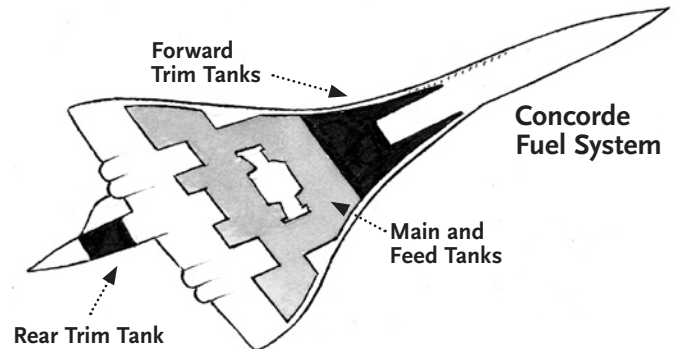


# Fueling the Burn

Fuel is used to fly and balance planes. Burning fuel changes the mass of the plane. The data set in this activity includes the average take-off weight and the average amount of fuel burned per hour for seven aircraft. Are all commercial aircraft designed to burn fuel at the same rate? How much fuel is burned per passenger carried? Do this activity to find out.



## Procedure

- 1 You will be calculating the changes in aircraft mass as fuel is burned after 1, 2, and 3 hours of flight. Use the data from the "Fuel Burn" chart on your "Aircraft Specifications" handout for this part of the activity.
- 2 Use the formulas listed on your "Aircraft Specifications" handout to determine the mass of fuel burned per hour (round to whole numbers) and the change in mass after 1, 2, and 3 hours of flight. (Although the mass of the plane changes after each hour of flight, thus affecting the fuel burn rate, to simplify your calculations you will be assuming the fuel burn rate remains constant throughout the flight.) Enter your answers into the chart.
- 3 Present your results as a line graph on your "Graphing Mass Change" handout.
- 4 Use the formulas on your "Aircraft Specifications" handout to find the mass of fuel burned after 3 hours and the percent change in mass of the plane after 3 hours of flight. Record the results in the chart below.
- 5 Now consider airplane fuel efficiency per passenger. Use the data from the "Passenger Count" chart on your "Aircraft Specifications" handout for this part of the activity.
- 6 Use the formula on your "Aircraft Specifications" handout to calculate how many gallons of fuel are used per passenger for a flight from London to New York. Enter your answers into the chart.
- 7 Create a bar graph to represent the last column's results in the "Passenger Count" table.

## Questions

Write your answers on a separate sheet of paper.

- 1 What might you infer from your graph that shows how airplane masses change during a three-hour flight?
- 2 Why is it important to consider how fast an aircraft burns fuel? How might extra weight impact fuel burn?
- 3 Why is it important to consider the percent change in mass of an aircraft in flight?
- 4 What affect does the initial mass of the plane have on the percent mass change due to fuel burn?
- 5 Describe three factors that have an effect on aircraft fuel consumption.
- 6 Which plane is most fuel efficient per passenger? Which is least fuel efficient per passenger?

Aircraft Type	Mass of Fuel Burned after 3 Hours (kg)	Percent Mass Change
Boeing 747-100		
Boeing DC-10-3		
Concorde		
Airbus 300-600		
Boeing 727-200		
Boeing 737-4		
BAE 146-2		