OZOBOT INLEIDING

Deze lessen zijn een vertaling en aanpassing van de
Ozobot lessen uit de "learnzone" van Ozobot.
De oorspronkelijke lessen zijn te vinden op:
http://www.ozobot.com/learnzone/
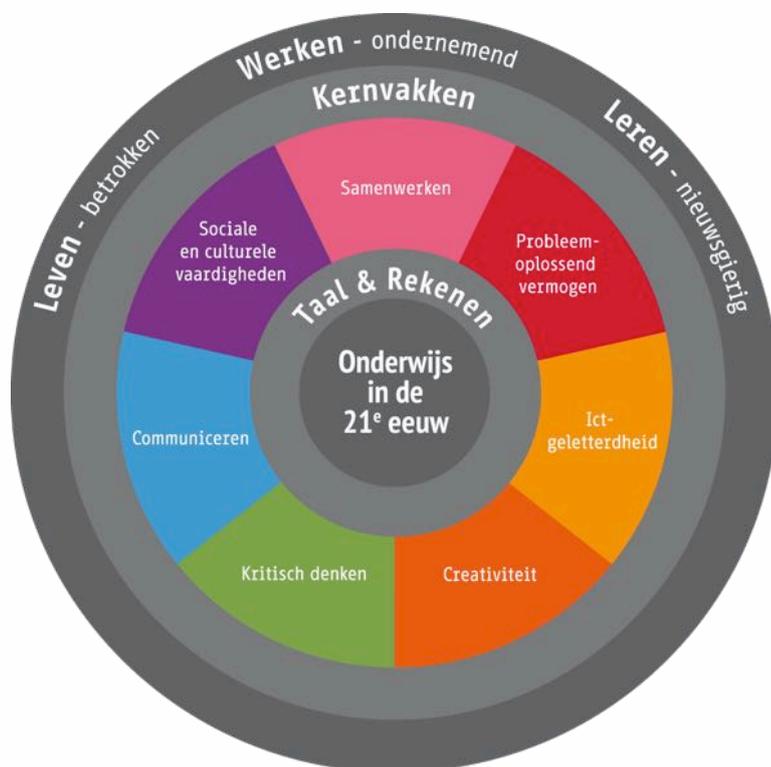
ozobot

IMAGINATION IN PLAY

WAT IS OZOBOT?

Inleiding: In 2006 ontstond in de VS het STEM-program (waarbij STEM staat voor Science, Technology, Engineering en Math) met de bedoeling (basisschool)leerlingen voor te bereiden op de toekomst. Nu is dat aangepast naar STREAM (Science, Technology, Reading, Engineering, Arts and Math). In de Nederlandse onderwijssituatie spreken we over vaardigheden voor de 21e eeuw

(zie http://www.kennisnet.nl/themas/21st-century-skills/vaardigheden/benodigde-vaardigheden-voor-de-21ste-eeuw/)

Wat Ozobot is?

Dit kleine robotje is een unieke manier om te beginnen met het opbouwen van een basis in informatica.
De robot zit vol met mogelijkheden en brengt simpele codes tot leven en stelt iedereen in staat om zich te verdiepen in de wondere wereld van kunstmatige intelligentie.

Ozocodes?

De Ozobot wordt geprogrammeerd door kleurencodes te detecteren en aan de hand hiervan een actie te ondernemen. Het enige wat u nodig heeft is dus een wit vel papier en stiften in de kleuren rood, blauw, groen en zwart! Door deze kleuren in een bepaalde volgorde achter elkaar te tekenen laat u de Ozobot alle kanten op bewegen. Deze kleurensequenties zijn onderdeel van een simpele code genaamd Ozocodes.

Leren én spelen?

Kinderen en volwassenen die met de Ozobot spelen leren een basis in technologie

en kunstmatige intelligentie, vandaar dat deze robot de 2014 en 2015 Beste Robot-prijs heeft gewonnen. Door te spelen met kleurcodes krijgt u een impressie wat er allemaal mogelijk is met een stukje simpele kunstmatige intelligentie. De Ozobot beweegt op papier en op uw tablet of smartphone met de speciale Ozobot app. De Ozobot kan tot wel 500 voorgeprogrammeerde kleurcodes onthouden en hierop reageren.

(tekst van: http://www.belsimpel.nl)

Enkele gegevens:

Kopen: Ozobot kost rond de 60 euro en is o.a. te koop bij:
http://www.belsimpel.nl/accessoire-detail/Ozobot-Smart-Programmable-Robot-Titanium-Black?utm_source=50967&gclid=CMCkzeSVkMcCFXTMtAodDiYNNw&cntd=1 Info: Heel veel info op de site van
Info bij Ozobot: http://www.ozobot.com
Apps: https://itunes.apple.com/nl/app/ozobot/id910831867?mt=8

Ozobot op school:

Wat kinderen leren:
• wat voor een robot is Ozobot?
• hoe beweegt Ozobot en wat kun je hem leren?
• hoe kun je Ozobot commando's geven?

Leeftijd:
Vanaf middenbouw (groep 3/4)

Niveau:
Eenvoudig met plusvragen

Vaardigheden:
Naast taal en rekenen en de kernvakken, zijn de competenties samenwerken, creativiteit, ict-geletterdheid, communiceren, probleemoplossend vermogen, kritisch denken en sociale en culturele vaardigheden van belang. Ook een betrokken, ondernemende en nieuwsgierige houding komen van pas in de 21ste eeuw. (Bron: Kennisnet)

Werkvorm:
Klein groepje leerlingen (3), afhankelijk van leeftijd/niveau met of zonder begeleiding

Materiaal:
- 1 Ozobot (gecalibreerd en opgeladen)
- enkele vellen wit papier

- dikke viltstiften in de kleuren **ZWART** - **ROOD** - **BLAUW** en **GROEN**
- uitgeprinte opdrachtvellen # 1 - 3 (bijlage bij deze les)
- uitgeprinte kleurencode-kaart (bijlage bij deze les)

Benodigde tijd per les:
Ongeveer een uur

Noot van de auteur
De beschikbare lessen zijn een vertaling en aanpassing (aan de Nederlandse onderwijssituatie) van de oorspronkelijke lessen van Ozobot.
De oorspronkelijke lessen zijn te vinden op: http://www.ozobot.com/learnzone/
Opmerkingen en aanvullingen zijn van harte welkom.

Auke Sikma
a.sikma@steunpunt-sofryslan.nl

Ozobot Tips

1
Hold down the power button on Ozobot for 2 seconds until the LED light turns white.

2
Place Ozobot in the middle of the black calibration dot.

3
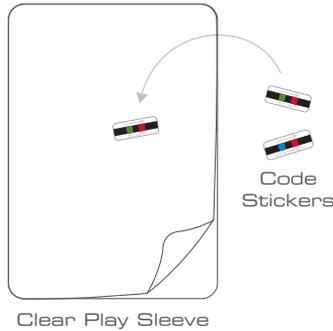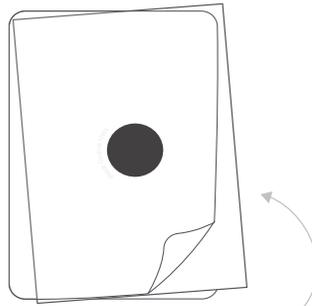Ozobot will then blink blue, move forward, and then blink green.

4
When Ozobot blinks green, it means that it has successfully calibrated. Start over if Ozobot blinks red.

Tips: Calibration

Every time you change play surfaces you should recalibrate.

Code Stickers

Clear Play Sleeve

When using the Clear Play Sleeve, be sure to place the calibration dot INSIDE the sleeve, then calibrate on top.

Before playing on a tablet or smartphone, you need to calibrate to the digital screen. Follow the calibration instructions in the "Ozobot Tuneup" section of our apps.
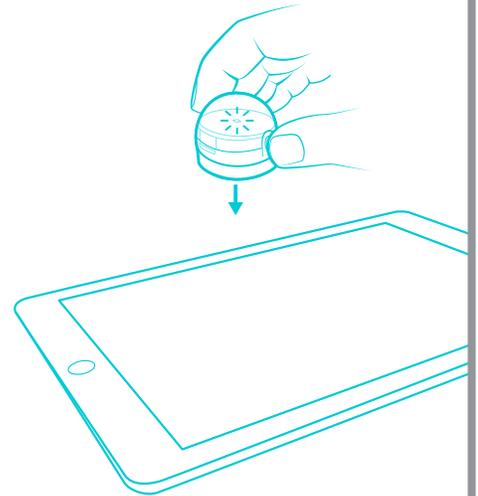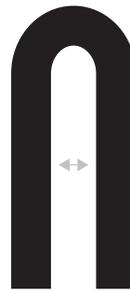
Tips: Drawing Lines

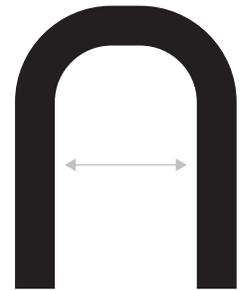X Too Thin!   X Too Thick!   X Inconsistent!   ✔ Just Right
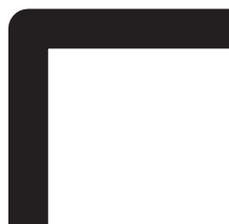
X Too Close!   ✔ Just Right

X Too Sharp!   ✔ Just Right   ✔ Just Right

Ozobot Tips

Tips: Drawing Codes

X Codes on colored lines

X Different sizes

X White spaces

X Overlapping colors

X Too dark

✓ Codes on black lines

Tips: Code Stickers

X Not lined up

GO STRAIGHT

✓ Lined up

GO STRAIGHT

X Codes on colored lines

GO STRAIGHT

✓ Codes on black lines

GO STRAIGHT

Tips: General
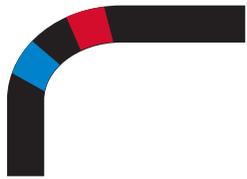
X No codes on corners!
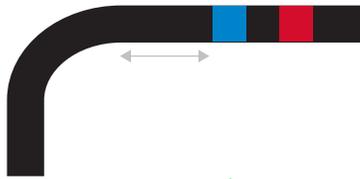
✓ Keep codes on straight lines away from corners
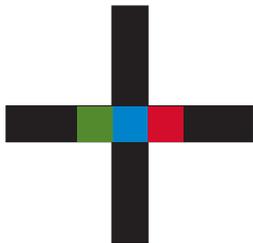
X Too close!
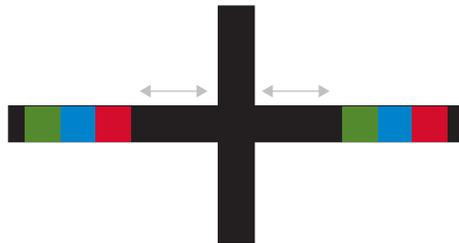
✓ Place codes away from intersections

✓ All other codes need black line before and after

✓ 2 color codes need to be at line end

Tips: OzoDraw

Flash Codes

Static Codes
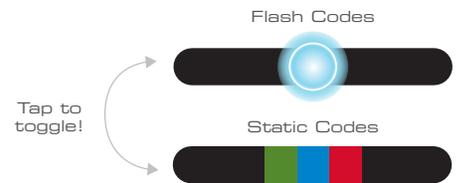
Tap to toggle!

Two-finger touch to rotate

✓ Flash Codes will work on colored lines

X Not aligned to path

To delete code, tap and drag code off screen

Color code reference chart

OzoCodes

ozobot

OPNIEUW

WIN / STOP (OPNIEUW)

WIN / STOP (KLAAR)

SNELHEID

EVEN LANGZAAM

LANGZAAM

NORMAAL

SNEL

TURBO

EVEN SNEL

TELLERS

ENABLE X-ING COUNTER

ENABLE TURN COUNTER

ENABLE PATH COLOR COUNTER

ENABLE OZOPILL COUNTER

OZOPILL +1

OZOPILL -1

RICHTING

GA LINKS

GA VOORUIT

GA RECHTS

SPRING LINKS

SPRING VOORUIT

SPRING RECHTS

U BOCHT

U BOCHT EIND

TIMERS

TIMER AAN

TIMER UIT

TIMER PAUZE

MOOI

TORNADO

TORNADO

SPIN

ACHTERUIT

OZObot

TEACHER'S GUIDE

Thank you for inviting Ozobot into your classroom!

How can Ozobot help to teach students in your classroom?

Ozobot is a miniature smart robot that can follow lines or roam around freely, detect colors, and can also be programmed. Your students will learn hands-on about robotics and programming while working on STEM/STREAM applications. Ozobot teaches them in a fun way so they learn while being engaged and playing.

Ozobot can teach kids of many ages. Elementary school students can start programming Ozobot with visual color codes on a tablet using our free apps, or with markers on a piece of paper. Starting in elementary school and all the way to high school, students have the additional option to learn advanced programming skills with Ozobot Bit and OzoBlockly.

Ozobot can play on paper or on a tablet, so even if your school does not have access to tablets, you can still use Ozobot in your classroom. Many lessons, workshops and activities are meant for markers and paper only, and some lessons that suggest the use of a tablet may be adapted for markers and paper. However, if you are working with Ozobot Bit and OzoBlockly, you do need either a tablet or computer to program and load Ozobot.

The small size of Ozobot is a plus for the classroom. It's portable, but does not require students to walk around the classroom in order to program and interact with Ozobot. Each entire lesson can be done at their usual table. Students can work in groups (a ratio 2 to at most 4 students per Ozobot/tablet is ideal) and can gather around Ozobot, the lesson plan and an optional tablet.

Ozobot Bit has been tested for ages 8+. The original Ozobot has a similar construction, but it was not tested as a toy. However, even elementary school kids should be perfectly capable of using Ozobot with minimal adult supervision.

Ozobot and Ozobot Bit – what is the difference?

The Ozobot base model is able to follow lines, detect colors, and can be programmed using visual color codes. Ozobot can also move and dance when programmed via the Ozogroove app. Ozobot Bit offers all of the functionality available in the base Ozobot model, but also gives students the ability to fully control its behavior with our block-based programming editor OzoBlockly. With Ozobot Bit, kids can make the natural progression from visual coding into the world of block-based programming.

What are the lesson plans?

There are two different introductory courses, the "Ozobot Basic Training" and "OzoBlockly Basic Training." Ozobot Basic Training serves as an introduction to the capabilities of the base Ozobot. Both models, the base Ozobot as well as Ozobot Bit, can be used for these lessons. Students don't need to have any prior knowledge of Ozobot – the lessons will walk them through everything they need to know about Ozobot, visual coding, and the Ozobot and OzoGroove app.

There are five Ozobot Basic Training lessons that focus on three main topics: robotics, programming and math. While the academic background of some of the lesson plans are based on 3rd through 5th grade material, they are nevertheless a good way for kids of many ages to get familiar with Ozobot. The main focus of each lesson is:

Lesson 1: robotics and programming
Lessons 2 + 3: learning math through robotics and programming
Lessons 4 + 5: learning programming through robotics

The Ozobot Basic Training lesson plans are designed such that, with the exception of lesson 5, every lesson can be taught separately or in any order desired. However, it is a good idea to start with lesson 1, since it serves as an introduction to how Ozobot works. If you do teach the lessons out of order, then be sure to check the "More about Ozobot" section at the end of this document to get an overview of how to use Ozobot. The only exception is lesson 5, which requires lesson 4 to be taught first.

OzoBlockly Basic Training introduces students to Ozobot Bit and the OzoBlockly language and editor. These lessons require the use of Ozobot Bit as well as a tablet or computer.

OzoBlockly Basic Training is for students of any age. Their programming background determines which lesson to start with. We have material for absolute beginners up to block-based programming experts.

OzoBlockly Basic Training incorporates on-screen tutorials and videos along with paper-based challenges. This way, students can get familiar with new concepts and try them out in game-based programming challenges.

Beyond the basic training, there are a variety of other lessons for download on the Ozobot STREAM Education page (http://www.ozobot.com/learnzone/). All of these lessons are stand-alone, for a variety of ages, and cover a multitude of topics. There are lessons for both the base Ozobot and Ozobot Bit.

Many of these lessons have been created by great teachers who love Ozobot. If you have created lessons for your class, please share them with us on the Ozobot STREAM Education page (http://www.ozobot.com/learnzone/) so other teachers can try them out with their students. Thank you!

Most lessons cover several common core or other standards and they are listed at the beginning of each teacher handout. According to the STEM principles, each lesson has been designed to integrate topics across multiple subjects. Moreover, students work on projects with real-life backgrounds and connections to careers in STEM fields. Additionally, having students work on group projects around Ozobot fosters their ability to analyze, reason, and communicate ideas effectively as they pose, formulate, solve, and interpret solutions.

Where can I get Ozobots for the classroom?

You can order individual Ozobots on the Ozobot website (http://shop.ozobot.com) or contact us at ozoedu@ozobot.com to order a classroom kit. We recommend one Ozobot for up to 4 students and 2 additional Ozobots as backups.

I got the Ozobots – now where do I start?

To learn more about how to use Ozobots in your classroom, to download lessons and other educational material, please visit the Ozobot STREAM Education page on our website: http://www.ozobot.com/learnzone/.

A good place to start is to take a look at the Tips sheets. There is one for the basic Ozobot, which explains how to calibrate, draw lines and place color codes, and another one covering everything about Ozobot Bit and OzoBlockly. A copy of each sheet is also part of the classroom kit.

Also be sure to read the "More about Ozobot" section at the end of this guide. Lastly, please check out our YouTube channel for more "How to" videos: https://www.youtube.com/user/OZOBOT/playlists.

What else is needed for the lessons?

Ozobots
Please see above on how to purchase Ozobots for your classroom. If you bought individual Ozobots, make sure to remove them from the package prior to class. Always check to have the Ozobots charged before each lesson. To make this easier, you may want to use a USB hub so several Ozobots can be charged at the same time. These multiport charges come with the classrooom kit. Lastly, make sure to place the Ozobots back into their carrying cases or container for protection once class is over.

Tablets or computers
Tablets or computer are required for some of the lessons. Not every students has to have a tablet or computer. We recommend to have as many tablets/computers as Ozobots available and suggest to have students work in groups of at most 4 per Ozobot/screen. The tablet can be either Android (OS 3.2 or higher with a screen size of at least 9in in diameter) or iPad (iPad 2 or newer running iOS 6 or higher). Make sure tablets are fully charged before starting a class.

Apps
If tablets are used, please download the free apps Ozobot, and OzoGroove. You can get these apps on the Google Play store for Android devices or on the iTunes App Store for iPads. The apps are free. Make sure to download the apps and familiarize yourself with them before class.

Lesson Plan
Each lesson has a lesson plan in PDF format for students as well as teachers. You can use the lesson plan as a resource for yourself or print it out for the students and let them learn self-guided. In either case, you will find solutions in the back of the lessson if necessary.

Printouts

Most lessons come with handouts for the students. They are attached to the lesson plan. Note that, if you are using a tablet, you can have the students view and use some of the handouts on the tablet. Only the handouts that students have to work on with a marker need to be printed out. You might want to print extra copies so that students can start over after making mistakes. Some lessons also call for blank sheets of papers.

Markers

Many lessons require students to use markers in colors black, red, light blue and light green. We recommend you use Ozobot markers to ensure that Ozobot reads the color codes reliably. Ozobot markers are part of the classroom kit, or can be ordered by contacting us at ozoedu@ozobot.com). If you don't have Ozobot markers on hand, you may use either Sharpie's wide chisel tip or Crayola classic markers instead. One set of markers per group of students is sufficient. If you are using permanent markers, please make sure to put an extra sheet of paper underneath to avoid permanent marks on the table surface.

Code Reference Chart

It is a good idea to have the OzoCodes reference chart printed out for students to use whenever they are working with the base Ozobot model. It is downloadable from Ozobot's website: http://www.ozobot.com/gamezone/color-language/ and prints are also part of the classroom kit.

DIY Skins

The DIY skins are blank skins for Ozobot that allow students to customize their Ozobot. They are also used in some of the lessons to create characters for a specific setting. The DIY skins are part of the classroom kit, but can also be ordered on our website (http://shop.ozobot.com), or by contacting us at ozoedu@ozobot.com.

Help and Tips Sheets

We have several help and tips sheets available for download on the Ozobot STREAM education page (http://www.ozobot.com/learnzone/). There is one on calibration, one on general tips for Ozobot and another one on OzoBlockly and Ozobot Bit. Samples of some of these come with the classroom kit.

Log Sheet

The log sheet makes keeping track of the Ozobots much easier. You can indicate which students have checked out and returned an Ozobot. The log sheet is available

for download on the Ozobot STREAM education page (http://www.ozobot.com/learnzone/).

Other resources for students

There are many ways students can continue to learn and play using Ozobot even when class is over. Visit the STREAM education page on our website (http:// www.ozobot.com/learnzone/) for a variety of activities, workshops and games. There are also games and brainteasers on the Gamezone of our website (http://www.ozobot.com/gamezone/).

Where do I get help?

If you have any questions about how Ozobot works, you may wish to check our series of "How to" videos. You can find them on YouTube:

(https://www.youtube.com/user/OZOBOT/playlists) or within any of our apps. There is also an extensive FAQ section on the Ozobot website (http://www.ozobot.com/faq/) or in the apps.

We are also always happy to help. Please contact us with questions feedback or suggestions at ozoedu@ozobot.com.

More about Ozobot

Ozobot Basic Training covers how to use and take care of Ozobot, but just in case you need to look it up again or if you are teaching the lessons out of order, you will find all the instructions below. Also make sure to visit the help resources (above).

Ozobot's On/Off button
Ozobot has only one button, the On/Off button and it can be found in the middle on one of the sides of Ozobot.

Protect Ozobot
Ozobot comes with protective skins that can be placed onto Ozobot and stay on during use. While not in use, Ozobot should be placed into the carry case or container for protection.

Screen brightness

When using a tablet or computer, make sure that the screen brightness is set to 100% (maximum brightness). Ozobot needs the brightest screen possible to function properly. Remember to calibrate whenever screen brightness or external light conditions change (see below on how to do this).

How to take care of Ozobot

It may happen that Ozobot starts behaving strangely. For example, Ozobot may stop to be able to follow lines. To prevent this from happening, do the following maintenance every time you start playing with Ozobot or whenever you change your location, the digital screen or type of paper:

1) Calibrate

What does this mean? Ozobot's "eyes" (the sensors) are very sensitive to the surrounding light. So much so that, if the paper changes or if you go closer to the window, it affects how Ozobot sees what's underneath. To let Ozobot know what the surroundings are, you need to calibrate: Please refer to the "Ozobot Tips" sheet for detailed instructions on how to calibrate.

There are two different ways to calibrate and it depends on what surface Ozobot is playing on: paper, or digital screen. You will have to calibrate every time you start playing, when light conditions change, or whenever you change Ozobot's playing surface.

If your Ozobot still behaves strangely, try moving away from any bright lights. Ozobot's sensors are very sensitive and too much light from the surroundings will confuse Ozobot.

If this still doesn't make a difference, try the following:

2) Clean the wheels

Ozobot is very small, so just a bit of dust or grease can get into the drivetrain. It's like driving through a dirty, muddy field with a car. You would certainly want to give the car a good cleaning afterwards. But don't try to clean Ozobot with soap and water, this would most certainly break Ozobot. Instead, take a clean white sheet of paper and move Ozobot's wheels gently back and forth on the paper. Done, Ozobot's wheels are clean!

3) Charge the battery

Ozobot's motor is fueled by a tiny battery, much like cell phones, but smaller. If Ozobot blinks red, then the battery needs charging very soon. Plug the mini USB cable to a computer or multi-port charger and plug Ozobot to the cable. When the battery is almost charged fully, Ozobot starts blinking green. Ozobot shows a solid green light when the battery is completely charged.

Tune the motors

If you start noticing that Ozobot doesn't turn properly or doesn't drive in a straight line when not in line-following mode, tuning the motors may help to correct this behavior. On a tablet, open the Ozobot or OzoGroove app and go to main menu -> tune up -> tune motors and follow the directions.

You are ready to start playing, teaching and learning. Enjoy!