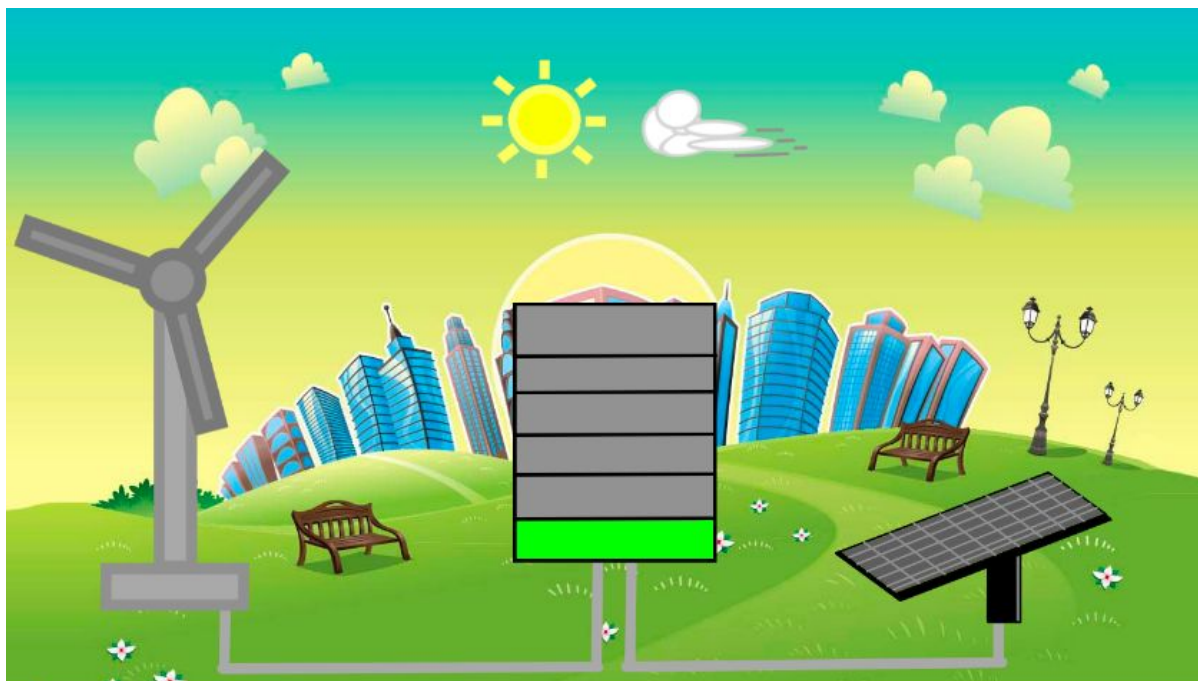


Affordable and Clean Energy Teacher Guide



Summary

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- | | |
|----------------------------|---|
| ● Web address: | tynker.com/hour-of-code |
| ● Coding skill level: | Intermediate |
| ● Recommended grade level: | Grades 3-5 (U.S.), Years 4-6 (U.K) |
| ● Time required: | 50 minutes |
| ● Number of modules: | 1 module |
| ● Coding Language: | Block-based |

Teacher Guide Outline

Welcome!

- How to Prepare

Activity

- Overview
- Getting Started (20 minutes)
- DIY Module (30 minutes)
- Extended Activities

Going Beyond an Hour

- Do More With Tynker
- Tynker for Schools

Help

Welcome!

Welcome to Hour of Code! This year, Tynker is incorporating meaningful coding projects that align with the United Nations Sustainable Development Goals. The Goals are intended to bring awareness to global challenges and provide a plan of action to achieve a more sustainable future for all. You can read about the 17 Goals and global challenges here:

<https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

Note: Each Goal listed on the website also includes information on *Facts and figures*, *Goal targets*, and *Links*.

In this lesson, students will explore the opportunities and challenges of using energy to meet our wants and needs (*Goal 7*). The lesson is intended to be completed in two different parts (as described in the "Getting Started" section of this teacher guide). In Part 1, students will reflect on *Goal 7: Affordable and Clean Energy* by completing a variety of activities. Part 1 also includes a "Goal 7: Affordable and Clean Energy" assignment, which will allow you to assess your students' understanding. The assignment will also guide your students' thought process before they start coding their Tynker project.

In Part 2, students will combine their coding and art skills as they complete the "Affordable and Clean Energy" project using Tynker. Students are provided a tutorial to help guide their creative process as they complete the project. Additionally, they'll reinforce coding concepts such as delays, direction and turning, sound playing, loops, simple events, input/output, and more! "Page 3" of the tutorial also includes three different sample projects that your students can use as inspiration. **Note:** This project is open-ended. Students are provided suggestions on how to get started, but need to choose which code blocks to use.

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 (e.g., Affordable and Clean Energy), 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. Here is a link to resources such as inspirational videos and posters from the Hour of Code website:

<https://hourofcode.com/us/promote/resources#videos>

3. **OPTIONAL: Sign up for a teacher account.** Although an account is NOT required, 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! Again, this is not necessary to complete the Affordable and Clean Energy lesson.
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. This will only print certificates for student accounts assigned to the selected classroom.
6. **Complete this lesson in two different parts.** Please refer to the "Getting Started" section of this teacher guide.

Activity

To begin Affordable and Clean Energy, have your students go to this URL:
tynker.com/hour-of-code

Overview

Objectives

Students will...

- Explore the Sustainable Development Goals
- Apply coding concepts and code blocks to create an Affordable and Clean Energy project

Materials

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

Vocabulary

- **Code:** The language that tells a computer what to do
- **Actor:** A Tynker character or object that can talk and interact with others
- **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
- **Loop:** An action that repeats one or more commands over and over

U.S. Standards

- **CCSS-ELA:** RI.3.7, RF.3.4, RF.3.4.A, SL.3.1, RF.4.4.A, RF.1.4.A, RF.4.4, SL.4.1, RF.5.4.A, RF.5.4, SL.5.1
- **CCSS-Math:** MP.1
- **K12CS:** P1.1, P1.3, P2.1, P2.3-2.4, P3.2-3.3, P4.4, P5.1-5.2, P6.1-6.2, P7.2-7.3
- **CSTA:** 1B-AP-11, 1B-AP-12, 1B-AP-14
- **CS CA:** 3-5.AP.10, 3-5.AP.13, 3-5.AP.14, 3-5.AP.17
- **ISTE:** 1.c, 1.d, 4.d, 5.c, 5.d, 6.b

U.K. Standards

National Curriculum in England (computing):

- **Key Stage 2 (Years 4-6)**
 - Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
 - Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
 - Understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration
 - Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact

Getting Started (20 minutes)

The lesson is intended to be completed in two different parts:

Part 1

Introduce students to *Goal 7: Affordable and Clean Energy* by completing the following activities:

- Play this short video (located at the top right) that explains the 17 Sustainable Development Goals:
<https://www.allaboardforglobalgoals.com/en-us#video-transcript-modal>
- Lead a discussion with your class. Ask students...
 - Who can think of everyday items that need electricity to run? (Example: lights, computers, refrigerator)
 - What are examples of renewable energy sources? (Answer: Solar, wind, geothermal, hydroelectric)
 - Has anyone seen a wind turbine? Where did you see it?
 - Has anyone seen a solar panel? Where did you see it?

Hour of Code, Affordable and Clean Energy

- Tell students that they're going to use Tynker in an upcoming activity to program an Affordable and Clean Energy project. Before students start coding, ask them to complete the "Goal 7: Affordable and Clean Energy" assignment (located on the next page) as an in-class activity.

Name _____

Date _____

Goal 7: Affordable and Clean Energy

Directions: Answer the questions below, then create an outline for your "Affordable and Clean Energy" project.

Questions:

1. List at least 2 different types of renewable energy sources.

2. True or false: Everyone has access to clean energy and electricity.

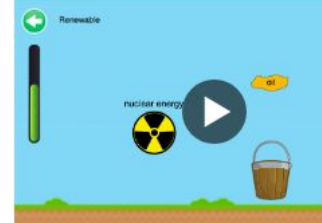
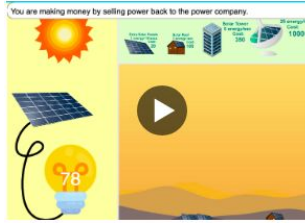
3. List at least 2 different ways you can improve energy efficiency in your house.

4. What is your "Affordable and Clean Energy" Tynker project going to be about?

Use the space below to sketch Actors or brainstorm ideas:

Part 2:

- Now that your students know more about the Sustainable Development Goals, they're ready to move on to the DIY Module and create a meaningful coding project inspired by *Goal 7: Affordable and Clean Energy*.
- Go to "Page 3" of the tutorial and show students the provided examples:



- Optional: Read the Affordable and Clean Energy tutorial out loud to your students.

DIY Module (30 minutes)

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

Affordable and Clean Energy (DIY)

- In this DIY, students will create an open-ended project that demonstrates their understanding affordable clean energy. **Note:** This project is open-ended. Students will need to determine which code blocks to use.
- Point out to students that "Page 3" of the tutorial includes three sample projects. They can view the samples and use them as inspiration by clicking (for web)/tapping (for mobile) on the project images.
- Remind students to use their "Goal 7: Affordable and Clean Energy" assignment as a reference.
- "Page 4" of the tutorial encourages students to add a background and Actors to their project. They can draw their own artwork or select images from the Media Library.
- Are students struggling to draw a picture?
 - Ask students to watch the Tynker support video on how to draw their own Actor: <https://www.tynker.com/support/videos>.
- Are students on the code blocks tab, and want to return to the tutorial? Ask them to click this icon:



- *Optional:* Direct your students to this link, which includes helpful video tutorials: <https://www.tynker.com/support/videos>

Extended Activities

Let's Discuss

Pair up students, then ask them to discuss the following questions:

- Is there a renewable energy source that you would like to learn more about?
- What are some drawbacks to solar energy? Benefits?
- Why do you think it's important that we use clean energy?
- How can you (or someone you know) use energy efficiently?

Optional: Ask students to share their answers with the class.

Going Beyond an Hour

If your students enjoyed an 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 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.

More Hour of Code Activities

Tynker offers many other tutorials for the Hour of Code, including [STEM Hour of Code](#) lessons that you can integrate into the subjects you already teach. 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.
- **Drones and Robotics:** Tynker integrates with connected toys, including Parrot drones and 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, 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 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!

Help

Need help? Below you'll find answers to frequently asked questions about using Affordable and Clean Energy.

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 event is held every December during Computer Science Education Week. You can also organize an Hour of Code year-round. The goal of the Hour of Code is to expand access to computer science education for people of all backgrounds. Learning computer science helps students develop logic and creativity, and prepares them for the changing demands of the 21st century. Tynker has been a leading provider of lessons for the Hour of Code since the event began in 2013. Since then, over 100 million students from 180 countries have finished an Hour of Code.

How do I prepare for Hour of Code?

1. **Familiarize yourself with the material.** After selecting your Hour of Code lesson (e.g., Affordable and Clean Energy), 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. **Get students excited about coding.** Inspire students and get them excited for the Hour of Code event. Here is a link to resources such as inspirational videos and posters from the Hour of Code website:
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3. **OPTIONAL: Sign Up for a teacher account.** Although an account is NOT required, 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! Again, this is not necessary to complete an Hour of Code.

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. This will only print certificates for student accounts assigned to the selected classroom.

How can Tynker help me manage my Hour of Code?

Tynker has several free features for registered teachers that will help you manage your Hour of Code. If you set your students up with a Tynker classroom, you will be able to track their progress and print Hour of Code completion certificates for them to keep.

How do I open Affordable and Clean Energy?

Have your students go to this URL: tynker.com/hour-of-code

Who is this activity for?

Affordable and Clean Energy is intended for students in grades 3-5 (U.S.) or years 4-6 (U.K.) with some coding experience.

Do I need to create Tynker accounts for my students?

No, you do not need to create Tynker accounts for your students.

What devices do I need?

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

How do my students code their Actors?

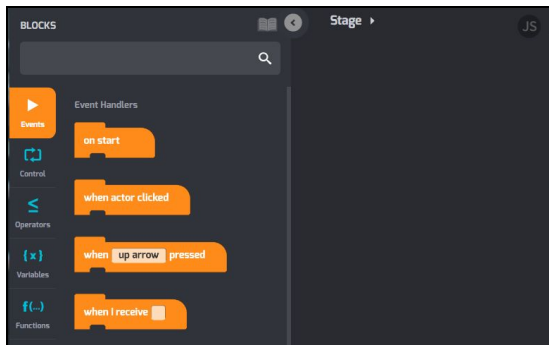
The Affordable and Clean Energy DIY module includes a workspace for students to code their project. The section on the left is a tutorial tab that provides suggestions on what to create. **Note:** This is an open-ended project. Students will need to select their own code blocks, then drag-and-drop the code blocks to the center coding area.

Students can access a variety of different code blocks by clicking this icon:



Hour of Code, Affordable and Clean Energy

Once students have the code blocks tab open, they should see something similar to the image below. Ask students to click the different categories (e.g., events, control, motion, etc.) to find the code blocks they want to use.



What will my students learn?

Students will explore the meaning behind *Goal 7: Affordable and Clean Energy*. They will also use Tynker to create an open-ended project that demonstrates the importance of Goal 7 and what clean energy means to them. This lesson will also reinforce coding concepts as students experiment with code blocks. In this process, students will develop debugging and logical reasoning skills.

How can I contact the Tynker support team?

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