

Turtle Racer Teacher Guide



Summary

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| • Coding skill level: | Beginner |
| • Recommended grade level: | Grades 3-8 (U.S.), Years 4-9 (U.K.) |
| • Time required: | 60+ minutes |
| • Number of modules: | 1 module |
| • Coding Language: | Tynker Blocks |

Teacher Guide Outline

- Welcome!
 - How to Prepare
- Activity
 - Overview
 - Getting Started (10 minutes)
 - DIY Module (40+ minutes)
 - Extended Activities
- Going Beyond an Hour
 - Do More With Tynker
- Help

Welcome!

In this lesson, students will use the Hand Tracking blocks to create a game called Turtle Racer in which they can control where the actor goes by using a virtual steering wheel as they try to help the turtle to eat all of the kelp.

How to play: Hold on to an imaginary steering wheel with your hands just in front of the camera and rotate the wheel to maneuver the turtle around the screen and collect the kelp.

Coding concepts include: simple body detection, advanced landmarks, simple conditionals, simple variables, simple loops, direction and turning, simple motion, functions, screen bounds, simple messaging and basic math.

Teaching Moment: How AI Works: This project uses Artificial Intelligence (AI) to track hand movements via the camera. Take a moment to demystify the "magic" for your students!

Explain that the computer isn't seeing their hands the way a person does. Instead, it has been trained on thousands of different images of hands. Through this training, it has learned to identify patterns and key landmarks—like the position of the palm, fingers, and thumbs.

This is a perfect real-world example of **Machine Learning**, a core concept in AI where computers learn from data without being explicitly programmed for every possible scenario.

How to Prepare

This activity is designed for self-directed learning. Your role will be to help students individually and facilitate as they complete the activities. The best way to prepare is to:

1. **Familiarize yourself with the material.** After selecting your Tynker lesson (Turtle Racer), read through this teacher guide and complete the activity before assigning it to students. This will allow you to troubleshoot anything in advance and plan for potential questions from your students.
2. **Get students excited about coding.** Inspire students and get them excited for the Hour of Code event. Consider showing inspirational videos or posters, which can be found on the Hour of Code website.
3. **OPTIONAL: Sign up for a teacher account.** Creating a free teacher account will allow you to access teacher guides, answer keys, and tons of additional

resources. You'll also be able to create free accounts for your students, monitor their progress, and see their projects.

4. **OPTIONAL: Create student accounts.** From your teacher account, you can easily create free student accounts for all your students. This will allow them to save their projects and progress, so they can continue coding when they get home!
5. **OPTIONAL: Print certificates to hand out.** While signed in to your Tynker teacher account, you can print certificates by clicking on a classroom from your teacher dashboard, clicking the "Gradebook" tab, going to "Hour of Code," and clicking the "Print All Certificates" button.

Activity

Overview

Objectives

Students will...

- Use angles of landmarks to control the motion of Actors
- Use variables and positions of Actors to control game flow
- Show and enable Hand Tracking blocks to create a virtual game controller

Materials

- **For web:** Computers, laptops, or Chromebooks (1 per student)
- **For mobile:** iPads or Android tablets (1 per student)

Vocabulary

- **Functions:** A sequence of commands that can be run together as if it were a single command.

Concepts:

- **Functions:** A sequence of commands that can be run together as if it were a single command. Functions are a helpful way of organizing your code.
- **Point in Direction:** An Actor will always move in the direction it is pointing. To change where an Actor is pointing, use the "point in direction" block. The direction is specified in degrees:
 - Point up = 0 degrees
 - Point right = 90 degrees
 - Point down = 180 degrees
 - Point left = -90 degrees

U.S. Standards

- **CCSS-Math:** MP.1
- **CCSS-ELA:** RF.3.4.A, RF.4.4.A, RF.5.4.A, 6-8.RST.3, 6-8.RST.4, 6-8.RST.7
- **CSTA:** 1B-AP-09, 1B-AP-10, 1B-AP-11, 1B-AP-12, 1B-AP-15, 2-AP-11, 2-AP-13, 2-AP-17
- **CS CA:** 3-5.AP.12, 3-5.AP.13, 3-5.AP.17, 6-8.AP.11, 6-8.AP.13, 6-8.AP.14, 6-8.AP.15
- **ISTE:** 1.1.c, 1.1.d, 1.4.d, 1.5.c, 1.6.b

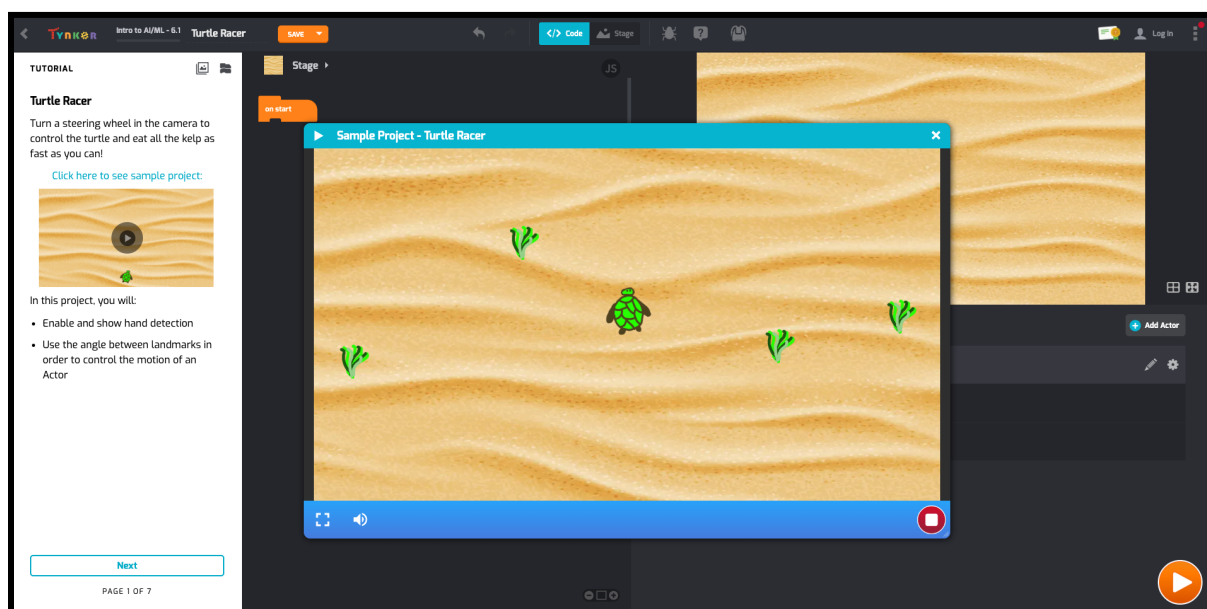
U.K. Standards

National Curriculum in England (computing):

- **Key Stage 2:** Design, write and debug programs that accomplish specific goals; solve problems by decomposing them into smaller parts; Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.
- **Key Stage 3:** Use two or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures; design and develop modular programs that use procedures or functions.

Getting Started (10 minutes)

- Open the Turtle Racer sample project (located on Page 1 of the tutorial).
- Next, explain the goal of the project and demonstrate how to play.



DIY Module (40 minutes)

This lesson has one DIY (do-it-yourself) module. Facilitate as students complete the module on their own:

Turtle Racer (DIY)

- In this project, students will follow step-by-step directions to learn how to create a fun game where the player uses their camera to turn a steering wheel to navigate a friendly turtle towards delicious kelp!
- Coding activities include enabling hand tracking, programming the turtle to move forward, building a steering wheel that the player can control using their wrists, and using variables to keep score of the game.
- Note that today's coding adventure uses functions. Inform students that a function is a sequence of commands that can be run together as if it were a single command. Functions are a helpful way of organizing your code.
- Optional: See if students can "hack the game" by changing the value of the score variable to a number greater than 1.
- Did students finish early? Direct their attention to the last page of the tutorial which includes bonus tasks.

Extended Activities (10 minutes each)

Unplugged Activity: Discussion

Ask students:

- What controls the direction and amount the turtle will turn in the game? (Answer: The angle formed between the right and left wrist is used to determine how much the turtle will turn and in which direction.)
- What happens when the turtle reaches the edge of the screen so that we don't lose track of the turtle? (Answer: When the turtle reaches the edge of the screen, it reappears on the opposite side of the screen.)
- What other body parts do you think it might be fun to control the turtle with? (Answers will vary.)

Plugged Activity: Bonus Challenges

Ask students to:

- Increase the speed of the turtle.
- Change the amount of kelp the turtle can eat.
- Add enemy Actors.
- Optional: See if students can "hack the game" by changing the value of the score variable to a number greater than 1.

Going Beyond an Hour of AI

If your students enjoyed Tynker's Hour of AI projects, then students should continue engaging with [Tynker's Hour of Code](#). In a Tynker Hour of Code, they're sure to enjoy the rest of what Tynker has to offer! Tynker offers a complete premium solution for schools to teach computer science. Over 500 hours of lessons are available to take K-8 students from block coding to advanced text coding. We offer tons of resources for teachers, including comprehensive guides, free webinars, and a forum to connect with other educators.

More Hour of Code Activities

Tynker offers many other tutorials for the Hour of Code, including [NASA Hour of Code](#) lessons that tie directly to NASA's Artemis mission. Check out the main Tynker [Hour of Code](#) page to see all the tutorials!

Do More with Tynker

With Tynker, kids don't just acquire programming skills—they explore the world of possibilities that coding opens up. Tynker has several interest-driven learning paths that make coding fun, both inside and outside the classroom:

- **Coding and Game Design:** Your students can use Tynker Workshop, a powerful tool for crafting original programs to make games, stories, animations, and other projects. They can even share their work with other kids in the Tynker Community.
- **Artificial Intelligence (AI):** Tynker offers exciting courses that introduce students to the fundamentals of AI. They can train models, build projects with machine learning, and explore the future of technology with hands-on activities.
- **Digital Literacy:** With courses like "All About Computers," students learn essential 21st-century skills. These lessons cover computer basics, internet safety, and how technology works, providing a solid foundation for their digital lives.
- **Robotics:** Tynker integrates with micro:bit, allowing students to program this pocket-sized computer. They can control its lights and sensors, and connect it to other hardware, making it possible for them to see their code come to life in the physical world.

Tynker for Schools

Used in over 150,000 schools, our award-winning platform has flexible plans to meet your classroom, school, or district needs. All solutions include:

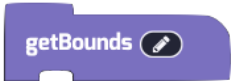
- Grade-specific courses that teach visual coding, JavaScript, Python, robotics and drones
- A library of NGSS and Common Core compliant STEM courses that are great for project-based learning
- Automatic assessment and mastery charts for whole schools and individual classes and students
- Easy classroom management with Google Classroom and Classlink integration
- Professional training, free webinars and other teacher training resources

Need help getting Tynker started at your school? [Contact us](#) to learn more about teaching programming at your school with Tynker!

Help

Need help? Below you'll find answers to frequently asked questions about the Turtle Racer lesson.

- **What is Hour of Code?**
The Hour of Code is a global learning event in which schools and other organizations set aside an hour to teach coding. No prior coding experience from you or your students is needed! The goal is to expand access to computer science education for people of all backgrounds. Tynker has been a leading provider of lessons for the Hour of Code since the event began in 2013.
- **Who is this activity for?**
Turtle Racer is intended for students in grades 3-8 (U.S.) and years 4-9 (U.K.) with some coding experience.
- **What will my students learn?**
Students will learn how to use Hand Tracking blocks to create a virtual game controller. They will apply coding concepts like using motion blocks, functions, and variables to control game flow. In this process, students will develop debugging and logical reasoning skills.
- **What do the code blocks do?**
Below is a description of the provided tutorial code blocks.

Code Blocks	What They Do
	Point the Actor at the specified degree.
	Rotate the Actor to the right (clockwise) by a specified amount.
	Rotate the Actor to the left (counter-clockwise) by a specified amount.
	Set the Actor's x-coordinate to the specified location.
	Set the Actor's y-coordinate to the specified location.
	This is a function definition code block that will run the attached code blocks when the getBounds function is called.
	Call the getBounds function.

How can I contact the Tynker support team?

If you have any issues or questions, send us an email at schools@tynker.com.