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THE PAUL STREET BOYS THE GRUND (T3)

S3
T3
D9
L1 P3

Focus on:

•Talent development (D9)

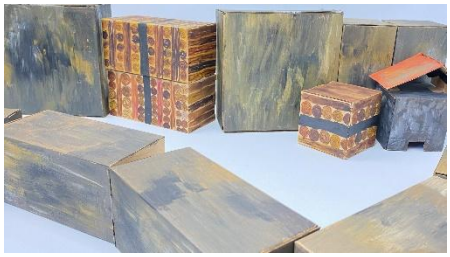
Task1: Plan and build a cool playground or build the „Grund”!

Students create elements of a playground or of the „Grund”.

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 playground or the Grund out of ArTeC Blocks
- Building a playground or the Grund out of recycled materials
- Creating 3D computer graphics

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

Developmental fields:

In focus:

- Fine motor skills
- Creativity
- Spatial orientation

In addition:

- Attention concentration
- Subject concentration – Drawing, arts&crafts, IT
- Talent development

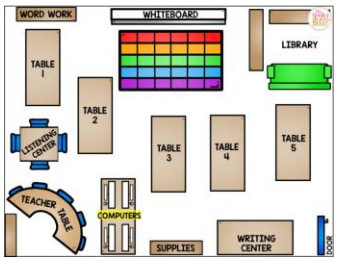
Task2: Draw a map of the classroom or the schoolyard! Make challenges to each other: get from one point to another!

Students create maps – making sure to measure the proportions and distances of objects

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:

- Students can make challenge cards (e.g. Get from the whiteboard to the teacher’s table!) and play with them
- Students should give instructions to each other (Go ahead, Turn right, etc.)
- First move in the classroom for real, then just show the route you’d take on the map!

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

Developmental fields:

In focus:

- Spatial orientation
- Computational thinking
- Attention

In addition:

- Subject concentration – Drawing, IT, mathematics
- Creativity

How to manage output:

Hang the pictures on the wall, on a big poster, and ask the children to arrange them according to a rule they decide.

Store the objects in a wardrobe, to protect them from falls.

Attach a label with the name of the group!

RIDE

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

THE PAUL STREET BOYS THE GRUND (T3)

S3 T3 D9 L2 P3

Focus on:
- Talent development (D9)

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

The grund was a vacant lot on the corner of Paul Street and Maria Street. For the Paul Street Boys, who lived on narrow streets among rows of tall houses, this little lot spelled freedom and boundlessness.
Its fence ran along the Paul Street side. Two tall buildings bordered it left and right, and in the rear... yes, it was the rear section which rendered this grund most attractive, magnificent.
Here, it should be noted, it was adjoined by another spacious site. This was under lease to a saw mill concern, and the lot was thickly strewn with piles of lumber. Here stacks of firewood formed symmetrical blocks, and among these huge blocks ran little alleys. It
was a veritable labyrinth. Some three-score narrow little streets intersecting each other among mute and dark stacks of wood.
It was no easy matter to find your way in this maze. But he who did manage to struggle through found himself within a small clearing in the middle of which stood a tiny hut. Within it was housed the steam-saw. It was a strange, eerie little house. It was completely covered by wild grapevines. Its graceful black chimney puffed through green foliage; at regular intervals and with clock-like regularity its clear white vapours issued forth.
All about the hut stood big, clumsy vans. From time to time one of these vans would back toward the eaves, producing a creaking sound. Directly under the eaves was a small window and out of this window extended a wooden trough. As the van stopped near the window, out of the trough there suddenly began to dribble a mass of kindling wood; it fairly poured into the big van. And as the van was filled to the top, the driver gave a shout. Thereupon the little chimney ceased its puffing, within the hut immediate silence ensued and, at the bidding of their master, the horses started off with their load. Another van – hungry and empty – rolled up to the little window and the black iron chimney resumed its vomiting, the dribbling of kindling wood was heard again.

Main features and interactions of the characters		
Character	Features	Interactions
The sawmill	Puffs - issues smoke Extends a trough Cuts wood	Pieces of wood are poured into the van When the driver of the van gives a signal, the sawmill stops
The van	Rolls The driver shouts	Rolls up to the sawmill Leaves when it is full

Suggestions

The Grund
- Discuss the importance of the Grund to the boys
- Collect and depict the the sights and buildings of the Grund
- Build a model of the Grund

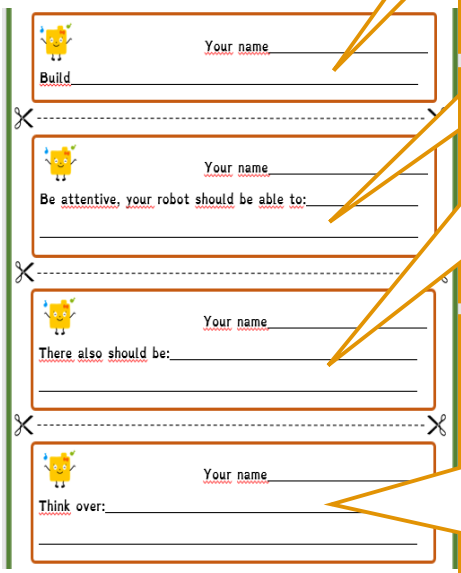
The sawmill
- Discuss the usage of kindling wood
- Discuss the different types of heating and fuel – focusing on historical eras, geographical and social differences, environmental protection
- Understand how the sawmill works – have the students draw plans, flowcharts

Suggested materials
- ArTeC robot and Blocks (at least the 112 pcs set)
- Cardboard, boxes, recycled materials, other building sets

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!



Sawmill
Van

Puff
Extend the trough
Pour pieces of wood
Roll to the sawmill
Give signal
Leave the sawmill

The Grund
Stacks of wood – maze
Grapevine covering the walls of the sawmill
Pieces of wood

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

RIDE

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THE PAUL STREET BOYS
THE GRUND (T3)

S3
T3
D9
L3–4
P4

Focus on:
- Talent development (D9)

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

Suggested materials
- ArTeC Blocks (at least the 112 pcs set) and ArTeC robotics set (1 or 2 Studuino motherboards, 3 DC motors, wheels, small gears, 2 servo motors, 4 Touch sensors, 1 IR Photoreflector, 1 Sound sensor, 1 Accelerometer, 4 LEDs)
- Photos, videos about sawmills
- Flowchart of a sawmill's operation
- Mindmap or Chart draft , Storyline
- Character cards and Robotic task card template
- Pencil

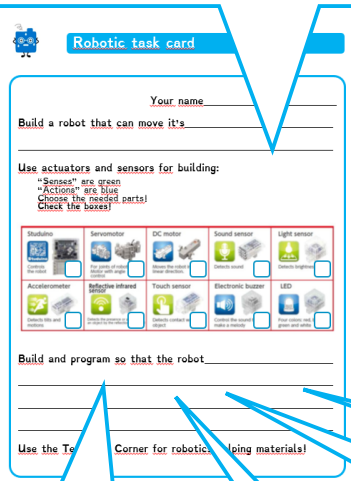
How to fill in the Robotic card?
- Choose robot's „activity" and its programming complexity according to the Character task card, the developmental aim and the programming level that fits the child's skills.
- More Robotic cards can be filled in if needed (for clarification or for differentiation).

Suggestions

Sawmill
- Understand how the sawmill works – have the students draw plans, flowcharts
- Build a simple modell of the sawmill with movable parts from ArTeC Blocks

Van
- Collect possibilities for moving and directing the van
- Collect possibilities for detecting that the van arrived to the sawmill and that the van is full and can leave

Trough
Ramp
Pieces of wood
Tossing arm
Wheels



Related topics in the Technical corner
- Programming DC motor
  - Winding the motor a number of times (2.a, 2.b)
  - Winding the motor until the sensor detects change (4.b, 4.c)
- Programming servo motor
  - Moving the arm to a given angle (3.a)
- Testing and programming Touch sensor (4.a, 4.b, 4.c)
  - Remote control for the robot made of 4 Touch sensors(4.d)
- Testing and programming IR Photoreflector (7.a, 7.c, 7.e)
  - Using an IR Photoreflector for detecting an object (7.d, 7.e)
- Testing and programming Sound sensor (9.a)
  - Activating the robot with sound (9.b)
- Using LED (5.a)
  - Blinking (5.b)
- Robot controller made of Accelerometer (4.e)

PROG1

Sawmill with mechanical tossing mechanism

Van rolls up to the sawmill automatically

PROG2

The trough and the tossing arm moves automatically

Van rolls up to the sawmill automatically

PROG3

The trough, the tossing arm and the ramp move automatically. The sawmill begins to work when the driver of the van shouts
Van controlled by a remote controller

PROG4

The trough, the tossing arm and the ramp move automatically. The sawmill begins to work when the van stops under the ramp
Van controlled by a remote controller

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THE PAUL STREET BOYS THE GRUND (T3)

S3
T3
D9
L3–4
P5

Ideas for robots on different programming levels

PROG1	PROG2	PROG3	PROG4
Sawmill with mechanical tossing mechanism Van rolls up to the sawmill automatically	The trough and the tossing arm moves automatically Van rolls up to the sawmill automatically	The trough, the tossing arm and the ramp move automatically. The sawmill begins to work when the driver of the van shouts Van controlled by a remote controller	The trough, the tossing arm and the ramp move automatically. The sawmill begins to work when the van stops under the ramp Van controlled by a remote controller

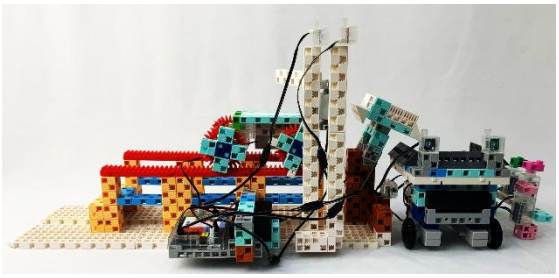
Sawmill

P1 Build a mechanical sawmill
- It can be achieved by movable parts without robotics
- The trough can be built as a simple cart with gears for wheels, rolling on drive rails
- The tossing arm that forwards the pieces of wood to the van using a ramp can tilt on axles

P2 Build an automatic sawmill
- The trough can be built as a simple cart with gears for wheels, rolling on drive rails (1 DC motor)
- The tossing arm that forwards the pieces of wood to the van using a ramp should be moved by a servo motor
- An LED should sign the action with blinking
- The ramp can tilt on axles

P3 Build a sound-controlled sawmill
- The working process of the sawmill should start when a Sound sensor detects sound (the shouting of the van's driver)
- The trough and the tossing arm should be built as in P2
- The ramp is tilted by a servo motor while an LED is blinking

P4 Build a cooperative sawmill
- The working process of the sawmill should start when an IR Photoreflector detects the van standing under the ramp
- The whole process is the same as in P3



Van

P1 Build an automatic van
- The van can roll up to the sawmill on 2 DC motors
- After turning it on, the wheels rotate a number of times

P2 Build an automatic van
- The van can roll up to the sawmill on 2 DC motors
- After turning it on, the wheels rotate a number of times

P3 Build a directable van
- Build a van with 2 DC motors
- Add a 4-Touch sensor remote control to it
- Blinking LEDs should show the direction it is turning

P4 Accelerometer-controlled van
- Build a van with 2 DC motors
- Add an Accelerometer as a remote control to it
- Blinking LEDs should show the direction it is turning

RIDEX

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THE PAUL STREET BOYS
THE GRUND (T3)

S3
T3
D10
L1 P3

Focus on:

•Creativity (D10)

Task1: Plan and build a cool playground or build the „Grund"!

Students create elements of a playground or of the „Grund".

Every solution is good!

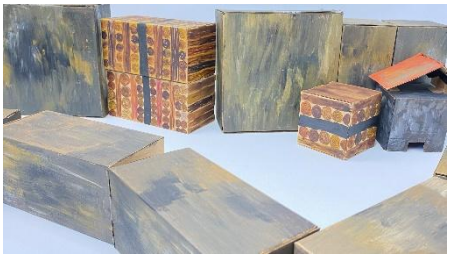
Any kind of tool and material can be used!

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 playground or the Grund out of ArTeC Blocks
- Building a playground or the Grund out of recycled materials
- Creating 3D computer graphics

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



Developmental fields:

In focus:

- Fine motor skills
- Creativity
- Spatial orientation

In addition:

- Attention concentration
- Subject concentration – Drawing, arts&crafts, IT
- Talent development

Task2: Draw a map of the classroom or the schoolyard! Make challenges to each other: get from one point to another!

Students create maps – making sure to measure the proportions and distances of objects

Every solution is good!

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Idea Bazaar – some ideas:

- Students can make challenge cards (e.g. Get from the whiteboard to the teacher's table!) and play with them
- Students should give instructions to each other (Go ahead, Turn right, etc.)
- First move in the classroom for real, then just show the route you'd take on the map!

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

Developmental fields:

In focus:

- Spatial orientation
- Computational thinking
- Attention

In addition:

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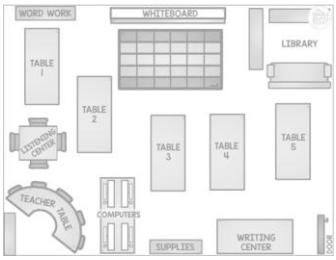
- Creativity



How to manage output:

Hang the pictures on the wall, on a big poster, and ask the children to arrange them according to a rule they decide.

Store the objects in a wardrobe, to protect them from falls.

Attach a label with the name of the group!

RIDEX

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THE PAUL STREET BOYS
THE GRUND (T3)

S3 T3 D10 L2 P3

Focus on:
- Creativity (D10)

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

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Main features and interactions of the characters

Character	Features	Interactions
The sawmill	Puffs - issues smoke Extends a trough Cuts wood	Pieces of wood are poured into the van When the driver of the van gives a signal, the sawmill stops
The van	Rolls The driver shouts	Rolls up to the sawmill Leaves when it is full

How to use the character card:
Each student fills in his/her own Character card:
- writes the name of the character
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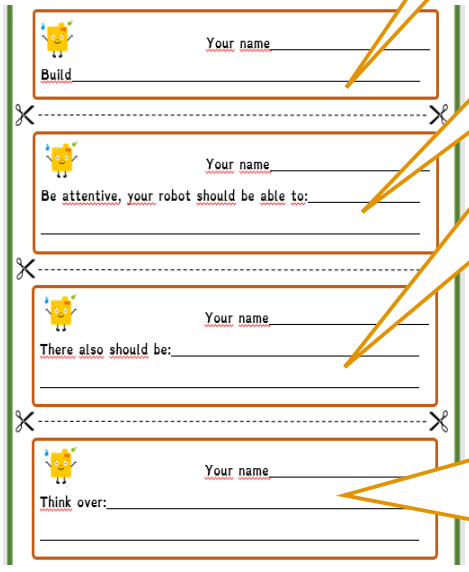

Sawmill
Van

Puff
Extend the trough
Pour pieces of wood
Roll to the sawmill
Give signal
Leave the sawmill

The Grund
Stacks of wood – maze
Grapevine covering the walls of the sawmill
Pieces of wood

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

Suggestions
The Grund
- Discuss the importance of the Grund to the boys
- Collect and depict the the sights and buildings of the Grund
- Build a model of the Grund

The sawmill
- Discuss the usage of kindling wood
- Discuss the different types of heating and fuel – focusing on historical eras, geographical and social differences, environmental protection
- Understand how the sawmill works – have the students draw plans, flowcharts

Suggested materials
- ArTeC robot and Blocks (at least the 112 pcs set)
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RIDEX

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THE PAUL STREET BOYS
THE GRUND (T3)

S3
T3
D10
L3–4
P4

Focus on:
- Creativity (D10)

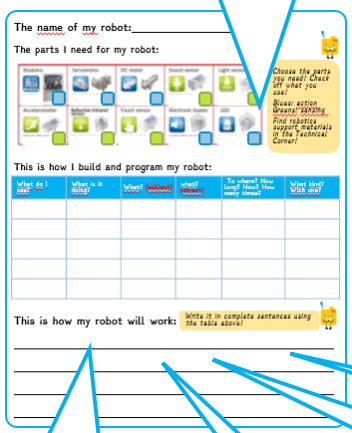
Goals of the lesson:
- fine motor skills,
- problem solving,
- decision making,
- life skills

Suggested materials
- ArTeC Blocks (at least the 112 pcs set) and ArTeC robotics set (1 or 2 Studuino motherboards, 3 DC motors, wheels, small gears, 2 servo motors, 4 Touch sensors, 1 IR Photoreflector, 1 Sound sensor, 1 Accelerometer, 4 LEDs)
- Photos, videos about sawmills
- Flowchart of a sawmill's operation
- Mindmap or Chart draft , Storyline
- Character cards and Robotic task card template
- Pencil

Suggestions
Van
- Collect possibilities for moving and directing the van
- Collect possibilities for detecting that the van arrived to the sawmill and that the van is full and can leave

How to fill in the Robotic card?
- Based on the character card, the developmental aspect and the programming level, choose the robot activity and the complexity of the program to match the child's abilities.
- Additional robot cards can be filled in if necessary (e.g. for clarification or differentiation).
- Not all the table's columns need to be filled in, only those relevant to the robot's particular function.
- Based on each row of the table, use grammatically correct sentences to describe the robot's operation in the target language.

Trough
Ramp
Pieces of wood
Tossing arm
Wheels



Related topics in the Technical corner
- Programming DC motor
  - Winding the motor a number of times (2.a, 2.b)
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- Programming servo motor
  - Moving the arm to a given angle (3.a)
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  - Remote control for the robot made of 4 Touch sensors(4.d)
- Testing and programming IR Photoreflector (7.a, 7.c, 7.e)
  - Using an IR Photoreflector for detecting an object (7.d, 7.e)
- Testing and programming Sound sensor (9.a)
  - Activating the robot with sound (9.b)
- Using LED (5.a)
  - Blinking (5.b)
- Robot controller made of Accelerometer (4.e)

PROG1
Sawmill with mechanical tossing mechanism
Van rolls up to the sawmill automatically

PROG2
The trough and the tossing arm moves automatically
Van rolls up to the sawmill automatically

PROG3
The trough, the tossing arm and the ramp move automatically.
The sawmill begins to work when the driver of the van shouts
Van controlled by a remote controller

PROG4
The trough, the tossing arm and the ramp move automatically.
The sawmill begins to work when the van stops under the ramp
Van controlled by a remote controller

RIDEX

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THE PAUL STREET BOYS
THE GRUND (T3)

S3
T3
D10
L3–4
P5

Ideas for robots on different programming levels

PROG1	PROG2	PROG3	PROG4
Sawmill with mechanical tossing mechanism Van rolls up to the sawmill automatically	The trough and the tossing arm moves automatically Van rolls up to the sawmill automatically	The trough, the tossing arm and the ramp move automatically. The sawmill begins to work when the driver of the van shouts Van controlled by a remote controller	The trough, the tossing arm and the ramp move automatically. The sawmill begins to work when the van stops under the ramp Van controlled by a remote controller

Sawmill

P1 Build a mechanical sawmill
- It can be achieved by movable parts without robotics
- The trough can be built as a simple cart with gears for wheels, rolling on drive rails
- The tossing arm that forwards the pieces of wood to the van using a ramp can tilt on axles

P2 Build an automatic sawmill
- The trough can be built as a simple cart with gears for wheels, rolling on drive rails (1 DC motor)
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- An LED should sign the action with blinking
- The ramp can tilt on axles

P3 Build a sound-controlled sawmill
- The working process of the sawmill should start when a Sound sensor detects sound (the shouting of the van's driver)
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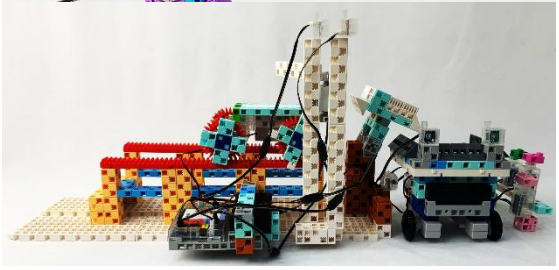
- The ramp is tilted by a servo motor while an LED is blinking

P4 Build a cooperative sawmill
- The working process of the sawmill should start when an IR Photoreflector detects the van standing under the ramp
- The whole process is the same as in P3



Van

P1 Build an automatic van
- The van can roll up to the sawmill on 2 DC motors
- After turning it on, the wheels rotate a number of times

P2 Build an automatic van
- The van can roll up to the sawmill on 2 DC motors
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P3 Build a directable van
- Build a van with 2 DC motors
- Add a 4-Touch sensor remote control to it
- Blinking LEDs should show the direction it is turning

P4 Accelerometer-controlled van
- Build a van with 2 DC motors
- Add an Accelerometer as a remote control to it
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RIDEX

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THE PAUL STREET BOYS
THE GRUND (T3)

S3
T3
D12
L1 P3

Focus on:

•Language communication (D12)

Task1: Plan and build a cool playground or build the „Grund”!

Students create elements of a playground or of the „Grund”.

Every solution is good!

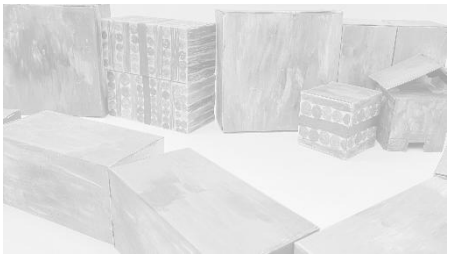
Any kind of tool and material can be used!

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 playground or the Grund out of ArTeC Blocks
- Building a playground or the Grund out of recycled materials
- Creating 3D computer graphics

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



Developmental fields:

In focus:

- Fine motor skills
- Creativity
- Spatial orientation

In addition:

- Attention concentration
- Subject concentration – Drawing, arts&crafts, IT
- Talent development

Task2: Draw a map of the classroom or the schoolyard! Make challenges to each other: get from one point to another!

Students create maps – making sure to measure the proportions and distances of objects

Every solution is good!

Any kind of tool and material can be used!

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Idea Bazaar – some ideas:

- Students can make challenge cards (e.g. Get from the whiteboard to the teacher’s table!) and play with them
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For details of the different solutions, see the Idea sheets!

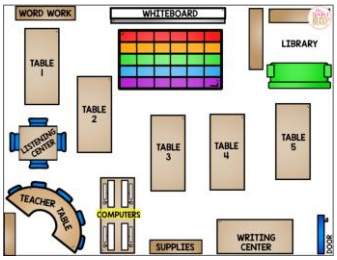
Developmental fields:

In focus:

- Spatial orientation
- Computational thinking
- Attention

In addition:

- Subject concentration – Drawing, IT, mathematics
- Creativity



How to manage output:

Hang the pictures on the wall, on a big poster, and ask the children to arrange them according to a rule they decide.

Store the objects in a wardrobe, to protect them from falls.

Attach a label with the name of the group!

RIDEX

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THE PAUL STREET BOYS
THE GRUND (T3)

S3 T3 D12 L2 P3

Focus on:
- Language communication (D12)

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

The grund was a vacant lot on the corner of Paul Street and Maria Street. For the Paul Street Boys, who lived on narrow streets among rows of tall houses, this little lot spelled freedom and boundlessness.
Its fence ran along the Paul Street side. Two tall buildings bordered it left and right, and in the rear... yes, it was the rear section which rendered this grund most attractive, magnificent.
Here, it should be noted, it was adjoined by another spacious site. This was under lease to a saw mill concern, and the lot was thickly strewn with piles of lumber. Here stacks of firewood formed symmetrical blocks, and among these huge blocks ran little alleys. It
was a veritable labyrinth. Some three-score narrow little streets intersecting each other among mute and dark stacks of wood.
It was no easy matter to find your way in this maze. But he who did manage to struggle through found himself within a small clearing in the middle of which stood a tiny hut. Within it was housed the steam-saw. It was a strange, eerie little house. It was completely covered by wild grapevines. Its graceful black chimney puffed through green foliage; at regular intervals and with clock-like regularity its clear white vapours issued forth.
All about the hut stood big, clumsy vans. From time to time one of these vans would back toward the eaves, producing a creaking sound. Directly under the eaves was a small window and out of this window extended a wooden trough. As the van stopped near the window, out of the trough there suddenly began to dribble a mass of kindling wood; it fairly poured into the big van. And as the van was filled to the top, the driver gave a shout. Thereupon the little chimney ceased its puffing, within the hut immediate silence ensued and, at the bidding of their master, the horses started off with their load. Another van – hungry and empty – rolled up to the little window and the black iron chimney resumed its vomiting, the dribbling of kindling wood was heard again.

Main features and interactions of the characters

Character	Features	Interactions
The sawmill	Puffs - issues smoke Extends a trough Cuts wood	Pieces of wood are poured into the van When the driver of the van gives a signal, the sawmill stops
The van	Rolls The driver shouts	Rolls up to the sawmill Leaves when it is full

Suggestions

The Grund
- Discuss the importance of the Grund to the boys
- Collect and depict the the sights and buildings of the Grund
- Build a model of the Grund

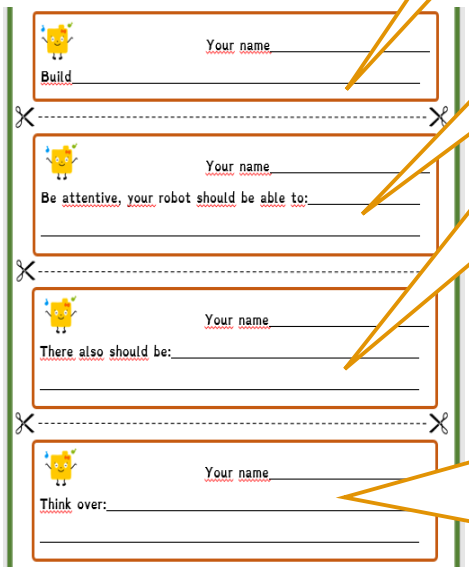
The sawmill
- Discuss the usage of kindling wood
- Discuss the different types of heating and fuel – focusing on historical eras, geographical and social differences, environmental protection
- Understand how the sawmill works – have the students draw plans, flowcharts

Suggested materials
- ArTeC robot and Blocks (at least the 112 pcs set)
- Cardboard, boxes, recycled materials, other building sets

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!



Sawmill
Van

Puff
Extend the trough
Pour pieces of wood
Roll to the sawmill
Give signal
Leave the sawmill

The Grund
Stacks of wood – maze
Grapevine covering the walls of the sawmill
Pieces of wood

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

RIDEX

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THE PAUL STREET BOYS
THE GRUND (T3)

S3
T3
D12
L3–4
P4

Focus on:
- Language communication (D12)

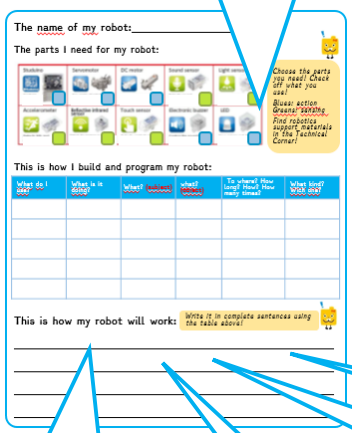
Goals of the lesson:
- fine motor skills,
- problem solving,
- decision making,
- life skills

Suggested materials
- ArTeC Blocks (at least the 112 pcs set) and ArTeC robotics set (1 or 2 Studuino motherboards, 3 DC motors, wheels, small gears, 2 servo motors, 4 Touch sensors, 1 IR Photoreflector, 1 Sound sensor, 1 Accelerometer, 4 LEDs)
- Photos, videos about sawmills
- Flowchart of a sawmill's operation
- Mindmap or Chart draft , Storyline
- Character cards and Robotic task card template
- Pencil

Suggestions
Van
- Collect possibilities for moving and directing the van
- Collect possibilities for detecting that the van arrived to the sawmill and that the van is full and can leave

How to fill in the Robotic card?
- Based on the character card, the developmental aspect and the programming level, choose the robot activity and the complexity of the program to match the child's abilities.
- Additional robot cards can be filled in if necessary (e.g. for clarification or differentiation).
- Not all the table's columns need to be filled in, only those relevant to the robot's particular function.
- Based on each row of the table, use grammatically correct sentences to describe the robot's operation in the target language.

Trough
Ramp
Pieces of wood
Tossing arm
Wheels



Related topics in the Technical corner
- Programming DC motor
  - Winding the motor a number of times (2.a, 2.b)
  - Winding the motor until the sensor detects change (4.b, 4.c)
- Programming servo motor
  - Moving the arm to a given angle (3.a)
- Testing and programming Touch sensor (4.a, 4.b, 4.c)
  - Remote control for the robot made of 4 Touch sensors(4.d)
- Testing and programming IR Photoreflector (7.a, 7.c, 7.e)
  - Using an IR Photoreflector for detecting an object (7.d, 7.e)
- Testing and programming Sound sensor (9.a)
  - Activating the robot with sound (9.b)
- Using LED (5.a)
  - Blinking (5.b)
- Robot controller made of Accelerometer (4.e)

Sawmill with mechanical tossing mechanism

Van rolls up to the sawmill automatically

PROG1

The trough and the tossing arm moves automatically

Van rolls up to the sawmill automatically

PROG2

The trough, the tossing arm and the ramp move automatically. The sawmill begins to work when the driver of the van shouts Van controlled by a remote controller

PROG3

The trough, the tossing arm and the ramp move automatically. The sawmill begins to work when the van stops under the ramp Van controlled by a remote controller

PROG4

RIDEX

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THE PAUL STREET BOYS
THE GRUND (T3)

S3
T3
D12
L3–4
P5

Ideas for robots on different programming levels

PROG1	PROG2	PROG3	PROG4
Sawmill with mechanical tossing mechanism Van rolls up to the sawmill automatically	The trough and the tossing arm moves automatically Van rolls up to the sawmill automatically	The trough, the tossing arm and the ramp move automatically. The sawmill begins to work when the driver of the van shouts Van controlled by a remote controller	The trough, the tossing arm and the ramp move automatically. The sawmill begins to work when the van stops under the ramp Van controlled by a remote controller

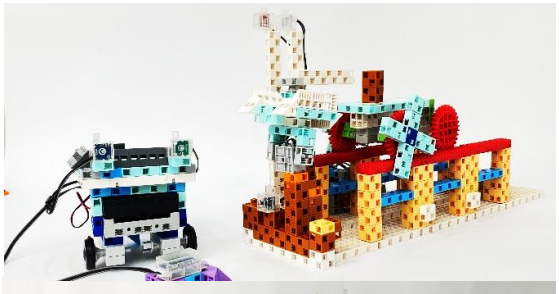
Sawmill

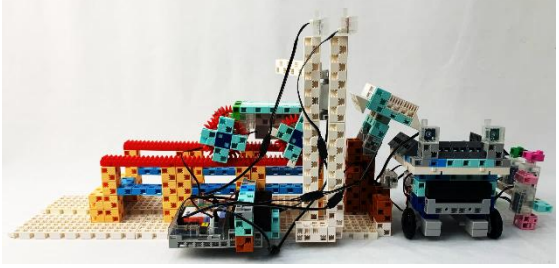
P1 Build a mechanical sawmill
- It can be achieved by movable parts without robotics
- The trough can be built as a simple cart with gears for wheels, rolling on drive rails
- The tossing arm that forwards the pieces of wood to the van using a ramp can tilt on axles

P2 Build an automatic sawmill
- The trough can be built as a simple cart with gears for wheels, rolling on drive rails (1 DC motor)
- The tossing arm that forwards the pieces of wood to the van using a ramp should be moved by a servo motor
- An LED should sign the action with blinking
- The ramp can tilt on axles

P3 Build a sound-controlled sawmill
- The working process of the sawmill should start when a Sound sensor detects sound (the shouting of the van's driver)
- The trough and the tossing arm should be built as in P2
- The ramp is tilted by a servo motor while an LED is blinking

P4 Build a cooperative sawmill
- The working process of the sawmill should start when an IR Photoreflector detects the van standing under the ramp
- The whole process is the same as in P3





Van

P1 Build an automatic van
- The van can roll up to the sawmill on 2 DC motors
- After turning it on, the wheels rotate a number of times

P2 Build an automatic van
- The van can roll up to the sawmill on 2 DC motors
- After turning it on, the wheels rotate a number of times

P3 Build a directable van
- Build a van with 2 DC motors
- Add a 4-Touch sensor remote control to it
- Blinking LEDs should show the direction it is turning

P4 Accelerometer-controlled van
- Build a van with 2 DC motors
- Add an Accelerometer as a remote control to it
- Blinking LEDs should show the direction it is turning