

The Quest for Physical Literacy

For teachers and coaches of young people

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Sports Institute Northern Ireland

Children's Coach Development Week 2014

Acknowledgements

- Kelvin Giles www.movementdynamics.com
- Phil Moreland
- My kids

He who has not first laid his foundations may be able, with great ability, to lay them afterwards, but they will be laid with trouble to the architect and danger to the building. Machiavelli

**The earlier we start this journey –
the better**

Children aged between 5 and 12 years are in their most productive and responsive period of movement learning. This is known as the 'skill-hungry' period and is the ideal time to further challenge the ever-growing muscular-skeletal system. Many of the limitations seen in the teen-age and senior years are traced back to this important period of a child's development. It is during this period that the child will encounter the start of their growth spurt and so it is important to begin the process of movement learning and progression as soon as possible. All future sports-specific actions e.g. running, jumping, throwing, kicking, catching and striking begin their journey here. If there is any intention of trying to achieve sporting excellence in later years this is THE period within which to start the process towards movement efficiency. Without movement efficiency NOW there will be problems later. There is much evidence linking physical activity and physical literacy to improved academic achievement.

- Kelvin Giles

Mechanical (movement) efficiency

The ability to execute the daily tasks of
**Walking, Running, Sitting, Standing, Lifting,
Carrying, Bending, Reaching**

With repeatable efficiency, consistency and
resilience

Squat, Lunge, Push, Pull, Brace, Rotate, Hinge

**Every direction
Every plane
Every amplitude
Every speed
Every complexity**



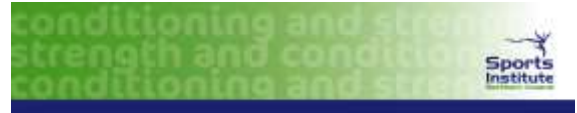
....and every learning style

Implicit and Explicit

'solving movement puzzles'

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10



WHAT?



Systems cannot be understood simply by understanding the parts –

- the interactions among the parts and the consequences of these interactions are equally significant.



'Physical' systems e.g.

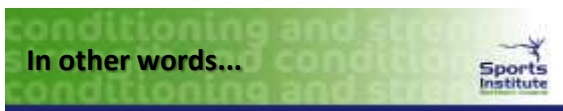
Muscular-skeletal
Neuro-muscular
Metabolic

'Cognitive' systems e.g.

How they learn to move
How they acquire skill
How they apply skill

'Psyche' systems e.g.

Behavioural
Perseverance
Discipline



In other words...

Putting the body parts in the right place at the right time – all the time
Using our movement potential to add to the **quality of life**

Safely responding to life's 'movement' challenges with intelligence, imagination and creativity



To efficiently and consistently do the correct movement sequence at exactly the right time

Sitting, standing, walking, jogging, running, bending, twisting, lifting, carrying
Running, jumping, throwing, kicking, catching and striking.

Foundation Movements

+

Fundamental Movement Skills

+

Fundamental Sports Skills

=

Physical Literacy


 Movement Dynamics


Fundamental Sports Skills



(Running, Jumping, Throwing, Catching, Kicking, Hitting, etc)

Well resourced historically –

Modified games rules, skills, drills, tactical elements.

Predominate coach education / resources.

Therefore predominate knowledge base.

Predominate lessons / sessions

Predominate what is learned

Fundamental Movement Skills



Our greatest weakness.

The unique relationship between Strength, Balance, Coordination and Stability along the entire kinetic chain.

“Function before sports-specific skill, force, speed and endurance”

What’s the single most important element?

What are the movements upon which all other moves depend?

‘Keystone Movements’

“Structure your practice around the keystone.”

Daniel Coyle

What is Physical Competence?



The ability to express levels of force production, force reduction and force stabilisation in general movement

Walking, Running, Lunging, Bending, Pushing, Pulling, Rotating, Reaching, Bracing

For every daily task or sport specific posture or action the body has to:



- Produce Force – Reduce Force – Stabilise Force
- Multi-Joint – Multi-Plane – Multi-Directional

- **At exactly the right time**
- **In exactly the right direction**
- **With just the right amount of force**

Stable →

Flexible →

Stable →

Flexible →

Stable →

Flexible →

As one part of the body accelerates, another slows

As one part of the body stabilises, another must move.

As one part may Flex, another may rotate.

Locomotor
Zig-zag run,
Shuttle run
Agility ladder,
spot tasks
Footwork patterns

Non-Locomotor
Turn & throw/ kick/
receive/control
Twist & throw/ kick/ receive /
control
Throw & receive on one leg
Bounce & pivot / turn

Manipulative
Run, send & receive
Dribbling
Run & bounce
Run & throw /kick/
receive/control

**Run, Hop,
Skip, Jump,
Gallop**

**Twist, Turn,
Balance, Pivot,
Stretch**

**Throw, Catch,
Control, Bounce**

(Locomotor; Non Locomotor; Manipulative)

FOUNDATION MOVEMENTS

Numeracy

Think: Counting on fingers; adding; subtracting..... EARLY CONCEPTS

On to Pythagoras

Literacy

Think: Phonetics C...A...T; words CAT.....EARLY CONCEPTS

On to 'War and Peace'

What do we do about their **PHYSICAL** development?

Go straight to **Running, Jumping, Throwing, Kicking, Catching, Striking (the Games based idea)**

What / Where are the Keystones?

Want to Run, Hop, Skip, Jump, Gallop?

What basic movement tools do you need to do these?

Squat (one and two legs)
Triple flexion and extension – the basis of all gait
Lunge
Transfer weight from one leg to the other
Brace
Be stable during motion

Want to Strike or Throw?

What basic movement tools do you need to do these?

Squat (one and two legs)
Triple flexion and extension – the basis of all gait
Lunge
Transfer weight from one leg to the other
Brace & Connect
e.g. be stable during motion
e.g. from 'Scapula on Spine' to Hands
e.g. From Legs to Hips to Trunk

Reactive Agility



...want to change direction / Jump / Throw / Strike?

Must be able to brake or stop

...want to brake or stop?

Must be able to Squat, Lunge, Push, Pull, Rotate and Hinge IN CONTROL

Reactive Agility



If you can't slow down...

..Don't speed up. Bill Knowles

Seriously.....



Do you really want to load these movements?

....until they get hurt?

....or create compensatory movements?

....or both?

Reactive Agility



"Injury – the underlying driver must be movement. Tissues do not just tear or become dysfunctional."

Andy Franklin-Miller



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31

Children aged 5-14 account for nearly 40% of all sports-related injury.



AOSSM 2009

Adolescent sports injuries are on the rise and are termed 'the silent epidemic'. Armstrong, 2007

Once a rarity, more kids developing chronic, overuse injuries. Quinn, 2009

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32

Reactive Agility



This is where we can make a difference right now



Foundation Movements
Squat, Lunge, Brace

Basic Actions

Land
Hop
Jump

Agility

Sports Specific

Solution?



Get them mechanically (movement)

EFFICIENT

Get them mechanically **CONSISTENT**

Get them mechanically **RESILIENT**



**“...the physical competence
to do the technical stuff
and the technical qualities
to do the tactical stuff**


.....in that order”

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WHY?

A worldwide, community-wide, sport-wide issue of the 20th / 21st century.




“For the first time in history children are less healthy than the generation before them. They’re not just a little worse off, they are precipitously worse off, physically, emotionally, educationally and developmentally”.

Childhood obesity obsession masks fitness ‘time bomb’



“Nearly half of Year 11 students are unfit – the numbers soared from 15% to 40%.”

Sandercock, 2013

“a frightening study.” Liam Donaldson – Chair of Health Policy

Just under one in ten 5 year olds are obese; rising to 1/5th of all 11 year olds.

...clear evidence of enlarged hearts, high BP, raised cholesterol in the 5 – 15 age group.

BMI, September 2012

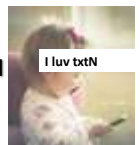


...mounting evidence shows children as young as 5 years are not sufficiently active on a regular basis to develop and maintain health (Armstrong, McManus, Welsman & Kirby 1996; Poest, Williams, Witt & Atwood 1989; Sallis, Patterson, McKenzie & Nader, 1988).

Children cite low skill level as a major barrier to participation in sport (Booth, Macaskill, McLellan, Phongsavan, Okely, Patterson, Wright, Bauman, & Baur, 1997; Ulrich, 1987)

Children with low movement competence usually exhibit low physical activity levels

(Bouffard, Watkinson, Thompson, Dunn, & Romanow, 1996; Butcher & Eaton, 1989).





...noted that children with low motor competence tended to be vigorously active less often. (Bouffard et al, 1996; Anderson, Clarke, & Smith, 2000).

On the other hand, **children who are confident about their movement ability actively seek out movement experiences** in an assured manner and develop positive expectations about their future participation in games and sports.



Is this a teen-age problem?

Poor parenting leaves half of children unprepared for school.

It's alarming to see the proportion of children with immature motor skills.

48 % of Primary School first years still had 'baby' motor skills.

35% of fourth years displayed 'baby' motor skills.

88% of seven and eight year olds still had motor problems. (Blythe, 2011)



Lack of Physical Literacy

Sedentary lifestyle – iPad – X-Box generation

One out of 6 children under the age of 14 can't swim.

One in 10 can't ride a bike.

33% never owned a bike; 79% owned a games console

One in 4 have never run more than 400m.



Is PE in schools the saviour?

Generally, school-based interventions had little effect on physical activity rates, systolic and diastolic blood pressure, BMI and pulse rate.

(Dobbins, et al . 2013)

...strong evidence that PE activities have had only a small effect on children's overall activity levels. (Metcalf, et al. 2012)



- Biased National PE Curriculum
- Lack of appropriate Primary School PE

A Competitive Games based curriculum sees a concentration on sports-specific postures and actions...

....unmindful of the need for a 'movement vocabulary' to actually do them efficiently and consistently.



PE grades and evaluations do not count as heavily as other course offerings....

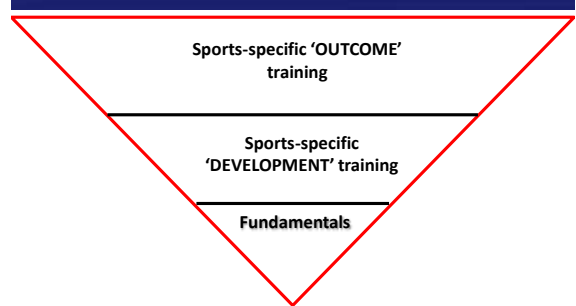
.... and therefore, are not taken as seriously by Governments, students or parents.

It is one of the first subjects to be sacrificed.

What about sport as a vehicle?



What things really look like (or we should guard against)



'Repeatable excellence...'

'Physiological, Psychological & Structural limits'...

'Bio-motor qualities under speed, fatigue and enormous pressure'

If young athletes fail to develop fundamental skills (i.e. Motor literacy before becoming involved in sports specific) – **future attainment will be limited.**

Payne & Isaacs, 1995; Oakley, Booth & Patterson, 2001

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Investment in a broad range of movements requires adjustments to be made in motor control and motor creativity which **encourages adaptability.** (Baker, 2003)

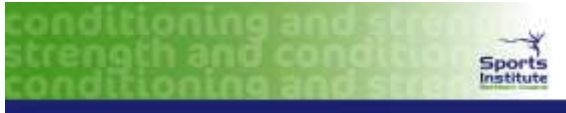
The establishment of a fundamental movement competence cannot be overemphasised...

...as it allows children to pass through a 'proficiency barrier' when attempting to develop the simple activities of early childhood to the more complex activities of later years.

Jess, 2004

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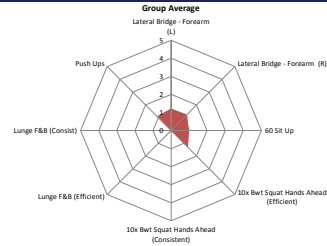


Fundamental movement skills (FMS) provide the foundation for all athletic maturity and are seen as the building blocks from which sports-specific skills are developed.

Youth Sports Trust



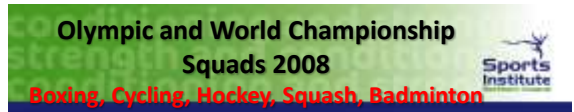
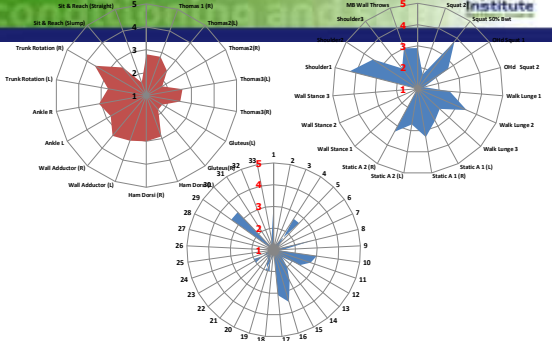
Primary School, Birmingham 2011



Giles 2011

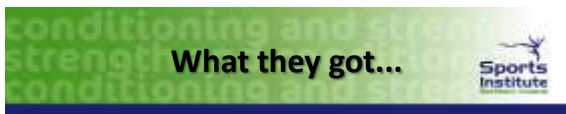
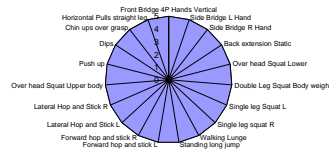


Secondary School Entry Screening - Australia

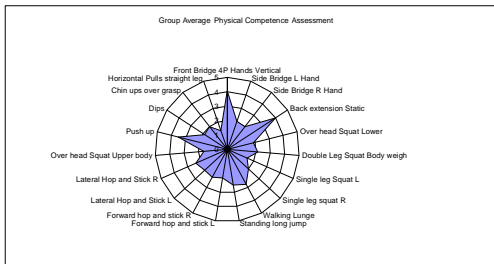


Olympic and World Championship Squads 2008
Boxing, Cycling, Hockey, Squash, Badminton

Physical Competence Screening
What the coaches expected



What they got...



SINI 2008



Their ranking does not automatically guarantee that the foundations are set.

...in fact, 'quick-fixing', 'fast-tracking' and an inappropriate focus on sports-specific actions and postures can create exactly the opposite.

Simply repeating a skill without this physical competence may not only slow skill acquisition down but may see the development of unwanted **compensatory movements** as the **body struggles to find the physical answers to the task.**

It takes great core-strength to do this . . .



. . . but if you think you will **create** great core-strength by doing this, you might **destroy** body parts before you make the team.



HOW?

Step 1

Where are they now?

Movement Efficiency

The Ability to....

SQUAT- Triple flexion and extension – the foundation movement for all **GAIT; LANDING; JUMPING ; AGILITY**

LUNGE- Transfer weight from one leg to the other – the other foundation movement for all **GAIT; LANDING; JUMPING; AGILITY**

PUSH- While 'bracing' the rest of the body so it is stable and at the same time **PUSHING** using trunk, arm and shoulder strength.

PULL- While bracing the rest of the body so it is stable and at the same time **PULLING** using trunk, arm and shoulder strength.

BRACE- To be able to stabilise the body from 'toenails to fingernails' so that all the forces created in movement have a platform to work from.

...Land, Hinge, Range, Jump, Coordinate

Double Leg Squat

•**Main 5 Scoring Points.** Executing all 5 points scores 5.

- Depth – Thighs parallel to the floor.
 - Ankle, Knee, Hip alignment (Knees don't collapse in or Feet don't turn or collapse)
 - Equal stance on both legs (Hips don't swing to favour one side)
 - Heels down
 - Trunk in proper alignment.
- Use the Wall Chart to assess or look for Trunk angle parallel to Shins

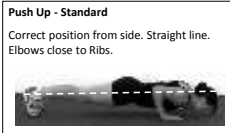


Push Up – Standard (Movement efficiency)

- Athlete sets the Shoulder Blades down and back and supports the weight on Hands and Feet.
- Hands placed in a comfortable position, Fingers forward.
- Full body braced.
- Lower the Chest to floor and return.
- Trunk remains fixed and straight at all times.
- Head in neutral position at all times.

•**Main 5 Scoring Points.** Executing all 5 points scores 5.

- Chest to touch floor
- Body remains straight and braced.
- Head remains in neutral position.
- Shoulders remain 'down & back'.
- Elbows tight to ribs.



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Lunge

Main 5 Scoring Points. Executing all 5 points scores 5.

- Step over opposite knee without any collapse at waist (waistband level)
- Step over opposite knee without support Leg flexing.
- Step over opposite knee without Shin of trail Leg turning out or in during pull-through.
- Ankle, Knee and Hip aligned at landing (Shin remains vertical)
- Land and return smoothly and in balance.



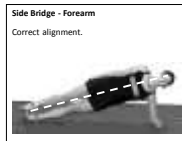
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Brace

Exercise	Desirable	Above Average	Average	Below Average	Poor
Lateral or Side Bridge – Forearm L&R	5	4	3	2	1
Level 1	25 sec	24-18 sec	17-11 sec	10-5 sec	<5 sec
Level 2	45 sec	34-44 sec	23-23 sec	10-22 sec	<10 sec
Level 3	70 sec	52-69 sec	33-51 sec	15-32 sec	<15 sec

•**Main Coaching Points**

- From Forearm and Foot.
- Support Arm at 90° to the body (Elbow under Shoulder).
- Free Arm in line with body.
- Body straight and in-line
- Shoulder Blades 'down & back'.
- Top Hip stacked above bottom Hip.
- Gluteus braced.
- Abdomen braced.
- Head in neutral position.



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60° Static Sit Up Test

•**Main Coaching Points.**

- Sitting with bent Knees the athlete leans back to 60° and holds the position. Feet are fixed.
- Abdomen braced.
- Back is kept straight with Shoulder Blades drawn 'down and back'.
- Arms are kept across the Chest or Hands held at Ribs. Keep Elbows back to straighten Back.
- Keep Chin up, Head in neutral position.
- Time the athlete in the correct position.



Exercise	Desirable	Above Average	Average	Below Average	Poor
60° Static Sit Up	5	4	3	2	1
Level 1	30 sec	29-23 sec	22-16 sec	15-10 sec	<10 sec

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PCA Scoring Rationale

A score of 5 is seen as being 'normal' for the general population based upon Community, School, Institute and Academy screening results.

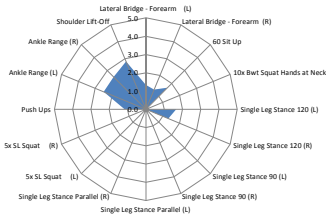
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Some Benefits


- Where are they now?**
- Tracking improvement**
- Is the program working?**
- Exercise selection**
- Exercise progression**

Stevenage Primary School 2009 

Group Average Sept 09




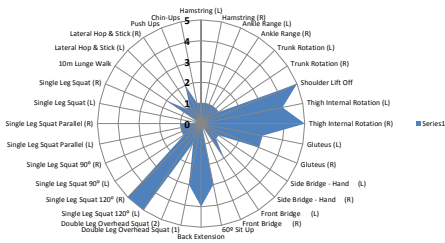
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Limitations have a long life!
Implications to Senior Players 



72

27 year old Golfer 



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The point is that neither skill, nor strategy, nor movement can be imposed - they are derived and evolve as a function of experience by an active participant.

The learner **discovers** relationships between biomechanical, anatomical physiological, and environmental variables by the application of existing resources (movement vocabulary).

...cyclic process of **discovery**, mastery and re-application. Whitehead, 1967; Ellis, 1976

Gain insight into the task

Gain insight into the force problem to be solved

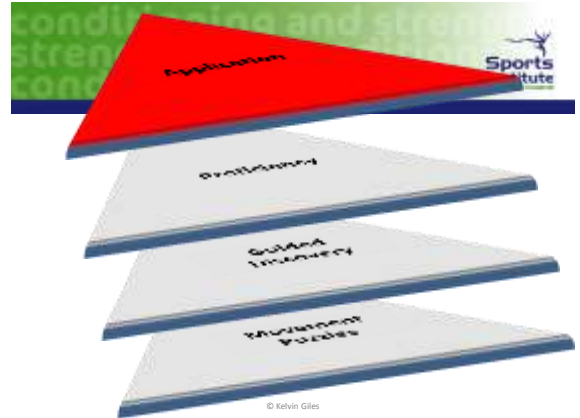
Fit the force problem to the movement

Progressively refine and gain control or mastery



**Under 9's power of observation is incredible.
Get them observationally engaged.
Say less and let them see a lot more.**

Greg Thompson



© Kelvin Giles



Question...

How are you teaching / coaching them?

To discover?

...or Robotic?



Solving movement puzzles The 5in5

Teachers and sports coaches teach students to perform movements which, in turn, serve as the constituent components of each five-minute **'movement break.'**

These movements are selected and taught with the three pillars of good teaching / coaching in mind:

Progression – Variety – Precision.



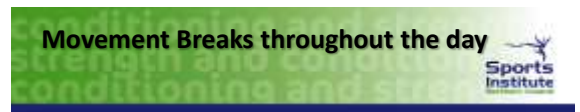
Show or demonstrate

Free practice

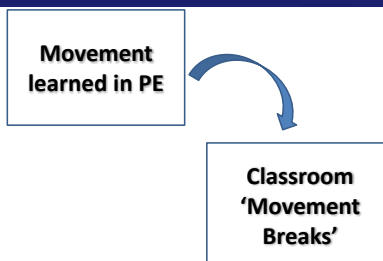
Guided discovery

'Turn Up' or 'Turn Down'

Patience



Movement Breaks throughout the day



Are these **Foundation Movements** difficult to do?



© Kelvin Giles

To the Coaches and Teachers & Athletes:

What are we all willing to give up to allow this to happen?



PE Lesson / Training Session format



[A 'movement' based lesson / session](#)

A Cycle of Work

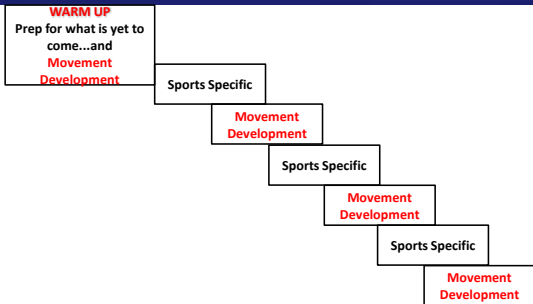
3 weeks - Locomotor



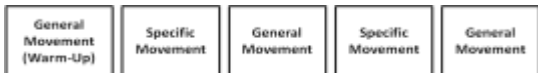
3 weeks Non-Locomotor

3 weeks Manipulative

Using time effectively



Using time effectively





A typical Athletics Club orientation session for 'newbies'
e.g. Under 10's

General (Warm-Up)	Specific Run	General (5in5)	Specific Jump	General (5in5)	Specific Throw	General (Warm Down)
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Criterion-based Progression

They must **'earn the physical right'** to progress.

Adaptation must be **consistent and permanent.**

© Kelvin Giles



Is the movement consistent?

Speed (Tempo, Rhythm)
Amplitude
Direction
Complexity
Surface

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Your Toolbox

Static to Dynamic

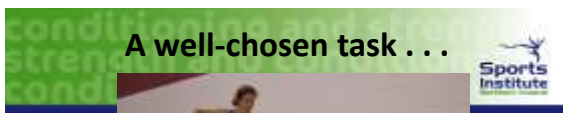
Slow to Fast

Small to Big (amplitude)

Simple to Complex

Unloaded to Loaded

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A well-chosen task . . .



. . . is better than ten thoughtful verbal cues



Never discourage anyone...who continually makes progress, no matter how slow. Plato

**THANKS FOR
LISTENING & DOING**