

Department of Science.  
2º ESO lab practice.

## CATCH IT!

### 1. TARGET – BASIC FACTS

---

Investigate what is called **reaction time** and to find out why it is so important in our daily lives. In this lab practice we propose too that you test your and your classmates reflexes.

When an object is dropped, it is attracted by the gravitational force from the Earth. As it falls, we can observe that it moves faster. This increase in speed during the fall tells us that it is in fact accelerating. When nothing else except for the gravitational force, interacts with the object, we talk about **free fall**.

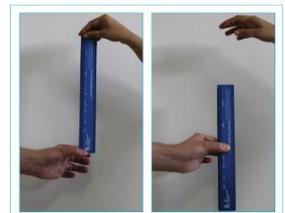
In free fall, objects are subjected to a constant acceleration of **9.8 m/s<sup>2</sup>**, which we call gravitational acceleration or only **gravity, g**. Since these objects start from a resting position, the distance travelled can be given as:

$$e = \frac{1}{2} g \cdot t^2 \quad / \quad s = \frac{1}{2} g \cdot t^2$$

### 2. PROCEDURE

---

- A. Look on the Internet for **information** about reaction time from people, what the average reaction time of human beings is and find out whether or not it can be modified by age, state of health, sex, etc.
- B. Calculate your reaction time ( $t_R$ ) trying the next **experiment** with a ruler: ask your friend to hold the ruler (at least 30 cm) and put your fingers over the zero (without touching it). Bring your fingers together as fast as you can when your friend lets the ruler go and write down the distance you have caught the ruler.



Then you can calculate your  $t_R$  by isolating  $t$  from the equation from free fall, where  $s$  is the number of centimetres that the ruler travels when it falls.

### 3. RESULTS

---

Complete the next table with your results and the reaction time you have calculated for each member of your team. Remember to use SI units!

	s (cm)	$t_R$ (s)

#### **4. CONCLUSIONS**

---

1. After your results, what conclusions do you obtain? Keep in mind that Usain Bolt's reaction time in their last Olympic Games was 0.146 s.
2. Try to relate the initial results of your research and those of your experiment with what happens in traffic accidents and distractions at the wheel while driving. What do you think happens in each situation? Why? What consequences might there be?