Thinking While Moving
(Integrating Physical Activity into Maths)

This workshop targets ways teachers can integrate physical activity into their classroom teaching of mathematics. Utilising physical activity concepts, participants will acquire teaching ideas, resources and class management skills to engage students more effectively in mathematics.

Thinking While Moving

Focus (Overview):

This workshop targets teachers interested in integrating physical activity into their classroom teaching of mathematics. Teachers will acquire research based teaching ideas, resources and practice classroom management skills to engage students more effectively in mathematics by including physical activity in the context of maths lessons.

CLUMPS

Strand/s:

- Active Lifestyle
- Games and Sports

Subject Matter:

Games and Sport	Active Lifestyle
Locomotor Skills • running / sprinting • dodging • jumping / landing	**Components of an Active Lifestyle** • concept of being physically active **Ways to be Active** • develop skills for participation in games and activities

PDHPE Syllabus Outcomes:

- **GSES1.8** - Demonstrates fundamental movement skills while playing with and sharing equipment.
- **MOES1.4** - Demonstrates a general awareness of how basic movement skills apply in play and other introductory movement experiences.
- **V5** - Willingly participates in regular physical activity.

Suggested Links to other Key Learning Areas:

Mathematics

Indicators of Learning:

- Shows understanding of the language used in games by responding to verbal and nonverbal directions, e.g. run, hop, skip.
- Demonstrates correct technique.
- Enjoys regular participation in worthwhile physical activity.

Learning Experience	Organisation and Resources	Teaching Tips / Strategies
Students are to complete a locomotor skill, with the whole class performing the locomotor skill around the space given. Locomotor skills that can be used include: • Running • Hopping • Skipping • Side gallop Teacher asks students a maths question, the students then have to work out the answer to the question but form groups quickly in the number that is remaining. Variation: Place numbered cones 1-20 around the grid. The teacher calls out an instruction such as "Run to a number that is greater than 6", "Skip to a multiple of 3," "Crab walk to an odd number", "Skip to a multiple of 3", "jump to a factor of 24".	Equipment: Variation Cones numbered 1-20 Set Up: Whole class in designated space e.g. Netball court Time: 5-10 minutes	Once groups have been established and are correct, students move randomly around the space again but complete a new locomotor activity, then the teacher asks the students the new question. Repeat this step for all of the questions. Correct technique using tips from Get skilled get active. http://www.curriculumsupport.education.nsw.gov.au/primary/pdhpe/gamessport/fmsindex.htm Remember to ask children regularly why they went to a particular number.

Assessment:

- Observe and respond to student misconception.
- Link to mathematics syllabus.

How can this activity be differentiated? (Ideas for inclusion)

Provide students with a variety of questions to suit the needs and abilities in your class, ranging from simple to complex. This enables the students working towards an understanding to still participate in the activity and be engaged whilst also providing revision for the students who need extending.

How can this activity be adapted to:

Early Stage 1	Example question: Friends of 10 e.g. I have 7 how many more to 10?
Stage 1	Example question: How many sides has a rectangle?
Stage 2	Example question: What is the remainder when I divide 20 by 6?
Stage 3	What is 3/8 of 40? How many vertices on a triangular prism?

Rob the Nest

Strand/s:

- Active lifestyle
- Games and sport

Subject Matter:

Games and Sport Locomotor Skills ▪ running / sprinting Minor games – running games	Active Lifestyle Components of an Active Lifestyle ▪ concept of being physically active Ways to be Active ▪ develop skills for participation in games and activities

PDHPE Syllabus Outcomes:

GSS1.8 Performs fundamental movement skills with equipment in minor games.
INS1.3 Develops positive relationships with peers and other people.
V5 willingly participates in regular physical activity.

Suggested Links to other Key Learning Areas:

Mathematics

Indicators of Learning:

- Participates in a range of minor games and practices that assist skill development.
- Displays cooperation in group activities, e.g. taking turns.
- Enjoys regular participation in worthwhile physical activity.

Learning Experience	Organisation and Resources	Teaching Tips / Strategies
Split the class into 4 even groups (6-8 groups for large classes). Each group lines up on a corner of a square grid approx. 20m x 20m (or 1/3 netball court) 20-30 numbered beanbags are placed in the middle of the grid inside a hoola hoop. On 'go' one player from each team runs to the middle to collect a bean bag. Once the bean bag is placed on the ground at the team corner then the next runner goes.	*Equipment:* *20 numbered bean bags* *5 hoops/game* *Set Up:* *Whole class* *Time: 5-10 minutes*	Have two smaller games to increase PA. * Rules: one runner from each time only, no guard the bean bags, collect only one bean bag at a time, once all bean bags have been taken from the middle then teams may steal from other team's collections, play designated time, team with the most bean bags wins. Change the aim frequently. E.g. total the numbers, add together the even numbers etc.

Assessment:

- Observe, listen and respond to student misconceptions.
- Link to mathematics syllabus.

How can this activity be differentiated? (Ideas for inclusion)

Provide students with a variety of questions to suit the needs and abilities in your class, ranging from simple to complex. This enables the students working towards an understanding to still participate in the activity and be engaged whilst also providing revision for the students who need extending.

How can this activity be adapted to:

Early Stage 1	e.g. Place numbers in numerical order, make friends of 10
Stage 1	e.g. Sort odd and Even numbers
Stage 2	e.g. Multiply the two highest numbers
Stage 3	e.g. Make the largest improper fraction 8/3

Ladder Activities

Strand/s:

- Active lifestyle
- Games and sports

Subject Matter:

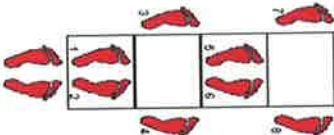|	

Games and Sport
Locomotor Skills
  • running
  • manipulative skills – catching, throwing
	Components of an Active Lifestyle
	  • concept of being physically active
	Ways to be Active
	  • developing skills for participation in games and activities

PDHPE Syllabus Outcomes:

- GSS2.8 - Participates and uses equipment in a variety of games and modified sports.
- MOS2.4 - Displays a focus on quality of movement in applying movement skills to a variety of familiar and new situations.
- V5 - Willingly participates in regular physical activity.

Suggested Links to other Key Learning Areas:

Mathematics

Indicators of Learning:

- Demonstrates efficient ways of using equipment while working cooperatively with others.
- Moves proficiently.
- Enjoys regular participation in worthwhile physical activity.

Learning Experience	Organisation and Resources	Teaching Tips / Strategies
Students perform various agility runs through the ladder (e.g. one step, double step, side-step, in & out) and then sprint forward to the end marker.	**Equipment:** Agility Ladders / chalked markings similar to ladders Bean Bags/variety of Balls. **Set Up:** Groups of 4-6 maximum Time: 5-10 minutes.	- Ball passing can be added to extend the skill, as can additional maths equations. Maths Integration: tasks added (e.g. Multiplication tables) Allow students to choose their own maths tables.

Assessment:

- Observe, listen and respond to student misconceptions.

How can this activity be differentiated? (Ideas for inclusion)

- Chalk the tables in the ladders.
- Encourage students to randomly pick a numbered bean bag from a selection 1-12.
- Introduce throwing and catching to develop manipulative skills.

How can this activity be adapted to:

Early Stage 1	Roll a die and count on
Stage 1	Skip count 2, 5 10.
Stage 2	Tables 1-10
Stage 3	Encourage students to randomly pick a numbered bean bag from a selection 1-12

Tabloid of Activities

Strand/s:

- Active lifestyle
- Games and Sports

Subject Matter:

Games and Sport	Active Lifestyle
Manipulative Skills ▪ Dribbling – hand skipping.	**Components of an Active Lifestyle** ▪ Concept of being physically active. **Ways to be Active** Develop skills for participation in games and activities.

PDHPE Syllabus Outcomes:

- **MOS3** - Refines and applies movement skills creatively to a variety of challenging situations.
- **INS3.3** - Acts in ways that enhance the contribution of self and others in a range of cooperative situations.
- **V5 -** Willingly participates in regular physical activity.

Suggested Links to other Key Learning Areas:

Mathematics

Indicators of Learning:

- Adapts throwing action to cater for different types of equipment for distance, accuracy and speed, e.g. koosh ball.
- Helps others to achieve set tasks.
- Works independently or in a group to devise a simple game.
- Enjoys regular participation in worthwhile physical activity.

Learning Experience	Organisation and Resources	Teaching Tips / Strategies
Olympic Maths Stations **Activity 1: Archery** Take turns to underarm throw 3 koosh balls on to a target. Total up your score and multiply your score by the number you roll on the dice. Have 3 attempts. Work out your total and your mean score. **Activity 2: Shot Putt** Using a shot putt technique aim 4 bean bags into hoops. Each successful aim should be placed before the decimal place, each miss after the decimal place. Using your digits work out your lowest and highest possible totals (place value). For example: 4 and 9 missed, 3 and 7 were accurate. Highest score= 73.94 Lowest Score = 37.49	**Equipment:** Bean Bags/variety of Balls Target Mat Variety of Dice 4 hoops Bean bags numbered 1-9 Chalk	*Groups of 4 per station* *Time: 20-30 minutes* *4-6 minutes per station* Encourage student autonomy on tasks. For example having a variety of dice. Encourage estimation on all tasks. Use chalk to record answers on the playground if possible. Encourage students to create their own station. Create task cards for each station. **Example task Card** **Olympic Maths** ᵗᵗ EASY Minds <u>Activity 1 Archery</u> Take turns to underarm throw 3 koosh balls on to The target. Total up your score and multiply your score by the number you roll on the dice. Have 3 attempts Work out your total and your mean score.

Activity 3: Basketball Estimate how long you think it will take you to bounce a ball a set number of times. Time each other how long it takes you to bounce a ball 10 times, 20 times and 30 times. Record your answers for three attempts. Work out the total time taken include hundredths.	Basketballs Stop watches	
Activity 4: Triple Jump Estimate the total distance you think you will jump. From the mark, hop, step and jump as far as you can. Use a chalk mark/ bean bag to indicate your final landing place. Estimate the distance travelled. Check your answer using the tape measure. Work out the difference.	Chalk Tape measure	
Activity 5: Boxing How many skips can you do in 30 seconds? How many skips can you do in 60 seconds? If you skipped at this pace how many skips would you manage in hour, 1 day and one leap year.	Skipping ropes Stop watches	

Assessment:

- Observe, listen and respond to student misconceptions
- Work product analysis
- Group Interaction/social skills

How can this activity be differentiated? (Ideas for inclusion)

Students should be encouraged to develop their own mathematics and physical activity stations.

How can this activity be adapted to:

Early Stage 1	This approach can be used for all stages by making both the physical tasks and the mathematics stage appropriate.
Stage 1	
Stage 2	
Stage 3	

Other Considerations:

- monitor participation of girls and boys in all games and learning experiences;
- use gender-inclusive language and actively encourage students to use the same;
- Balance competitive and cooperative movement experiences
- Students need to be reassured and supported in all learning situations
- establish a class borrowing system to ensure that all students can have access to resources by enabling students to take them home or use them outside of class time;
- Every child has a right to participate in learning- make activities inclusive
- All students can learn and succeed if tasks are appropriate and meaningful

Links to Technology:

- Use of I pads to record scores for additional mathematics from data collected during activity
- YouTube links to add significance to the physical activity eg. Hop step jump activity.
  https://www.youtube.com/watch?v=M1GAx_7hXv0

Supporting Teacher Resources:

https://online.det.nsw.edu.au/psc/programs/getActiveInMiddleYears.html
http://www.sports.det.nsw.edu.au/tpl/2016/sport.php

Physically Active Numeracy Ideas - Nick Riley 2016

1: Skipping Activities

Students are to have their own individual skipping rope. Maths Integration: Students have to complete the number of skips that is a friend to ten, for example if the teacher says 7; the students have to complete 3 skips.

Students can ask each other the algorithms e.g. How many more to 10, if I have got 5. Students in Stage 2 and 3 can complete problem solving questions, for example: 76% of students like weekends, what percentage do not like weekends.

Fractions- what is 3/7 of 21 etc. Partner A skips the number of Skips from the answer. Partner B skips the other fraction. E.g., 3/5 of 20. Then discuss their answers.

Partner A		Partner B
Total number to skip	How many to skip?	Total number to skip
	2/5 of 20	
	3/4 of 12	
	3/8 of 24	
	6/10 of 30	
	2/9 of 18	

How many edges are there on a triangular prism? Students skip their response.

2: Area:

Students are to estimate and measure the area of selected areas using standard and non-standard measures.

Location:	Units used:	Estimated Measurements:			Actual measurements:			
		Length:	Breath:	Overall Area:	Length:	Breath:	Overall Area:	Perimeter
Area :	My unit							
	2 footed jumps							
Area :								

3: Maths Scavenger Hunt

Using i pads send students on a maths trail. At each point they are to perform an additional physical activity. Make question cards, and allow students to set trails. Use a map of school and overlay a grid to teach coordinates. Students return to teacher at end of each clue to receive another clue.

For Example: Power walk to find an acute angle. Take a picture of your group at the acute angle and perform a Mexican wave!

4: Higher or lower

Choose a number between 1 and 100. Choose one child to come out to the front and take a guess as to which number it is. If the number chosen by you is lower all the other students' squat, if higher students jump up.

5: Making shapes

Give a group of students a small number of cones/markers. Ask them to set out an estimate of a   shape and then measure. E.g. An irregular pentagon with a perimeter of 25m. Allow students to measure with a tape measure to check for accuracy

6: Have students hypothesize which activity (30 seconds) burns more energy: *hopping, skipping, jumping rope, jogging on spot, or walking.* Rank each activity in terms of energy expenditure from 1 (hardest) to 5 (easiest).

Have students complete each activity and record steps taken and energy expended.

Activity (30 secs)	Estimated Ranking (1-5)	Heart rate	Energy expended	Actual ranking (1-5)
Hopping				
Skipping				
Jumping rope				
Jogging on spot				
Walking				

Recording Sheet

Activity 1	Attempt 1			Attempt 2			Attempt 3		
ARCHERY									
Total x dice									
Mean									

Activity 2	20	30	40
Time estimated			
Actual time			
Difference			

Activity 3	Record numbers	Highest	Lowest
Shot Putt 1			
Shot Putt 2			

Activity 4	Estimate	Actual	Difference
Attempt 1			
Attempt 2			

Activity 5	30 seconds	1 minute	1 hour	1 day	1 leap year
Skip 1					
Skip 2					

Pedometers

Outline instructions for wearing pedometers and entering personal data for stride length (press mode to distance then press set to change) and weight (press mode to kcal then press set to change).

Students to calculate their own stride length using a 10m distance. Have each student calculate stride length by walking 10m and dividing 10m by number of steps. For quick reference, see table:

Steps	Stride length (cm)
9	110
10	100
11	91
12	83
13	77
14	71
15	67
16	63
17	59
18	55

	Estimated distances	Steps taken	Actual distance	Difference between estimated and actual
TOTALS				
TOTALS				

Olympic Maths EASY Minds

Activity 1 Archery
Take turns to underarm throw 3 koosh balls on to
The target.
Total up your score and multiply your score by the
number you roll on the dice.
Have 3 attempts.
Work out your total and your mean score.

Olympic Maths

Activity 2 Basketball
EASY Minds

Estimate how long you think it will take you to bounce a
ball a set number of times. Time each other how long it
takes you to bounce a ball 10
times, 20 times and 30 times.
Record your answers for three attempts.
Work out the total time taken include hundredths.

Olympic Maths EASY Minds

Activity 3 Shot Putt
Using a shot putt technique aim 4 bean bags into the
hoops. Each successful aim should be placed before the
decimal place, each miss after the decimal place.
Using your digits work out your lowest and highest
possible totals (place value).
For example: 4 and 9 missed, 3 and 7 were accurate.
Highest score= 73.94
Lowest Score =49.37

Olympic Maths EASY Minds

Activity 4 Triple Jump
Estimate the total distance you think you will jump.

From the mark, hop, step and jump as far as you can. Use
a chalk mark/ bean bag to indicate your final landing place.

Estimate the distance travelled.

Check your answer using the tape measure.

Work out the difference.

Olympic Maths

Activity 5 Boxing
EASY Minds
How many skips can you do in 30 seconds?

How many skips can you do in 60 seconds ?

If you skipped at this pace how many skips would you
manage in hour, 1 day and one leap year.