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School Lessons 1-10: Robo's First Steps Worksheets Answer Key

with Robo Wunderkind Robotics Kit

Welcome to the Robo Wunderkind Student's Journal and Worksheets - Core Curriculum Block 1!

These supporting materials correspond with the Curriculum Lessons Plans and Teacher Sides and are designed to make your teaching with Robo Wunderkind Curriculum smoother, more structured and for you to feel supported.

The Student's Journal and Worksheets will help your students **personalize** their learning experiences with Robo Wunderkind robotics set, **link their new knowledge to real-life experiences** and to **track their progress**. All Worksheets can be filled accordingly to the grade and skills of your students: the younger students may draw and color the modules, while the older ones can answer using the specific terminology and full sentences. The Worksheets Answer Key is designed to show the possible answers but not the only right ones; you can **always adjust the complexity level of the tasks to the needs of your student.**

Tricks and Tips:

- **Give students the freedom and opportunity** to try to solve challenges by themselves and learn by doing.
- Some of the **tasks have more than one right answer**, which allows students to be creative.
- **Return to the Keywords section** a few times during the lesson, adding new words - Module's names or Actions after learning them. You can also use this section in order to summarize at the end of the lesson.
- **Use the section "What did I learn?"** to reflect on the lesson and new knowledge. The students' answers can be different depending on their own experience, so do not focus on one perfect answer, instead, help them formulate their own reflections, if needed.
- In the lessons 9 and 10, we suggest to use the additional **"My Robo Project" worksheet** to practice the Engineering Design Process. This worksheet is a **universal schema** for creating their own project with Robo Wunderkind robotics kit and **can be used in any other lesson.**
- **Use the Teacher Slides for the Curriculum Block 1** together with the Worksheets to make your teaching even more visual and effective.

Project 1: Meet Robo!

NAME / DATE

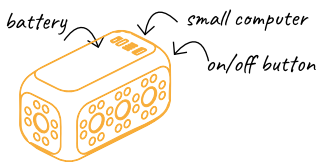
Project 1: Meet Robo!

Robo's Story:
Today, we have a special guest in our class! This is Robo, a smart robot that has come to our class to be our friend and learn with us!

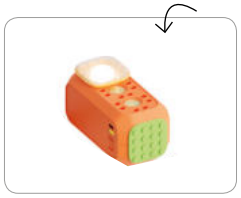
Lesson Goal:
We will become engineers in order to assemble and control our first robot!

Keywords
Robot, Robotics, Engineering, Main Block, Control

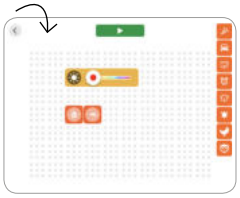
1 It's Robo's brain!



2 Design is...
to create, stetch or construct



Build



Controls

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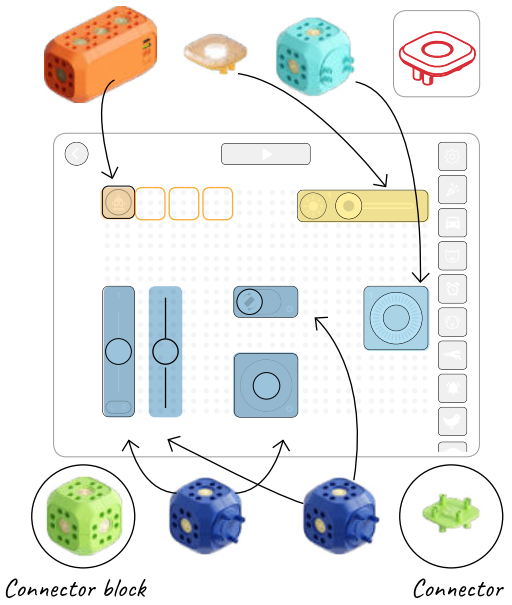
3 Explore Robo's Modules and Controls



What did I learn?
What a robot is.
How to control Robo.
Robo's Brain.

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Lead In

Together with your students **read aloud Robo's Story, identify** the problem situation and discuss the **Lesson goal. Add Control as a keyword later during the lesson.**

Keywords

- Discuss and write down: **Robot, Robotics, Engineering**
- Add **Main Block, Control** as keywords later during the lesson

Guided Activity

1.Class Discussion: What Module is Robo's brain?

- **Ask:** Which module is the biggest one? What can we see **outside** and what is **inside** the Main Block? Why is it important?
- **Conclude:** The biggest module – **the Main Block** – is the most important one, it's **Robo's brain**. We can see the switch **on/off button, the small light, speaker, USB port** on the block and inside, there are the **battery and a small computer**. The Main Block can be connected to the tablet. **We need the Main Block in each project** in order to make all other modules work.
- **Draw** Robo's Brain – Main Block.
  Optional: Write down the components of the Main Block.

2. Class Discussion: What is design?

- **Ask:** What is design? How will we design a robot?
- **Conclude:** To design means to create, sketch or construct something according to a goal. We will design a **Build** for our Robo – how its Modules are attached together and why. We will also design how **Controls** are arranged in the Robo Live App.

3. Pair Work: Explore Robo's Modules and Controls

- **Connect** different **Modules** to the Main Block and see how they appear in the **Controls menu**, **disconnect** them to see how they disappear.
- Use **Controls** which appear in the Controls Menu to **control Modules**.
- **Color the Controls** accordingly to Modules they control; match them by drawing the arrows.
- Which **Controls are missing?** Draw them. (Motor 2 Control, Sound Controls)
- Which **Modules do not have Controls** and why? Circle them. (Connector, Connector Block; They are special **Connectors** needed to connect some Modules)
- Discuss that the **Disconnecting tool** needed to disconnect the Modules.
- Which **Modules are missing**? Draw **one** of them (Button or Robo's "Head" or Disconnecting tool)

Reflection

What did I learn?
Ask students to think about what they learned today, help them to formulate the answer(s).

Project 2: Program Your First Robo!

NAME / DATE

Project 2: Program Your First Robo!

Robo's Story:
Our new friend Robo is very excited to meet us and wants to say "Hi" to us. But can robots do something like this by themselves?

Lesson Goal:
To help Robo make sounds, we will become programmers and create our first program code in the Robo Code App.

Keywords
Code, Programming, Action, Connection, Sound action

1 Imagine that you are a robot!

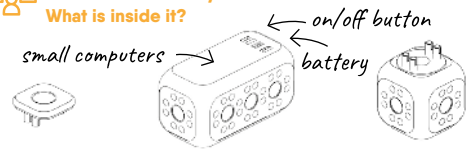
- **Control** your partner-robot to say "Hi! How are you doing?" using the buttons. As you press the button, your partner-robot should react immediately by saying this word.

HI! ARE DOING? HOW YOU

- **Program** your partner-robot to say "Hi! How are you doing?" using the same buttons, but plan the order of words in the sentence in advance by drawing the arrows between the words. Once you have drawn all the arrows, your partner should say the whole sentence at once, following the order of your arrows.

HI! ARE DOING? HOW YOU

2 Color and name only the Main Block – Robo's brain. What is inside it?



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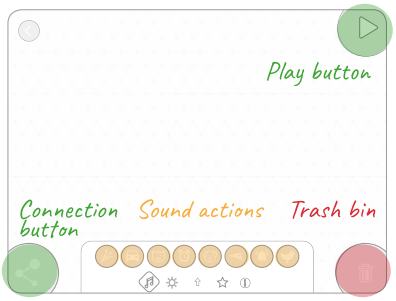
3 Color and name Sound actions, Play button, Connection button and Trash bin



4 Imagine that you are a robot!

- Program your partner-robot to sing a song which consists of 5 musical notes. Draw the code for it.

- Program your partner-robot to sing a song which consists of 3 musical notes and never ends – it is a Loop! Draw the code for it.

What did I learn?

What code is.
How to program Robo to make Sounds.
What Loop is.

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Lead In

Together with your students **read aloud Robo's Story, identify** the problem situation and discuss the **Lesson goal**.

Keywords

- Discuss and write down: **Programming, Code, Action, Connection, Loop.**
- Add **Sound action** as a keyword later during the lesson.

Guided Activity

1. Pair work: Imagine that you are a robot!

Goal: to understand the difference between remote control and programming.

- **Read** aloud the first task - Control, **perform** it in pairs, and **discuss after** that the "students-robots" should react immediately to pressing a button - this is **remote control.**
- **Read** aloud the second task - Program, **work on** it in pairs, and afterward, **discuss** that we need to plan the order of words in the sentence in advance, and only when we are done, will the student-robot say the whole sentence; writing the set of commands is **programming**.

2. Class Discussion: Color and name only the Main Block.

Recall that there is a battery and a small computer inside the Main block, this is why **we need it in each project** in order to make all other modules work.

3. Class Discussion: Explore the Robo Code App interface.

Together with your students try out the coding buttons and Actions, color and name them.

4. Pair work: Imagine that you are a robot!

Goal: to explain and apply the principle of sequential logic and a Loop using the everyday experience of students.

- **Read aloud** the task and discuss together how you would do it; you could give an example.
- **Students work** on the task **in pairs**.
- **Discuss together** the codes students created.
- Point out the terminology: **Code, Loop.**

Reflection

What did I learn?

Ask students to think about what they learned today, help them to formulate the answer(s).

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Project 3: Robo Lights Up the Classroom!

NAME / DATE

Project 3: Robo Lights Up the Classroom

Robo's Story:
Robo is very happy to be your friend and wants to throw a small party with colorful lights!

Lesson Goal:
To help Robo throw a party, we will build a shining Robo and program it to light up in different colors.

Keywords
Code, Action, Connection, Loop, Visuals

1 What does Robo want? How can we help it?

Robo wants to *shine*

1) Which Modules will we need?

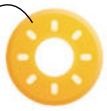
Main Block  *Light*

2) Build a Robo *- Light*

3) Program a Robo *- Light to emit Lights*

2 Visuals

Color
Brightness
Time



Constant Light

Blink

Color
Brightness
Number of Times

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Lead In

Together with your students **read aloud Robo's Story, identify** the problem situation and discuss the **Lesson goal**.

Keywords

- Discuss and write down: **Code, Action, Connection, Loop.**
- Add **Visuals or Constant Light and Blink actions** as a keyword later during the lesson.

Guided Activity

1. Class discussion: Plan the project.

Goal: to plan the steps for the project.

- Robo wants to **shine**

1) Modules: **Main Block + Light**

2) Build a Robo-**light**

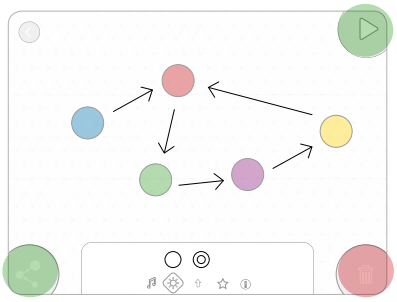
3) Program a Robo-**light to emit lights**

2. Learning by doing: Visuals.

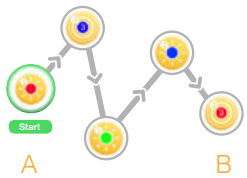
Goal: to plan the steps for the project.

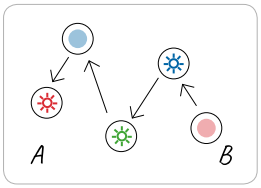
- Together with your students **find Visuals in the Action Dock**, try out the **Constant Light** and **Blink actions**, their settings, **Connections** between them and sum up the information.
- Younger students can **draw** the icons
- Older students can also **write down** the terms

3 Make a Robo-party code which consists of 5 Visuals and one Loop. Color the coding buttons you used to make a code.



4 Reverse the code - rewrite it so it goes in the opposite direction from B to A. How can you do it?





What did I learn?

Visuals
How to build Robo-Light and program different lights.

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3. Individual activity and class discussion.

Goal: Consolidate the knowledge - Visuals, Connections, Loop

- **Create** a **Robo-party code** which consists of 5 Visuals and one Loop.

Share your codes with the class and discuss them

4. Pair work: Reverse the code.

Goal: understand the importance of the **direction of the Connections**, how it can changes a code and influences Robo's performance.

- **Read aloud** the task: **Reverse the code** - rewrite it so it goes in the opposite direction from B to A.
- **Discuss** what it means - reverse the code.
- Let **students try to solve the task** by themselves and discuss the right answer(s).
- **Conclude:** the direction of each Connection is very important because it can change the code and Robo's performance; it can also make the mistake in the code.

Reflection

What did I learn?

Ask students to think about what they learned today, help them to formulate the answer(s).

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Project 4: Robo-car Drives Around

NAME / DATE

Project 4: Robo-car Drives Around

Robo's Story:
Robo is a very curious creature who likes to discover the surrounding world! Robo wants to travel, but first Robo needs to learn how to drive.

Lesson Goal:
To help Robo drive around, we will build and program a Robo-car.

Keywords
Sequential Code, Action, Connection, Loop, Motors, Movement

1 What does Robo want? How can we help it?

Robo wants to *drive*

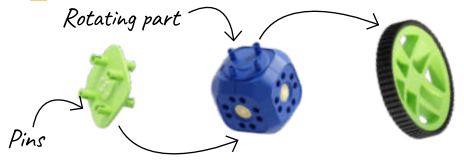
1) Which Modules will we need?

Main Block + Motors + Wheels + Connectors

2) Build a Robo *-car*

3) Program a Robo *-car to drive and turn*

2 Motors: How to attach them?



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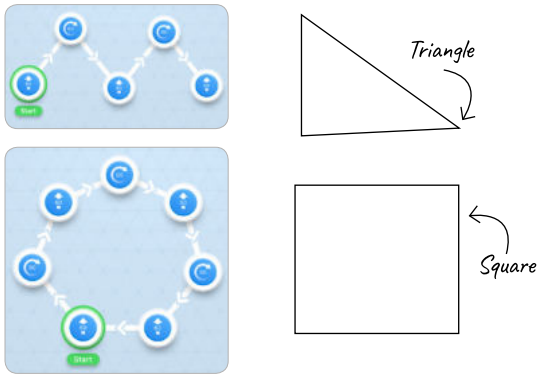
3 / Movement

4 Draw the shape your Robo will make following the code.



What did I learn?

How to build Robo-car
Motors
Movements: Drive and Turn actions

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Lead In

Together with your students **read aloud Robo's Story, identify** the problem situation and discuss the **Lesson goal**.

Keywords

- Discuss and write down: **Code, Action, Connection, Loop.**
- Add **Motor, Movement, Drive and Turn actions** as a keyword later during the lesson.

Guided Activity

1. Class discussion: Plan the project.

Goal: to plan the steps for the project.

- Robo wants to **drive**

1) Modules: **Main Block + Motors + Wheels + Connectors**

2) Build a Robo-**car**

3) Program a Robo-**car to drive and turn**

2. Class discussion: How to attach the Motors?

- Let students **attach the (DC) Motors differently** and see if they appear in the App or not.
- **Discuss** their mechanical details: the **rotating part** without **Pogo-Pins**, compare it to the **Connector**.
- **Conclude:** The **Pogo-Pins** help the **electricity and signals** from the Main Block flow to the Motors. If there are no Pogo-Pins - electricity won't flow to the Motors and they won't work. Motors should be **attached with the help of the Connectors** in order to work properly. The rotating part should be attached to the Wheels.
- **Draw or write down** the right answer.

3. Learning by doing: Movement.

- Together with your students **find Movement** in the Action Dock, **try out** the **Drive and Turn actions**, their settings, **Connections** between them and sum up the information.
- Younger students can **draw** the icons
- Older students can also **write** down the terms

4. Pair work: Draw the shapes.

Goal: develop abstract and logical thinking.

- **Read aloud** the task and discuss how students would solve it:
  1) use the Robo-car and code it to see the answer;
  2) just imagine Robo-car driving.
- Let students try to solve the task by themselves and **discuss the right answers: Triangle, Square.**

Reflection

What did I learn?

Ask students to think about what they learned today, help them to formulate the answer(s).

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Project 5: Robo's First Journey

NAME / DATE

Project 5: Robo's First Journey

Robo's Story:
Now it's time for Robo's first journey! Where will your Robo travel to, and why? Who will it meet?

Lesson Goal:
To help Robo have its first journey, we will build and program a Robo-traveller and combine all the Actions we had learned before.

Keywords

Sequential Code, Action, Connection, Loop, State, Transition

1 What does Robo want? How can we help it?

Robo wants to *travel*

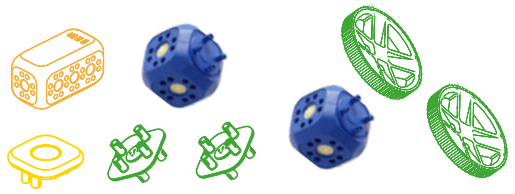
1) Which Modules will we need?

Main Block + Light + Motors + Wheels + Connectors

2) Build a Robo *-traveller*

3) Program a Robo *-traveller to drive, turn, make sounds and emit lights*

2 Draw the parts missing to build your Robo-traveller.



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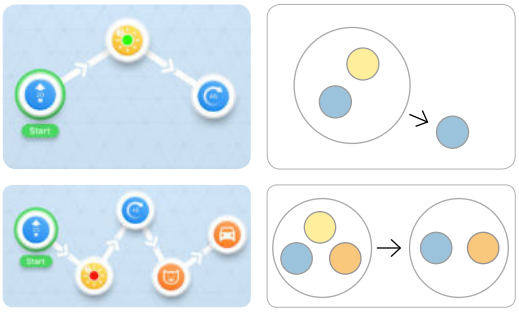
3 Modify the code to form a State which consists of the largest number of Actions. How many Actions can be in one State in such a code?



4 Imagine that you are a robot!

- Think about actions in your life which you can do simultaneously – at the same time.
- Draw or write down a code with parallel actions from your real life.

Smile and jump at the same time

Brush my teeth while standing on one leg

What did I learn?

Robo can do commands at the same time.
What State is.
Different actions in one State.

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Lead In

Together with your students **read aloud Robo's Story, identify** the problem situation and discuss the **Lesson goal**.

Keywords

- Recall all previously learned keywords: **Sequential code, Action, Connection, Loop**
- Add new keywords - **State, Transition** later during the lesson

Guided Activity

1. Class discussion: Plan the project.

Goal: to plan the steps for the project.

- Robo wants to **travel**

1) Modules: **Main Block + Light + Motors + Wheels + Connectors**

2) Build a Robo-**traveller**

3) Program a Robo-traveller **to drive, turn, make sounds and emit lights.**

2. Class discussion: Draw the missing parts.

- **Read aloud** the task and **discuss** which Modules are missing to build the Robo-traveller.
- **Recall** the the **mechanical details of the Motors**: the **rotating part** without **Pogo-Pins** which should be attached to the Wheels; the need of the **Connectors** to attach Motors to the Main Block.
- **Draw or write down** the parts missing.

3. Learning by doing: Create a Robo-party code.

- **Read aloud** the task and discuss how students would solve it.
- Let **students try to solve the task by themselves** using the Robo-traveller and **discuss** the right answer(s) together.
- **Conclude:** in the 1st code - 2 different Actions can be in one State; in the 2d code 3 different Actions can be in one State

4. Pair work: Imagine that you are a robot!

Goal: to explain and apply the concept of Parallel Execution to everyday experience of students.

- **Read aloud** the task and discuss together one example.
- **Students work** on the task **in pairs.**
- **Discuss together** the codes students created.
- Point out the **terminology**: State, Parallel Execution / Actions.

Reflection

What did I learn?

Ask students to think about what they learned today, help them to formulate the answer(s).

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Project 6: Robo Travels to Toytown

NAME / DATE

Project 6: Robo Travels to Toytown

Robo's Story:
Robo is invited to visit Toytown! To get there, Robo has to travel a long way avoiding obstacles and making tricky turns.

Lesson Goal:
To help Robo get to Toytown, we will program Robo-vehicle to avoid obstacles and cope with some challenges.

Keywords
Action, State, Connection, Transition, Lifespan Parallel Execution

1 What does Robo want? How can we help it?

Robo wants to *travel to Toytown*

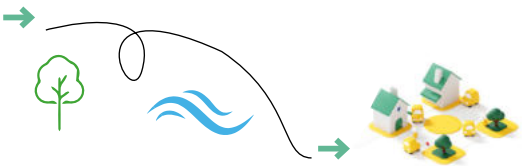
1) Which Modules will we need?

Main Block + Light + Motors + Wheels + Connectors

2) Build a Robo *-traveller*

3) Program a Robo *-traveller to cope with challenges*

2 Draw the road to Toytown with different turns and obstacles; create a code to drive through these challenges.



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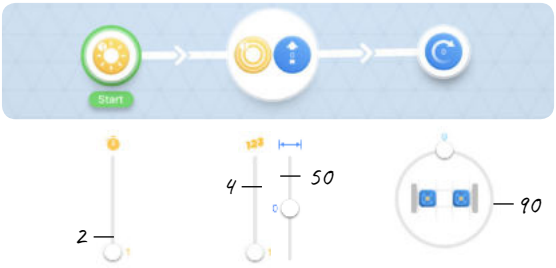
3 Create States in your code for Robo; draw them here.

- 2 different Actions in one State
- 3 different Actions in one State
- only 1 Action in State - *Is it a State?*

1 Action = State

4 Action's Lifespan: Set the Lifespan for each Action in this code.



- How many Transitions will take place in this code?
- How do you know?

2

What did I learn?

A State can consist of only one Action

Action's Lifespan

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Lead In

Together with your students **read aloud Robo's Story, identify** the problem situation and discuss the **Lesson goal**.

Keywords

- Recall all of the previously learned keywords: **Action, State, Connection, Transition**
- Add a new keyword **Lifespan** later during the lesson.

Optional: Parallel Execution

Guided Activity

1. Class discussion: Plan the project.

Goal: to plan the steps for the project.

- Robo wants to **travel to Toytown**

1) Modules: **Main Block + Light + Motors + Wheels + Connectors**

2) Build a Robo-**traveller**

3) Program a Robo-traveller **to cope with challenges**

2. Pair work: Draw the road to Toytown.

- **Read aloud** the task and **discuss** which "challenges" can be on Robo's way to Toytown.
- **Students work** on the task **in pairs.**
- **Discuss together** the roads students created and challenges Robo needs to cope with.
- **Students solve** those challenges they created using Robo-vehicle and **share** their projects.

3. Pair work and class discussion

- **Read aloud** the task and discuss how students would solve it.
- Let **students try to solve the task by themselves** using the Robo-traveller and **discuss** the right answer(s) together.
- **Conclude:** Yes, a State can consist of only one Action.

4. Class discussion: Action's Lifespan.

- **Read aloud** the task and discuss together the questions: What is Action's Lifespan? Who can we find out the Action's lifespan? What does it affects?
- **Conclude: Lifespan** is a length of time for which an Action is performed by Robo. The **Lifespan affects** when the **Transition** to the next State happens - the Transition happens when all the Actions in one State are performed until the end.
- **Students work** on the task **in pairs.**
- **Discuss together** the Lifespan for each Action and how it affect robo's performance.

Reflection

What did I learn?

Ask students to think about what they learned today, help them to formulate the answer(s).

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Project 7: Robo Looks Around

NAME / DATE

Project 7: Robo Looks Around

Robo's Story:
Now it's time to meet other creatures - the toys! Robo wants to learn how to look around in order to communicate with the fun toys.

Lesson Goal:
To help Robo look around, we will build a Robo with a head that can be programmed to turn around using different motors.

Keywords
Motor, DC Motor, Servo Motor, Distance, angle, degree

1 What does Robo want? How can we help it?

Robo wants to *look around*

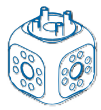
1) Which Modules will we need?

Main Block + Motor + Head

2) Build a Robo *that can look around*

3) Program a Robo *to turn its head*

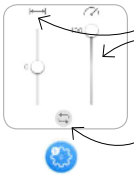
2 Motors: are the different or the same?



DC Motor

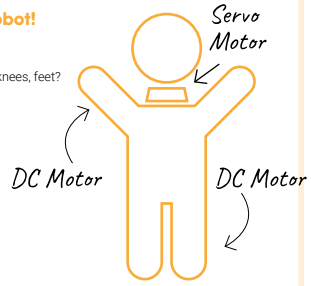
Servo Motor

3 / Movement: Different or the same?



4 Imagine that you are a robot!

- Which Motor will you use to turn your head?
- Which Motor will you use to move your wrists, knees, feet?
- Draw yourself as a robot with different motors!



What did I learn?

DC Motor, Servo Motor
How DC and Servo Motors are different

Lead In

Together with your students **read aloud Robo's Story, identify** the problem situation and discuss the **Lesson goal**.

Keywords

- Recall: **Motor, distance**
- Add a new keywords **DC Motor, Servo Motor, angle, degree** later during the lesson

Guided Activity

1. Class discussion: Plan the project.

Goal: to plan the steps for the project.

- Robo wants to **look around**

1) Modules: **Main Block + Motors + Head + Connector**

2) Build a Robo that **can look around**

3) Program a Robo to turn its head

2 & 3. Learning by doing and class discussion: Motors and Movement.

- **Read aloud** the task and **discuss** the design of the Motors - color and their rotating parts and let students only **guess the answer about their functions**
- **Attach** first Motor, **program Motor 1 action** and **discuss** its settings, introduce the terms: **DC Motor. Motor 1 action, distance. Sum up** the information on the **worksheet**.
- **Attach** the second Motor, **program Servo action, discuss** its settings and how they are different, introduce the terms: Servo Motor, Servo action, angle, degree. Sum up the information on the worksheet.
- **Discuss** the **Reset button** and **Zero position** - the position from which the Servo motor will turn when you play the code.
- Discuss the **Random function** - the special command when Robo (computer inside Robo) decides itself on a certain setting.
- **Compare** two Motors using the **summary**.
- **Conclude:** There are two types of Motors in the box. They are **different** in color and in terms of their **functions. DC Motor** - dark blue motor which rotates around itself; **Servo Motor** - light blue motor which turns to the exact angle.

3. Pair work: Imagine that you are a robot!

Goal: to explain and apply the new knowledge about DC and Servo Motors to the everyday experiences of students.

- **Read aloud** the task and discuss one example together.
- **Students work** on the task in **pairs**.
- **Discuss together** the answers.

Reflection

What did I learn?

Ask students to think about what they learned today, help them to formulate the answer(s).

Project 8: Robo Meets Friends

NAME / DATE

Project 8: Robo Meets Friends

Robo's Story:
Today is a significant day for our Robo: we are going to help Robo meet and interact with other toy creatures!

Lesson Goal:
To help Robo communicate with the other toys, we will build Robo using all of the learned Modules, and program different Actions.

Keywords
Action, State, Connection, Transition, Lifespan, Design

1 What does Robo want? How can we help it?

Robo wants to *meet friends*

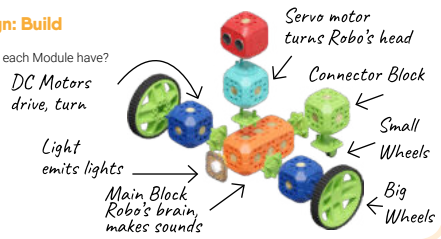
1) Which Modules will we need? *Main Block + Light + DC Motor + Head + Wheels + Servo Motor + Connectors*

2) Build a Robo *that can drive, turn, make sounds and emit lights*

3) Program a Robo *creature to interact with other toys*

2 Design: Build

- Which function does each Module have?



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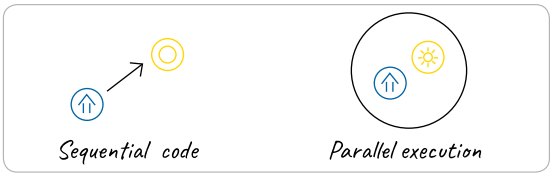
3 Tasks and Code design.

- Create a code for Robo to perform. Can it be Sequential code or Parallel execution? Draw one of the codes you created.
  1) Robo drives and emits different lights to greet new friends.
  2) Robo turns its head saying "Hi" and greeting a new friend with a light.



4 Imagine that you are a robot!

What actions in your life you do:
1) One after another - as sequential code?
2) Simultaneously at the same moment - parallel?

Draw or write down your code(s).

1. Get ready for school
- *wake up*
- *brush teeth*
- *get dressed*
- *eat breakfast*

2. Eat breakfast and talk to parents

What did I learn?

Design: Build, Code

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Lead In

Together with your students **read aloud Robo's Story, identify** the problem situation and discuss the **Lesson goal**.

Keywords

- Recall all previously learned keywords: **Action, State, Connection, Transition, Lifespan, Design**
- *Optional: Sequential code, Parallel Execution*

Guided Activity

1. Class discussion: Plan the project.
Goal: to plan the steps for the project.
- Robo wants to **make new friends**

1) Modules: **Main Block + Light + 2 DC Motors + Wheels + Servo Motor + Connectors**
2) Build a Robo that **can drive, turn, make sounds and emit lights**
3) Program a **Robot-creature to interact with other toys**

2. Individual work and class discussion: Build design Motors and Movement.
- **Read aloud** the task and discuss what design means, how can we design a build for Robo.
- **Discuss** the build of Robo and **functions** of all the **Modules** in it.
- **Students** build the Robo.

3. Individual work and class discussion: Code design.
- **Read aloud** the task and **discuss terminology:** Sequential code, Parallel Execution.
- **Students work** on the task in **pairs**.
- **Discuss together** the answers.

4. Pair work: Imagine that you are a robot!
Goal: to explain and apply the concept of Sequential code and Parallel Execution to the everyday experiences of students.
- **Read aloud** the task and discuss one example together.
- **Students work** on the task in **pairs**.
- **Discuss** the codes students created.

Reflection

What did I learn?
Ask students to think about what they learned today, help them to formulate the answer(s).

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Project 9: Robo Makes a Surprise

NAME / DATE

Project 9: Robo Makes a Surprise

Robo's Story:
Robo is happy that it met some fun toys and wants to create a surprise for these new friends.

Lesson Goal:
To help Robo design a surprise for his new friends, we will learn about the Engineering Design Process and then use it to build and program the Robo-project.

Keywords
Design, Project, Task, Plan *Engineering Design Process*

1 Recall some of the projects we created to help Robo.

- What was the reason for each project?

Robo says "Hi" → makes sounds
Robo-light → lights up the classroom, makes party
Robo-car → drives around
Robo-traveller → travels to Toytown

2 What are the steps we usually take to create a Robo-project?

Robo wants to do something - goal, idea
1) *Robo modules - plan*
2) *Build a Robo ...*
3) *Program a Robo ...*

- Do you think that there is a universal plan for creating a project?

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3 Engineering Design Process

Step 1. Identify a reason.	*Task or Idea?*
Step 2. Brainstorm.	*Solutions* *As many as possible!*
Step 3. Evaluate and pick one.	*Best solution*
Step 4. Sketch and plan.	*Sketch the solution* *Plan: modules, actions, materials*
Step 5. Work on the solution.	*Build program - test - repeat*
Step 6. Finalize: Is everything ready?	*• Robo-build* *• Code* *• Environment*
Step 7. Present the solution:	*1. Robo's story* *2. Robo build* *3. Code*
Step 8. Reflect: How was it?	*Feedback* *What worked well?* *What to change?*

4 Practice the Engineering Design Process:
Use My Project Worksheet to follow the steps and create your own Robo-project!

What did I learn?
Plan to create a project.
Engineering Design Process

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Lead In

Together with your students **read aloud Robo's Story, identify** the problem situation and discuss the **Lesson goal**.

Keywords

- **Start the lesson with tasks no. 1 & 2.**
- **After tasks 1&2, ask:** Do you think that there is a universal plan for creating a project?
- **Discuss** the keywords: **Design, Project, Task, Plan**
- *Optional: Engineering Design Process*

Guided Activity

1. Class discussion: Projects with Robo.
Goal: to analyze the previous projects and find similarities.

- **Recall** some of the **previous projects** with Robo and discuss the **reason** for each of them.
- **Conclude:** Each project has a goal, concerning which we decide on the Modules for Robo build.

2. Individual work and class discussion: Plan for a Robo-project.
Goal: to analyze the previous projects and find out the steps for planning and carrying out a project.

- **Ask students to recall the steps** you usually take for creating a **Robo-project** individually.
- **Check** and **discuss** the **answer(s)** together.

3. Learning by doing: Engineering Design Process.

- **Go back to Robo's Story and ask** students to describe how they would make a project for the set task.
- **Collect their answers,** discuss them on the board and **introduce** the **Engineering Design Process** - the universal plan for creating a project.
- **Read** aloud and **discuss** each step, **add the information missing** for each step, and then **apply** this step for Robo-surprise project.

(**Our advice:** Use the printed cards with the steps of EDP or Teacher Slides.)

4. Pair work: Create an own surprise-project following the steps of the **Engineering Design Process.**

! Use "My Project Worksheet" to follow the learned steps and record the process.

Reflection

What did I learn?
Ask students to think about what they learned today, help them to formulate the answer(s).

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Project 10: What is YOUR Robo

NAME / DATE

Project 10: What is YOUR Robo?

Robo's Story:
Now it is your turn to decide which device or character you would like your Robo to transform into!

Lesson Goal:
To transform your Robo into your own project, follow the steps of the Engineering Design Process.

Keywords *Design, Project, Task, Plan, Brainstorm, Feedback* *Engineering Design Process*

1 Robo - Project and Engineering Design Process

- What project did we create last time?

Surprise - project

- What is the Engineering Design Process?

A special plan to make a project

- How did it help us with our last project?

We followed the steps

2 Think about any project you need to make for school.

- What steps will you take?

Art project
1. Idea - a drawing
2. Solution - what to draw
3. Plan - paper, paint, material
4. Work on the project - paint
5. Finalize - is a painting ready for a presentation?
6. Present the art project

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3 / Put the steps of the Engineering Design Process in the right order: number them and draw arrows between the steps as you follow them.

- **Step 2 Brainstorm:** What are the solutions?
- **Step 1 Identify a reason:** What is the problem or idea?
- **Step 4 Sketch and plan:** What will I need?
- **Step 3 Evaluate and pick one:** What would happen if...?
- **Step 6 Finalize:** Is everything ready?
- **Step 5 Work on the solution:** Build and program, test, repeat!
- **Step 8 Reflect:** How was it?
- **Step 7 Present the solution.**

4 Practice the Engineering Design Process:
Use My Project Worksheet to follow the steps and create your own Robo-project!

What did I learn?

Steps of Engineering Design Process
My own project

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Lead In

Together with your students **read aloud Robo's Story, identify** the problem situation and discuss the **Lesson goal**.

Keywords

- Recall the keywords: **Design, Project, Task, Plan, Brainstorm, Feedback**
- *Optional: Engineering Design Process*

Guided Activity

1. Class discussion: Engineering Design Process.

- **Discuss** together and **write down** the answers to the questions.

OR

- Ask students to **answer the question themselves** and then **check** the answers together.

2. Pair work: School project.

Goal: to consolidate and apply the steps of the Engineering Design Process to the everyday experiences of students.

Tasks:

- **Read** the task aloud.
- Students work in pairs.
- **Discuss** the students' **answers** together.
- **Discuss:** Can we use the steps of the Engineering Design Process to create any other project in our life?

3. Individual work and class discussion: Steps of the Engineering Design Process.

- **Read aloud** the task and do the **steps 1-2** together as an **example.**
- **Students work individually** to finish the task.
- **Discuss** the right answer.

4. Pair work: Create an own Robo-Project following the steps of the **Engineering Design Process.**

! Use "My Project Worksheet" to follow the learned steps and record the process.

Reflection

What did I learn?

Ask students to think about what they learned today, help them to formulate the answer(s).

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School Lessons 1-10: Robo's First Steps Worksheets Answer Key

with Robo Wunderkind Robotics Kit