



Accessible Resistance Movement Experiences for Elementary Students and Educators

Item Type	Book chapter – Version of Record
UoW Affiliated Authors	Murray, Pamela
Full Citation	Murray, A., Murray, Pamela and Howells, K. (2023) Accessible Resistance Movement Experiences for Elementary Students and Educators. In: Bridging Science and Practical Appliance in Resistance Training. IntechOpen, London, pp. 1-30. ISBN ISBN 978-1-83768-551-6 • PRINT ISBN 978-1-83768-550-9 • EBOOK (PDF) ISBN 978-1-83768-552-3
DOI/ISBN	ISBN ISBN 978-1-83768-551-6 • PRINT ISBN 978-1-83768-550-9 • EBOOK (PDF) ISBN 978-1-83768-552-3 https://doi.org/10.5772/intechopen.110179
Book/Journal/Publisher	Bridging Science and Practical Appliance in Resistance Training IntechOpen
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Chapter

Accessible Resistance Movement Experiences for Elementary Students and Educators

Alison Morag Murray, Pamela Murray and Kristy Howells

Abstract

What is meant by accessible resistance movement and why is the elementary education phase proposed as such a superb period in a child's life to gain competence and knowledge using resistance activity? This chapter presents a case and a means to do just that. The resistance program is called 'I Can Resist'. It is shared with accompanying pedagogical methods to scaffold learning and progress motor competence and biomotor fitness (agility that improves health through skill-related fitness). Interleaved through the progressions are ways to increase the self-management in how to participate in and create meaningful ways to improve targeted benefits. 'I Can Resist' is designed for novices to more experienced, participants and tutors alike. It was developed primarily for physical education supporting national curricular policy and implementation as regards knowledge and fitness outcomes. It was extended beyond the curriculum expectation in order to encourage greater use of the available affordances beyond the curriculum for lifelong health and well-being. Current findings are examined and insights offered. The 'I Can Resist' program is underpinned through research and theoretical application. It is showcased as interwoven with the means to develop agentic thinking and action. This ecological approach to and through resistance movement is contextually adaptable.

Keywords: developmentally appropriate, resistance, accessible, motor competent, pedagogy

1. Introduction

What does it mean to practice (educate) in a developmentally appropriate way? In essence, it means we go at the pace of the participant as they acquire the targeted and potential learning through meaningfully planned activities (scope) in a sensible order (sequence). There is a wee bit of nuanced room for emergent movement properties, beyond the planned foundational skills and accompanying competencies. Designed learning sequences need to be appropriate for the child's developmental level, rather than age or class level [1]. Within a practical learning domain, a developmentally appropriate scope and sequence will be informed by inclusive principles for children diverse in how they think, move and ultimately learn. Encouraging children to

become more active for the sake of appreciation is an important objective for physical activity provision. Enjoyment has long since served as an antecedent of physical activity [2] and remains a subconstruct and strong indicator of intrinsic motivation [3]. To promote health relatable activity that interests and engages children during lessons in a developmental way is together challenging. Curricular time around meaningful physical activity is limited. Quality experiences, when meaningful and enjoyable, are likely to promote participation beyond mandated curriculum opportunities [4]. Often activity choice is curricular-driven and directed with carefully planned staged outcomes. Barriers and perceived barriers by children and youth need to be sensitively illuminated and addressed and related issues constructively resolved in efforts to increase the desire and the means to participate. Adolescence is acknowledged as a vulnerable phase. Growth slows and inactivity increases [5]. Youth can be very aware of how they look, and or how they feel they look in comparison to peers and or some external expectation. Body image satisfaction around perceptions and feelings around how one looks remains of seminal importance into early adulthood [6–8]. Unfortunately, body image is often low across the developmental stage [9]. Physiologically, children who are more active, tend to have lower levels of adipose tissue (body fat) as part of their body composition in contrast to more active peers [10]. This may also be an unfortunate, avoidable barrier as children try to engage in physical activity [11] where how they move is partly influenced by body composition. It is crucial to use only functional language. Communicating the function and purpose of body parts around body composition allows participants to learn and gain awareness in how to manage their bodies in non judgmental ways. Educating participants on the functional value of adipose tissue is a definitive starting point, and how to use empowering and task-oriented language is also a means to modelling ways to communicate around the body without triggering judgement of self and or others, performance and or body-wise. Furthermore, resistance problems can offer children and youth, diverse in needs and abilities and collective opportunities to learn through accessible yet resistance movements, sequences and challenges. Creative means to help children grow up respecting how they move and feeling comfortable enough to do in nurturing environments is crucial. Advising children on the need and benefits of all body composition components as well as the importance of their management of how they move makes for meaningful ways to keep the focus on the learning and away from spotlighting students as they enter the learning progressions. They too will present a broad range of needs and competencies and so program use needs to remain dynamic and responsive. It adopts more of a descriptive than prescriptive ethos whereby other ideas emerge as competence and confidence around such movement increases. Body image and mental health can be negatively impacted when social interactions are untoward [12]. I Can Resist is found to be effectively situated as just one part of a varied and contextually dynamic curriculum or complementary extra-curricular affordance, rather than as a fixed point. Its components can also be applied through a wide range of topics, themes and curricular areas (subjects). It is but one means to advantage of limited space and engage children and youth in health-related experiential education. The accessibility is to ensure that educators varied in their competence, just as with our students, and have an equitable opportunity to include resistance movement as part of a holistic educational movement series.

In summary, a holistic, non-linear approach to the presented program is recommended. An explicit way to provide movement content knowledge and movement competence using individually preferred ways of being mobile create means by which participants take over ownership to use, adapt or progress beyond the first

iteration is then possible. A functional approach can assist in accessibility and social acceptance, with the resistance band acting as an extension of the body and potential movement.

1.1 Not the 'F' word

What is it about fitness that turns thoughts, conversations and decisions? Skill-related fitness (SRF) consists of agility, balance, coordination, power, reaction time and speed [13]. Through SRF children are better able and equipped to access more ways to improve health and go on to explore other ways to enjoy a vigorous active life. With strategies to develop an independent understanding of exercise, in knowing what to do, how to do it, for how long and at what intensity, children can exercise informed judgements over making decisions important to living a healthy life [14]. These resistance challenges start from a simple to complex nature and remain engaging through creative use of FITT principles (frequency, intensity, time and type). Practically speaking, each component can be progressed through the incorporation of resistance work. Resistance training, generically defined as 'a form of periodic exercise whereby external weights provide progressive overload to skeletal muscles in order to make them stronger and often result in hypertrophy' [15], p. 208), is popular across society and used for a variety of purposes inclusive of strength training for recreation, for health and rehabilitation and for sports performance. In parallel with a lifelong approach to health and well-being denoted through physical educational guidelines across the globe [16, 17], the UK presents guidelines that adopt a lifelong approach through physical activity participation [18]. Through policy, physical activity is encouraged across the day from as early as infancy, from such a thirty-minute distributed time allotment, toddlers extend at least three hours daily in a variety of distributed physically active time. Pre-schoolers are then encouraged to increase the effort exerted within that time. Children of school age ought to be physically active for at least 60 minutes daily. Again, variety is encouraged and importantly, activities that develop movement skills, muscular fitness and bone strength [19] are advocated. The UK Chief Medical Officers emphasise the importance of strengthening activities in childhood. Furthermore, activities that provide periods of high-intensity interval exercise provide beneficial effect to fitness, body weight and insulin resistance (2019; 8). Children across elementary health-related require a daily average of 60 minutes of moderate-to-vigorous activity. Physical education is acknowledged as part of this, alongside after-school activity [18, 20]. How much is too much and hard is too hard? Children in most deprived areas of England are found as most obese in relation to peers living elsewhere [21]. Surely, we can position a socially just exciting affordance for children and adolescents regardless of home address and zip code? Worldwide adolescents are trending as inactive and therefore not meeting guidelines [22]. This means moving beyond traditional activities and/or traditional ways to access appear salient ways to arouse interest and increase engagement.

'I Can Resist' provides a range of body resistance challenges across a varied series of ways to try these ahead of explicit implementation of choices to use the bands. Of itself, this also provides a super field formative assessment to inform the tutor of how the participant manages their body and manages their body when movement skills are presented, modelled and explained, and then made into more complex sets and sequences and implemented into other activity and game forms. Intensity-wise, it is also vital we provide practical means for children to develop their awareness of what effort means and how their bodies respond to such exertion. A student-directed

approach reflects the ecological nature underpinning the program and its holistic implementation. *'I can talk and practice'*—light, *'I can talk and engage but am out of breath'*—medium, *'I need to do the exercises first and then rest and talk'*—high intensities can be gently introduced, modelled and experienced within programmed time. Pedagogically, effort, together with actual challenges, can be experienced and increased through solo, peer and group endeavours.

1.2 F-word summary

For a series of timeproof reasons, many students are turned off by fitness, and sadly statutory linear outcome expectations have further impoverished its image. Let us clean up and embrace functional language as we live this F word!

1.3 Physical activity, motor competency through physical education

From a motoric standpoint, Gabbard [23] illustrates the significant role of motor competence through life span. Physical education programmes should provide concentrated instruction in basic movement skills needed to enjoy a variety of skills [24]. Fundamental skills need to be acquired ahead of advanced and for that reason, expectations to experience and master these through elementary physical education are depicted [25, 26] as policy enactment exemplars of the UNESCO Charter of Physical Education and Sport (1978). Freedoms to 'develop physical, intellectual and moral powers' when facilitated through developmentally relevant means within the respective educational system, open opportunities beyond these. As an 'essential element of education and culture', physical education (and sport) has been prioritised as an 'essential element of lifelong education' ([17]; Article 2.1).

In England, the nominal expectations for elementary-aged children are two hours of physical education a week [25]. This length of time is acknowledged as insufficient to appropriate adequate physical education active learning time for children to become proficient in movement skills [1]. Students should be actively moving 50–80% of this time [27]. There are pupils within the national primary curriculum temporal span who lack competency in movement proficiency [28]. This is all the more complex when emergent movement is part of the joy of the experience. Moves, unplanned and unanticipated, are often part of an exciting movement experience. If then, motor skill competence promotes participation [29], we do need to have contemplated how we balance planned and emergent skill acquisition and implementation. Keeping that ambiguity is part of a wider embodiment of the complexity of physically educating [30]. Such complexity thinking can serve as a principle to further opening access to enjoyable physical activity.

In England, some children are found to be inactive from as young as five years of age [31]. Children participating in the United States can expect a minimum of 150 minutes weekly at the primary level, increasing to 225 minutes through secondary levels [26]. The U.S. Department of Health and Human Services recommend that students engage in more than 50% of class time at moderate-to-vigorous activity levels [32]. Regular physical activity promotes a variety of physical and mental health benefits yet a majority of children have systematically struggled to meet guidelines [33, 34]. Intensity levels within these expectations become even more problematic to attain let alone measure when children are less motor competent. Pupils without proficiency in movement skills have exhibited lower levels of physical activity

participation than their peers during school break times [35, 36]. Barriers (such as screen time) and facilitators (such as physical education and home-based activity) to physical activity are varied [37]. Nonparticipation in physical activity is attributed to equal complexity and decisive action and has been prominent through holistic approaches to increase physical activity within physical education [38]. Cognitive functioning is accepted as pivotal for the successful engagement in health-related elements of developing health [39]. Further compromise was created by the educational closures as a result of the COVID-19 pandemic reductions in physical fitness, together with increases in mental distress [40].

Physical education programmes should provide concentrated instruction in basic movement skills needed to develop a variety of skills [24]. As determined through its philosophical underpinning and attributed value, it will seek to educate through determined criteria to attain and surpass curricular expectations for all children of all abilities and needs. The notion of attaining fitness-specific outcomes with all children, diverse in needs, is inherently challenging [41]. Some children do not enjoy the subject. Some children do so yet may be less enthusiastic regarding fitness-specific activities. Others may thrive across the settings regardless of pedagogies or topics. Explicit strategies to support child enjoyment are required [42]. The environment offers potential interest for children. In schools where space beyond the school building is a premium, the use of the playground can exploit limited areas and offer opportunities to develop motor skills, providing opportunities for action as determined by the environmental stimulus [43]. When physical education is constrained through time and space, such additional affordance can extend learning beyond the physical education experience. Greater creativity during the multiple considerations for children regarding their health through physical education widens the scope of plausible solutions. Health-related fitness, namely flexibility and coordination, cardiovascular endurance, muscular strength and endurance, with metabolic components [44], is accessible and improved as motor competence improves. Motor competence, motor ability and coordination as practised through fundamental motor skills [45] are determined essential for the development of a healthy and active lifestyle [46]. Motor competence has been found to be a significant predictor of HRF through locomotor skills and for boys using locomotor and manipulative skills [46]. Globally, such essential skills are incorporated into curricular elementary education.

1.4 Summary

If we wish children to get more excited about how they move, we need to facilitate exciting movement opportunities. We need to listen to our adolescents even more so that they get the chance to do more of what they enjoy in and around the school setting. That way they will become part of the solution in creating other opportunities in the wider community. Physical education has effectively used a part of a wider approach to educate and engage children and adolescents. Pedagogy—how we teach this Pedagogy and the way we enact it communicate so much to students as regards who we are and who we think they are. A social constructivist approach to knowledge acquisition would place emphasis on the active role of the learner in constructing respective knowledge with appropriate and explicit guidance and scaffolding form an informed entity; traditionally a teacher [47]. Personal and social perspectives toward the creation of knowledge can each play an important role in pupil education [48].

How we facilitate learning is as important as the knowledge, competencies and concepts explored themselves. The role of the program, in part, is to improve awareness and functionality so that participants become more able and apt to explore other activities and pursuits following completion of both the scaffolded body movement management learning sequence and the commitment resistance band program. From a participant's perspective, interests and preferences will vary greatly across family and community contexts and so the way the information is shared and how it is experienced during and around the curriculum wants to sound and feel exciting. Accessing physical activity relies upon being motor competent and cognizant. The I Can Resist program goes through all basics in what, how and where and we move practical means using, managing their bodies as they move through different planes and directions in closed to more open environments, without and then using manipulatives. Its pedagogical element ensures that an understanding of why we do so is developed through the experience. The development of self-awareness enables the collective body to become more aware of one another. Being and keeping a conscious awareness of the diversity across the class/group enables us pragmatically to open our awareness in non-judgmental ways [49] and model that to our participants. As educators, how we support learning through our language, as expressed through what and we say what we communicate, is collectively as important as what we actually do. Such practice sits companionably beside a curriculum as well as within it. Once 'bodies' have experienced how to move in differing directions, at different levels and using varied points of contact (e.g. one wheelset and two feet, for example, equate one to two points of contact) through varied movement concepts (e.g. explored alone, shared with a partner, mirroring or following a partner, at a very slow tempo and so on), participants are invited to participate in other tasks and challenges and resistance-based games drawing from (and thereby learning) the I Can Resist movement bank (**Tables 1 and 2**). The I Can Resist introductory progression spiral prepares the participant for a series of traditional resistance exercises, each and all of which can be more meaningfully implemented through a progression spiral approach. Movement challenges can be created by tutors and students, games can be modified to incorporate lower, core and upper resistance tasks, all of which proffer benefits without or with the added resistance band. Once participants can manage their bodies through resistance with coordinated control, they can attend to the added cognitive and physical challenge of doing so with the resistance band [50]. To create an accessible and enjoyable experience series, all children should have the appropriate time needed to gain self-body management through resistance exercises before progressing to an added piece of equipment. Participants become accustomed to an educational progression spiral (viz. learning driven such as through skill-task-challenge-game application). However, if you choose to implement the program to reflect your philosophies and desired to learn, avoid slipping into a fitness set. It always ends with the cessation of something. Keeping it educationally accessible is an authentic attempt to do just that. You may have other helpful means. Use sporadically as part of a spiral wider curriculum/program so that the experience stays meaningful. You can return to and progress it as when it supports your learning and resistance experience intentions. A simple A-B-C approach works well and can be conflated to work toward goals and intentions.

- a. A light dynamic movement warm-up and educational elicitation to the experience (skill-activity-game-based challenges to open the inquiry and the interest to learn more).

#1. Squats (quadriceps and hamstrings)



Begin in a standing position and feet shoulder-width apart. With your hands in front begin to squat down (as if to sit in and get out of a chair). Squat down until you feel tightness in your thighs. Again, keep your hands in the front and stand back straight.

#2. Hamstring (and gluteus maximus) resistance curl and extensions



Begin face down using four point contact stable position. Anchor band under hands and set around foot (like a stirrup). Drive one leg back and hold.

#?. Floor star shapes. Floor 4-point contact points (hand-hand-foot-foot**) position
Star positions can incorporate L, C, and U areas.



Face down extended body position Feet and hands can contact (4 points) or be raised off the ground. Can add resistance band over shoulders, anchoring band at each hand contact over shoulders.

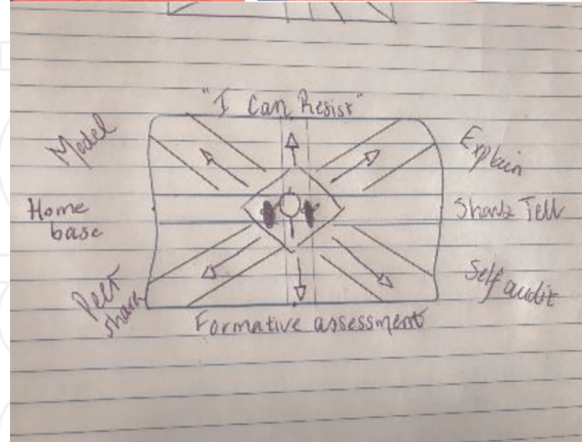
#3. Reverse lunge/*forward lunge (*only when comfortable)/Side lunge

Formative assessment

A cross (flag) shape- forwards, backwards and to the sides provide a very accessible formative assessment of stability.

Participants will need control in these directions and changing levels before they add complexity (such as skill combinations and or added resistance).

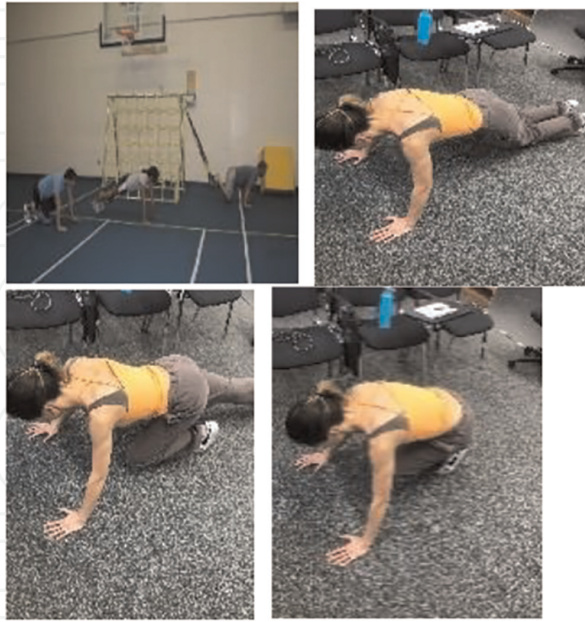
Participants to show and tell as in try the set and explain how it is done and why to provide a formative point of understanding and competence.



Anchor the band at the level of the ground. Standing, hook your foot around the band and take the leg backwards. Bend the knees into a lunge position, keep knee behind the foot and hold for one second. Slowly return to starting position, Both legs.

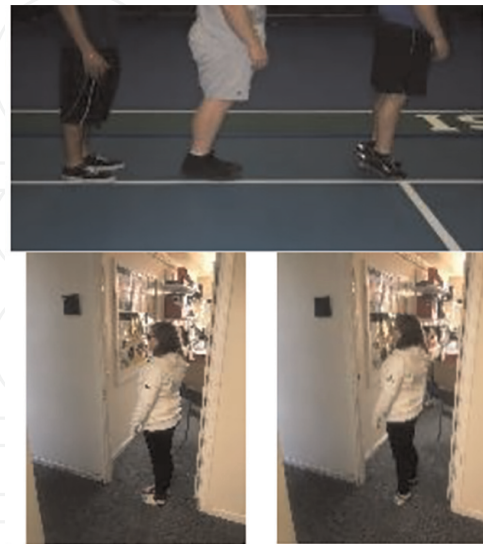
For formative assessment- competence and understanding. Show the British union flag as a movement guide to show the directions, show and explain forwards, backwards straight and diagonals. Use and adapt to appropriate access: A) With body only, and hands-free, b) holding the band in front and then c) using the band to increase the difficulty of the lunge. Start and return to home base each time.

In push-ups/plank position, bring one of your legs forward, so as to touch your knee to the chest and bring it back. Repeat this with the opposite leg. Try legs at the same time for a double squat thrust.



#4. Single-leg and double-squat thrust repeats (quadriceps and gluteus maximus)

Stand with toes on the raised platform and heels on the ground. Lift your heels keeping the toes on the balance bar until you feel the tension in your calf muscles. Return back to starting position.



#5. Heel Raise (gastrocnemius)

#6. Seated/standing tibial toe raise



In a seated position, bent legs assume a 90-degree angle with feet knees and hips parallel to shoulders. Raise toes of both feet while keeping the heel on the ground (dorsiflexion). For standing toe raise, feet in parallel position, shoulder-width apart.

#7. Adapted versions of 1–6 to suit; engage and inspire learner ** Creative combos? Peer led

Peer/group ideas and creations.

peer

techno peer

#8. Curl up (rectus abdominus)



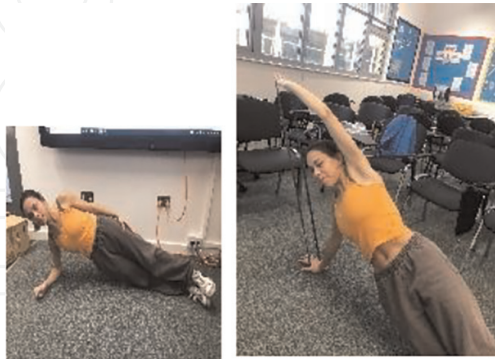
Assume a lying position with arms parallel to the body. Hands remain in contact with the ground bring your chin toward your chest by lifting your shoulders and then return to the start position. Bend legs at the knee.

#9. V – Sit (rectus and transverse abdominus)



Assume a sitting position and lean back to take weight on your hands (hands facing forward). Raise feet off ground and bring knees into the chest. With feet off ground extend your legs forward. Repeat action.

#10. Plank
Side plank (oblique abdominal)



Lower to floor position and extend into a side plank. Raise hips and knees off the floor. Keep head and spine neutral (keep tension through core). Add resistance by raising top arm and/or with band.

#11. Seated row (back and forearms)



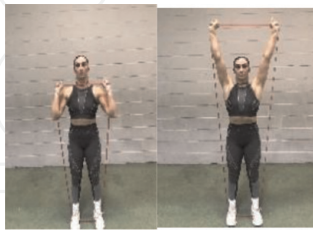
In seated position, with back straight and chest open, anchor the band around both feet (like stirrups). Pull the band toward abdomen and squeeze shoulder blades together. Keep back straight across; pull elbows back, staying close to sides, controlled release and repeat.

#12. Back extension (erector spinae and gluteus)



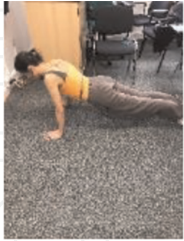
Lie on stomach. Hold resistance band in hands and stretch it. Raise both hands and legs at the same time. Return back to start position and repeat action.

#13. Standing shoulder press



Anchor band under feet and drive arms straight up. Keep core engaged.

#14. Mini push up (chest; pectoralis, with upper body and core) to plank and back to push up position repeats.
Resistance push ups—only if the position is stable



Push-up position; (focus effort to avoid sagging banana and high bridge shapes). Press to change position from hands to forearms and back.
Anchor band under hands, extend over shoulders and move into a plank position, bend arms to lower chest and keep body tension. Take out slack of band and try to push upwards.

#15. Upright row (shoulders, upper back, delts and traps)



Stand, feet shoulder-width apart, stand on band to anchor it, then hold with both hands to pull the band up toward chin level. Lead with elbows, pause at top, slow release and repeat.

#16. Adapted versions of 8–16 to suit; engage and inspire learner

Creative combos? Peer-led

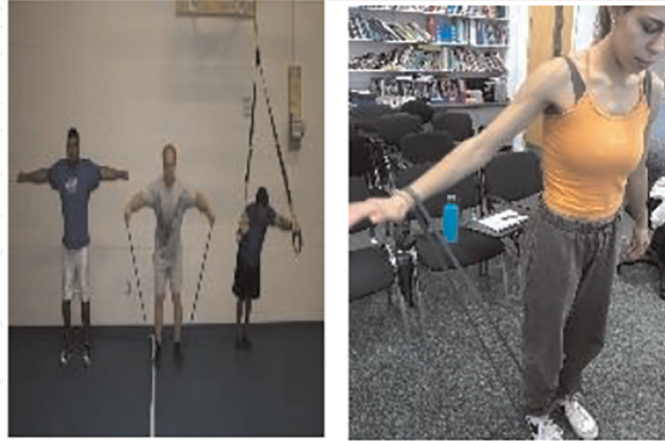
Peer/group ideas and creations

#17. Latissimus dorsi pull down



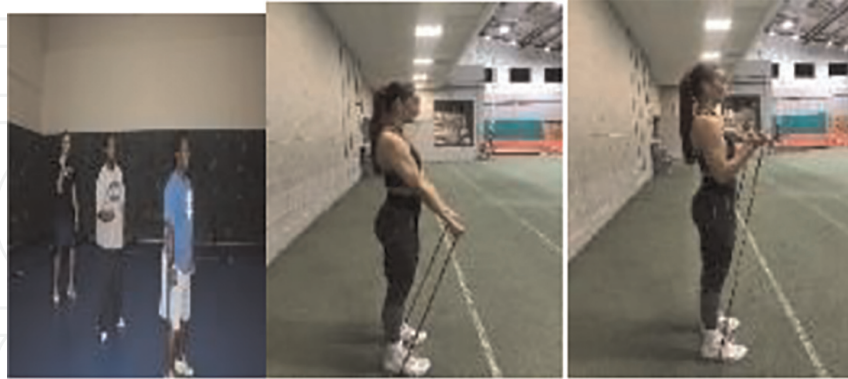
Assume wall squat position. Raise arms to stick-up position with arms pressed against wall and elbows parallel to shoulder level. Maintaining contact with wall, pull arms down to shoulder level. Return to start position and repeat action.
Can add band. Standing, add resistance by pulling both ends of the band extended above the head. Lower arms in front chest level and repeat.

#18. Deltoids (and trapezius) lateral raise



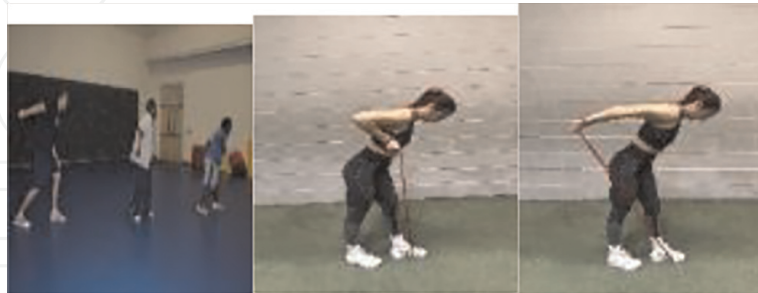
In standing position, raise arms from extended position parallel to body up to shoulder level and return to the start position.
Repeat action.

#19. Biceps curl



Stand straight with knee slightly bent. Bend arm at elbow to bring hand toward shoulder. Return to the start position and repeat action.

#20. Triceps extension



Anchor the resistance band under the foot on the opposite side (diagonal) to extending arm. Lean forwards, and with a high elbow parallel to the body, try to straighten and extend arm back. Hold then gently release and repeat.

#21. Combinations of 2–3 exercises sequentially connected (supersets)	L,C,U combinations	Peer/group led
#22. Adapted versions of 17–21 to suit; engage and inspire learner	Creative combos? Peer led	Peer/group ideas and creations

N.B. accessibility: #seven, 16 and 22 invites and encourage all pupils and tutors to use these creatively to ensure all children can access and improve their motor competence and confidence as their health and skill-related fitness improve. Choices. Make your own pics for your own class/group relatable series.

Table 1.

Accessible resistance movement bank-basic exercise name, primary muscle engaged (only), description and image for lower (L), core (C) and upper body (U) development, adapt to the participant’s preferred mode of mobility.

#1. Squats (quadriceps and hamstrings)
#2. Hamstring (and gluteus maximus) resistance curl and extensions
#? Floor star shapes. Floor 4-point contact points (hand-hand-foot-foot**) position
#3. Reverse lunge/*forward lunge (*only if comfortable), England flag lunge challenge
#4. Single-leg and double squat thrust repeats (quadriceps and gluteus maximus)
#5. Heel raise (gastrocnemius)
#6. Seated/standing tibial toe raise
#7. Adapted versions of 1–6 to suit, engage and inspire learners **
#8. Curl up (rectus abdominus)
#9. V–Sit (rectus and transverse abdominus)
#10. Plank (rectus abdominis, obliques, and transverse abdominis) and side plank (oblique abdominal)
#11. Seated row (back and forearms)
#12. Back extension (erector spinae and gluteus)
#13. Standing shoulder press
#14. Mini push up (chest; pectoralis, with upper body and core) to plank and back to push-up position repeats, Resistance band Push ups
#15. Upright row (shoulders, upper back; delts and traps)
#16. Adapted versions of 8–16 to suit; engage and inspire learner
#17. Latissimus dorsi pull down
#18. Deltoids (and trapezius) Lateral raise
#19. Biceps curl
#20. Triceps extension
#21. Combinations of 2–3 exercises sequentially connected
#22. Adapted versions of 17–21 to suit, engage and inspire learner

Table 2.
Summary.

- b. The experience sequence (through whichever medium fits context and informs and inspires the group). This, following the first explicit progression spiral, is then ready for adaptations and or to be swapped out by self/group/class-created and generated iterations.
- c. Plenary to revisit any points to progress further, to respond to movement questions and acknowledge meaningful movement responses from the participants (with a light cool down), again as interests the group and constructively completes the engagement.

Developmentally appropriate rest (and quality water breaks) is and remains student-determined and led. Use holistic means to sensibly and safely manage the participation experience time. Active rest through participation for light to moderate

intensity participation use water break walking reflections between more intense bouts. Use a holistic approach to intensity, for example, perceived intensity guide: Child initiated is important to model and facilitate that ownership toward self-awareness and agency—‘I can talk and practice’—light, ‘I can talk and engage but am out of breath’—medium, ‘I need to do the exercises first and then actively rest, for example, walk and talk’—high intensity). Always adapt to engage and inspire every learner. Know and accommodate participant constraints and expectations ahead of time [51]. Work alongside participants and have them inform/show you what works for them. Encourage peer opportunity and creative use of concepts to engage children through cooperative and competitively cooperative means to experience the challenges. Competition (against self and others) can be interpreted in ways meaningful to the respective group at the respective time in the respective context across the curriculum/learning journey. For example, the program can be explicitly used for challenges and ways such as using effective communication and peer modelling to create, present and even compete in dynamic resistance band routines set to student-chosen instrumental music. It can also be reduced implicitly (following skill acquisition and competence attainment) through modified adventures, games and pursuits.

2. Summary

The emergent nature surfaces following explicit scaffolding of the basics through the I Can resist progression spiral which is holistically designed to develop both movement and self-management competence through self and socially interactive opportunities. Participant ownership then creates further affordances to engage in meaningful resistance movement activities following explicit modelling and explanation of the basics. This simply provides an equitable entry point for all and then is used and imagined on their terms.

3. Current findings exploring resistance movement activities in and around the curriculum

Strength-related activities improve daily function and self-esteem children varied in functional gross motor proficiency [52]. In regards to biomotor abilities (strength, endurance, speed, flexibility and coordination), children and youth made significant improvements across aerobic endurance, strength endurance, flexibility and body composition (as indirectly measured through waist-to-height ratio) when implementing the program twice weekly as is and once weekly through an educational games version as measured using the FITNESSGRAM [53]. **Tables 3–7** depict the number of participants across the control and three groups using the program through differing pedagogies. All four groups participated in daily physical education classes across the academic year and participated in the pre- and post-experimental implementation. Each enumerated grouping (1–4) included several classes from both one elementary and one secondary school setting. Groups 2, 3 and 4 all experienced significant improvements in their biomotor fitness components. Those from the control experienced a significant reduction. Results depict between participant effects. Means are displayed to denote any changes between pre- and post-daily physical education curricular programmes, three of which were dedicated to the biomotor-focused resistance program. Following the attainment of institutional and school

district ethical permissions, elementary and middle schools volunteered to participate. The eight schools were randomly assigned to training (three cohorts of 250; n = 750) as implemented using a variety of more direct to less direct teaching styled choices and one cohort as control (N = 250). All groups participated in daily PE (60 minutes). Those in the control group participated in the respective school curriculum and dedicated two days weekly to fitness-related activity. Those in the training groups participated in the resistance exercise program across two (out of five) lessons in their curriculum. All schools provided games-focused activities across the remainder days (court and field games). The main outcomes found significant improvement in biomotor competencies (as measured through the FITNESSGRAM). Cohorts across a series of state elementary and secondary schools participated through control and three pedagogical iterations of the resistance program to explore tutor and participant preference. The direct teaching group (n = 201) demonstrated significantly improved scores across fitness biomotor competencies measured ($z = -5.763$, $p < 0.001$). Those in the inquiry-based cohort (n = 174) significantly improved their fitness ($z = -4.439$, $p < 0.001$). Pupils within the combined group of resistance as delivered through

Treatment	Fitness	Mean	Std. error
Control	1	101.815	4.087
	2	85.444	4.312
Direct	1	84.404	3.669
	2	99.115	3.871
Inquiry	1	102.960	3.943
	2	114.920	4.160
Inquiry-direct	1	102.556	4.477
	2	107.378	4.723

Table 3. Mean changes from pre (1) to post (2) measurement across four groups (elementary and secondary student combinations) in the treatment of biomotor fitness components through three differing pedagogical iterations implementing the same content program content, competencies and knowledge.

Self-management	Pre	Post	Change
Mean	2.42	2.59	0.18
Number of items measured in responses (of participants present)	6253	6226	27

Table 4. Mean score and change across questions around self-management (metacognition) of physical activity.

	Number of responses	% of responses
That stayed the same	4441	72%
That increased	1388	22%
That decreased	380	6%

Table 5. Score changes between the pre- and post-self-management measurement.

	Pre	Post	Change
Mean	3.75	3.88	0.13
Number of items measured by responses (of participants present)	4876	4879	3

Table 6.
Motivation pre and post change.

Motivation	Number of responses	% of responses
That stayed the same	2568	53%
That increased	1367	28%
That decreased	905	19%

Table 7.
Mean score and change in score, all motivation questions combined.

direct–indirect combination teaching method ($n = 135$) demonstrated significant improvements across the collective fitness regimen ($z = -6.902$, $p < 0.001$). Pupils in the control group ($n = 162$) did not improve their fitness. This reduced significantly ($z = -3.675$, $p < 0.001$) (**Table 3**).

Following this inquiry, it became imperative to explore how to maximise physical education (PE) provision for settings where the academic subject was provided limited time (twice weekly). Therefore, if PE allocated time could not encompass adequate time to improve biomotor fitness, it could arguably be used to prepare children and to motivate them to learn how to use such skills in ways they found enjoyable in and beyond PE. This function was integrated into the next research series, linking curricular PE to recess physical activity. Institutional and local authority ethical permissions were sought and attained for this quasi-experimental study. Participating schools in South England incorporated explicit teaching to participating children and youth on how to exercise and perform the moves safely and effectively. Basic skills were introduced, explained and modelled during PE through teacher-led sequences. Explicit attention was provided to the explicit training of educators and interested (student) participants for recess time peer-initiated participation following the introduction and practice of the skills in PE time. Both motivations to join in and continue this beyond class time, together with knowledge of how to execute and regulate self-participation significantly improved as measured through developmentally appropriate intrinsic motivation and metacognitive awareness inventories [3, 54]. Participants significantly improved declarative, procedural and contextual knowledge around the skills and competencies acquired in PE and then transferred to extracurricular peer-led physical activity following a five-month intervention ($x = 0.400$, $n = 6226$, $p < 0.001$). Awareness of how to use resources beyond the PE setting learning was significantly higher in the post-condition compared to the pre-condition ($z = -22.86$, $r = -0.29$, $p < 0.001$). Unlike that of the directed PE time, when scaffolded in a way that opened participant choice of how and when the resistance challenges were used, motivation to participate during lunchtime, with peer invitation and support increased. In all participants there was a larger number whose score increased (mean \pm s.e. = 195 ± 8.37) than decreased (129 ± 3.82) although the majority of scores stayed the same (367 ± 7.41).

Metacognition was measured. Findings show that the level of participant metacognitive awareness, with regard to their use of the playground markings, increased from the beginning to the end of the study and that this difference was statistically significant ($x = 0.400$, $n = 6226$, $p < 0.001$) [55]. Scores were significantly higher post-treatment compared to pre-treatment in both function groups although the effect size was larger for regulation of cognition (Wilcoxon Signed Rank test: $z = -13.78$, $r = -0.25$, $p < 0.001$) than it was for knowledge of cognition ($z = -18.26$, $r = -0.33$, $p < 0.001$). Consistent with this, the regulation cognition group of questions were associated with a substantially larger number and proportion of increases in response score from pre- to post-treatment than were the knowledge of cognition question. The mean knowledge of cognition scores were higher than the mean regulation of cognition scores both pre- (Knowledge: 2.60' Regulation: 2.23) and post (Knowledge: 2.73; Regulation: 2.46) treatment but the change in score was greater for regulation of cognition (Regulation +0.22; Knowledge: +0.13) (Tables 4 and 5).

Motivation to participate using a variety of moves in student-directed ways during lunch was appraised via the motivation scores. These scores were significantly higher in the post-condition compared to the pre-condition and when the questions were considered separately, scores were significantly higher post-treatment compared to pre-treatment in five out of the seven questions. In all cases, there was a larger number of students whose score increased (mean \pm s.e. = 195 ± 8.37) than decreased (129 ± 3.82) although the majority of scores stayed the same (367 ± 7.41). (Tables 6 and 7). Unsurprisingly opportunities to share some ownership of how such a program is to be experienced in conjunction with 'the what' of it, make for a welcome pedagogical inclusion [56].

To date, it is plausible that curricular time can be effectually used to introduce the skills and competencies needed for children to gain motor competence and fitness. However, creative means to facilitate other ways to participate are found to have been of value for children to use these meaningfully at their own discretion.

The 'I Can Resist' program takes explicit steps to build in structured choice and to facilitate peer support and self-agentic opportunities. Access in this regard shifts intended outcomes toward the facilitation of independent movers who can use, adapt and/or extend the resistance exercises into meaningful individual or group endeavours at their respective discretion ahead of motor proficiency outcomes. The latter progresses at the pace of each participant.

4. The 'I Can Resist' program

I Can Resist commences with resistance moves that are practised, refined and acquired through isometric challenges and then progressed through concentric-eccentric contractions and increase in number and complexity. The use of the 1st pronoun is to model and communicate and ensure the doing, and learning is done by each participant. That tactic also keeps the pace participant led. The spiral of progression (Table 8) reads from bottom to top and incorporates movement concepts so that participants have the opportunity to try the skills in a variety of ways that build understanding through interpretation of movement concepts. Mastery-wise, participants work their way through the bodyweight (only) progression spiral before they continue with added band resistance challenges. Further along the proficiency journey, participants can actually return (revisit) the progression spiral (Table 8. exemplification) and work their way through it incorporating resistance band

challenges in ways found accessible and enjoyable. However, it is essential that participants work their way through the spiral managing only their own body weight first and foremost, before progressing onto the resistance movement skill series (Tables 1 and 2). Pedagogical tips are provided and discretionary. They serve simply as a user-friendly optional guide. Clearly, this can be used and adapted to fit desired goals and expectations across a varied series of settings. The program has emerged from its original piloted three-step method incorporating the body, the resistance band and the suspension trainer as modes of improving biomotor fitness [57–59].

4.1 Health and safety guidelines

Health and safety remain consistent across each and all. Ensure respective health and safety policies and guidelines are adhered to across the planning and implementation and evaluation of program use. Participation remains student dependent and centred. Adapt to the known and emerging needs of the individual/group. Provide equitable, transparent and engaging ways the student can assist in your being effective in the provision and presentation of accessible learning opportunities. Rest and water breaks are also student centred and directed.

<ul style="list-style-type: none">• Body resistance progressions-body weight isometrics, dynamic body weight (Novice entry series without added band resistance *)• I can lead a peer through a resistance movement set using any of the skills introduced and making sure lower, core and upper body being engaged.• I can participate in peer-led resistance, move challenges, sequences and or games.• I can participate in a mini challenge or game in my group, which includes 2–3 resistance moves (tutor guided and children can share ideas).• I can show a partner my combo exercise routine and have them try it. I can try their routine.• I can combo 2–3 exercises of my own choice to create a dynamic movement routine (e.g. lunge to line forwards, side lunges, back)• I can travel from one point to another (about 5 meters) on all fours facing down, and then facing upwards• I can perform a series of 5–8 superheroes (face down plane positions) using a coordinated and controlled proficient form• I can perform a series of 3–5 V sits using legs bent or straight• I can squat 5–10 times a stay balanced as I lower and stand up• I can perform a series (5–10) of superheroes (plane positions) using proficient form and control• I can perform a series of V sits (3–5) using proficient form and control• I can perform a series (5–10) of curl-ups using proficient form and control• I can hold a plank for a set target time (10–30 secs) and move my feet and then hands (one at a time)	<p>Ready to transfer In Progress Attempting</p> <p>Have students estimate how they are getting on progression spiral completion.</p> <p>Any part can be revisited (and adapted), for example, completed on own, then with a partner, then with a group tying it with an added resistance band. Allow for motor creativity once motor skills have been acquired and how to use them understood.</p> <p>No part of this is to be tested. This is a formative informal evaluation opportunity for students and tutors in knowing better where and when to adapt as and when needed.</p>
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- I can hold a plane shape (facing downwards; superhero) keeping feet and arms off the ground
 - I can start in a dish and move into a V shape, and hold a V shape (facing upwards) (3–5 secs)
 - I can hold a dish shape (lying on floor, facing upwards) with feet and shoulders off the floor
 - I can hold a sky-plank (facing upwards, keeping hips up) (5–10 secs)
 - I can hold a side plank (both sides keeping my core tight) (5–10secs)
 - I can hold a plank (facing downwards), in a straight form (and avoid a banana or bridge shape) (5–10 secs)
 - I can curl up and hold (5–10 secs and /or show a peer) and return to the flat slowly
 - I can hold a squat position and stay balanced (lower as if I am sitting on a chair, and stay there)
 - I can push press my hands toward the ceiling (as if I am lifting and lowering a heavy boulder)
 - I can lunge sideways (to right and to left)
 - I can lunge backwards (right and left)
 - I can get into a (static like a statue) a lunge position and hold it (10–20 secs)
 - Novice resistance mover entry point using preferred mobility mode. (Participants more experienced in resistance exercise can aim to show greater control across the introductory lead into the program)
-

Table 8.

The 'I Can Resist' introductory progression spiral.

4.1.1 Pedagogical tip

Fitness tip—do not make it about fitness! Keep it task/challenge oriented and match the language to show the genuine tutor focus of motor competence—agility development through balance and control.

Inclusion target: Start somewhere, anywhere, for example, with a short 5–10 secs hold, and/or show a peer that takes even less but gets participants moving and trying and exploring and managing their bodies through a progression that takes them from high to medium and low levels, exploring personal space through basic moves, in a variety of ways. Progress using limited repetitions (or short-time bouts). That way peer modelling happens inadvertently and explicitly and attempts to stay task focused (rather than fitness). The way it is done.

*Can be revisited with a resistance band for the more experienced mover.

4.1.2 Pedagogical tip

Work your way through these by modelling and providing a brief explanation as you go. Keep all group members active and work your way up. Once you get to the top, start back again and repeat this time, change.

Table 8 depicts how the program is introduced. Explicit opportunities to develop motor competence manipulating the body in a variety of ways, at different levels to engage all major muscle groups are presented. Differing ways to develop social competence are integrated into the movement's challenges. Participants need to draw from cognitive, emotional and social skills to work their way through the progression spiral. The tutor initiates each new competence and skill through direct teaching and then facilitates greater inquiry-led challenges when students have something to access and try and something to talk about in their exchange.

Once participants have journeyed through the spiral, the resistance movement bank (**Tables 1 and 2**) can be utilised and drawn from to support the next progression spiral iterations. Tutors will want to show and tell each, as regards their utility, how they are done and exploring these across a variety of opportunities. If initiated from the outset of elementary years, a curriculum map can plot how and where and when the resistance skills, sequences and activities are interleaved into the full curriculum spiral, whereby competence, confidence and concomitant motor creativity are developmentally facilitated across a full six-year journey, for example. Tutors are well apt to make use of affordances as depicted through respective curricular and extracurricular chances.

4.2 Developmentally appropriate question—With or without bands?

Use the 'flag lunge' stability challenge across the sessions. If pupils struggle with this essential stability move (See formative assessment within item #3), provide band-free versions and as well as adapt as required. You can use any of the movement challenges from the resistance movement resource bank (#1–22). A worked example of how to use it following the movement induction is depicted in **Table 9**. Of course, this is but a linear rendition. Contextual educational topic choices with desired themes will readily modify if not replace this.

4.2.1 Pedagogical replace

Have biomotor fitness as a by-product instead of the actual focus. Encore une fois—Do not make it about fitness! A progression learning spiral is exemplified and participants have patiently progressed through this. You have also shown patience with term use and modelled and explained how to get here. Take advantage of this.

4.3 The 'I Can Resist' summary

Make it work for you and for your group. To be learned, it does need to be tried, understood and appreciated with plenty of chances to try and take calculated risks in figuring movement and verbal responses to challenges through less to more invariant opportunities.

4.4 Plenary

The premise behind 'I Can Resist' is that we, educators, can make resistance exercise meaningful and enjoyable for a wide variety of children and youth. One story that motivated the creation of this invitational approach remains with me today. One PE day, during a dedicated activity period of the lesson, a grade 4 student ran to me and was crying because he had never before felt his heart beating so hard through his

Session	The B (main part of the session) Use upper (U), core (C) and lower (L) exercises every session Adapting options #7, #16 and #22 can be used every session-use/add as needed for your group	Check off	Notes
3	Lunge stability assessment #1,#2, #3 (L) #10 (C), #19, #20 (U)		Formative entry point Student invitation to self-audit competence and understanding through the stability lunge challenge, then share with a peer.
4	#3, #5, #6 (L), #10, #12 (C), #13,#17,#18 (U)		
5	#3, #4, (L) #? (L,C,U), #8 (C), #14, #15 (U)		
6	#1, #2, #3 (L), #9, #12 (C), #19, #20,#15, #13		
7	#4, #5, #6 (L)#? (L, C, U),		
8	#1, #3, #4 (L), #8, #9 (C), #11, #12, #13 (U)		
9	#3 and group choice (L), #10 (C), #17, #18, #19, #20 (U)		
10	#4, #2 (L), #? (L, C, U), Group choice (C), #15, #17 (U)		
11	#1, #5, #6 (L), #14 (C,U), #21(L, C, U)		
12	#3, #4 (L), #? (L, C, U), #19, #20, #15 (U)		
13	#1, #2 (L), #8 or #9 (C), #11,#12,#13 (U)		
14	#? (L, C, U), #21 (Choice combos)		
15	#1, #2, #3 (L), #14, #15 (C), #12, #13, 17, #18 (U)		
16	#4,#5,#6 (L), #8, #10 (C), #11, #13, #17 (U)		
17	#1, #2, #3 (L), #21 (Core Choice combos), #19, #20 (U)		
18	#1,#2.#3 (L), #? (L, C, U), #13, #17, #18 (U)		
19	#1, #21 (Choice combos)		
20	#1, #21(L combo), #21 (C combo) #21 (U combo), Group choice		
21	#21(L combo), #21 (C combo) #21 (U combo), Group choice		
22	Lunge stability assessment* Group made L-C-U #21(with options) circuit Into group designed small game, planned alongside emergent movement solutions and opportunities will be suitable. You could use this formative field		Formative exit point How am I doing? What might I revisit? How might I progress?

assessment to top and tail your own scope and sequence, for example, a six-lesson medium-term plan—modify to fit as a means to inform students of their own progress and for you to be able to have this.

This exemplified scope and sequence follow the introductory body and self-management progression spiral (Table 3-content). It uses resistance movement vocabulary from Tables 1 and 2. Students and educators can take ownership to use the movement vocabulary in a meaningful way to suit the intention and aspirations of the class and learning experience. Greater ownership and creativity can emerge using ideas such as those through the progression spiral challenge ideas (Table 3-pedagogical progression).

Table 9.

A basic rendition of starting resistance moves around the contextually relevant educational themes, topics and aims can be built.

chest. I locked eyes with him, smiled and gently encouraged him to walk with me as his heart rate came down. I learned never again, to assume that all children are wired to move and move with vigour. The role of the other, the parent, the guardian and the peer, compelled me to develop means for children to become agentic alongside respective environmental factors, and hopefully irrespective of these where, and when they lacked opportunity for positive progression. The other part of my lesson learned of course is to make more efforts to offer joyful ways for the heart to soar and, educationally, to make this count. Now with my colleagues, we are able to progress such inclusive and aspirational practices in more accessible ways.

Acknowledgements

Thank you, colleagues, for your commitment to building an array of valuable life skills and competencies through the bold implementation of the 'I Can Resist' in your own contexts, starting right from the beginning... My sincere thanks to colleagues and students from and found around the world, to my pole vault peer and my daughter for giving of their time to try out the program and capture these efforts in a simple and accessible way, as depicted in the start-up resistance movement bank (Tables 1 and 2). To my esteemed colleagues Dr. Kristy Howells and Dr. Pamela Murray for the next exciting and emerging steps as we take 'I Can Resist' and explore movement possibilities with our students as we build body strength, identity and belonging.

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