

Scientific Measurement



Chemistry is an experimental science based on carefully designed experiments carried out under controlled conditions.

Any experiment is carried out on the basis of accurate operations called *measurements*. Measurements are made nearly every day, not only in the lab but in every establishment and even at home.

The Universal Language of Scientific Measurement

Measurement is the process of comparing a known quantity like a measuring device to an unknown quantity or the things or objects to be measured. It is the process of determining how many times a

certain quantity is contained in a standard measuring device.

The scientific system of measurement is called the *metric system*, which is often referred to as the *International System of Units, or SI*.

Scientists throughout the world use the metric system of measurement that is based on units of ten.

Basic Types of Physical Quantities

1. **Mass (*m*)** is a basic property of matter. The standard unit of mass is the kilogram, kg. One **kilogram (*kg*)** is the mass of **1 liter (*L*)** of water at 4°C and a pressure of 1 atmosphere (***atm***). The mass of an object remains the same even if the position of the object is changed with reference to the earth's center.
2. **Length (*l*)** is a distance between two distinct points. It is measured by using a metric ruler.
3. **Width (*w*)** is also a length, and **height (*h*)**, is the vertical distance. The basic unit is the **meter (*m*)**.
4. **Time (*t*)** is the regular interval between two successive points. The standard unit of time is the second. The second was originally defined in terms of the motion of the earth, but it was revised and instead compared to vibrations of cesium atoms.
5. **Temperature (*T*)** is the measure of the hotness or coldness of an object. It is technically defined as the measure of the average kinetic energy of a body. **Kelvin (*K*)** is used as the basic unit.
6. **Electric current (*I*)** is the measure of the flow of electrons or charges. An ammeter is used to measure current expressed as **Ampere (*A*)**.
7. **Luminous intensity (*E*)** is the amount of illumination received by an object. The unit of measure used to describe this is **candela (*cd*)**.
8. **Amount of substance (*n*)** is the number of moles. The basic unit is the **mole** or ***mol***.

1 Consider an experiment you have carried out in your chemistry lab and note down the type of measurements you made.

The courage to follow your dreams: “The Alchemist” by Paulo Coelho

Dreams, symbols, signs, and adventure follow the reader like echoes of ancient wise voices in “The Alchemist”, a novel that combines an atmosphere of Medieval mysticism with the song of the desert. With this symbolic masterpiece Coelho states that we should not avoid our destinies, and urges people to follow their dreams, because to find our “Personal Myth” and our mission on Earth is the way to find “God”, meaning happiness, fulfillment, and the ultimate purpose of creation.

The novel tells the tale of Santiago, a boy who has a dream and the courage to follow it. After listening to “the signs” the boy ventures in his personal, Ulysses-like journey of exploration and self-discovery, symbolically searching for a hidden treasure located near the pyramids in Egypt.

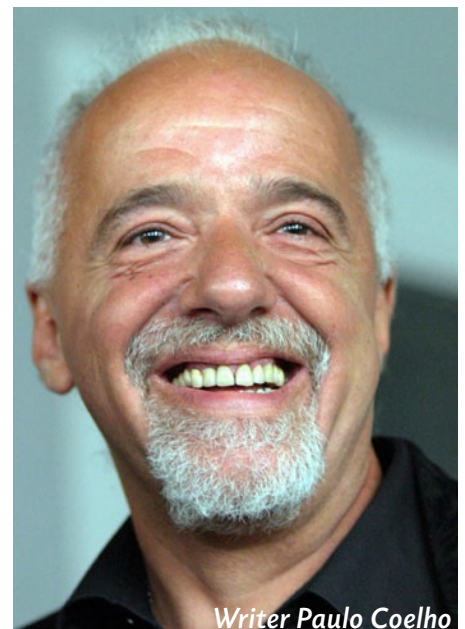
When he decides to go, his father’s only advice is “Travel the world until you see that our castle is the greatest, and our women the most beautiful”. In his journey, Santiago sees the greatness of the world, and meets all kinds of exciting people like kings and alchemists. However, by the end of the novel, he discovers that “treasure lies where your heart belongs”, and that the treasure was the journey itself, the discoveries he made, and the wisdom he acquired.

“The Alchemist”, is an exciting novel that bursts with optimism; it is the kind of novel that tells you that everything is possible as long as you really want it to happen. That may sound like an oversimplified version of new-age philosophy and mysticism, but as Coelho states “simple things are the most valuable and only wise people appreciate them”.

As the alchemist himself says, when he appears to Santiago in the form of an old king “when you really want something to happen, the whole universe conspires so that your wish comes true”. This is the core of the novel’s philosophy and a motif that echoes behind Coelho’s writing all through “The Alchemist”. And isn’t it true that the whole of humankind desperately wants to believe the old king when he says that the greatest lie in the world is that at some point we lose the ability to control our lives, and become the pawns of fate. Perhaps this is the secret of Coelho’s success: that he tells people what they want to hear, or rather that he tells them that what they wish for but never thought possible could even be probable.

Coelho also suggests that those who do not have the courage to follow their “Personal Myth”, are doomed to a life of emptiness, misery, and unfulfillment. Fear of failure seems to be the greatest obstacle to happiness. As the old crystal-seller tragically confesses: “I am afraid that great disappointment awaits me, and so I prefer to dream”. This is where Coelho really captures the drama of man, who sacrifices fulfillment to conformity, who knows he can achieve greatness but denies to do so, and ends up living a life of void.

It is interesting to see that Coelho presents the person who denies to follow his dream as the person who denies to see God, and that “every happy person carries God within him”. However, only few people choose to follow the road that has been made for them, and find God while searching for their destiny, and their mission on earth.



Writer Paulo Coelho

Consequently, is Coelho suggesting that the alchemists found God while searching for the elixir of life and the philosopher's stone? What is certain is that the symbolism of the text is a parallel to the symbolism and the symbolic language of alchemy, and similarly the symbolism of dreams is presented as "God's language".

It is also symbolic that Santiago finds his soul-mate, and the secrets of wisdom in the wilderness of the desert, a symbol that has been used by many great writers. In the desert, Santiago meets his "twin-soul" and discovers that love is the core of existence and creation. As Coelho explains, when we love, we always try to improve ourselves, and that's when everything is possible. The subject of love inspires a beautiful lyricism in Coelho's writing: "I love you because the whole universe conspired for me to come close to you."

"The Alchemist" is a novel that may appeal to everybody, because we can all identify with Santiago: all of us have dreams, and are dying for somebody to tell us that they may come true. The novel skillfully combines words of wisdom, philosophy, and simplicity of meaning and language, which makes it particularly readable and accounts for its bestselling status.

(adapted from <http://bookreviews.nabou.com>)

- 1 Write an essay explaining the importance of carrying out one's personal research, both in the novel and in your own experience.**