straws, pencils, recycled materials, etc.
- Steering marbles together by tilting a huge maze

For details of the different solutions, see the Idea sheets!

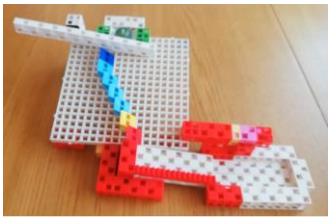
Developmental fields:

In focus:

- Spatial orientation
- Fine motor skills
- Social competencies

In addition:

- Attention concentration
- Subject concentration – Physics



Task5: How to join a game?

Students talk about acceptance, exclusion, ostracism, sharing toys and opportunities, bullying. They dramatize and act out the given situation.

Focus on

- Social skills
- Communication strategies
- Social relationships

You can use the Act it out! cards from the Idea Bazaar

Developmental fields:

In focus:

- Social competencies
- Text comprehension

In addition:

- Attention concentration
- Life skills
- Talent development

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- Find out and dramatize a situation where you want to play with other children!
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Cut out the situation cards!

Choose the focus that you want the children to deal with! Give them the appropriate situation card!

Help them to build the situation if needed!

How to manage output:

Take a video recording of the dramatized situation!

RIDEX

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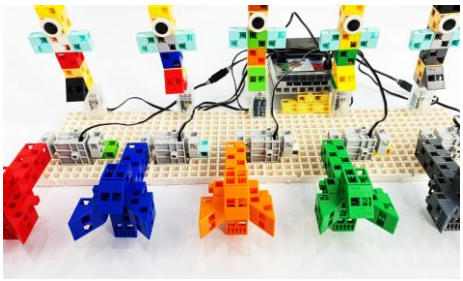
THE PAUL STREET BOYS
PLAYING WITH MARBLES
EINSTAND (T2)

S3 T2 D10 L2 P3



Focus on:
- Creativity (D10)

Goals of the lesson:
- text comprehension
- problem solving
- decision making
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Main features and interactions of the characters

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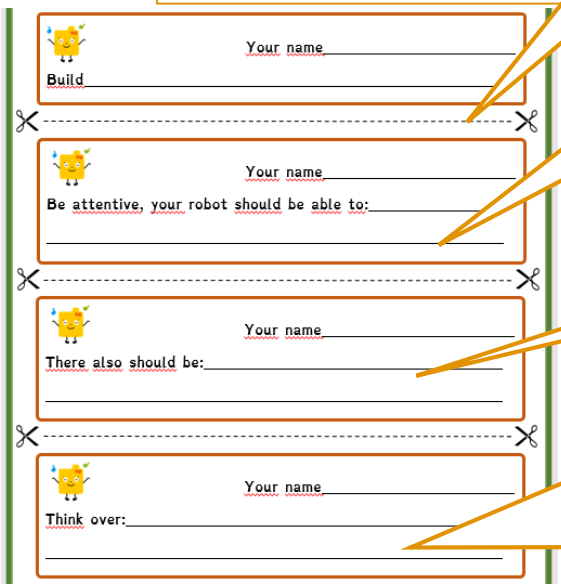

Nemecsek
Other boys
Pásztor boys
Marble run track

Roll marbles
Be directed
Collect marbles

Trees
Other boys

The main actions of the story
Divide the text segment into pieces
Make a list about things needed
Media files needed

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- Gather experiences: try colliding marbles, build a simple ramp and try rolling marbles

Suggested materials
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- Marbles
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RIDEX

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THE PAUL STREET BOYS
PLAYING WITH MARBLES
EINSTAND (T2)

S3
T2
D10
L3–4
P4

Focus on:
- Creativity (D10)

Goals of the lesson:
- fine motor skills,
- problem solving,
- decision making
- simple machines

Suggested materials
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Collecting marbles
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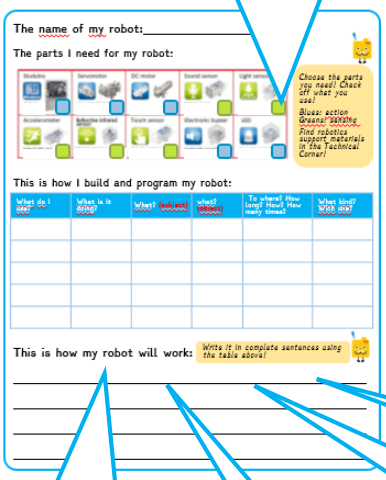
- Plan different solutions for collecting marbles

Suggestions
Rolling marbles
- Discuss the movements of rolling and directing marbles
- Discuss how a ramp functions
- Discuss the collision of marbles
- Discuss simple machines, like a catapult
- Build simple models of catapults with different techniques

Provide marble run path
Rolling arm
Approach objects
Collecting arm



How to fill in the Robotic card?
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  - Winding the motor a number of times (2.a, 2.b)
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  - Using an IR Photoreflector for detecting an object (7.d, 7.e)
- Using variables, programming increasing value, counting (11.c)

PROG1
Marble run ramp with mechanical boom barrier
The Pásztor boys approach to collect the marbles

PROG2
Marble run ramp with motorized boom barrier
The Pásztor boys approach the marbles directed by a remote to collect the marbles

PROG3
Marble run ramp with motorized boom barrier OR
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The Pásztor boys approach the marbles directed by a remote to collect the marbles with a special arm

PROG4
Marble run ramp with automatic boom barrier OR
Boys aim and throw the marbles
The Pásztor boys approach the marbles directed by a remote to collect the marbles with an automatic arm

RIDEX

Co-funded by the Erasmus+ Programme of the European Union

THE PAUL STREET BOYS
PLAYING WITH MARBLES (T2)

S3
T2
D10
L3–4
P5

Ideas for robots on different programming levels

PROG1	PROG2	PROG3	PROG4
Marble run ramp with mechanical boom barrier The Pásztor boys approach to collect the marbles	Marble run ramp with motorized boom barrier The Pásztor boys approach the marbles directed by a remote to collect the marbles	Marble run ramp with motorized boom barrier OR Boys throw the marbles The Pásztor boys approach the marbles directed by a remote to collect the marbles with a special arm	Marble run ramp with automatic boom barrier OR Boys aim and throw the marbles The Pásztor boys approach the marbles directed by a remote to collect the marbles with an automatic arm

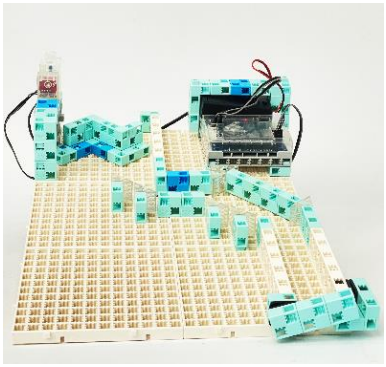
Rolling marbles

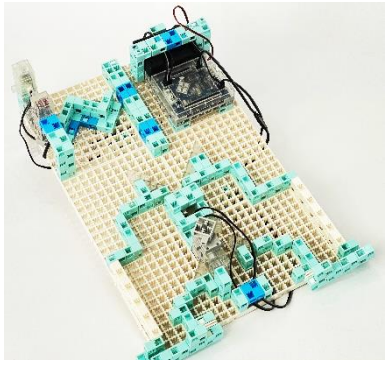
P1 Build a ramp with a marble run path
- It can be achieved by movable parts without robotics
- Baseplate, multibase or beams can be used for building
- Build a mechanical boom barrier (axle) to close/open the way of the marble

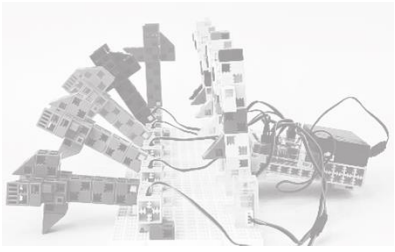
P2 Build a ramp with a marble run path and a motorized boom barrier
- Baseplate, multibase or beams can be used for building
- Build a boom barrier moved by servo motor to close/open the way of the marble
- The barrier should open when a Touch Sensor is pressed. A LED sould signal the moment of starting the marble

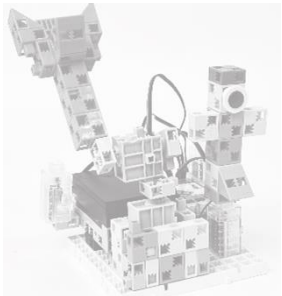
P3 Build a ramp with a random marble run path and a motorized boom barrier
- Baseplate, multibase or beams can be used for building
- Build 2 barriers moved by servo motors to close/open the way of the marble.
- Randomly chosen, one of the barriers should open when the Touch Sensor is pressed. A LED should signal the chosen barrier and the moment of starting the marble

P4 Build a ramp with random automatic junction and a motorized boom barrier
- Baseplate, multibase or beams can be used for building
- Build and program the barrier at the beginning of the path as in P1
- On its path the marble hits another barrier that is equipped with an IR Photoreflector and opens the path for the marble when it detects it.
- When the barrier opens, it should randomly choose between 2 paths.









Rolling marbles - catapult

P1 Build a mechanical marble catapult
- Use beams and axles for building
- Try to launch the marble by affixing the axle to different points of the beam

P2 Build a robotic catapult
- Use a servo motor for launching
- The movement begins at the press of a button

P3 Build 5 boys playing with marbles
- Build 5 small figures standing on the button of 5 Touch sensors
- Use 5 servo motors for launching
- Each figure should launch a marble when its Touch sensor is pressed

P4 Build a directed catapult
- Use 2 servo motors: 1 for launching and 1 for aiming
- The movement begins at the press of a button
- The launching structure should rotate left and right with 2 more Touch sensors

RIDEX

Co-funded by the Erasmus+ Programme of the European Union

THE PAUL STREET BOYS EINSTAND (T2)

S3
T2
D10
L3–4
P6

Ideas for robots on different programming levels

PROG1	PROG2	PROG3	PROG4
Marble run ramp with mechanical boom barrier The Pásztor boys approach to collect the marbles	Marble run ramp with motorized boom barrier The Pásztor boys approach the marbles directed by a remote to collect the marbles	Marble run ramp with motorized boom barrier OR Boys throw the marbles The Pásztor boys approach the marbles directed by a remote to collect the marbles with a special arm	Marble run ramp with automatic boom barrier OR Boys aim and throw the marbles The Pásztor boys approach the marbles directed by a remote to collect the marbles with an automatic arm

Einstand - Collecting marbles

P1 Build a „marble sweeper" with two figures on it
- Build a car with 2 DC motors
- Add a scoop and two boys to it
- The „marble sweeper" should move automatically

P2 Build a directable „marble sweeper"
- Build a car with 2 DC motors
- Add a 4-Touch sensor remote control to it
- Add a scoop and two boys to it

P3 Build a directable marble collector
- Build a car with 2 DC motors and add two boys to it
- Add a 4-Touch sensor remote control to it
- It should have a marble collector arm moved by a servo motor and controlled by a 5th Touch sensor
- A Buzzer should make a sound every time the arm collects a marble

P4 Build a „smart" marble collector
- Build a car with 2 DC motors and add two boys to it
- Add a 4-Touch sensor remote control to it
- It should have a marble collector arm moved by a servo motor and controlled by an IR Photoreflector (the arm should make the collecting movement when the IR Photoreflector detects a marble)
- A Buzzer should make a sound every time the arm collects a marble
- The robot should count the collected marbles. The robot should stop when 5 marbles have been collected.