

Context-Based Teaching in Science

Bringing Science to life

FE VILLALINO

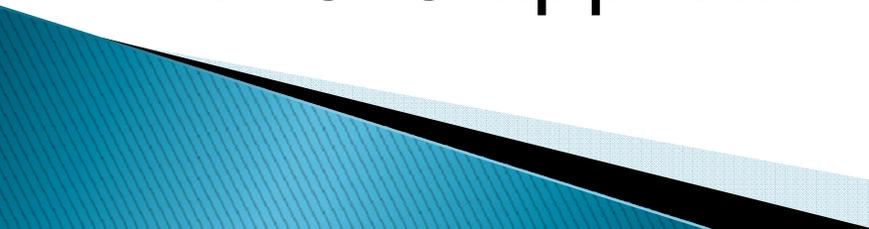
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Bureau of Elementary Education
Department of Education

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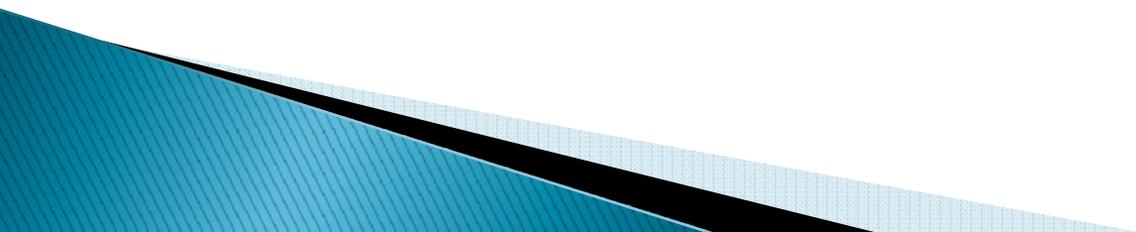
Context-Based Teaching in Science

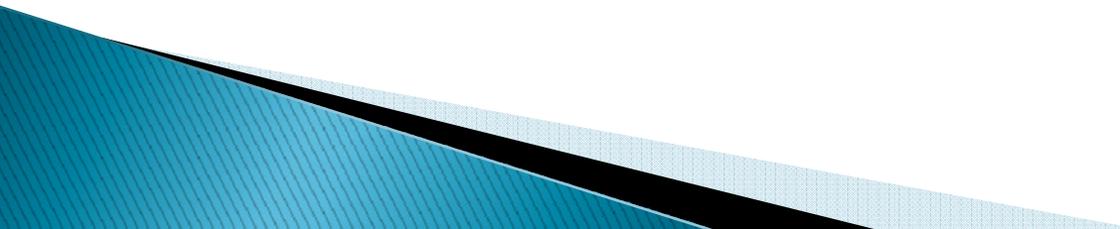
*What is Context-Based or
Science-Technology-Society (STS) Approach?*

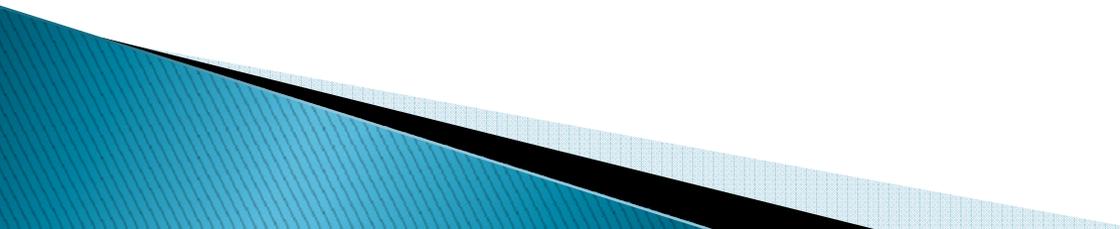
Context-based approach is an approach adopted in science teaching where contexts and applications of science are used as the *starting point* for the development of scientific ideas.

- ▶ Discernible trends in Science Curriculum development has been to use contexts and applications of science as a means of developing scientific understanding
 - ▶ Contexts are selected on the basis of their perceived relevance to student's immediate and future lives.
 - ▶ Teaching science in this way has come to be known as using a context based or STS approach
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FEATURES of Context-Based Teaching and Learning



- ▶ recognizes that learning is a complex and multifaceted process that goes far beyond drill-oriented, stimulus-and-response methodologies.
 - ▶ learning occurs only when students process new information or knowledge in such a way that it makes sense to them in their own frames of reference
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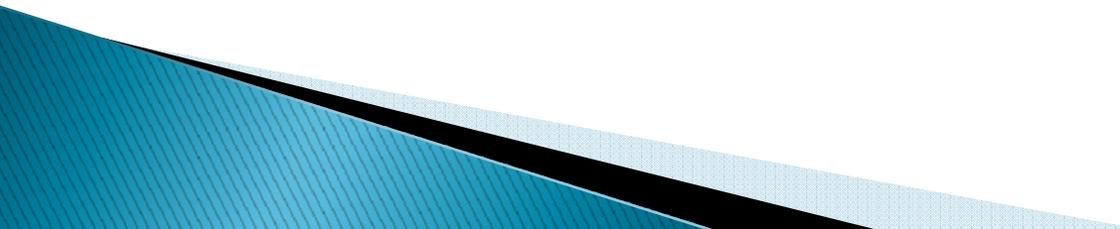
- ▶ assumes that the mind naturally seeks meaning *in context*—that is, in relation to the person's current environment—and that it does so by searching for relationships that make sense and appear useful.
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- ▶ focuses on the multiple aspects of any learning environment, whether a classroom, a laboratory, a computer lab, a worksite, or a rice/corn field.

- ▶ It encourages educators to choose and/or design learning environments that incorporate as many different forms of experience as possible—social, cultural, physical, and psychological—in working toward the desired learning outcomes.

Context-based/STS approaches and attitude to science

The aspirations of context-based/STS approaches lies in the area of students' *affective* responses to science – how they *feel* about the science they do. The hope is that the contexts used to develop scientific ideas will motivate students and make them feel more positive about science by helping them see the importance of what they are studying.

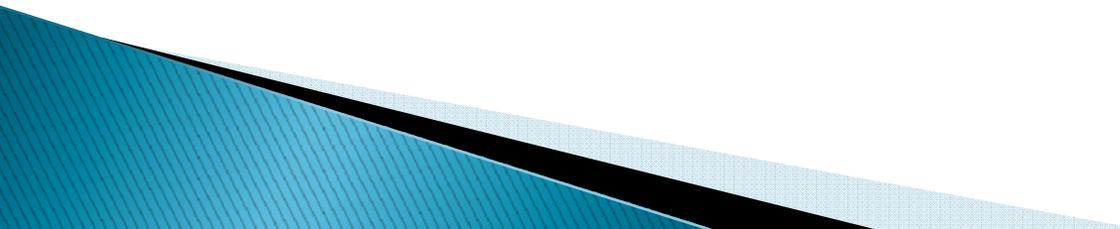


Context-based/STS approaches and uptake of science subjects

- ▶ provide students with more interesting lessons, there is also the hope that this interest will be translated into a desire to study science subjects beyond the period when they are compulsory.

Context-based/STS approaches and understanding of science ideas

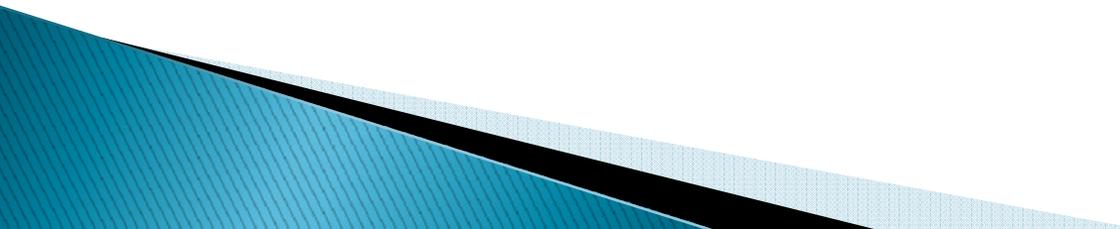
if students are more interested and motivated by the experiences they are having in their lessons, this increased engagement might result in improved learning.



Context-based/STS approaches and scientific literacy

- concerns the desire to produce scientifically-literate citizens.
- Encompasses knowledge, understanding and skills young people need to develop in order to think and act appropriately on scientific matters that may affect their lives and the lives of other members of the local, national and global communities in which they are a part.

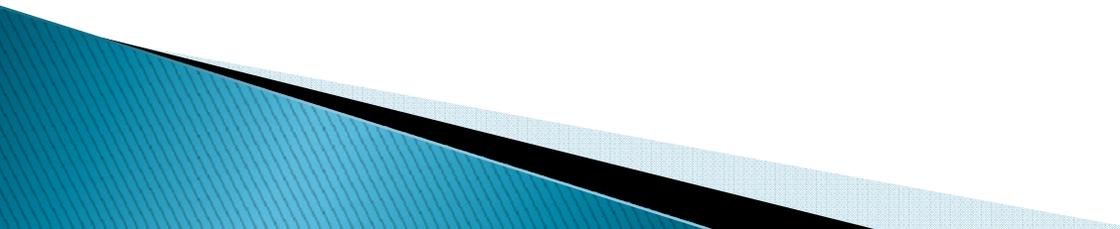
Are You Teaching Science Contextually?

1. Are new concepts presented in real-life (outside the classroom) situations and experiences that are familiar to the student?
 2. Are concepts in examples and student exercises presented in the context of their use?
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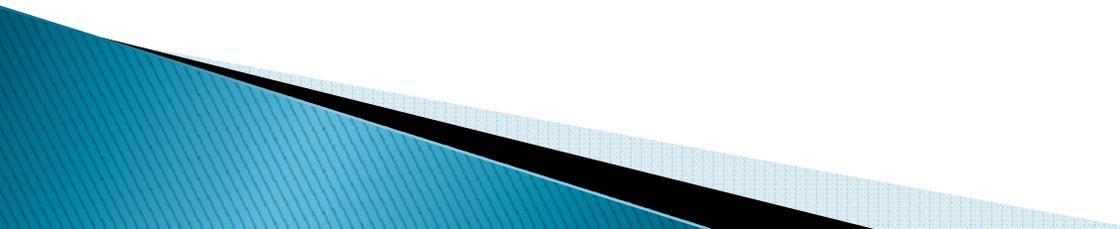
Are You Teaching Science Contextually?

3. Are new concepts presented in the context of what the student already knows?
 4. Do examples and student exercises include many real, believable problem-solving situations that students can recognize as being important to their current or possible future lives?
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Are You Teaching Science Contextually?

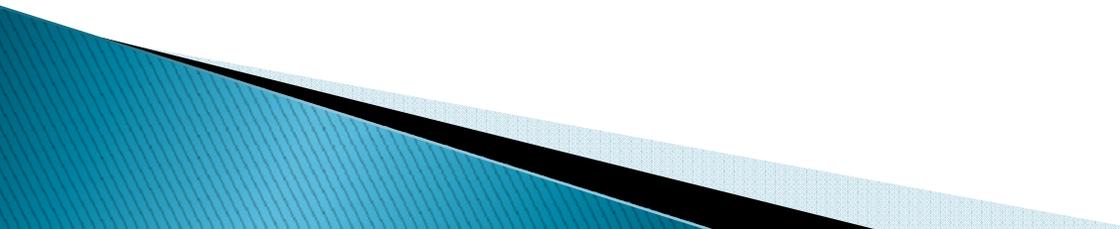
5. Do examples and student exercises cultivate an attitude that says, “I need to learn this”?
 6. Do students gather and analyze their own data as they're guided in discovery of the important concepts?
 7. Are opportunities presented for students to gather and analyze their own data for enrichment and extension?
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Are You Teaching Science Contextually?

8. Do lessons and activities encourage the student to apply concepts and information in useful contexts, projecting the student into imagined futures (e.g., possible careers) and unfamiliar locations (e.g., workplaces)?
 9. Are students expected to participate regularly in interactive groups where sharing, communicating, and responding to the important concepts and decision-making occur?
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Are You Teaching Science Contextually?

10. Do lessons, exercises, and labs improve students' reading and other communication skills in addition to scientific reasoning and achievement?



Context-Based Strategy

1. *Relating*

2. *Experiencing*

3. *Applying*

4. *Cooperating*

5. *Transferring*

REACT strategy

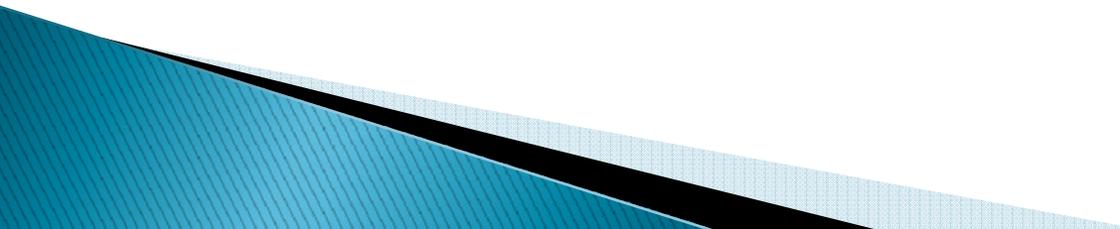
Relating

Learning in the context of life experience, correlating, is the kind of contextual learning that typically occurs with very young children.

REACT strategy

Experiencing

learning in the context of exploration, discovery, and invention—is the heart of contextual learning.



REACT strategy

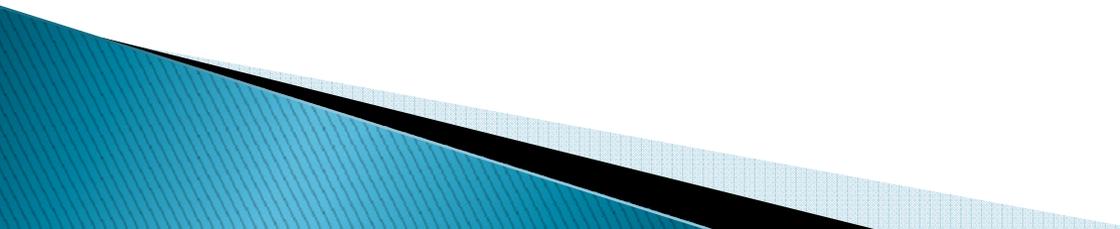
Applying

concepts and information in a useful context
often projects students into an imagined
future

REACT strategy

Cooperating

learning in the context of sharing, responding, and communicating with other learners—is primary instructional strategy in contextual teaching.

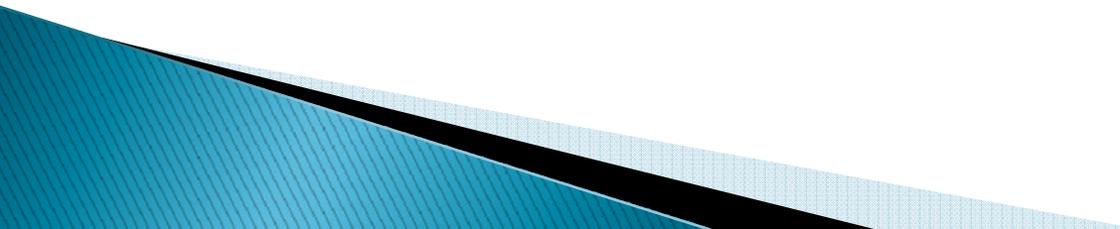


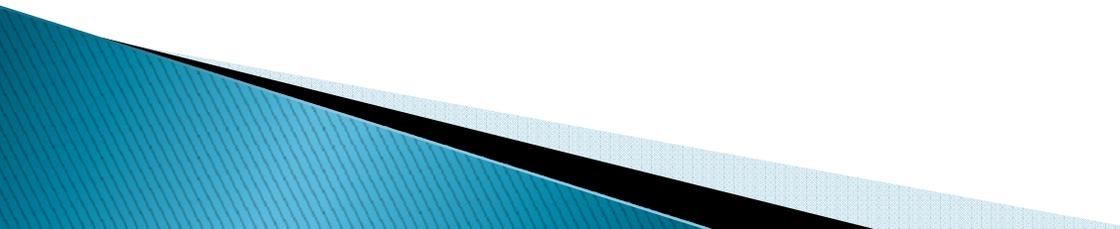
REACT strategy

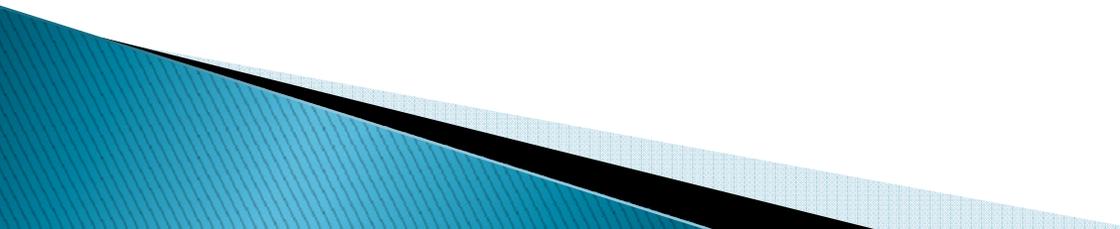
Transferring

Learning in the context of existing knowledge, or transferring, uses and builds upon what the student already knows.

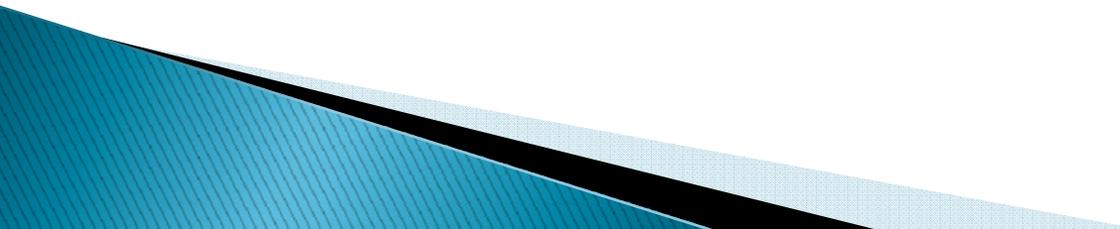
Indicators of the CTL Method

- ▶ Students are actively engaged. They are encouraged to be mobile in the classroom. The learning environment is dynamic and exiting.
 - ▶ Students view learning as relevant. Projects and problems are real world, not contrived. They are encourage to become active in the community as a window on real life.
- 

- ▶ Students learn from each other. Encouraged students to share whatever experience or knowledge they bring to the classroom.
 - ▶ Students are encourage to take responsibility for monitoring their own development.
 - ▶ Students are encouraged to share experiences, information and strategies for solving problems.
- 

- ▶ Learning occurs in multiple settings and contexts. Knowledge extends beyond the boundaries of conventional classrooms
 - ▶ The role of the teacher is significantly changed. The teacher acts as a facilitator of student learning. Teachers use many different techniques in their teaching, not only lecture. Teacher also accepts his role as a learner.
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Ways of learning and teaching

- » problem-oriented approach
 - » inquiry-based science programs
 - » co-operative learning
 - » showing links between instrumentation, experiment and theory
 - » investigate science in the making
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Ways of learning and teaching

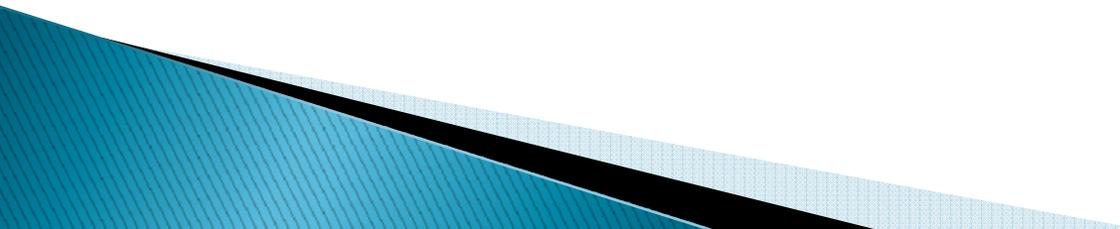
New places of learning

» **science centres**

» **science museums**

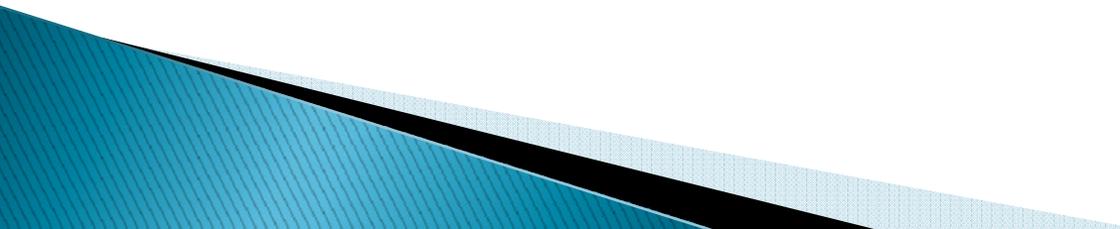
» **laboratories**

» **companies**



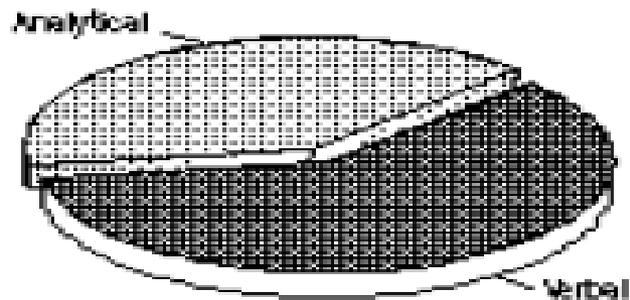
Context-based Teaching is

▶ *More Than
One Kind of
Intelligence*

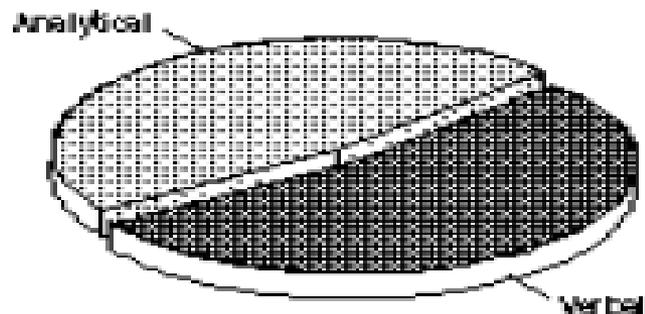


Traditional VS Contemporary views of intelligence

Traditional Views of Intelligence

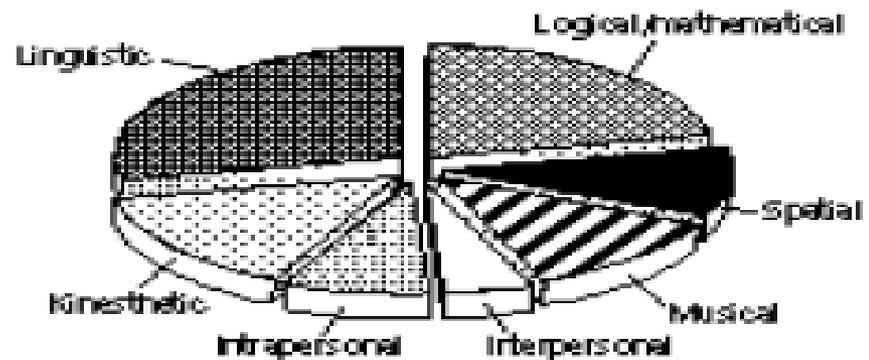


Student A

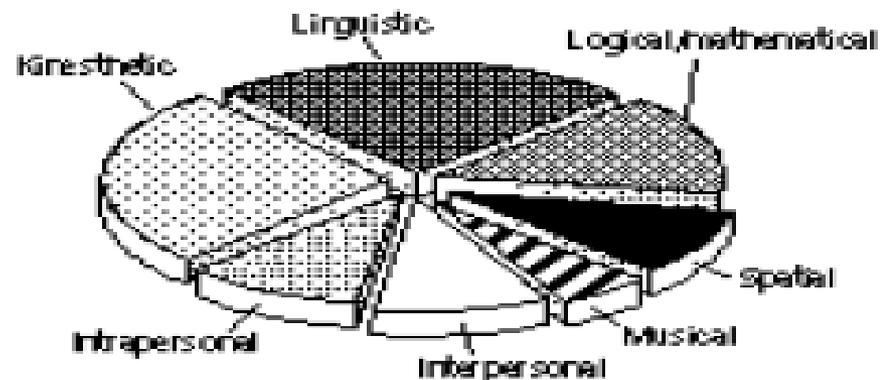


Student B

Gardner's View of Multiple Intelligences



Student A

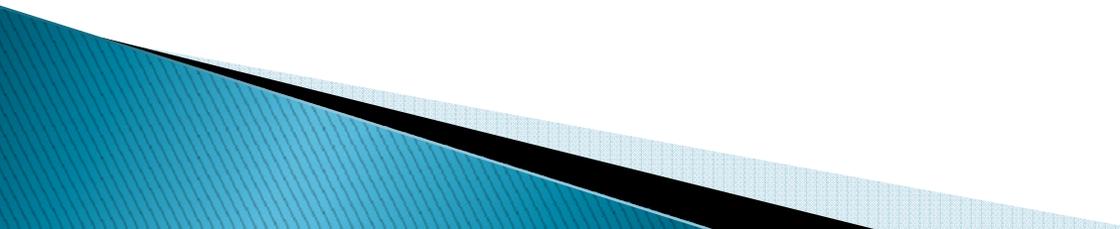


Student B

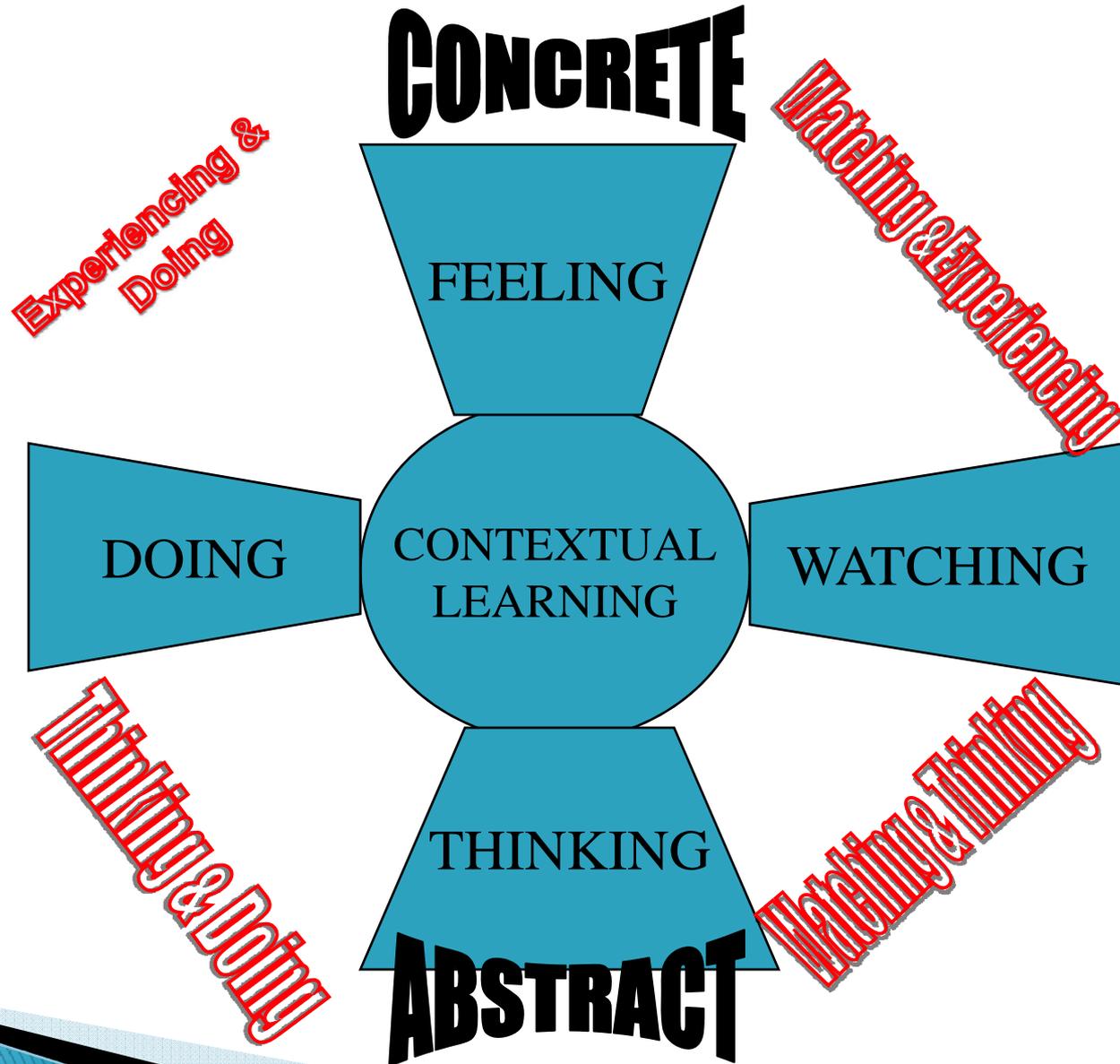
- ▶ everyone has some measure of each of the seven intelligences, the specific strengths and combinations vary according to the individual. No two people have the same kind of mind.
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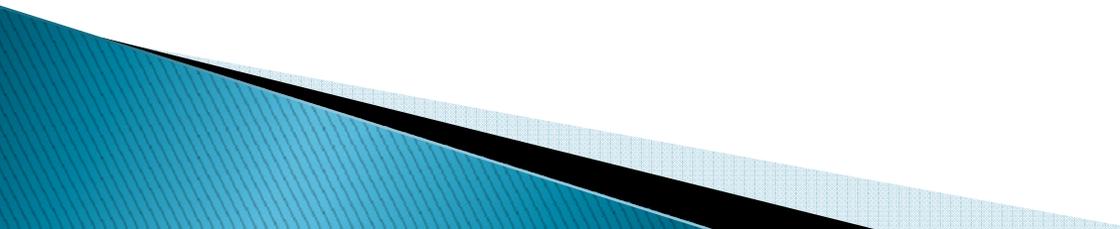
Context-based Teaching is

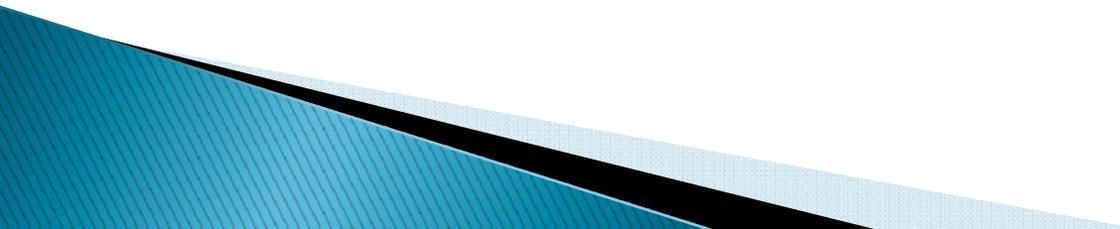
▶ *More Than
One Way to
Learn*



Contextual learning should encompass all styles of learning

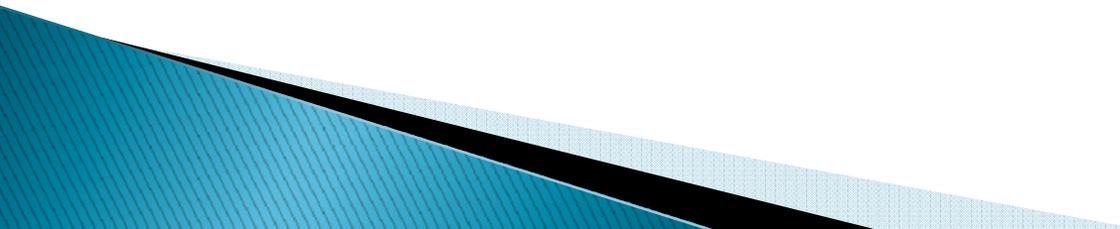


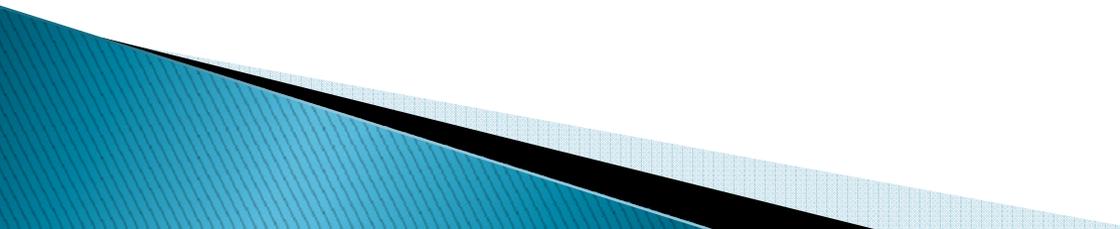
- ▶ learners tend to perceive information either abstractly (by conceptualizing/thinking) or concretely (by experiencing/feeling)
 - ▶ process that information either actively (by experimenting/doing) or reflectively (by observing/watching).
 - ▶ Almost all students can learn by and benefit from all four experiences (thinking, feeling, doing, and watching).
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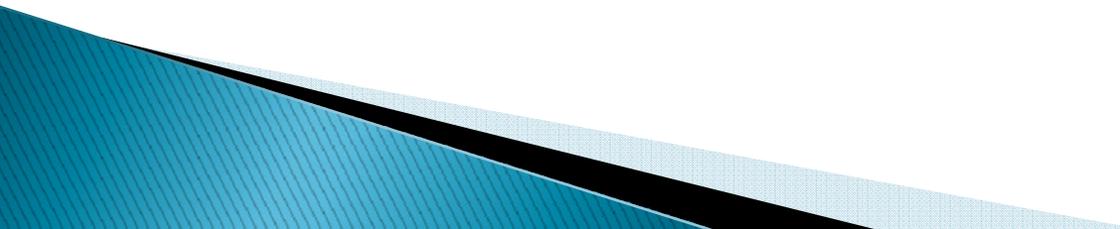
- ▶ no one type of learning is superior to another; all contribute to the process of effective learning.
 - ▶ most students will show a preference for one or two particular kinds of learning, and this preference will indicate the individual's primary learning style(s).
 - ▶ The emphasis for contextual learning is to use this process for effective learning to reach the strengths of all students.
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- ▶ most students have a tendency to learn in a concrete manner (with an emphasis on feeling and doing), while the school system tends to teach in an abstract manner (with an emphasis on thinking and watching)

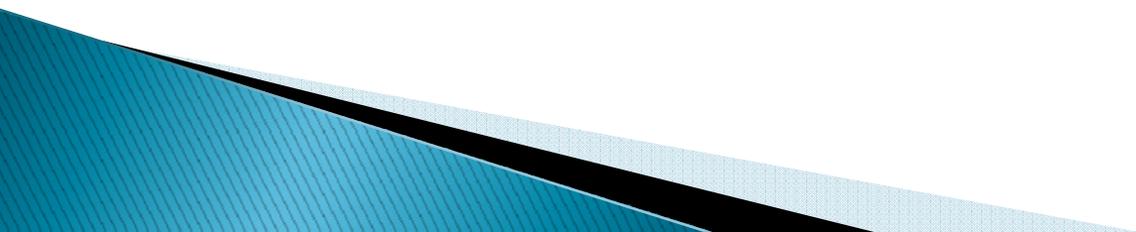
CONTEXT-BASED LEARNING PROCESSES

- ▶ Most people learn best in a concrete manner involving personal participation, physical or hands-on activities, and opportunities for personal discovery.
 - ▶ Learning is greatly enhanced when concepts are presented in the context of relationships that are familiar to the student
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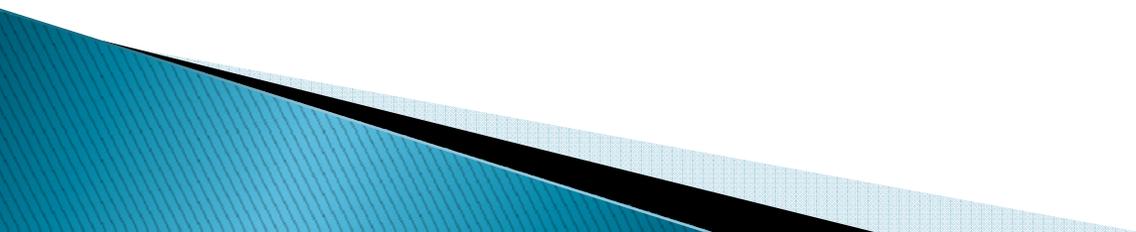
- ▶ Most people relate better to concrete, tangible examples and experiences than to abstract conceptual models.
 - ▶ Most students learn best through some sort of personal interaction with other students—through study groups, team learning, and so on.
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- ▶ Rote memorization of isolated fragments of knowledge is a relatively inefficient and ineffective learning strategy for most students.
 - ▶ Transfer of learning from one situation to another is not consistently predictable, and the ability to do so is a skill that must be learned.
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- ▶ “The goal of science education is scientific and technological literacy for all which leads to an understanding that science education prepares citizens who are empowered to lead productive lives and to enjoy the best possible quality of life.”



**A SMALL
TRUTH TO
MAKE LIFE 100%**



If

ABCDEFGHIJKLMNOPQRSTUVWXYZ

is equal to

1234567891011121314151617181920212223242526

Hard Work

H+A+R+D+W+O+R+K

$$8+1+18+4+23+15+18+11 = 98\%$$

Knowledge

K+N+O+W+L+E+D+G+E

$$11+14+15+23+12+5+4+7+5 = 96\%$$

Love

L+O+V+E

$$12+15+22+5 = 54\%$$

Luck

L+U+C+K

$$12+21+3+11 = 47\%$$

(don't most of us think this is the most important ???)

Then what makes 100% ?

Is it Money ? ... NO !!!

M+O+N+E+Y

13+15+14+5+25 = 72%

Leadership ? ... NO !!!

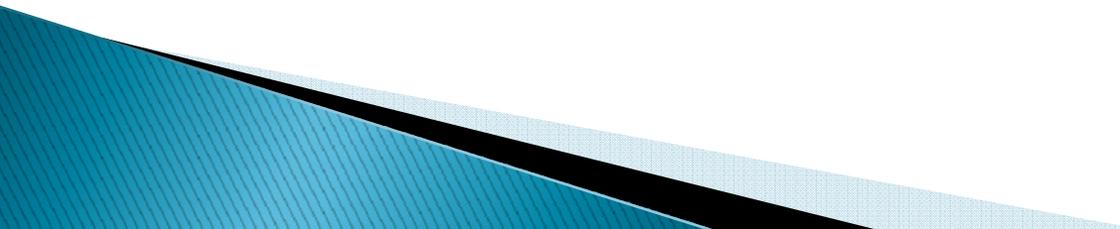
L+E+A+D+E+R+S+H+I+P

12+5+1+4+5+18+19+9+16 = 89%

Every problem has a solution,
only if we perhaps change our
attitude.

To go to the top,
to that 100% ,

what we really need to go
further... a bit more...



ATTITUDE

A+T+T+I+T+U+D+E

1+20+20+9+20+21+4+5 = 100%

It is OUR ATTITUDE towards
Life and Work that makes OUR
Life 100% !!!

ATTITUDE IS EVERYTHING

Change Your Attitude ...

And You Change Your Life ! ! !

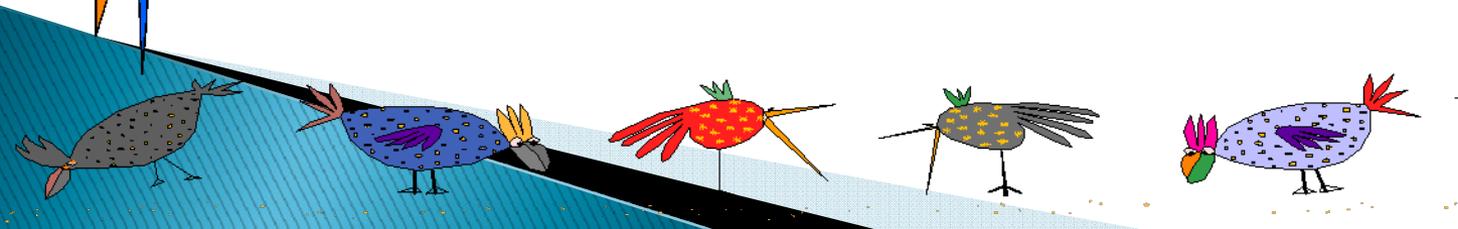
Now that you know the answer...

WHAT WILL YOU DO ABOUT IT ?

**THE LEAST YOU CAN DO IS TO
SHARE THIS MESSAGE WITH
THOSE YOU CARE**



Thank you...



REFERENCES

- ▶ 4 Howard Gardner, *Frames of Mind: The Theory of Multiple Intelligences*(New York: Basic Books, 1983), 4–6.
- ▶ *Teaching Science Contextually: The Cornerstone of Tech Prep* © 1999, Center for Occupational Research and Development, Inc.
- ▶ Bringing science to life: the research evidence on teaching science in context Department of Educational Studies Research Paper 2005/12