

PI IN THE SKY: TAKE THE CHALLENGE

LESSON PLAN | VERSION 1

LESSON OVERVIEW

Prerequisite Knowledge

- Build Essentials
- Fly Essentials
- Basic multiplication facts
- Understanding of decimals

Materials Needed

- Hopper(s)
- safety glasses
- controller **or** FTW Fly device with Bluetooth capabilities (such as an iPad or laptop)
- tape (for the floor)
- measuring tape (up to 20')
- landing pads
- towers
- scratch paper
- writing utensils

Time Allotment

Lesson: 45 minutes (or 1 class period), Setup: 20 minutes

Document

- Pi Day 2025 Slide Deck

Vocabulary

- Pi (π) – has a value *approximately* equal to **3.14**; a circle's circumference is equal to *approximately* the circle's diameter, **3.14** times
- Diameter – the distance across the widest part of a circle, which goes through the center of the circle
- Circumference – the distance around a circle

In this Lesson...

Students celebrate Pi Day by learning about circles and where the value of pi comes from. Then, they fly Hopper in circles with various parameters using their knowledge of Hopper's flight maneuvers.

Learning Objectives

- Learn about π and how its value comes from components of a circle.
- Review the four flight maneuvers to fly Hopper with a controller.
- Use knowledge of flight maneuvers (altitude, pitch, roll, and yaw) to participate in a group discussion on how to fly Hopper in circles with various parameters.

LESSON STRUCTURE

Read through the following table before starting the lesson. Approximate times have been given for each section to help with scheduling and time management.

Lesson Section	Description	Approximate Time
Direct Teaching	<p>Open the slide deck titled Pi Day 2025 Slide Deck and have the first slide up as the students walk in. Encourage students to think about the bell ringer questions:</p> <p>“Have you ever celebrated Pi Day before? Why do we celebrate it on March 14th?”</p> <p>Go through the rest of the slides of the slide deck with the students. Play any videos directly from the slides (as opposed to going to the external website). Reference any presenter’s notes as needed for each slide.</p> <p>*Hide slide 5 if students have not learned about ratios in their math class yet. Ratios are a Common Core Math grade 6 topic.</p>	15 minutes
Discussion & Flying Activity	<p>Ensure the activity is set up prior to the beginning of the lesson.</p> <p>The last three slides contain the flying patterns that students will be discussing and practicing.</p> <p>Encourage the use of flight terms such as altitude, pitch, roll, and yaw during the discussions.</p> <p>Visuals of the controller and initial drone placement for each flight pattern can be found on page 4 of this lesson plan. Do the extension if appropriate. Then, lead a group discussion.</p> <p>*Depending on the age of your students and their experience with flying Hopper, slide 13 can be hidden if it could be too difficult. The questions on slide 14 can be adapted to your students as needed.</p>	30 minutes

ACTIVITY SETUP

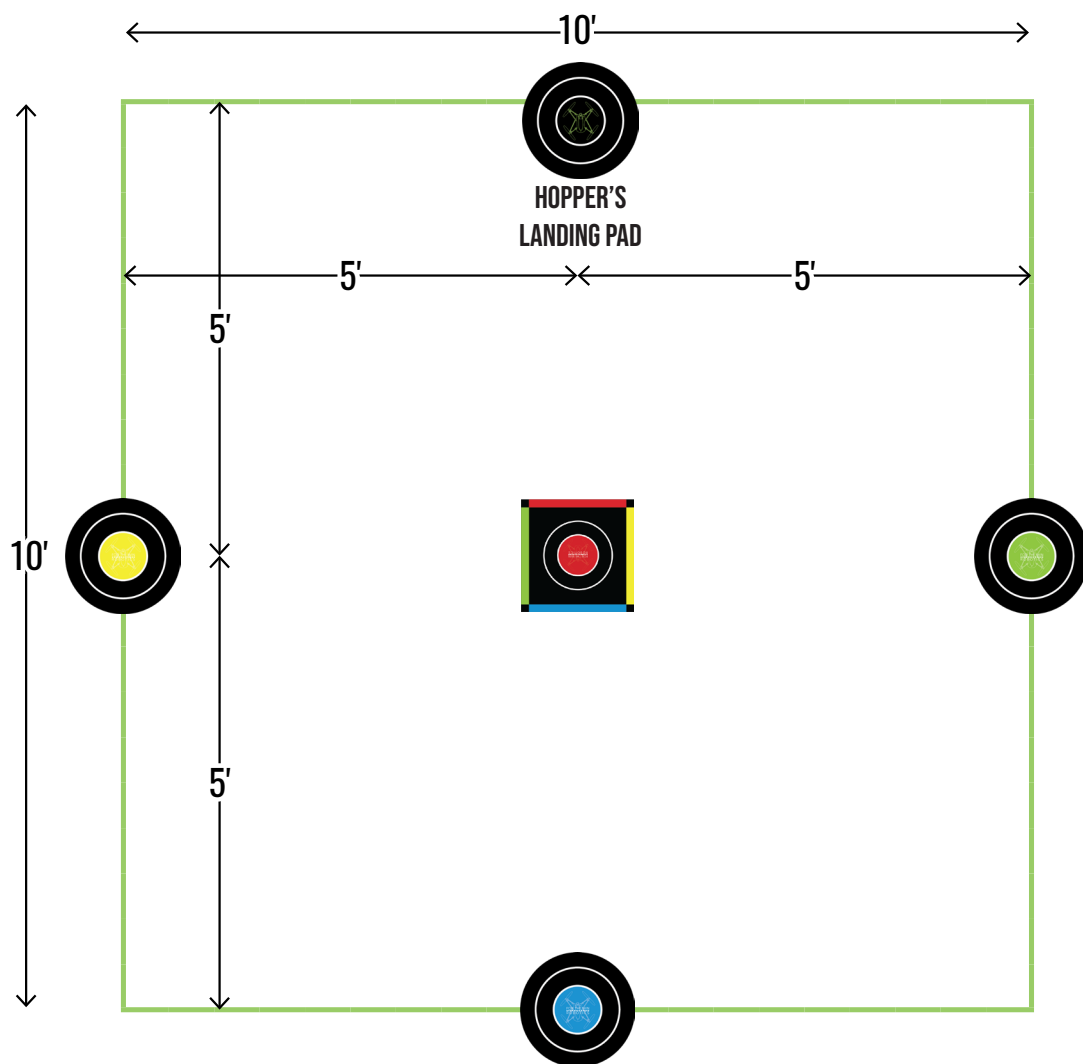
Tape a 10' × 10' square on the ground which will be the fly zone. Place four landing pads at the 5' mark of each side of the square. One of these landing pads will be for Hopper to take off and land, and the other three landing pads will act as guides for students when flying.

If students will be attempting the flight pattern on slide 13, place a tower at the center of the square.

If space permits, multiple of these 10' × 10' squares can be setup to allow for more students to practice flying Hopper at a time.

An example of the setup is shown below.

*The initial placements of Hopper for each flight pattern can be found on page 4 of this lesson plan.

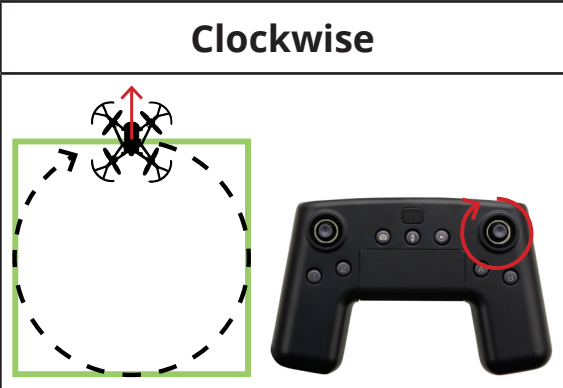
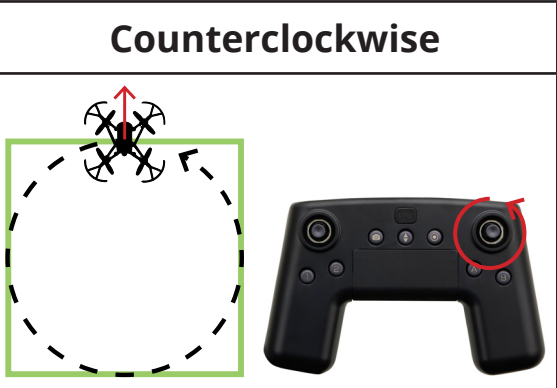

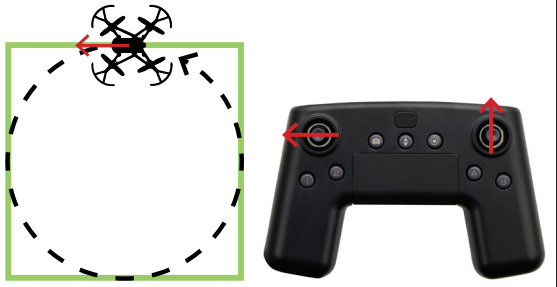
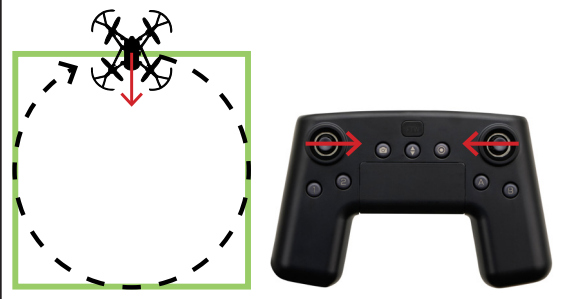
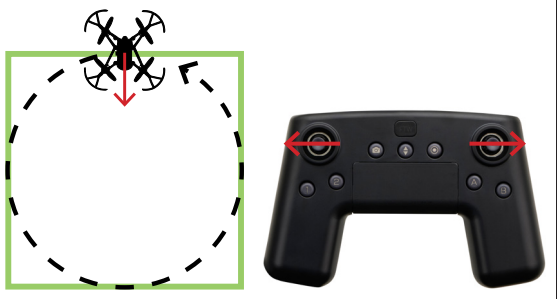


ACTIVITY IMPLEMENTATION

Activity Facilitation

Students will take turns piloting Hopper to successfully complete each flight pattern (slides 11 – 13). Visuals of the controller and Hopper’s initial placement for each pattern are shown below. The red arrows show the direction that Hopper’s eyes are facing.

*The camera rotated at a 45° angle can be connected to a Wi-fi capable device for the flight on slide 13. The tower should be in frame throughout the flight.

	Clockwise	Counterclockwise
Slide 11		
Slide 12		
Slide 13		

Extension

Ask students to calculate the circumference of the circle they flew using the dimensions of the setup and π . Elementary and middle school students can let $\pi \approx 3.14$ and use multiplication ($10 \text{ ft} \times 3.14 = 31.4 \text{ ft}$). High school students can leave their answer in exact form ($10\pi \text{ ft}$).