

Air and Aerodynamics Study Guide

Test -

1. Identify the three properties of air discussed in class. Be able to give experiment examples that demonstrate each.

- air takes up space
- air can be compressed (squeezed into a smaller space)
- air has pressure

2. Be ~~able to order~~ ^{familiar with} the different gases that make up air from greatest to least.

- Nitrogen, Oxygen, Argon, Carbon Dioxide, Hydrogen, Krypton, Xenon, Neon, Helium

3. Be able to explain the importance of different gases in air (oxygen, carbon dioxide...).

- Nitrogen

* helps to reduce the effect of O₂ by controlling the rate of combustion, oxidation & rusting of iron & corrosion of metals

- Oxygen

* the life processes such as respiration, in all living organisms

* combustion of fuels (otherwise, fire would not have been possible)

- Argon

* used to provide an inert atmosphere that will protect materials from reacting with oxygen or other gases (the inside of a light bulb is often filled with argon - no matter how hot the filament inside the bulb gets, it will not react with argon)

- Carbon Dioxide

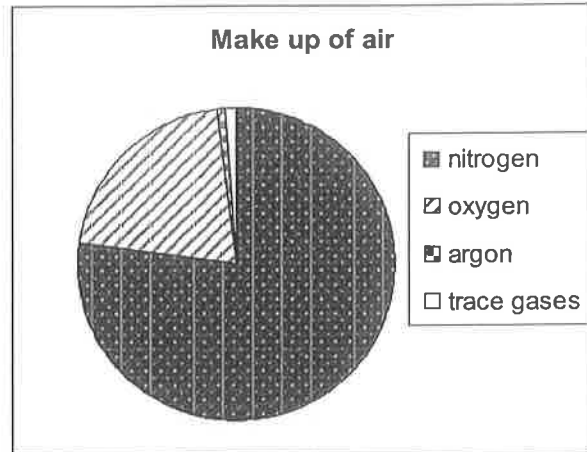
* used up by plants to prepare their food through photosynthesis

* absorb infrared radiation (helps in maintaining Earth's moderate temperature, necessary for the existence of life)

Air & Aerodynamics/ Flight Study guide

Air – the air we breathe is made of different gases

Gas	Percent in Air
Nitrogen	79 %
Oxygen	21 %
Argon	1 %
Other trace gases	Less than 1%



Air exists because:

- ◆ It takes up space
- ◆ It has volume
- ◆ It has weight
- ◆ It has pressure

Air takes up space

- ◆ Run a garbage bag through the air- it fills with air = air takes up the space in the bag
- ◆ Put a cup upside down in water. The cup will not fill with water because air is taking the space up in the cup. You must let the air out (by tipping the cup) in order for water to fill up the space.

Air has volume

- ◆ You can measure the volume of air in a room- take the measurements of the room (length X width X height). This will equal the volume of air in the room.

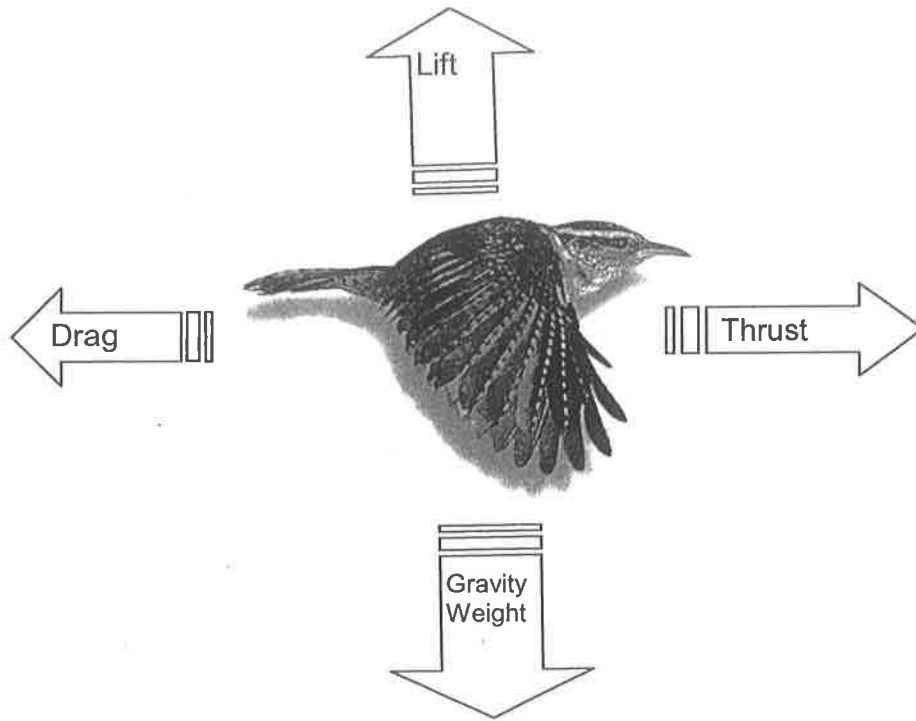
Air has weight

- ◆ tie two equal size balloons on the ends of a stick. Balance them. Pop one balloon. The other balloon filled with air will fall towards the ground because it has weight.

Air has pressure

- ◆ air pressure increases the closer you are to sea level
- ◆ air pressure decreases as you go up a mountain.

Air	Higher or Lower Pressure	Why?
Cold air	higher	More particles in the same space (contracts)
Warm air	lower	Less particles in the same space (expands)
Still air	higher	More particles in the same space
Moving air	lower	Less particles in the same space



How do birds fly?

- They have feathers
- They have lightweight hollow bones
- They have large chest (pectoral) muscles
- They have a fused clavicle (collar bone)
- They have an aerodynamic shape (feathers stay flat)

How do insects fly?

- Lightweight body
- Aerodynamic shape
- Specialized wings with many veins
- Double wings on some insects
- Large surface area on wings

What is streamlining?

Streamlining is using an aerodynamic shape to cut down on drag.

What is an airfoil?

- An airfoil is a special shape of a wing which is curved on the top and flat underneath. This shape is aerodynamic and helps create a pressure difference which creates lift.
- Airplane wings, bird wings, insect wings all have an airfoil shape.

"Airfoil Test"

