



FlyBy Math™ SIMULATOR QUICK START GUIDE

Introduction

This Guide outlines ways to help prepare you to teach the FlyBy Math simulator to your students.

For more details, see the Teacher Guide for the FlyBy Math Simulator.

Overview of the Student and Teacher Materials

The FlyBy Math simulator is an online visualization tool that offers multiple linked dynamic representations to help students understand distance-rate-time relationships in the real-world context of air traffic control. The side-by-side layout enables students to observe and manipulate three views: the planes on their routes, the corresponding distance vs. time graph, and the equation of each line on the graph.

The FlyBy Math simulator is supported by five printed student worksheets with accompanying assessments. Each worksheet and assessment has an answer document with a full set of answers and solutions.

The FlyBy Math simulator can be accessed here:

<https://atcsim.nasa.gov/simulator/sim2/sector33.html>

- Educators can download and print both educator materials (with answers) and the student worksheet materials.

1

View Introductory Materials

SmartSkies website: <https://www.nasa.gov/smart-skies>

If you have never used the FlyBy Math simulator, view the following movies:

- “24-Hours of Flight in the US” – the world’s biggest distance-rate-time problem.
- “An Introduction to the FlyBy Math Simulator” - an overview of the three linked simulator panels and the relationships among them.

2

Download and Print the Online Documents

In the FlyBy Math simulator window, select the Problem Set you will use to introduce your students to the simulator. If your students have never used the FlyBy Math simulator, we strongly recommend starting with Problem Set A.

Select and download the student worksheet and answer for the Problem Set you have selected. Also download the corresponding assessment and answer documents. (Note: Problem Set A does not have an accompanying assessment document.)



3

Review the Materials

If you have never used the FlyBy Math simulator, familiarize yourself with the selected student workbook and assessment document. With the student and teacher materials in hand and with access to the the FlyBy Math simulator, read the Implementation Section in the Teacher Guide for the FlyBy Math simulator.

4

Duplicate the Student Worksheet and Assessment

For the Problem Set you have selected, duplicate the student worksheet and assessment to provide each student with one print copy.

5

Implement the Instructional Activities with Your Students

a) If your students are new to the FlyBy Math simulator, begin with the video:

- “24-Hours of Flight in the US”

This 2-minute QuickTime movie is available from the FlyBy Math simulator window.



As you read through this step, you may find it helpful to have a copy of the Student Worksheet and teacher materials.

- b) If your students are new to the FlyBy Math simulator, show the introductory video:

- “An Introduction to the FlyBy Math Simulator”

This 2-minute QuickTime movie is available from the FlyBy Math simulator window.

- c) If your students are new to the FlyBy Math simulator, assign Student Worksheet A to introduce the simulator. You may choose to have the students work independently or in pairs on individual computers. (Or you may choose to project the simulator and the video for a whole class activity.)

Provide time for your students to explore the FlyBy Math simulator and the assigned interactive worksheet activities that include exploration, data gathering, and analysis.

Students should access the FlyBy Math simulator from the website: <https://atcsim.nasa.gov/simulator/sim2/sector33.html>

- d) After your students have completed the worksheet, discuss the activities with them. For Worksheets B through E, make sure that students have correctly answered the summary questions that follow the data gathering. These summary questions lead students to generalize the data they have collected and guide students to an understanding of the key worksheet objectives.
- e) Assign the assessment that accompanies the completed worksheet. (Note: There is no assessment document for Worksheet A.) The assessment questions feature a series of sketches of the FlyBy Math simulator panels in which some of the information is missing. Instruct your students to use the given data to “fill in the missing information” and complete the multiple representations.

You may want to let your students know that each of the questions in the assessment can be answered without using the FlyBy Math simulator. In order to encourage your students to apply what they have learned in the worksheet, we recommend that your students complete this section without access to the FlyBy Math simulator. (In fact, for some of the assessment problems, there is not enough information given for students to recreate the starting conditions on the simulator.)