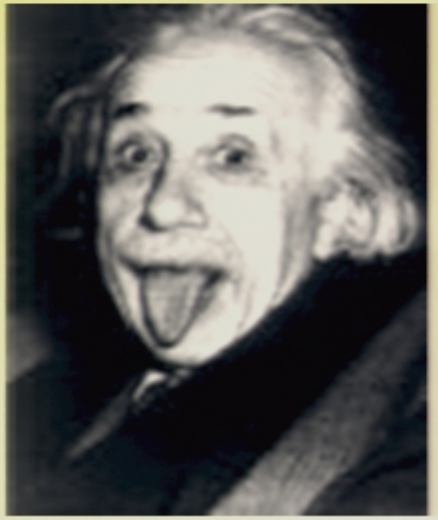
Title: Einstein\'s Science Demystified - Ages 15 and up

Date: Oct 02, 2005 12:00 PM

URL: http://pirsa.org/05100005

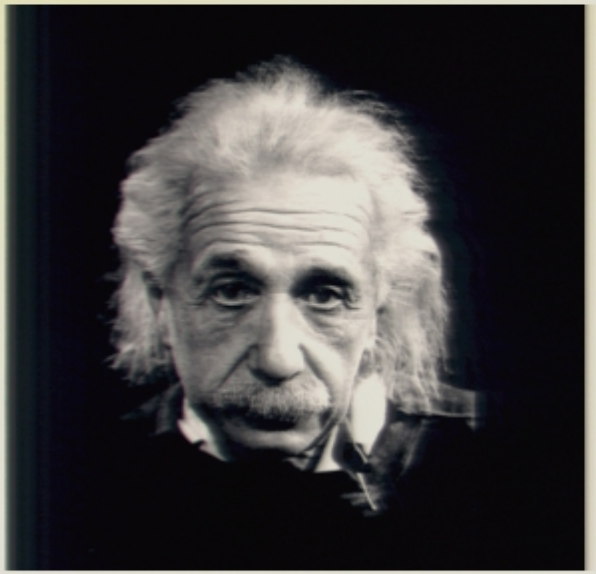
Abstract: This talk will take you on a tour through the mind of Albert Einstein, focussing on his discoveries of 1905 and the vital role his theories play in many of today\'s technologies. <kw> Damian Pope, Einstein, impact, modern technology, light, time, space, special relativity, time dilation, length contraction, curiosity</kw>

Einstein's science demystified



Summary

- Einstein's curiosity
- Where it led him; his ground-breaking discoveries in 1905.
- Einstein's impact on modern technology in 2005

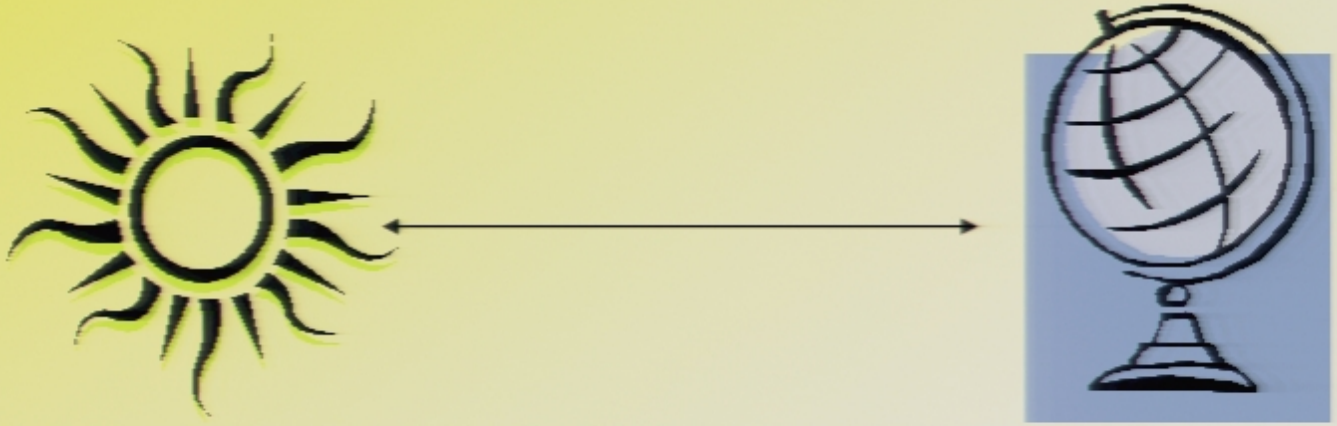


Einstein at school

Einstein at school

Einstein at 16 years of age

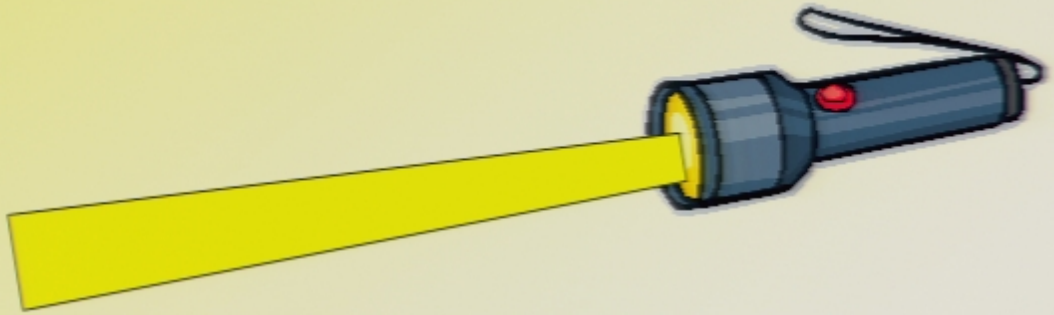
"What if I ran after a beam of light? … What if I could run fast enough, would it seem like it was still?"



8 minutes

Light is Strange

300,000 km per second



300,000 km per second

20 kms per hour

Einstein in 1905: miracle year

- 1905
- 26 years old.
- Working approving new inventions and discoveries
  (patent clerk) eg. Toblerone chocolate bar
- Everything came together & his questions paid off.

Physics is for young people

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What is light made of?

- Different types of light

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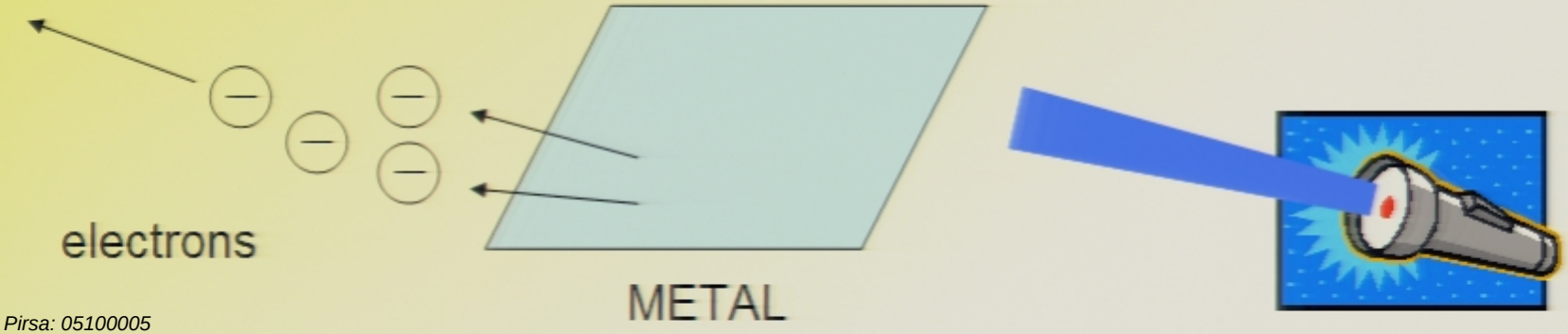
- Different types of light

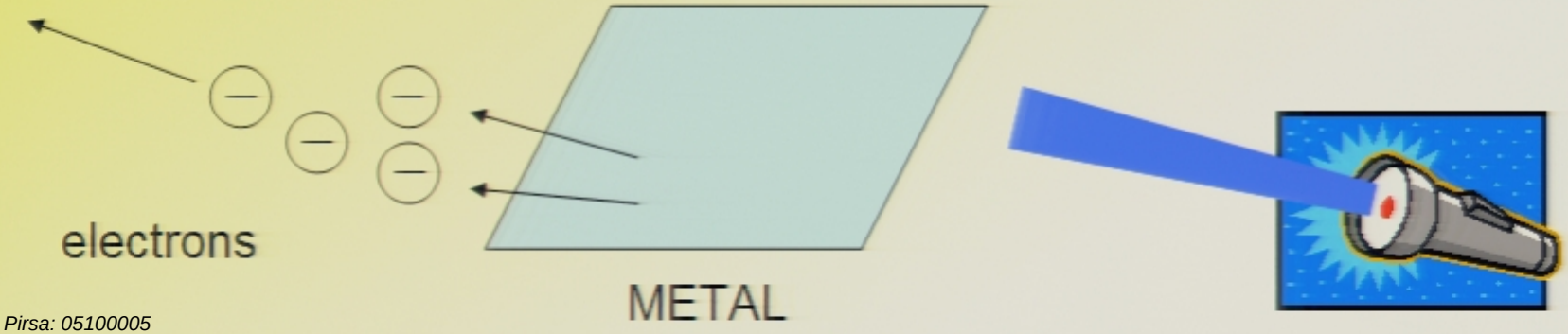
- Imagine shining a flashlight on a piece of metal.



Why?

- tiny particles of pure energy called PHOTONS
- photoelectric effect

- Imagine shining a flashlight on a piece of metal.



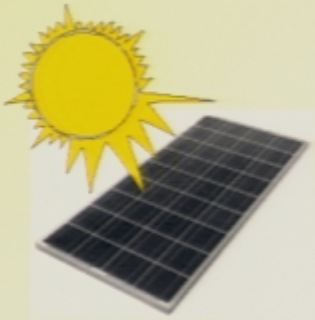
Why?

- tiny particles of pure energy called PHOTONS
- photoelectric effect

Uses

- digital cameras

- solar cells



- QUESTIONS (What makes up light?)

- IDEAS (photons?)

- ANSWERS & DISCOVERIES (Yes, photons.)

- TECHNOLOGIES (digital camera, solar cell)

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- IDEAS (photons?)

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- TECHNOLOGIES (digital camera, solar cell)

Space & Time: special relativity

If you travel close to the speed of light, then lots of very strange things start to happen …

time slows down (TIME DILATION)

objects shrink (LENGTH CONTRACTION)

you can see things behind you.

Through Einstein's Eyes: Seeing Relativity

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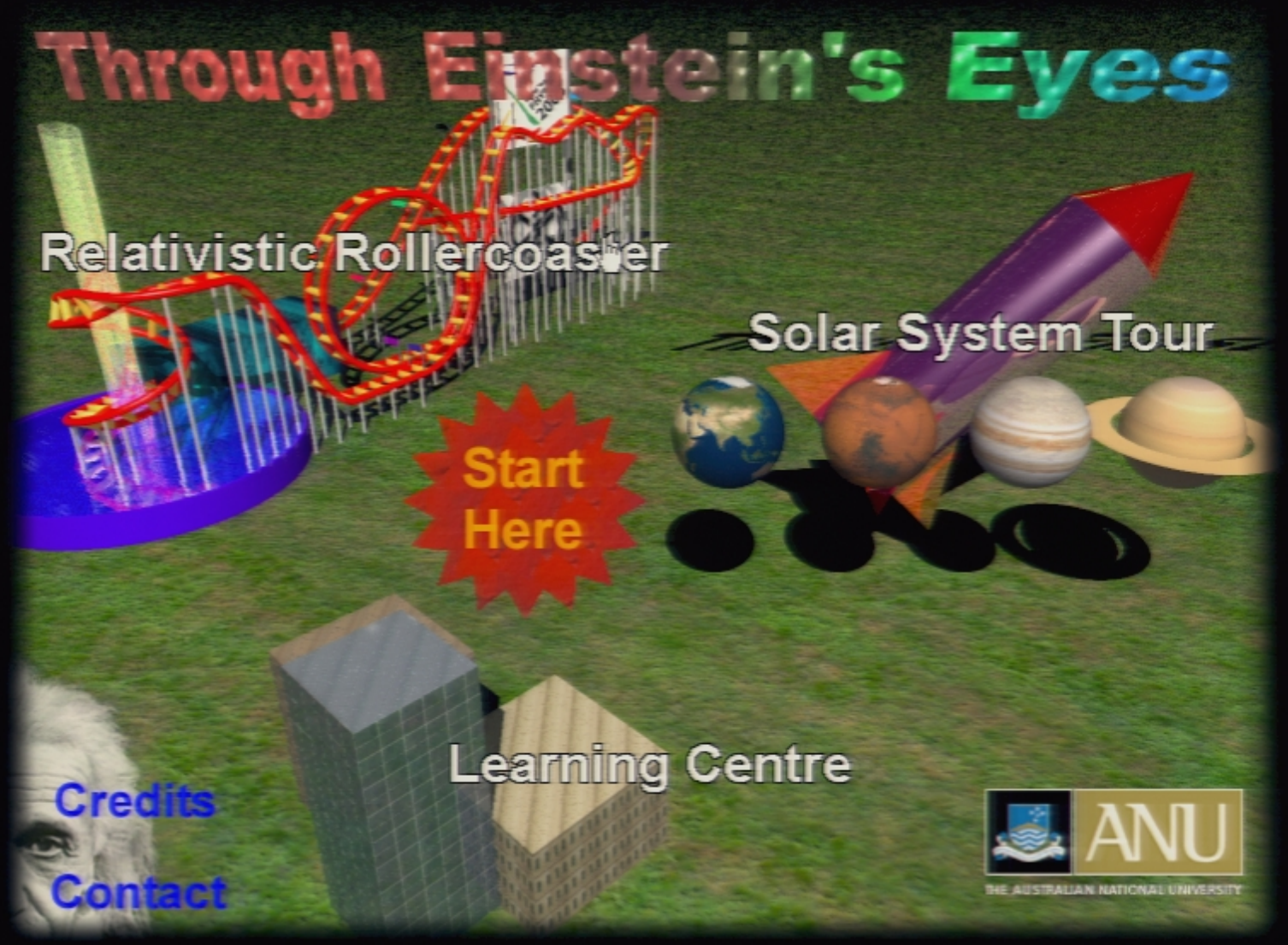
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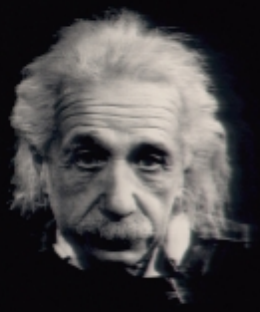

Movie explained

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The overall effect is a curving of lines - including the horizon.

Rollercoaster

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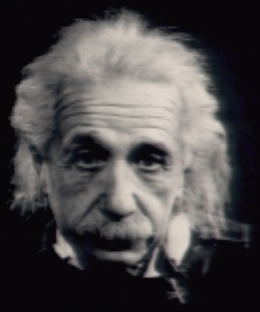
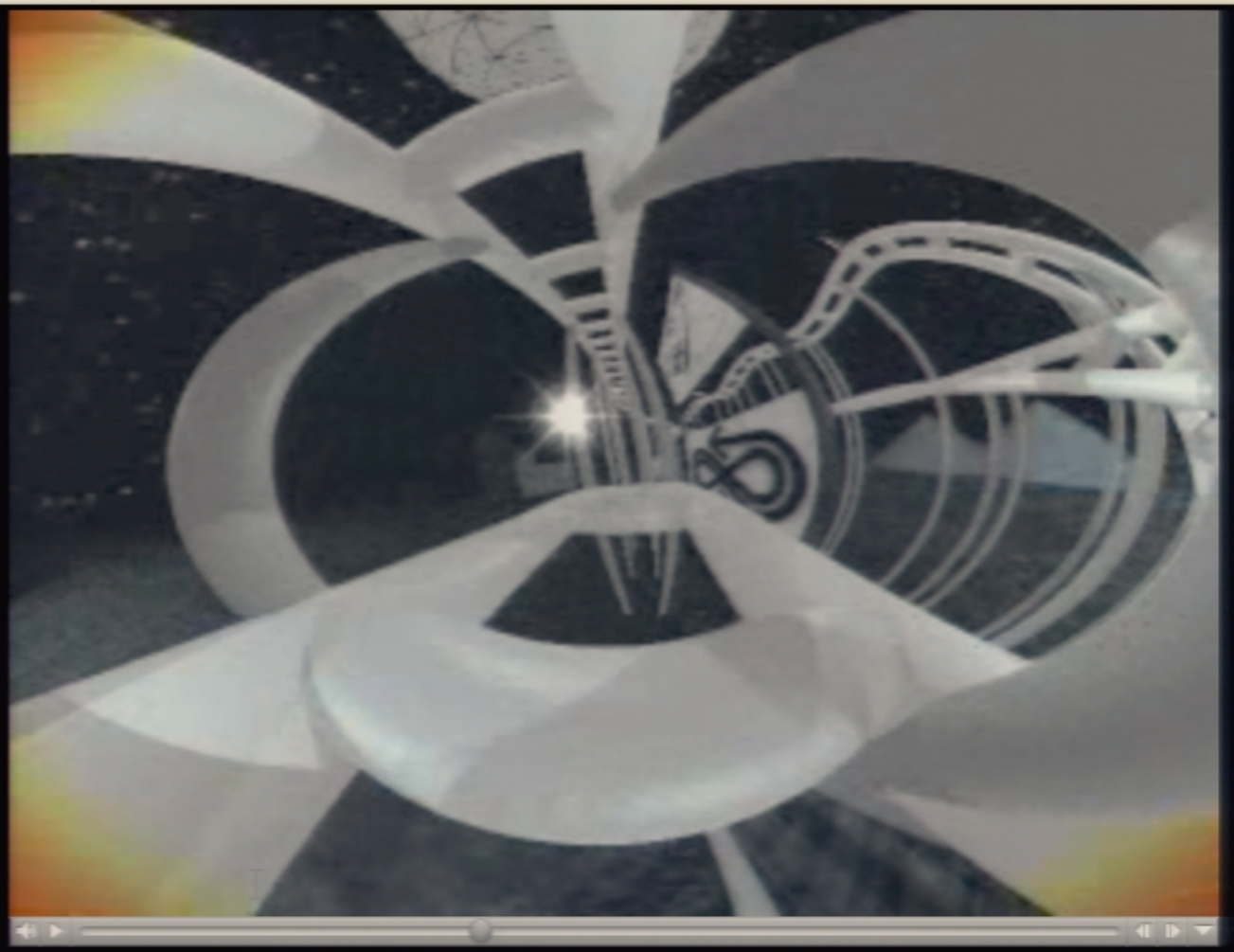


Movie explained

Continue tour



Distortions occur as space and time become mixed.

Desert Road

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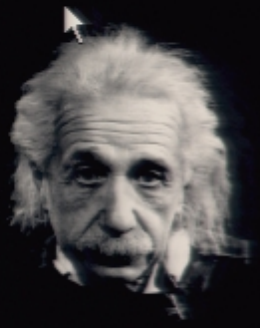

- Movie explained
- **Continue tour**

Accelerating down a desert road. Even though we are going forward, things appear to recede at first.

Cube

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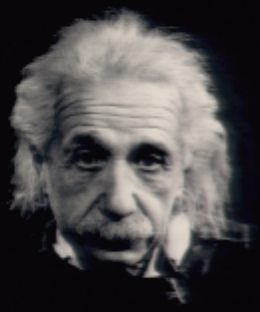

Movie explained

Continue tour

We fly through a hollow cube at 99% light speed. The inset (bottom right) shows where we are relative to the cube.

Microsoft PowerPoint - [einsteins science demystified]

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Space & Time: special relativity

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Slide Layout

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Slide 16 of 22 Default Design

- QUESTIONS (How does light move?)

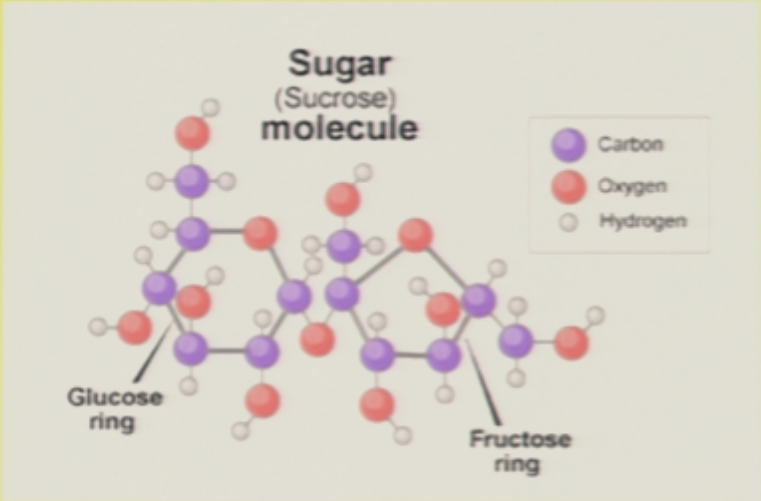
- IDEAS

- ANSWERS & DISCOVERIES (about space & time)

- TECHNOLOGIES (Global Positioning System)

What makes up all objects?

- atoms
- like tiny building blocks or Lego blocks
- Albert's questions played a key role in proving that these were real



- Used in the stockmarket

- QUESTIONS (What is everything made of?)

- IDEAS: (atoms?)

- ANSWERS & DISCOVERIES (atoms)

- APPLICATION (stockmarket)

Conclusion

The important thing is not to **stop questioning**.
Curiosity has its own reason for existing."