Aerodynamics

Guess what! Air is a fluid! We call the study of air flow aerodynamics. To best picture this, we will consider an airplane in flight. Its wings create lift when smooth airflow (laminar flow) is present on both their tops and bottoms. Passengers are subject to the side effects of turbulence when the airflow is disturbed and the wing(s) enter a turbulent state.

Fluid Dynamics

When we want to study the characteristics of a fluid in general, we look to fluid dynamics. Of the many characteristics a fluid may have, the famed Richardson number (Ri) in the image to the right gives us a way to predict the probability of a turbulent state in a fluid. In the image below, local swirling develops due to Kelvin-Helmholtz instability. These areas are likely for turbulence to occur.

Turbulence

Gerardo M. Ramirez, Colorado College ('18)

Moving Forward

We can draw parallels in sciences to help us better understand our environment. By considering Henry’s Law in chemistry and a little fluid dynamics, foaming beer is a mystery no more!

Beer Bubbles!

To keep things fun, let's apply understanding of fluid dynamics to a real-world scenario. While pouring beer, bubbles can be seen escaping and forming a dense foam “head”. These bubbles form as a result of turbulence! Areas where the Richardson number dips near and below 0.25 are likely to be areas of low pressure where the gas can escape. As these bubbles rise, they are coated with proteins and oils left over from the brewing process. They end their journey at the “head”, waiting to be popped!

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