



# Roll, Pitch, Yaw Lesson Plan

**Overview:** In this hands-on lesson, students explore the flight terms “roll,” “pitch,” and “yaw” and play a fun game where they “fly” through the room.

**Grades:** Preschool and K-2

**Length of Lesson:** 30-45 minutes

**Related Video:** “How to Fly” Segment

## Learning Goals:

After completing this lesson, students will be able to:

- Explain the different ways a plane can move.
- Provide the definitions of “roll,” “pitch,” and “yaw.”

## Related Goals from the Space Racers™ Curriculum:

**Key Facts about Space and Space Exploration - Space Flight/Aeronautics:**

- Flight (Students will learn basic concepts about flight.)

## Materials:

- “Roll, Pitch, Yaw” poster
- A toy plane or paper plane

## Prep:

- Print out the “Roll, Pitch, Yaw” poster.
- Find a space (either inside or outside) where students can “fly” around like airplanes.

## Lesson Activities:

### Activity 1: Flying

1. Tell your students that today you will be talking about flight and how planes move through the air.
2. Go to an area of your room or school (inside or outside), where you have open space.
3. Ask students to spread their arms, reaching left and right, as if they were airplanes. Ask students to pretend they are airplanes and “fly” around the room.
4. Have students experiment with different ways they can fly.
5. Have students line up behind you and, in follow the leader style, lead them around the room, with your arms spread open like an airplane and have your students follow you as you “fly.”
6. Now tilt your body from side to side, tilting your right arm down toward the ground and then do the same with your left arm, tilting your body down toward the left. Then lift your head up high, and then lower your head and arms down low. Fly toward the left and then fly toward the right.

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7. Ask for a volunteer to be the lead plane and have everyone (including you) follow them as they continue flying. Have a few more students take turns being the lead plane.
8. Have everyone sit down on the ground/floor. Ask students to discuss some of the different ways they moved when “flying” through the air. (Up, down, side to side, straight, etc.)

## Activity 2: Introducing Roll, Pitch, Yaw

1. Hold up a toy plane. Ask for a volunteer to describe and demonstrate one way a plane can move. (Up & down, side to side, etc.) Then ask for a volunteer to describe and demonstrate another way a plane can move.
2. Show your students the “Roll, Pitch, Yaw” poster. Hold the toy plane and move its left wing down and then its right wing down. Explain that this movement in flight is called “roll.” Point to the “roll” column in the poster.
3. Then move the nose of the plane up and then move it down. Repeat this action a few times, having students describe the motion as you are doing it (up and down). Explain that this up and down movement in flight is called “pitch.” Point to the “pitch” column in the poster.
4. Then move the nose of the plane to the left and then to the right and explain that this movement in flight is called “yaw.” Point to the “yaw” column in the poster.

*Tip: To help illustrate the concepts of “roll,” “pitch,” and “yaw,” show and discuss the animated images on the National Air and Space Museum’s website: <http://howthingsfly.si.edu/flight-dynamics/roll-pitch-and-yaw>.*

## Activity 3: Roll, Pitch, Yaw Rap (optional)

1. To help your students learn the terms “roll,” “pitch” and “yaw,” teach them the following rap:

Fly, fly, let’s spread our wings and fly.  
Fly, fly, help us reach the sky.  
Let’s fly, fly, moving through the air.  
Let’s fly, fly, going from here to there.  
Roll our plane to the left, pointing our left wing to the ground.  
Roll our plane to the right, pointing our right wing down, down, down.  
Roll to the left, roll to the right,  
As we fly around.  
Pitch up, pitch down.  
Pitch up to the sky, and down to the ground.  
Pitch up, pitch down,  
As we fly through town.  
Yaw to the left, yaw to the right,  
Moving our plane from side to side.  
Yaw to the left, yaw to the right,  
As we continue on in flight.  
Fly, fly, let’s spread our wings and fly.  
Fly, fly, come help us reach the sky.  
Let’s fly, fly, moving through the air.  
Let’s fly, fly going from here to there.

2. After you have gone over the rap, have students “fly” around the room, saying the rap and acting out the actions as they say them. Repeat a few times.

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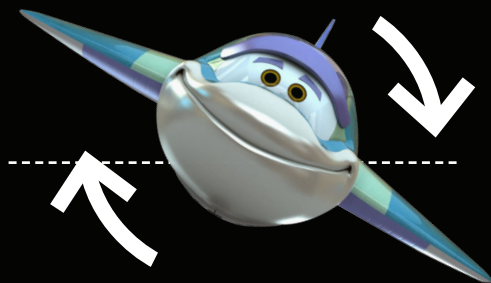
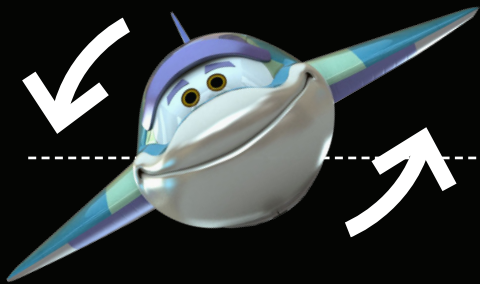
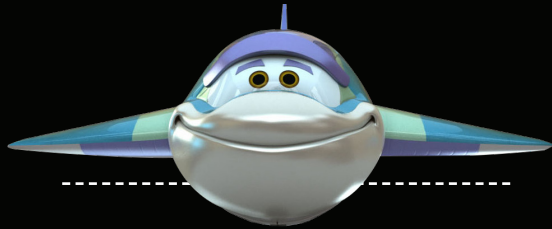
## Activity 4: How to Fly

1. Show your students the Space Racers™ “How to Fly” segment from the National Air and Space Museum.
2. Ask students to discuss something new they learned from the video.

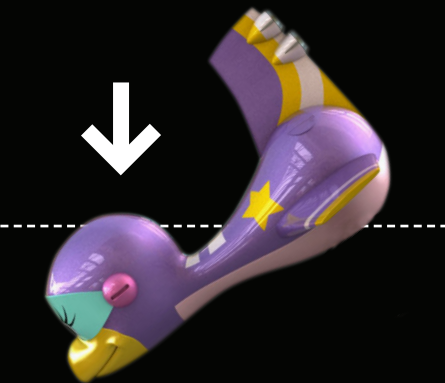
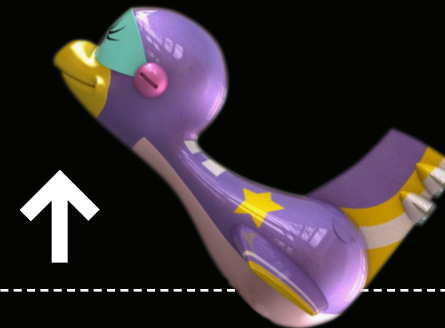
## Wrap-up:

1. Hold up the “Roll, Pitch, Yaw” poster and ask students to describe the different ways a plane can move.
2. Point to the different columns in the poster and ask student to explain what each of the terms mean.
3. Ask students to discuss something new they learned in today’s lesson.

# Roll



# Pitch



# Yaw

