

**Aerodynamic, door, drag, efficient, gas, liquid, motion, power, slippery, turbulence, velocity, wind.**

In everyday English, the word *fluid* is used to describe (1) -----substances. In physics and engineering, a fluid can be either a liquid or a (2) ----- . *Fluid dynamics* refers to the study of fluids in (3)----- i.e. how they behave when they move, or when objects are moved through them.

One of the major applications of fluid dynamics is in (4) -----design – the study of how objects affect / are affected by a flow of air, either when moving through the air, or when subjected to a flow of air – e.g. due to the (5) -----blowing around them. One of the main considerations in aerodynamics is assessing how much (6) -----(air resistance) a vehicle or aircraft generates as it moves through the air. Designs that generate very little drag are said to be aerodynamically (7) -----. In general terms, minimizing drag means having a shape which allows air to flow around it as ‘cleanly’ as possible – i.e. with minimum (8) -----(disruption to the airflow).

Generally, the faster a vehicle or aircraft is designed to travel, the more critical its aerodynamic design will be. This is because, for a given increase in (9) ----- (speed), there is a proportionately much greater increase in drag. Due to this phenomenon, when vehicles or aircraft travel extremely fast, they must deliver significantly more (10) -----in order to increase their velocity by a relatively small amount. In familiar language, engineers often describe aerodynamically efficient designs as being (11) ‘-----’, inferring that they ‘slide’ through the air easily. In the automotive industry, aerodynamically inefficient cars are often described as being ‘like a barn (12) -----’.

<b>The terms in 1–10 are useful for describing the behaviour of rockets. Match them to the definitions in a–j.</b>	
<b>1 blast-off</b>	<b>a</b> an object’s resistance to acceleration or deceleration, increases as the mass of the object increases
<b>2 drag</b>	<b>b</b> describes an object which has the highest proportion of its mass located towards its upper end
<b>3 in freefall</b>	<b>c</b> downward force exerted by the earth’s mass
<b>4 gravity</b>	<b>d</b> a pushing force
<b>5 inertia</b>	<b>e</b> the moment a rocket launches from the ground
<b>6 powerless</b>	<b>f</b> descending towards the ground, with no force counteracting the descent except aerodynamic resistance
<b>7 thrust</b>	<b>g</b> aerodynamic resistance
<b>8 top-heavy</b>	<b>h</b> the path taken by a moving object
<b>9 trajectory</b>	<b>i</b> the way the total mass of an object is divided/positioned within the volume of the object distribution
<b>10 weight</b>	<b>j</b> has no means of propulsion