

Science and the Arts

Before the invention of photography, drawing was essential to presenting scientific information

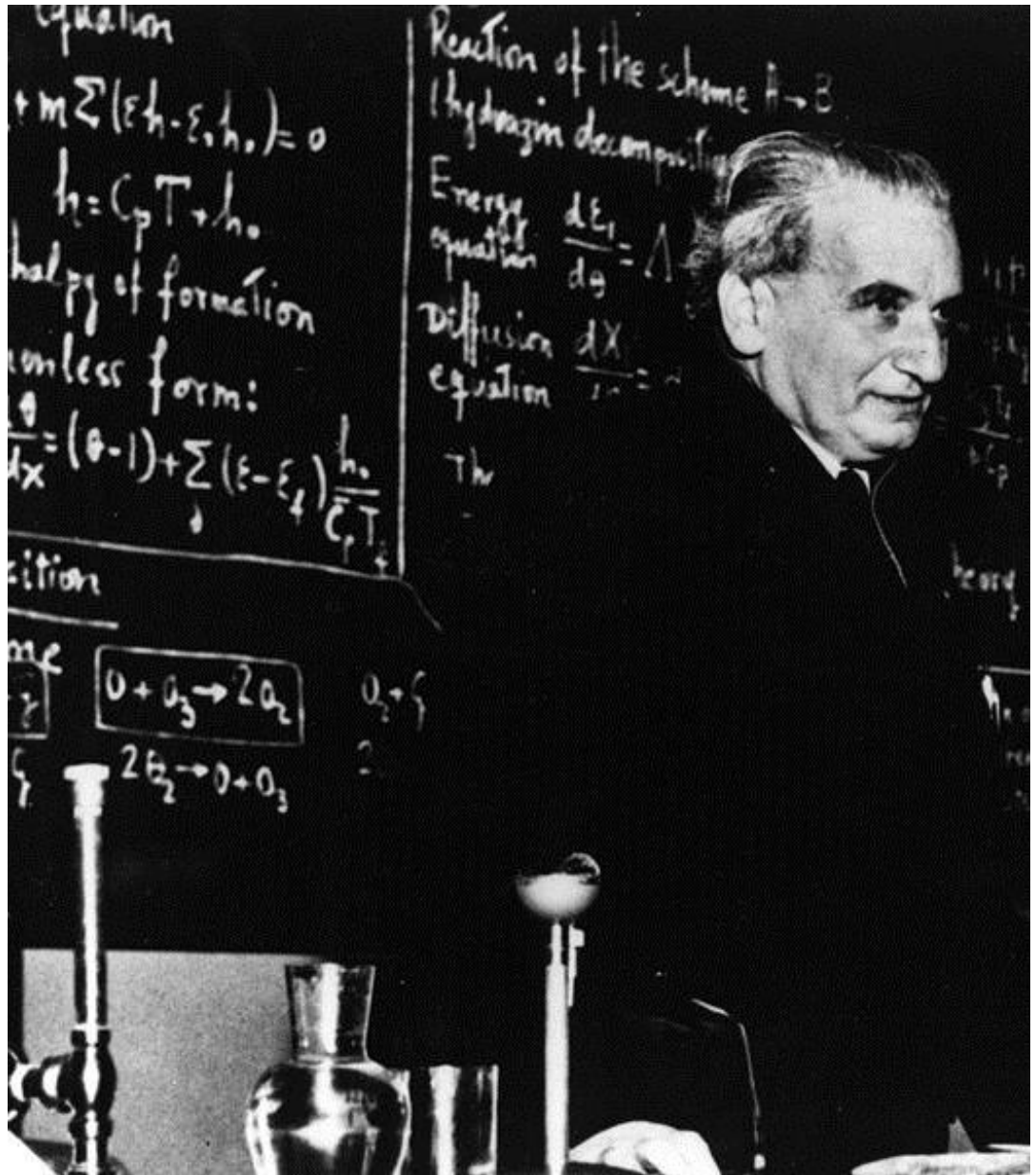


But, as science became more influential, it also came to be harder to understand.

Images gave way to equations that could not be understood without special training

This is Theodore von Karman, co-founder of the Jet Propulsion Laboratory (JPL) in Pasadena, California -- and an aeronautical theoretician.

A street near Orange County's John Wayne Airport is named after him.



Art came to be seen as a subjective medium, unsuited to communicate scientific concepts.



Children are Concrete Thinkers

For educators, this created a problem. As Piaget pointed out, children are concrete thinkers.

In our highly technological world, we cannot wait till students reach their teenage years to teach science.

So, how do we present basic scientific concepts and vocabulary in a valid but still understandable manner to schoolchildren?

Fortunately, scientists have already begun grappling with the challenge of visualizing scientific information.



Visual representation is making a comeback as a way to represent large sets of complex data



**Science and art
have much in common**

They share cross-cutting
characteristics such as a

Focus on patterns,

Cause and effect,

Structure and Function.

For this reason, art and
scientific inquiry naturally
complement one another.



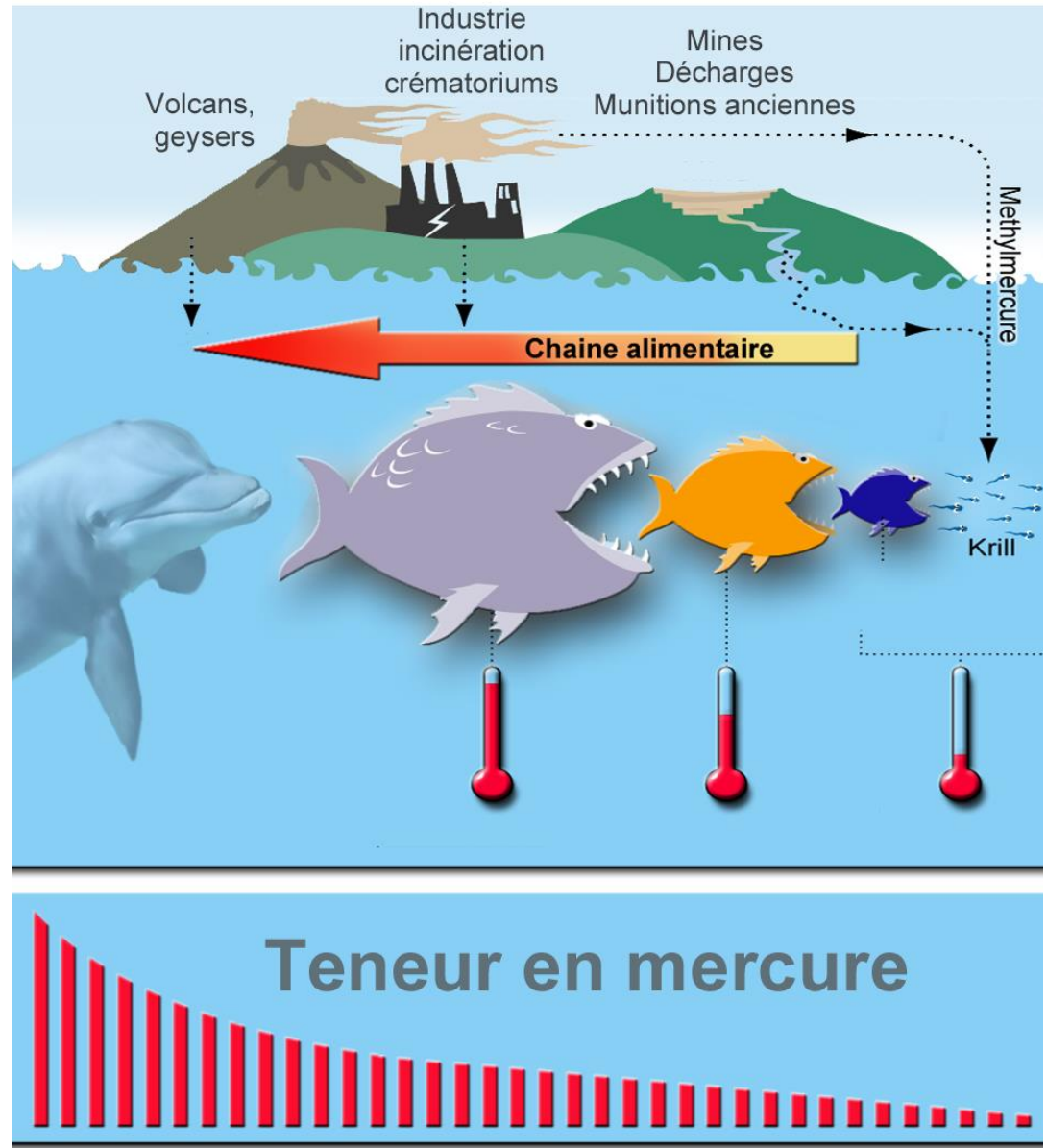
Communicating across Language Barriers

This photograph of a solar eclipse was taken in West Africa.

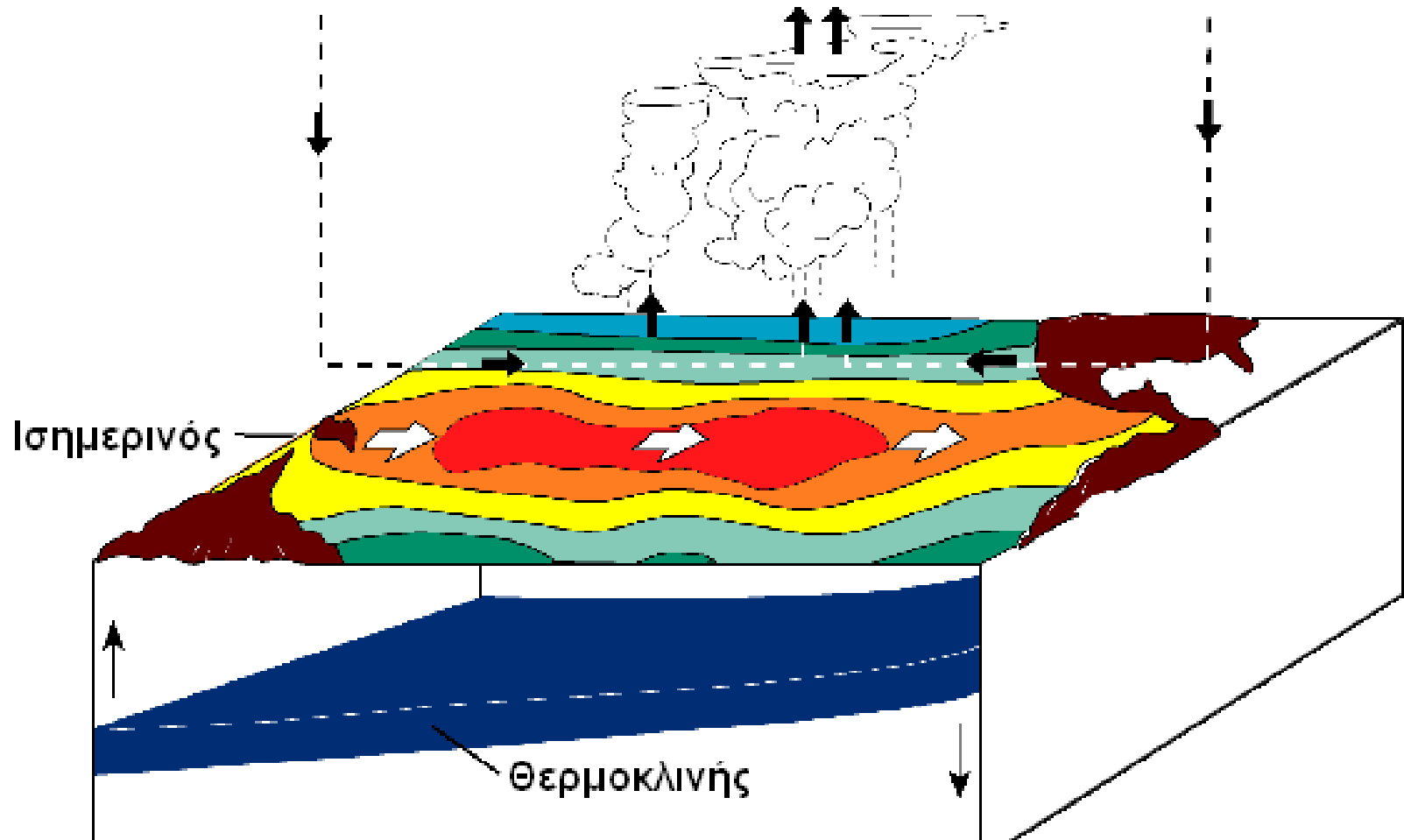
As science has become more international, visual images have also provided a way to transcend language barriers.



You could probably explain this diagram – even if you do not speak a word of French



Here El Niño is explained in Greek – yet we still grasp much of the message



Another way to communicate across language barriers is through



Unlike the linear, segmented format of speech, a gesture can be instantaneous



If words are not understood,
gesture provides an alternative



Using Movement to Clarify Concepts

Children's urge to get out of their seats and move can be utilized to deepen their understanding of concepts they have just learned.

In this project we will use gesture to communicate concepts, but we will also use creative movement.

Through dance, children will physically mimic the counter-clockwise rotation of the Earth, along with the tilt of the Earth's axis that causes the seasons.

Through creative movement, children will model the placement of the Sun, Moon, and Earth that would cause a person standing at a specific spot on Earth to perceive the time to be noon, midnight, 6 a.m. or 6 p.m.



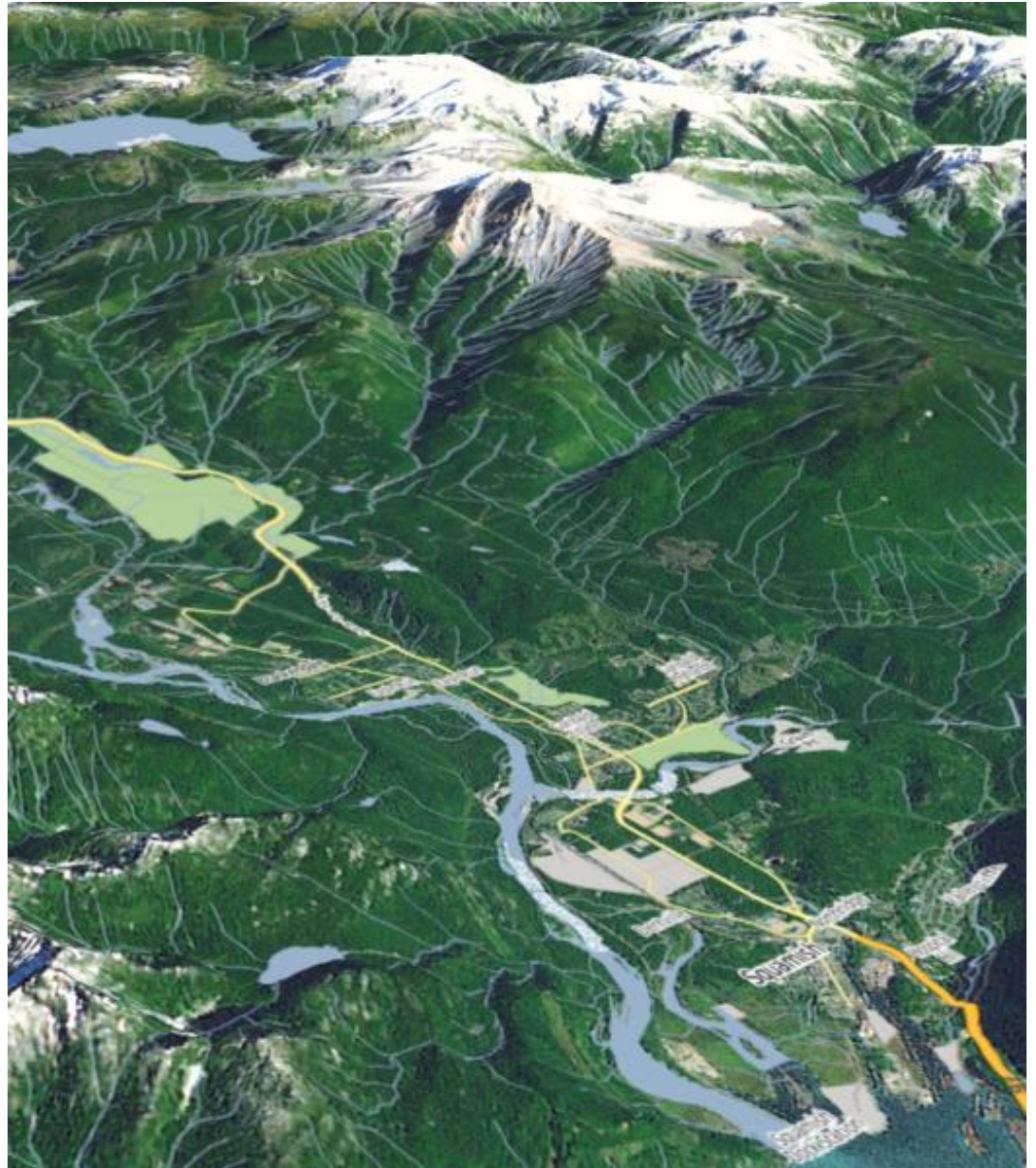
Images have another advantage: Reducing Cognitive Load

Individuals learn best when their working memory is not loaded with too many tasks at the same time.

We can only hold a limited number of items in our working memory.

This becomes especially problematic if one is simultaneously struggling to translate the language in which the concepts were presented.

However, if the separate bit of data are organized in “chunks” through being presented as part of a memorable image, the task is easier.



In this project the arts will be used to improve the accuracy of children's mental representations, introduce academic vocabulary, and review concepts explored via scientific inquiry

