PROCESSO SELETIVO – TURMA DE 2012

FASE 1 – PROVA DE INGLÊS

NOME: _____

ASSINATURA: _____

Na página anexa, você encontrará um pequeno texto de Joan Solomon, retirado do Capítulo 3 do livro "How can we be sure (Science in a Social Context), publicado pela Association for Science Education, Basil Blackwell Publisher, da Grã-Bretanha, em 1986. Após a leitura deste texto, responda em português às perguntas apresentadas, com base no que consta no texto. É permitida a consulta a dicionários.

Questão 1

Qual era a chave para o entendimento do mistério do arco-íris que ficou óbvia no Século XIII?

Questão 2

Quantos são os arco-íris formados e qual a característica deles que poucos conhecem?

Questão 3

Há alguma ocasião em que é possível ver o arco-íris completo?

Questão 4

Qual era o objetivo dos diversos aparatos projetados para estudar o arco-íris?

Questão 5

Em que ano se deu o avanço, e quem foi responsável por ele, que permitiu explicar as medidas feitas ao longo de séculos?

Questão 6

O que induziu a uma explicação para os desvios dos raios de luz?

Questão 7

Qual foi a analogia feita para explicar o comportamento dos raios de luz?

Questão 8

Que tipos de suposições foram feitas pela primeira vez?

Questão 9

O que foi possível deduzir a partir desta teoria e o que se pode dizer da comparação entre as previsões da teoria e dos dados experimentais existentes na época?

Questão 10

Que outro cientista utilizou esses resultados para explicar efeitos óticos?

Questão 11

Por quanto tempo essa teoria foi bem sucedida?

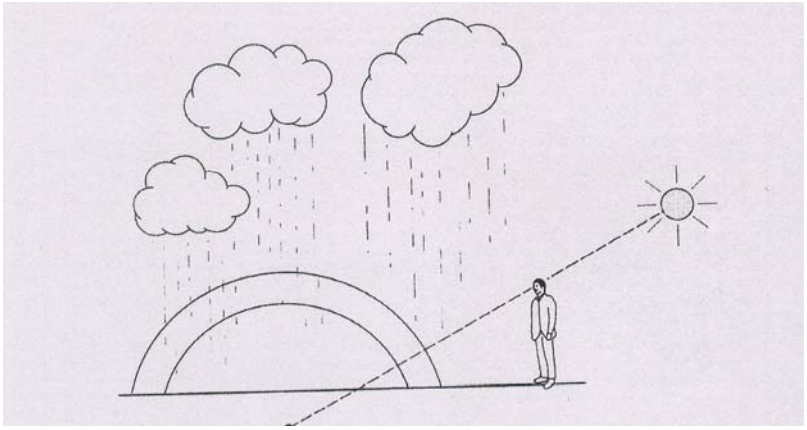
The Birth of Scientific Theories
Joan Solomon

LIGHT, REFRACTION AND THE RAINBOW

The rainbow is an inspiring source of legend, a beautiful enigma and a very early object of scientific study. By the thirteenth century it had already become obvious that the clue to its mystery should be sought in experiments which traced the paths of light rays through water.

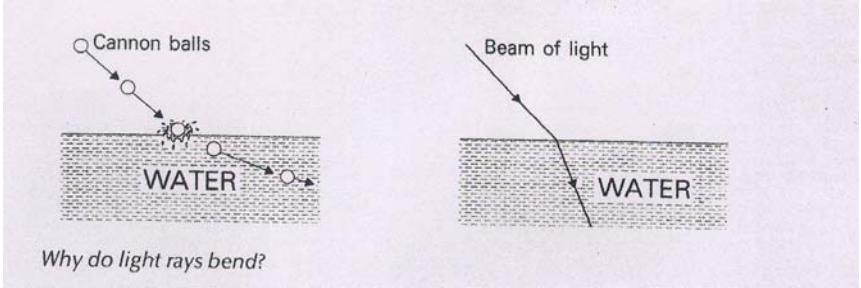
Most people know that there are two bows which can only be seen with the back to the sun. Fewer know that the angular sizes of these bows are always the same, 42^o for the stronger primary bow and 51^o for the fainter reversed secondary bow outside it.

From a mountain in the evening or early morning much more of the circle can be seen. From an aeroplane it can occasionally appear complete. The drops of water are essential. So apparatus of various shapes was designed to trace light rays and measure the angles at which they were bent as they passed into and out of water. Gradually the data became more accurate and yet no reliable theory emerged as the centuries passed. Mere juggling with the figures could not produce a generalisation, let alone an explanation of the angular sizes of the bows.



The rainbow: an observer sees the bow when his back is to the sun and the centre of the bow is below the horizon.

The breakthrough occurred in the 1620s. The French philosopher René Descartes was watching cannon balls being fired across a river and noticed the change of direction when they hit the water. The reason seemed obvious, they travelled slower in water than in air.



Descartes made the analogy: light rays were like a stream of tiny particles (mini-cannon balls) which speeded up instead of slowing down when they entered water. For the first time someone had made a guess about *how* light moved and *why* it changed direction. (Ignore the fact that this is not now the accepted theory of light).

Unlike Bacon's sterile lists, Descartes' theory proved fertile. From it he could deduce a numerical law of refraction and compare it with the experimental results. They fitted almost perfectly. Then he could plot the paths of rays of light through a drop of water and calculate the angular size of the two rainbows from his theory. This gave exactly 42^o and 51^o. The theory was also taken up by Isaac Newton who used it to explain other optical effects. For nearly two hundred years it was a successful scientific theory.