

PH Pädagogische Hochschule Wien

KEY COMPETENCIES

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SCIENCE HITS 4 KIDS SH4K



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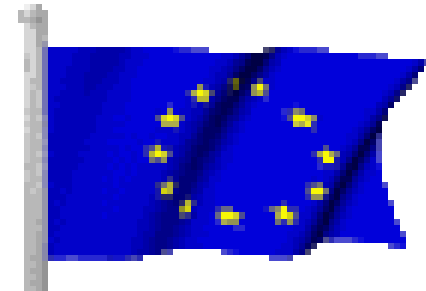
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Key Competencies Eurydice European Unit

- communication in the mother tongue,
- communication in foreign languages,
- ICT,
- **numeracy and competencies in maths, science and technology,**
- interpersonal and civic competencies,
- learning to learn,
- general culture.



TEACHING PRIMARY SCIENCE

Pupils shall observe everyday life

Pupils shall gather impressions

Pupils shall understand what's going on

Pupils shall do a first simple and elementarized research

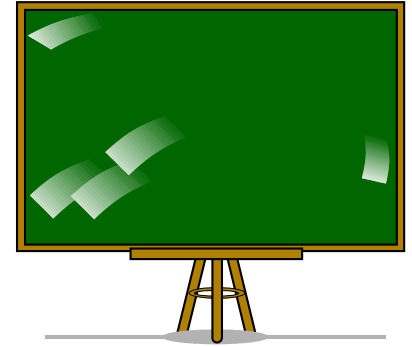
Pupils shall be enabled to draw conclusions

Pupils shall be enabled to explain and to understand what's happening round them

Pupils shall obtain a first elementarized structure on science
- this arrangement we call primary science.



Pupils shall learn to observe and to realize what's **happening round them**



Pupils shall gather experiences by and from everyday life

Pupils shall learn to arrange these experiences

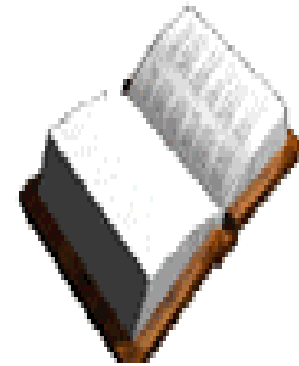
Introduce a first elementarized structure

Pupils learn to arrange their experiences into this structure and by this to extend it

**BASIC COMPETENCIES
BASIS SKILLS**

A Viennese Politician ment:

**Basic Skills are:
to be able to read
to be able to write
to be able to calculate**

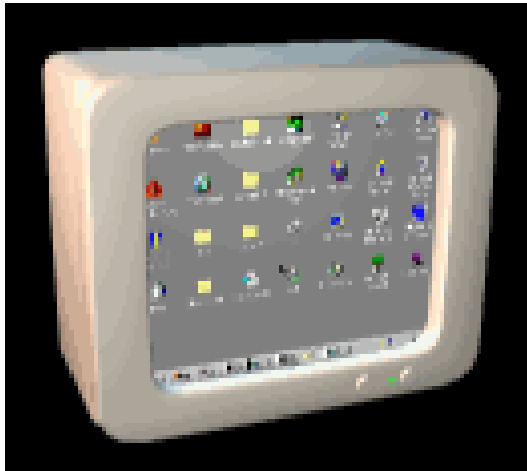
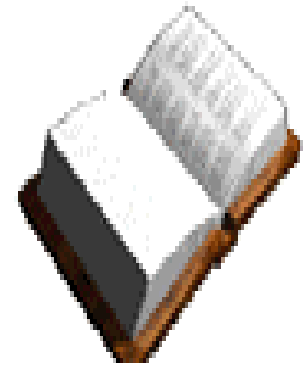


But times have changed...

Initial teacher education for teaching science

**IN ADDITION TO
THERE ARE DEMANDED:**

**DIGITAL SKILLS – COMPUTER
ICT
FOREIGN LANGUAGE(S)**



THE PROBLEM IS

The whole day you face your computer playing games. Why you do not want to do something else ?



JETZT HOCKST DU SCHON DEN GANZEN TAG VOR DEM COMPUTER! WILLST DU NICHT ENDLICH MAL WAS ANDERES MACHEN?

DU HAST RECHT, ONKEL RUDI. ICH GEH FERNSEHEN.

You are really right, I will change to the TV.

next day



UND GESCHLAFEN HAB ICH AUCH NICHT GUT

I have headache and I could not really sleep !!!!

IMMER ÖFTER HÖRT MAN, DASS UNSERE VOLKSSCHÜLER UNTER KOPF = SCHMERZEN UND SCHLAFSTÖRUNGEN LEIDEN. WORAN DAS WOHL LIEGT?!

I cannot find out the reason why it is ????

**SKILLS DEMANDED BY THE
EUROPEAN COMMUNITY**

ethical, economic and cultural competences and values

basic concepts of science and technology

reading (and writing) literacy

mathematical literacy

numeracy

generic skills (communication, problem-solving, reasoning, leadership, creativity, motivation, team-work and the ability to learn)

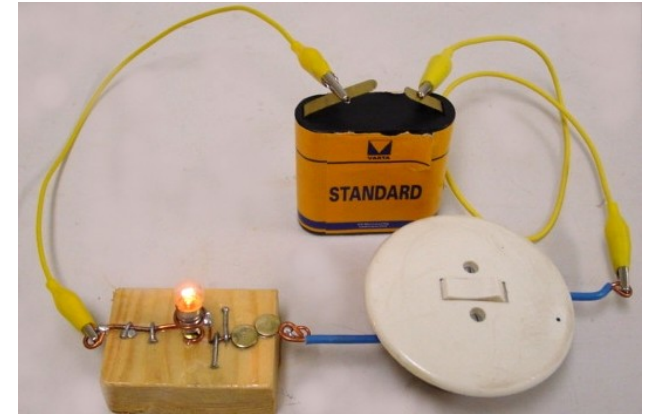
considerable importance is attached to ICT and foreign

languages

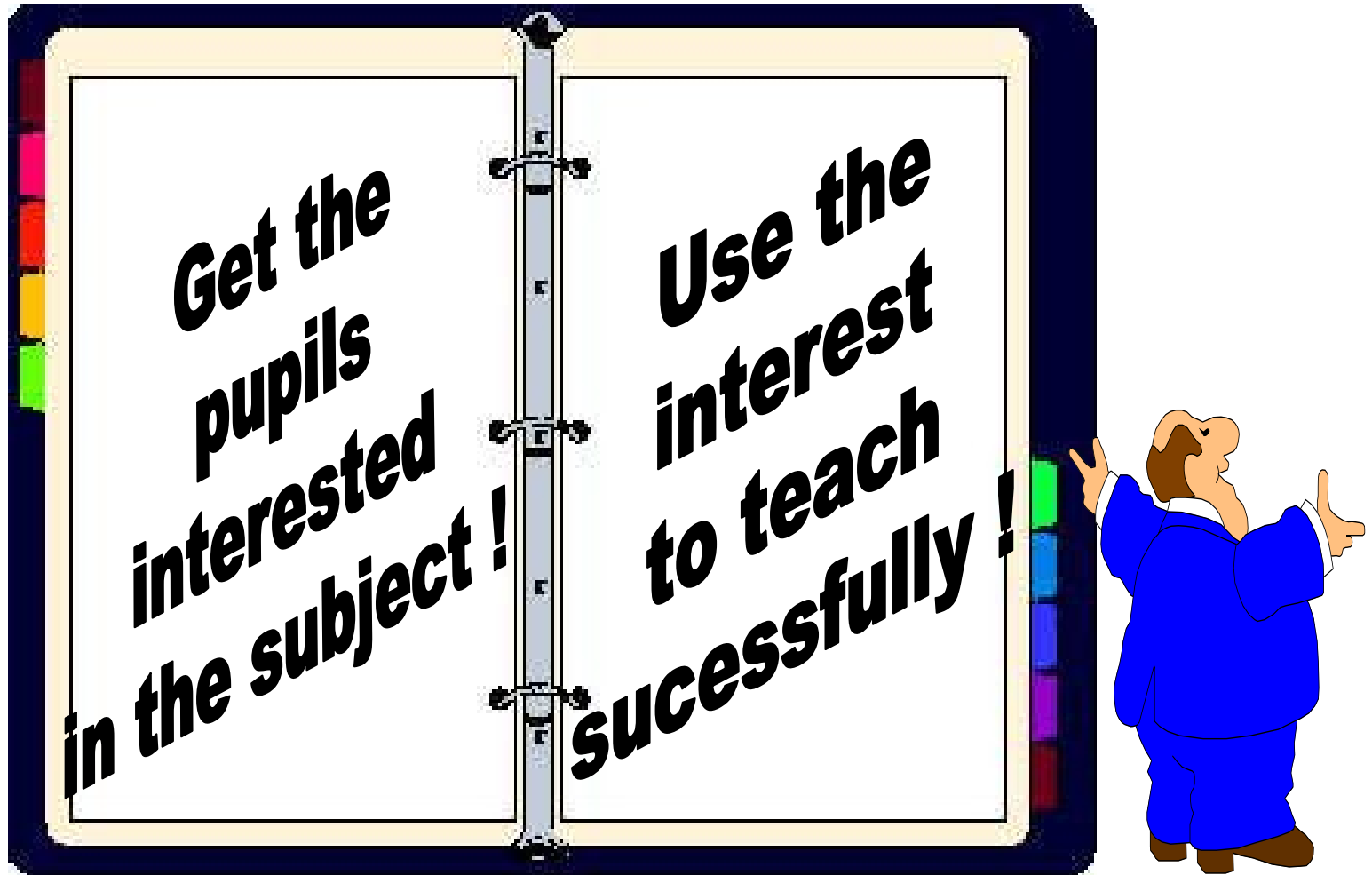


**THE BEST CHANCE IN THIS
SITUATION....**

**...is to use the fact,
that children in the primary
school's age mostly are curious
about a lot of things and by this
the teacher has the chance to get them interested -
- also in science –
- but only by active learning as a first simple and
basic research by low-cost experiments**



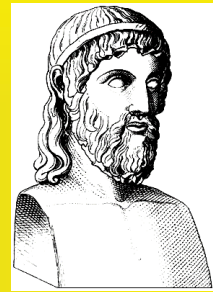
THE TEACHER'S TASKS



THE PROCEDURE....



TAKE CARE OF THIS !



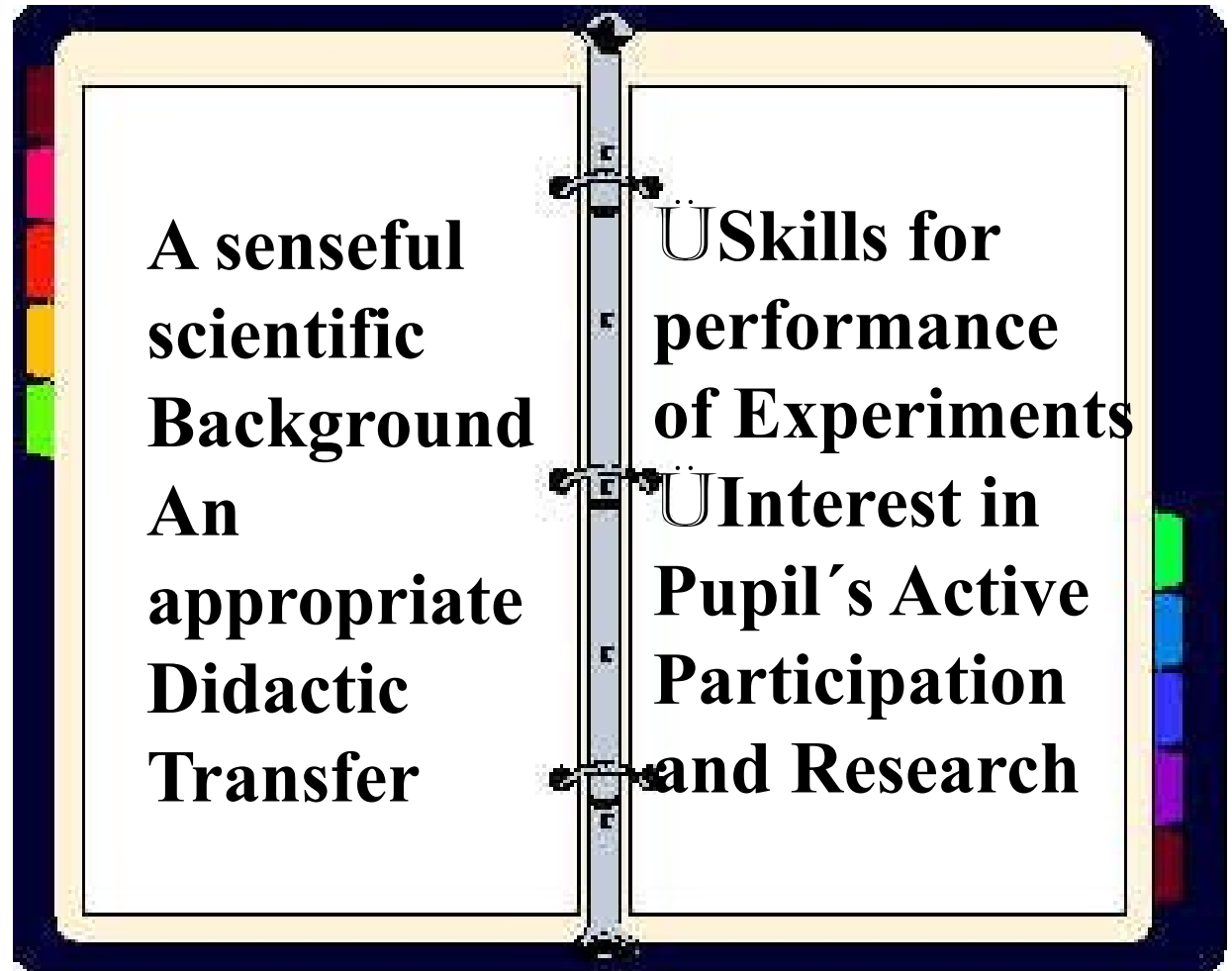
**OBEST PLERUMQUE IIS,
QUI DISCERE VOLUNT,
AUCTORITAS EORUM,
QUI DOCENT.
Cicero, De natura deorum**



Translation see notices

WE HAVE TO PROVIDE FOR OUR STUDENTS...

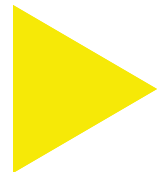
**A teacher having
knowledge,
skills
and
interest
is enabled
to forward these
qualities
to the pupils !**



**THE TEACHER MUST BE ABLE
TO ELEMENTARIZE !!**

To elementarize means:

- **correct**
- **simple - basic**
- **easy to understand**



for the Child !!

**IN PRIMARY SCHOOL WE OFFER
AND THE PUPILS ACHIEVE
BASIC KNOWLEDGE**

**The primary school's knowledge is only to be extended and
to be refined when changing to the secondary school
THERE IS NO FRICTION EXISTING !!**

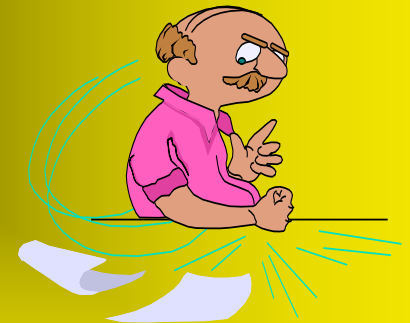
WHAT WE OFFER TO THE STUDENTS THEY WILL OFFER TO THE PUPILS....

**Doing experiments and
and research by himself**

**Being able to put
creative ideas into action**

SCIENTIFIC KNOWLEDGE
**the interrelationship between different
subjects and topics**

to take pleasure in the work



ATTENTION !!

The primary school teacher is no specialist !!

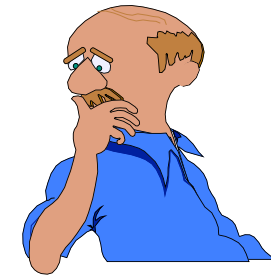


And for this he needs a special training !!

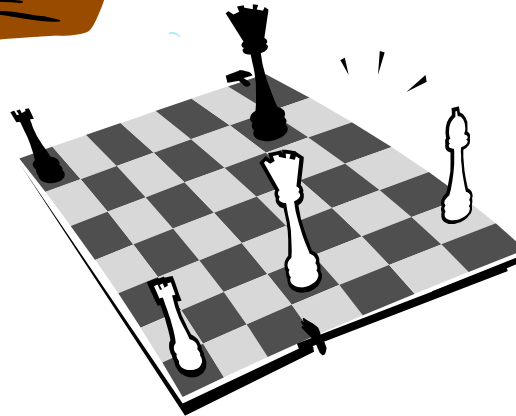


The primary school teacher is a decathlete !!

ABOUT THE LEVEL...



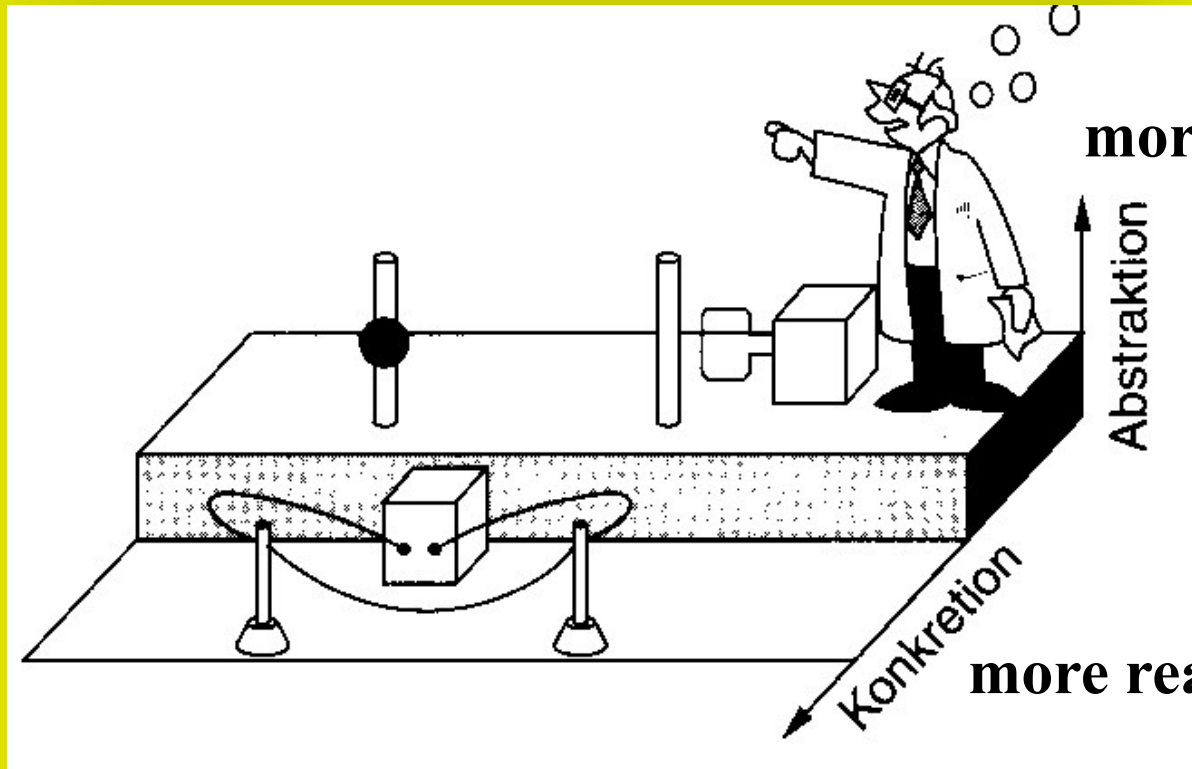
**To play chess is
about the same
as to play science**



**The teachers
level must allow
him to rise the
pupil from
down under
on top of the
chessboard,
so he can play.**

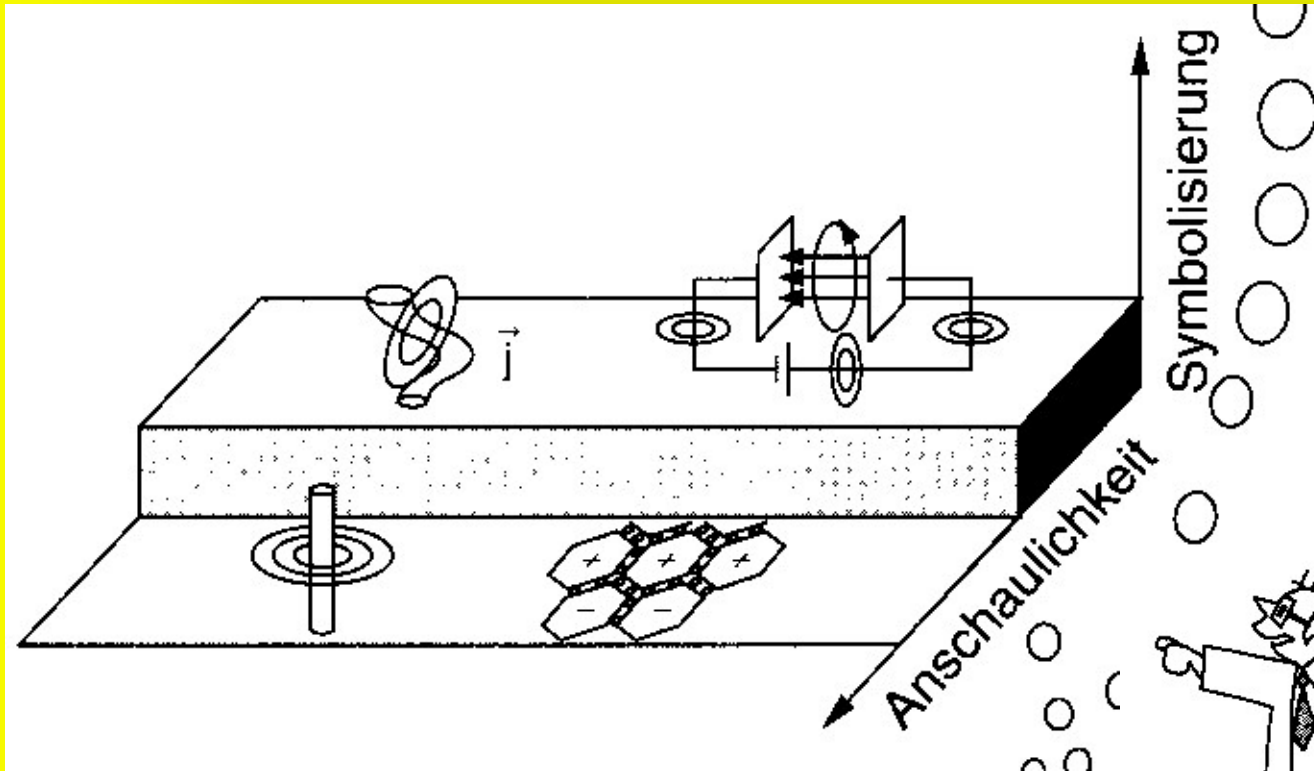


Level of view and experience



In any case we need this level.

Level of Model



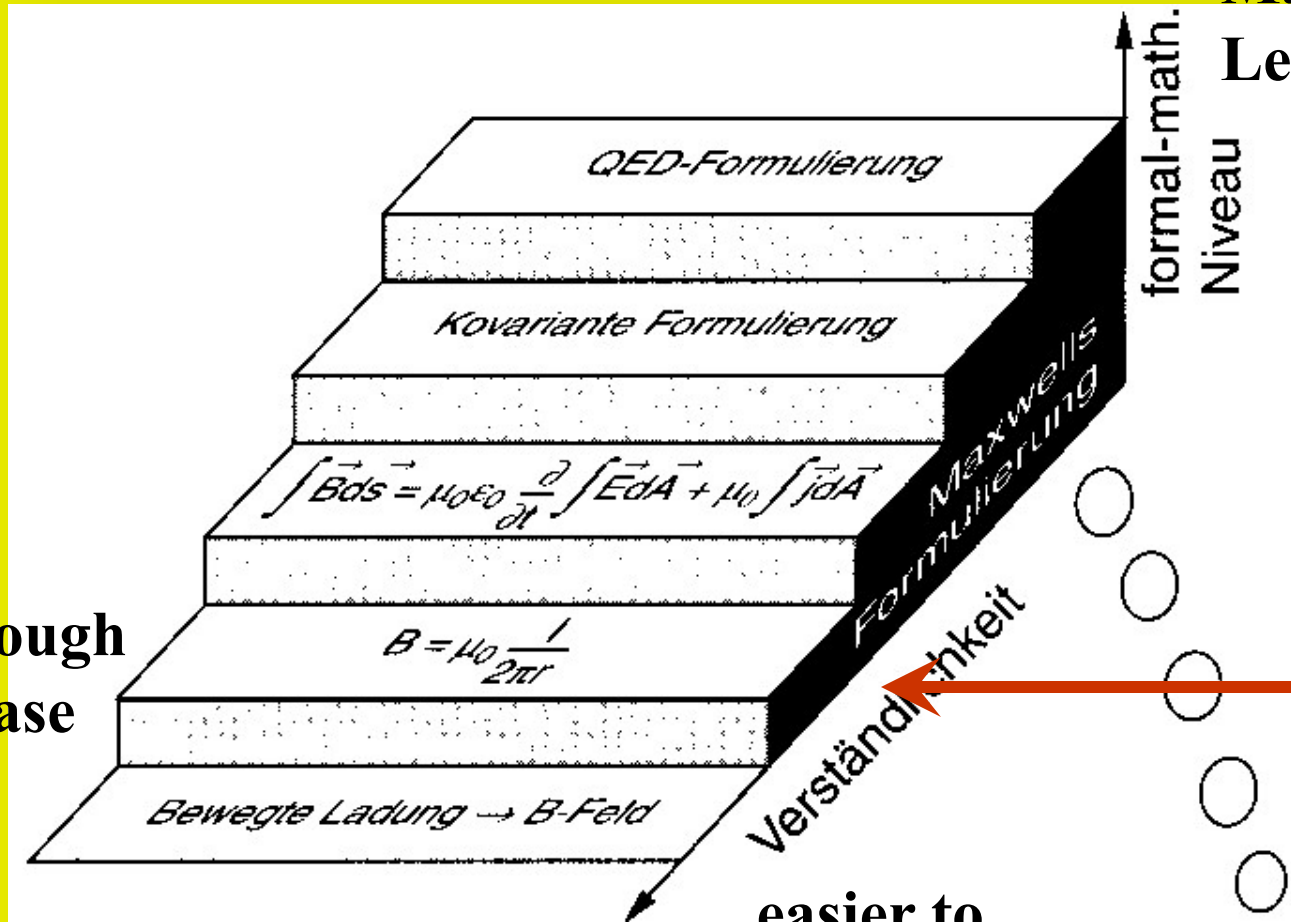
more
symbolic

Needed to a high extent

more
graphic
and
plastic

Level of Abstract Theory

**High
Mathematic
Level**



**High enough
in any case**

**easier to
understand**



ERKENNTNISTHEORIE
PHILOSOPHIE

THEORIE

Maxwell-Hertz

$$\frac{\partial^2 E}{\partial x^2} = \epsilon_0 \mu_0 \frac{\partial^2 E}{\partial t^2} \quad \lambda = \frac{n \cdot \lambda \cdot l}{d}$$

$$E = E_0 \cdot \sin 2\pi \left(\frac{t}{T} - \frac{x}{\lambda} \right)$$

WISSENSCHAFTSTHEORIE

Hinter allem
steht etwas
Gemeinsames

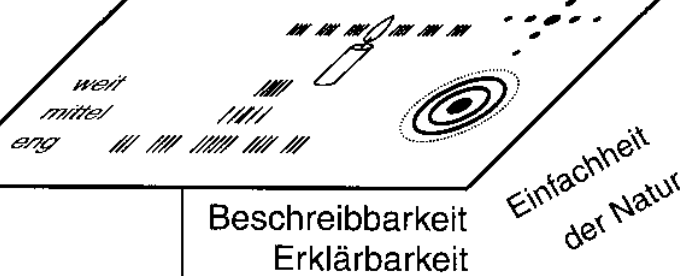
MODELL



METHODOLOGIE

Einfachheit
Komplexes = Synthese von
Einfachem

PHÄNOMEN



scientific philosophy
mathematical theory

Level
of
Theory

All is ruled by a common law

In any case sufficient for
primary purposes

Level
of
Model

methodology complex
is a synthesis of simple

Level
of
Phenomenon

Describe and explain the phenomenon find
out, that nature works simple.



ielwisserei bringt noch keinen



erstand.

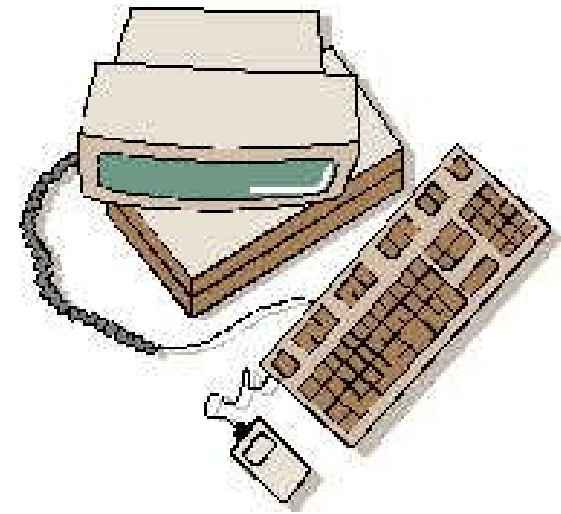
Multum, non multa !

(„Many, not much !“)

**Heraklit,
ancient
Human
Scientist !**



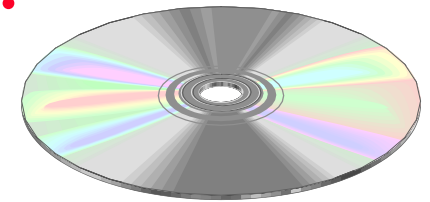
Who is educated ?



One knowing all ?

One being able to reproduce all and ?

A Computer knows more !!

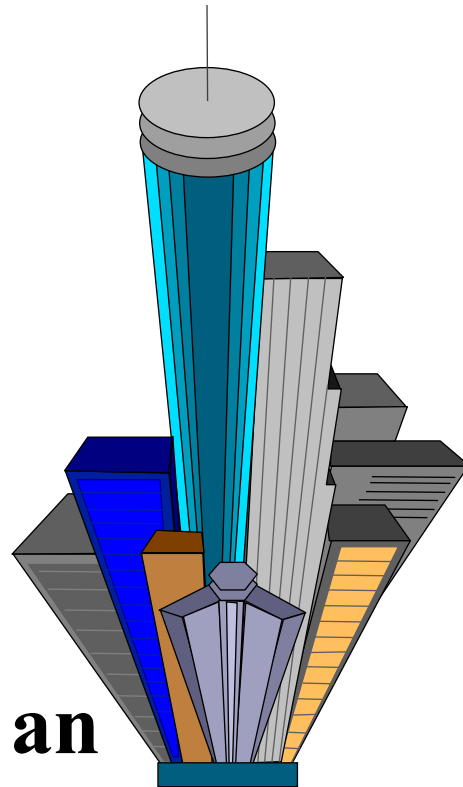


**One knowing where to find details he does
not know ?**

***For managing this you need real
knowledge !***

**THE TEACHER HAS
TO TEACH CONSTRUCTIVE**

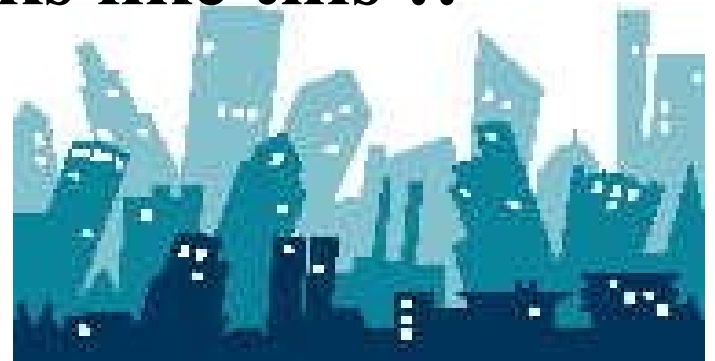
**A high
floor...**



**...needs an
excellant base...**

**Teaching equals
constructing
a building.**

**...otherwise the outcome
looks like this !!**



Initial teacher education for teaching science

THE TEACHER HAS TO BE AWARE OF...

Primary School

Lower Secondary School

Higher Secondary School

Job

Advanced Studies

Adult's education

Lifelong Learning

**Constructive
Teaching
without
break !**