# Grade 6 Lesson 1

<table>
<thead>
<tr>
<th>Item</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Plan</td>
<td>Page 2</td>
</tr>
<tr>
<td>Student Activity Handout</td>
<td>Page 5</td>
</tr>
</tbody>
</table>
# Marlins Think Tank: Sixth Grade Science
## Lesson Plan #1

## VISION-SETTING

**OBJECTIVE.**

What is your objective?

- SC.6.E.7.3 - Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, humidity and precipitation.

- SWBAT - Understand that the faster flowing air creates less pressure, which forces a ball to dive in the game of baseball causing it to be a curve ball.

**KEY POINTS.**

What knowledge and skills are embedded in the objective?

- Define air pressure and how it changes with height in the atmosphere.
- Air pressure can be thought of as the weight of the air above a given level.
- The motion of objects can be changed by forces.

## ASSESSMENT.

Describe, briefly, what students will do to show you that they have mastered (or made progress toward) the objective.

Students will be able to measure and make comparisons based on reaction time by measuring distances and logging the information into a data table.

## OPENING (10 min.)

*How will you communicate what is about to happen?*

*How will you communicate how it will happen?*

*How will you communicate its importance?*

*How will you communicate connections to previous lessons?*

*How will you engage students and capture their interest?*

Divide the students into groups. Ask each group to discuss and answer the following questions:

- What happens in the game of baseball when a ball drops?
- Why does the ball drop?
- Why does the batter swing?
- What exactly happens to the ball when it is thrown?
- What causes the ball to curve, slide, or stay in a straight pattern?

After 5 minutes, ask groups to share their answers with the class.

The teacher will then explain that a curve ball is caused by a drag force or air pressure.

**Demonstrate:** To demonstrate air pressure take a paper towel and shove it into the bottom of a glass. The paper towel needs to be packed in tight enough that it will remain in the bottom of the glass even when the glass is turned upside down.

Next, fill a container with water. The water must be equal to or greater than the height of the glass. Place the glass upside down into the water. The glass must be placed straight down into the water without tilting it to the side.

Lift the glass from the water. Remove the paper towel.

Students will notice the paper towel is still dry.

**Explain:** The air pressure in the glass pushes the water away, so that the water cannot go into the glass to get the paper towel wet. Even if the water on the outside of the glass completely submerges the glass, the air pressure in the glass prevents the water from entering.

## MATERIALS

- Plastic cup or glass
- Water
- Paper towel
- Student notebooks
**INTRODUCTION OF NEW MATERIAL (10 min.)**

How will you explain/demonstrate all knowledge/skills required of the objective so that students begin to actively internalize key points?

Which potential misunderstandings do you anticipate?

How will you proactively mitigate them?

How will students interact with the material?

Today we are going to be learning about how air gets thinner with increasing altitude. That is one reason mountain climbers need oxygen to breathe, and why it is so easy to get “winded” while hiking in high mountains or even visiting an elevated place.

Both atmospheric pressure and the density of air decreases with altitude.

It is the Earth’s gravity that holds the atmosphere. The interconnection between temperature, pressure, and density with altitude is as follows: The sun heats our Earth’s surface so the temperature of the air near Earth’s surface is greater and the value decreases with increase in altitude.

Why is it that our bodies do not get crushed due to the atmospheric pressure?

The weight of the column of air above us is very heavy. We can call this weight an external pressure, because it pushes down on us. We do not get crushed by air pressure because air moves in all directions.

In addition, the motion of objects can be changed by forces.

Show students a short video about the flight of a baseball. While watching, students should think about the importance of the three forces of a ball in flight: gravity, drag force/air friction, and magnus force/air flow.

Ask students to take notes.

Give each team a paper plate and have them divide the plate into thirds. Then have the team member draw and identify the three forces involved in the flight of baseball which are: gravity, drag force, and air flow.

Allow students time to color and finish their illustrations (with written explanations).

**GUIDED PRACTICE (25 min.)**

How will students practice all knowledge/skills required of the objective, with your support, such that they continue to internalize the key points?

How will you ensure that students have multiple opportunities to practice, with exercises ranged from easy to hard?

Students will now work in pairs to complete the Student Activity Handout (action vs. reaction of a baseball).

**Lab on Reaction Time**

Background knowledge: baseball players need to have excellent reaction time when they’re playing either offense or defense.

One student will hold a yardstick vertically and drops it, another student catches the yardstick as quickly as possible as it is dropped. The catchers must stare straight at the ruler, rather than the hands of the person holding the ruler.

Students will then use a data sheet to record best score and average score.
<table>
<thead>
<tr>
<th><strong>Lesson Assessment:</strong></th>
<th>Once students have had an opportunity to practice independently, how will they attempt to demonstrate mastery of the knowledge/skills required of the objective?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will turn in their data lab sheets and their paper plates for a grade.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CLOSING (5 min.)</strong></th>
<th>How will students summarize and state the significance of what they learned?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student teams will create a short simulation skit demonstrating one of the following: Air pressure, gravity, or action vs. reaction.</td>
<td></td>
</tr>
</tbody>
</table>
Student Activity Handout: Reaction Time

<table>
<thead>
<tr>
<th>Trials</th>
<th>Time in Seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial 1</td>
<td></td>
</tr>
<tr>
<td>Trial 2</td>
<td></td>
</tr>
<tr>
<td>Trial 3</td>
<td></td>
</tr>
</tbody>
</table>

1. What was your best time?

2. What was your average time?

3. Why is reaction time important in baseball?