

# Weather Control Teacher Guide



## Summary

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|----------------------------|--|
| • Coding skill level:      | <b>Beginner</b>                            |
| • Recommended grade level: | <b>Grades 3-8 (U.S.), Years 4-9 (U.K.)</b> |
| • Time required:           | <b>40 minutes</b>                          |
| • Number of modules:       | <b>1 module</b>                            |
| • Coding Language:         | <b>Tynker blocks</b>                       |

## Teacher Guide Outline

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### Welcome!

- How to Prepare

### Activity

- Overview
- Getting Started (10 minutes)
- DIY Module (30 minutes)
- Extended Activities

### Going Beyond Weather Control

- Do More With Tynker
- Tynker for Schools

### Help

## Welcome!

In this lesson, students will use Tynker's AI (artificial intelligence) body tracking model to create a fun, interactive project where they can control the weather using gestures! Students will begin with a teacher-led discussion about the completed sample project. Next, students will move on to the DIY module where they'll reinforce coding concepts to program a project called "Weather Control." The DIY module includes a sample project, step-by-step tutorial, code blocks to help students get started, and ideas on how to modify their project. Additionally, students will cover science concepts as they complete the "Extended Activities" section of this teacher guide.

**Important:** Students will need a working webcam in order to complete the project.

## How to Prepare

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

1. **Familiarize yourself with the material.** After selecting your Tynker lesson (Weather Control), read through the 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. **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.
3. **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!

## Activity

### Overview

#### Objectives

Students will...

- Apply coding concepts such as simple pose detection, simple landmarks, simple loops, conditionals, and basic math
- Use code blocks to create an interactive project that uses Tynker's body tracking AI

#### Materials

- **For web:** Computers, laptops, or Chromebooks (1 per student)

## Vocabulary

- **Artificial Intelligence:** The idea of machines (such as computers) demonstrating intelligence, similar to how our brain works
- **Machine learning:** When computers learn from examples or experience to make decisions or recognize patterns on their own.
- **Code:** The language that tells a computer what to do
- **Actor:** A Tynker character or object that can talk and interact with others
- **Costumes:** Different appearances for an Actor
- **Stage:** The background of the project where the Actors are placed
- **Sequence:** The order in which steps or events happen
- **Command:** A specific action or instruction that tells the computer to do something
- **Condition:** A logical expression that evaluates to true or false
- **Loop:** An action that repeats one or more commands over and over
- **Infinite loop:** A loop that repeats forever and does not end until the program stops
- **Counting loop:** A loop that repeats one or more commands a specific number of times
- **Conditional loop:** A loop that performs one or more commands as long as the specified condition is met

## U.S. Standards

- **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
- **CCSS-Math:** MP.1
- **CSTA:** 1B-AP-11, 1B-AP-12, 1B-AP-15, 2-AP-13, 2-AP-17
- **CS CA:** 3-5.AP.13, 3-5.AP.17, 6-8.AP.13, 6-8.AP.15
- **ISTE:** 1.1.c, 1.1.d, 1.4.d, 1.5.c, 1.5.d, 1.6.b

## U.K. Standards

National Curriculum in England (computing):

- **Key Stage 2 (Years 4-6)**
  - Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
  - Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact
- **Key Stage 3 (Years 7-9)**
  - Create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability
  - Understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct, and know how to report concerns

## Getting Started (10 minutes)

- Show students the completed sample project by clicking this image in the tutorial:



- Next, inform students that they're going to create an AI-controlled weather simulation where their gestures can "control" the weather. Start by playing the sample project, then raise your right hand on the Stage. What do the students observe? Ask your students to suggest other gestures and observe what happens! Here are some suggestions:
  - Raise your right hand and slowly raise it higher and higher
  - Raise your left hand and slowly raise it higher and higher
  - Raise both your left hand and right hand

## DIY Module (30 minutes)

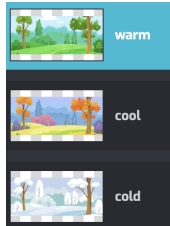
This lesson has one DIY (do-it-yourself) module. Facilitate as students complete the Weather Control module on their own:

### Weather Control (DIY)

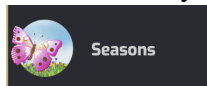
- In this DIY, students will use Tynker's pose detection blocks to create a project where the weather changes based on their gestures.
- Note that this project utilizes an AI model. This model has already been "trained" to recognize the human body by being shown many photos of people and data about what's in the photos. Now the model is ready to be used in the project, where it can "find" your students' hands using their webcam.
- Coding activities include setting up Tynker's pre-trained AI model to track your students' body and show the tracking on the Stage, adding/drawing weather backgrounds, applying graphic effects, and incorporating more gestures to the project.
- Inform students that we're going to be using body detection AI which will predict where parts of their body are located.
- Make sure students follow the step-by-step instructions and drag blocks from the tutorial tab to the center coding area.
- Page 3 of the tutorial instructs students to draw or add more weather states than the ones provided:

## Hour of AI

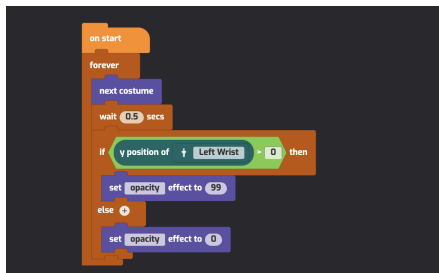
### Weather Control



If needed, encourage students to check out the different backgrounds in the Media Library's Seasons category:



- Do students want to show a snowing animation when the background is cold? Direct your students to the Snow actor. Note that there are multiple ways to create this effect and here is one possible solution:





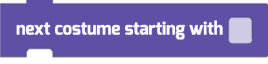
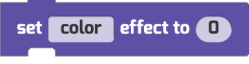
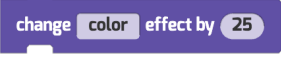

- Do students want the weather to look darker? Direct their attention to the "set effect" block and change the parameter to "brightness":



Encourage students to see what happens when the brightness is set to 20 or 40.

- Page 5 of the tutorial includes suggested code blocks to help students add effects and animate their project. Here are the suggested code blocks and what they do:

Code block	What does it do?
	Run the code attached to this block when the background switches to the specified scene.
	Keep repeating the code inside this loop forever.
	Repeat the code inside this loop a specified number of times.
	Pause the program for the specified number of seconds
	Change the Actor's costume to the specified one.

	Make the Actor appear on the Stage.
	Make the Actor disappear from the Stage.
	Switch to the next costume starting with the one specified.
	Set the specified effect to the specified variable.
	Change the specified effect by the specified value.
	Clear the graphic effects of an Actor.

## Extended Activities

### Unplugged Activity

#### Mini Field Trip

If possible, briefly take your class outside to practice using weather vocab terms as they talk about the weather. If you're not able to bring your class outside, have them look outside the classroom window or show them a weather image.

- For younger students, pair them up and have them ask each other "How's the weather?" Encourage students to use 2-3 adjectives (ex: sunny, rainy, windy, cloudy, snowy, foggy, hot, cold). Time permitting, ask them to identify and/or describe the clouds (ex: stratus, cumulonimbus, cirrus), flowers, and insects they see.
- For older students, ask them...
  - What are the factors that determine the weather of an area? (suggested answer: humidity, air pressure, temperature, cloudiness)
  - What do you understand by "humidity"? (Answers will vary.)
  - What is the weather typically like here in winter? (Answers will vary.)

### Plugged Activity

#### Make It Your Own

- Direct your students' attention to the last page of the tutorial which includes ideas on how to expand on their Weather Control project.

## Going Beyond Weather Control

If your students enjoyed Weather Control, 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 400 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.

## 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:

- **Even More Free AI Tutorials** — <https://www.tynker.com/blog/tynker-toolbox-the-ai-blocks/>
- **Artificial Intelligence 101** — This AI course uses Tynker's fun and friendly code blocks. Webcam projects powered by AI put your students at the center of the action! Create interactive Snapchat-style costumes, hand-tracking apps, activity games, and so much more. Along the way, students understand how AI models are driving their amazing inventions behind the scenes. Students even explore natural language processing (NLP), the technology used by modern chatbots like ChatGPT. Find out more here: <https://www.tynker.com/k8-school/coding-curriculum/artificial-intelligence-101>
- **Artificial Intelligence 401** — This JavaScript course is perfect for experienced students looking to implement AI in their programs. Learn how to use MediaPipe, an AI solution from Google, and explore topics like neural networks, supervised learning, and much more. More than that, students dive into AI ethics and consider how AI might impact our future. Find out more here: <https://www.tynker.com/k8-school/coding-curriculum/artificial-intelligence-javascript-401>
- **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.
- **Robotics** — Tynker integrates with connected toys, including Lego WeDo robotics kits, so kids can see their code come to life.
- **Minecraft** — Tynker integrates with Minecraft so your students can learn coding through a game they love. Tynker offers skin and texture editing, as well as a custom Mod Workshop that lets kids try their original code in Minecraft.

## Tynker for Schools

Used in over 90,000 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, Java, Python, and robotics
- 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 Clever 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!

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## Help

Need help? Below you'll find answers to frequently asked questions about using Weather Control.

### How do I prepare for Weather Control?

**Familiarize yourself with the material.** After selecting your Tynker lesson (Weather Control), read through the 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.

### How does this project use AI?

This project utilizes a pre-trained AI body tracking model. The AI model has been trained on a large dataset of images featuring the human body. When your students interact with the project, the model analyzes the incoming video feed to identify and follow the movements of the user's body landmarks, specifically of the face, providing accurate and instantaneous tracking. Using Tynker's AI blocks, students can apply the AI technology to build interactive, sophisticated projects. Let's see what your students will create!

### Who is this activity for?

Weather Control is intended for students in grades 3-5 (U.S.) or years 4-6 (U.K.) with some coding experience.

### How do my students code their project?

The Weather Control DIY module includes a workspace for students to code their project. The section on the left is a tutorial tab that gives step-by-step directions and describes what is happening in each step. Students can code their project by dragging code blocks to the middle coding panel.



## What will my students learn?

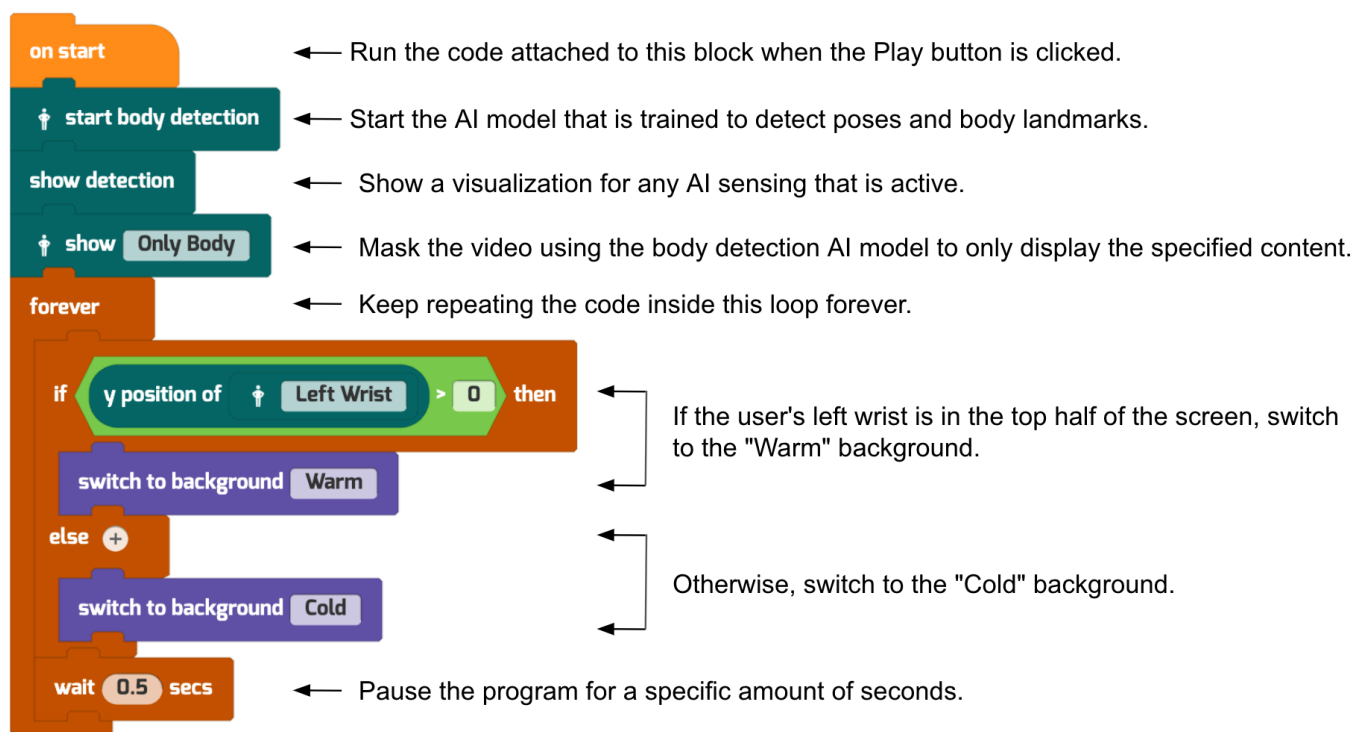
Students will combine creativity and coding concepts to create an interactive project called "Weather Control" that uses Tynker's AI model. Additionally, students can also expand on their project while experimenting with new code blocks. In this process, students will develop debugging and logical reasoning skills.

## What do the code blocks do?

Below is sample code for the Stage Actor.



**Stage:**



**Note:** This is an open-ended DIY project. Above is an example that uses the provided code blocks to create a Weather Control project.

## How can I contact the Tynker support team?

If you have any issues or questions, send us an email at [support@tynker.com](mailto:support@tynker.com).