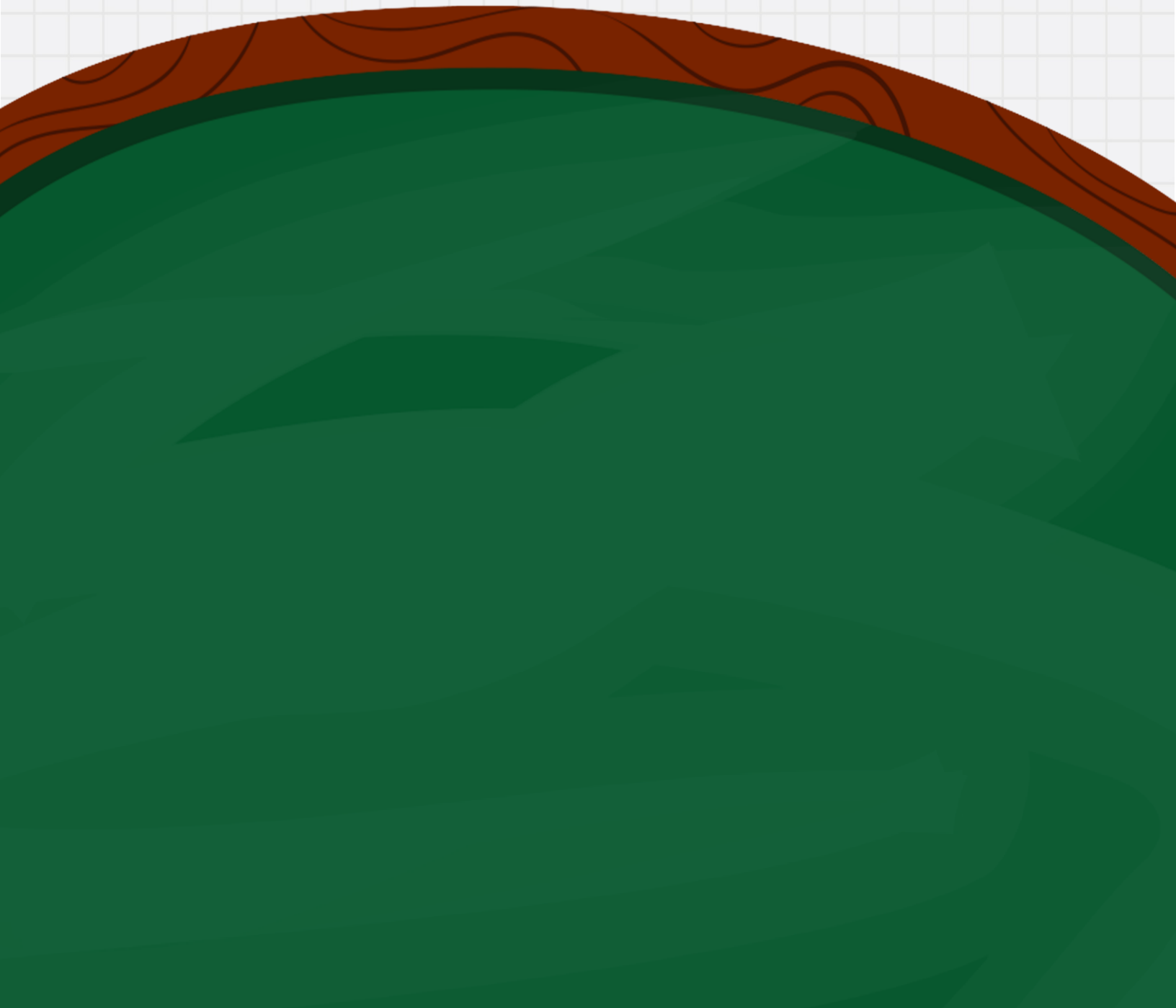




# schoolio

**GRADE 6 SCIENCE - FLIGHT**






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## Lesson 1 – Properties of Air

### Discussion:

 Before you can think about flying, you must understand the properties of air.

 Let's look at some of the properties of air:

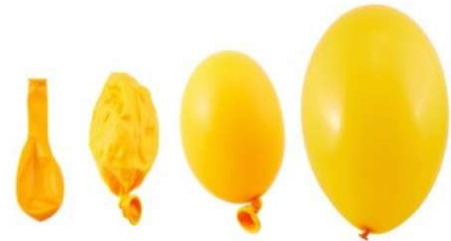
#### ✓ Air Takes Up Space

▪ What are your thoughts? Do you think that's true? Is the air around you taking up space?

• Example: Take an empty balloon - now fill it with air.

• What do you think now? Did the air take up space inside the balloon? How can you tell?

◦ The air does take up space, you can see this with the balloon because it pushes out on the stretchy balloon walls as it fills the space.



#### ✓ Air Has Weight

▪ Do you think air has weight? Does air weigh nothing?

• Example: Get some sort of stick, like a ruler or a long dowel. Even a stick from outside will work as long as it's balanced. Find the centre balance point by balancing it on one finger. On one end, tie an empty balloon, on the other end, tie a filled balloon - what happens?



• Why does a filled balloon weigh more than an empty balloon? Because air has weight!

#### ✓ Expands When Heated

▪ Do you think air takes up more space (expands) when it is heated?

- Example: Blow up a beach ball so it is full of air. Put it in the freezer for 10-20 minutes. What happened?
  - If the air takes up less space when it is cold, then it takes up more space when it is warm!
  - Why does warm air rise? Because it has expanded, so it is the same amount of air spread over a bigger space, making it lighter. Warm air rises because it is lighter than colder air.
- ✓ Air Can Be Compressed
- Do you think you can compress (squeeze smaller) air?
    - Example: Get an empty plastic water bottle. Put a lid on it tightly, trapping air inside. It looks empty, but it's filled with air! Now, squeeze!
    - Were you able to squeeze the air? That's because air can be compressed!
- ✓ Air Exerts Pressure in Every Direction
- Air is pushing on its surroundings in every direction
    - Example: Put a ruler on a table half hanging off the edge of the table. Put some paper on top of the part of the ruler on the table- one or two sheets of newspaper should be enough. Push down on the end of the ruler that is hanging over the edge of the table. Can you lift it?
    - What is happening? You should be stronger than the weight of two sheets of paper! What is happening is the air is pushing down on the paper, and since it's a fairly large surface area, it is a lot of pressure.

**Practice Work:**

Complete Canadian Curriculum 6, pg. 296-297 (Air)

## Lesson 2 – Four Forces of Flight

### Discussion:

- ✎ The four forces of flight are:
  - ✓ Thrust: Thrust causes forward movement
  - ✓ Drag: Resists movement
  - ✓ Lift: Causes objects to rise
  - ✓ Gravity: Pulls objects to the Earth

- ✎ Flying is a balance in these forces.
  - ✓ To speed up, thrust must be greater than drag.
  - ✓ To take off, lift must be greater than gravity

Balance the forces of flight, you must!



- ✎ Thrust comes from whatever propels flying objects.
- ✎ Drag comes from air resistance

### Activity: Flying

# Flying

1. When an object is speeding up through the air, are thrust and drag balanced or unbalanced?

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2. When a race car releases a parachute to slow itself down, what force is it using?

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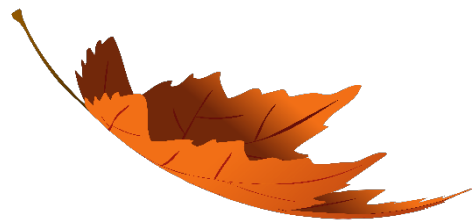
3. When a helicopter takes off, it is using the force of \_\_\_\_\_ to overpower the force of \_\_\_\_\_.

4. When a leaf falls from a tree, the force at work is \_\_\_\_\_.

It doesn't fall straight down though, it glides slowly. Explain why:

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## Lesson 3 – Moving Through Air

### Discussion:

#### Airfoil:

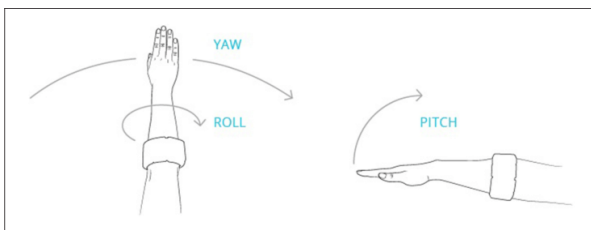
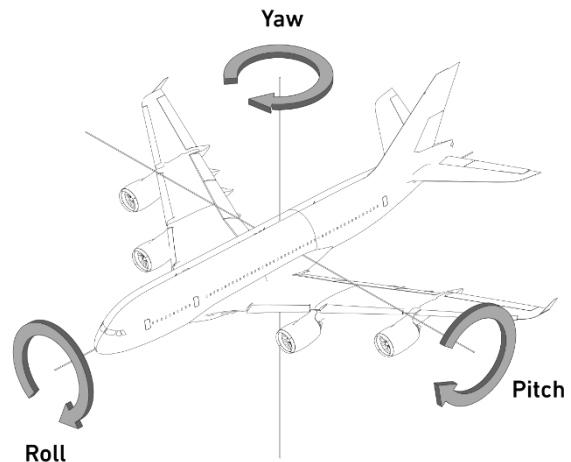
- ✓ An airfoil is a shape that causes air pressure to be higher on one side than it is on another side.
- ✓ This is the shape of airplane wings and bird wings

#### Streamlining:

- ✓ Streamlining helps an object move through the air.
- ✓ It's a shape that reduces drag and provides the least air resistance

#### How Aircraft move:

- ✓ Pitch: To climb or descend (nose of aircraft moves up or down)
- ✓ Roll: To turn over (wings move up or down)
- ✓ Yaw: To turn left or right (nose turns left or right)



**Experiment:**

Have you ever noticed that your bicycle helmet is smooth and curved? It has been specially designed to be streamlined. Pick a distance to ride your bike that you can get up to a really good speed. Do it once wearing your helmet normally. Now ride it again, but this time, wear a box over your helmet (make sure your helmet is still properly on your head for safety!). You should notice a pretty big difference in the amount of drag as you ride!

**Practice Work:**

Complete Canadian Curriculum 6, pg. 300-301 (Flight 1)