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# *Math in Motion*

— By DaraLyn McColl —  
Edu 514 - Fall 2020

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# Relating 3 Math Standards

## Units of Time

Students *understand* and use *units* of time

## Rational Numbers

3 Students recognize unit fractions including  $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{1}{2}$  and  $\frac{4}{4}$ .

## Geometry (shapes and angles)

Students recognize, *classify*, and *create* geometric figures in two and three dimensions

- a. Identify shapes in the physical environment.
- b. *Classify* figures as circles, triangles, and quadrilaterals by focusing on their properties.
- c. *Create* shapes by using objects to combine and *decompose* other shapes.

# Learning Goals

1. Students will show that corners can be demonstrated as angular still shapes or through movement when changing direction.
2. Students will show that a quarter turn is a “right” angle
3. Student will use locomotor movements to travel in clockwise and counterclockwise directions together (relating to time).
4. Students will work cooperatively with peers to perform exciting movements creating still shapes, right angles,
5. Students will relate movements to time and fractions.

# Disciplinary Literacy in Math

What I appreciate about disciplinary literacy in action

Students learn to read and write like mathematicians when

- Allowed to explain, justify, describe and analyze through movement
- May use representations
- Utilize real-world situations and connections
- Draws conclusions
- Uses symbols and abstractions
- Includes reasons and examples
- Evaluate data
- Ask questions
- Consider the unique vocabulary, language, and word parts specific to math

Students learn to think like mathematicians when

- Allowed to use all available information to solve problems
- Consider generalizations, exceptions, and patterns
- Share previous knowledge
- Create a plan for solving problems
- Determine the relevance of the given information

<http://www.nytimes.com/section/learning>

The Learning Network

Http: [www.educationworld.com/acurr/mathchat/mathchat019.shtml](http://www.educationworld.com/acurr/mathchat/mathchat019.shtml)

<http://www.mathalicious.com>

Real World Problems

# Disciplinary Literacy in the Arts

What I appreciate about disciplinary literacy in action in the arts

Students learn to read and write like an artist when

- Allowed to synthesize knowledge and personal experience
- Connect cultural, societal, and historical artistic ideas
- Understand specialized vocabulary
- Consider others' perspectives
- Compare their experiences to others through engaging in research
- Apply their own creative artistic processes
- Find inspiring and new ideas and apply to their own works
- Articulate their ideas, explain the evolution and explain their process

When students participate as artist

- Participation in their discipline
- Generate new ideas and works of art
- Draw from a variety of sources
- Apply problem-solving skills
- Develop skills through experimentation and repetition
- Refine and complete works
- seek , evaluate, and apply feedback about their work
- Make decisions how to convey meaning

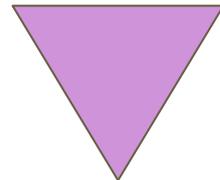
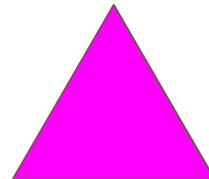
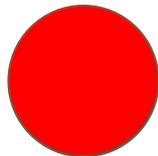
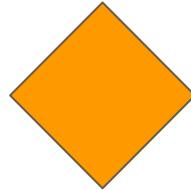
<https://www.metmuseum.org>

<http://www.nytimes.com/section/learning>

# What makes a shape?

Students are assigned to small groups and use their prior knowledge to openly discuss the qualities of a shape and find them in the room.

1. What shapes can you find in our classroom?
2. Sketch your shape on your paper.
3. How many sides does your shapes have?
4. How many corners does your shape have?
5. Do all shapes have corners or sides?



# What is a Corner?

A corner is where two edges meet or where one edge turns and changes to a different direction. Corners are sharp.

# What is an Edge?

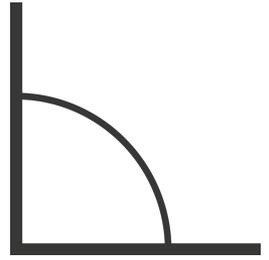
Edges are straight lines.

Show how you make a **CORNER** with your body?  
Show how you can make an **EDGE** with your body?  
Another name for when two sides meet at the corner is "vertex"?



# What is the space called in between the leg bones called?

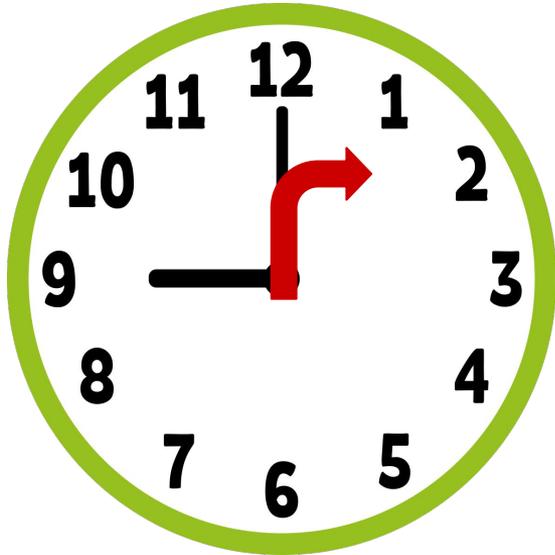
Can you make another ANGLE with your body?  
How many angles can you make?



Introduce vocabulary terms: **Clockwise** and **Counterclockwise**

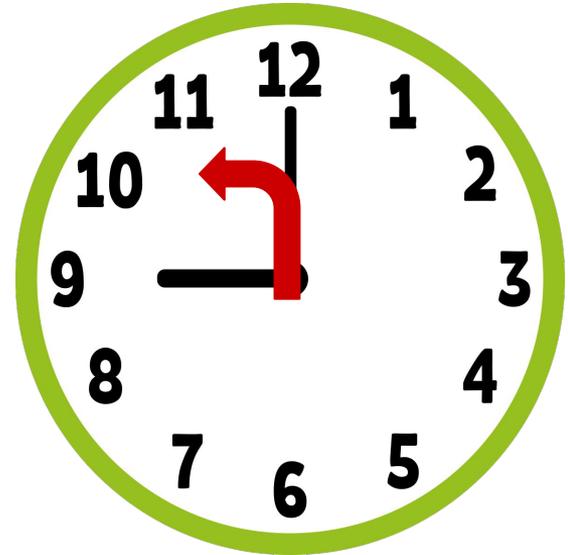
### What does Clockwise look like?

To move in the direction of the clock.  
Show us what that looks like together.



### What does Counter-clockwise look like?

To move in the opposite direction of the clock.  
Show us what that looks like together.



# Floor Pathway Squares

Using the tiles on the floor, markers, and some lively music, have the children move in a clockwise and counterclockwise directions around the square.

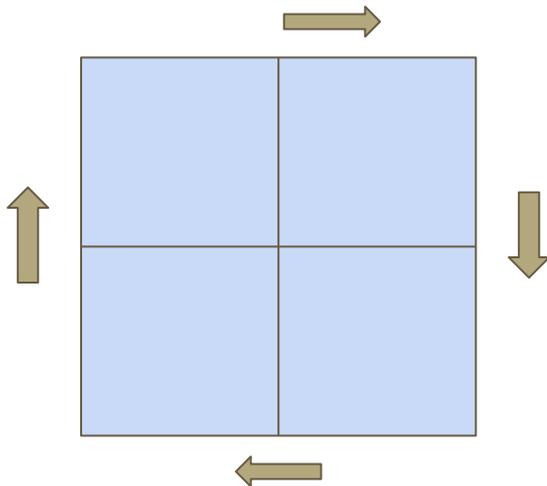
## Thinking questions for students?

1. How many right angles did you make to get back to where you started?

## Relating terms:

Each time you made a right angle, you were TURNING a corner.

2. What does "TURN" mean?  
(to change direction)



# What is locomotor movement in dance?

**Locomotor movements are movements that take you from one place to another (examples: walk, run, skip, hop, jump, slide, leap, gallop, and more). ... \*These movements are used to create dances with a beginning, middle and end.**

**We will explore different locomotor movement:**

- Marching
- Tiptoeing
- Crawling
- Walking sideways



## ELEMENTS OF DANCE

Nancy Johnson Barker 2007

**SPACE - the space we move through as we dance.**

**Shape** - the design of the body: open/closed, symmetrical/asymmetrical, angular/curved (individual and group shapes)

**Focus** - audience (where viewer's eye is drawn)

- dancer (single focus - looking in direction of movement;  
multi-focus - changing head/eye focus during movements).

**Size** - use of size in given space or range of motion.

**Level** - the vertical distance from the floor (high, medium or low)

**Direction** - forward, backwards, up, down, diagonal

**Pathways** - patterns we make as we move across the floor: straight, curved

**TIME - the relationship of one movement to another.**

**Rhythm** - a pattern of beats

**Tempo** - steady beat, fast or slow (the speed of the movement)

**Duration** - the length of time the movement lasts

**Pulse** - accented beat or heartbeat of the rhythm

**Phrases** - longer sequences of movement

**ENERGY or FORCE - the use of more or less energy while moving.**

**Tension/relaxation** - tension feels hard and tight, relaxation feels soft, loose and floppy, (soft/hard, light/heavy, sharp/smooth).

**Bound Flow/Free Flow** - when energy is released in a controlled, restrained manner it is bound flow; when energy is released freely the movement is free flow.

**Weight** - strength (force) or lightness

**DANCE FORM (Choreographic Forms)**-call and response, AB and ABA, narrative.

## MOVEMENTS IN DANCE

**LOCOMOTOR** - movements that take you from one place to another (examples: walk, run, skip, hop, jump, slide, leap, gallop, and more).

**NON-LOCOMOTOR** - movements that do NOT take you from one place to another (examples: bend, stretch, twist, reach, swing, sway, and more).

\*Dances are composed of a variety of locomotor and non-locomotor movements.

\*These movements are used to create dances with a beginning, middle and end.

## COMMUNICATION

Dance communicates ideas, thoughts, and feelings.

Expressive movement pictures emotions, showing us the idea of the dance.

Dance has been a part of cultures and time periods throughout history.

# Making TURNS on the spot.

## Recall

What is a right angle again?

What is clockwise?

What is counter-clockwise?

## Performance

Make a turn to the right (clockwise)

Make another one

Make another one

Make another one

## Thinking?

Where are you now?

How many quarter turns

did you make before you arrived back to the starting point?

Does four quarter-turns make a full turn?

## Performance

Repeat the 4 quarter turns, but in **counter-clockwise** direction

## Student thinking

How will you perform your quarter turns? (locomotor: jumping, skipping, keep you body straight and tummy button over your toes so you stay balanced.

**Explore** performing 2 feet jumping quarter and half turns. Try landing in a straddle, on one foot, fancy arms.

## Show a sequence

To right: 4 x 2-2 quarter turns

To left: 4 x 2-2 quarter turns

To right: straddle, 2-2, to left straddle, 2-2

To left: straddle, 2-2, to right straddle, 2-2

Now using music we will march in a square  
Students may try  $\frac{3}{4}$  turn, where did you wind up?

## Recall, Evaluate, Revise and Add

Students will gather in a close group and revise corners, angles turns and right angles,  
Adding and sharing in any NEW knowledge gained during this lesson

	Quarter turn clockwise  
	Half turn anticlockwise  
	Full turn clockwise  
	Quarter turn anticlockwise  
	Half turn clockwise  
	Quarter turn anticlockwise  

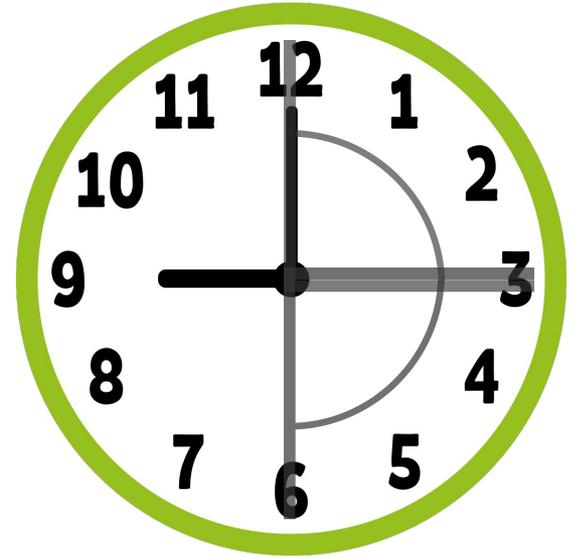
# Relating time, money and fractions.

## Relating time, money and fractions.

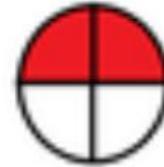
How many quarters in one hour?

How many quarters make a dollar?

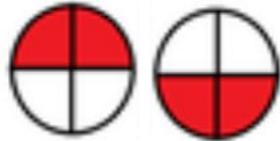
How many quarters make a WHOLE number?



$$\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$$



Quarter turn  
Half turn  
Whole turn



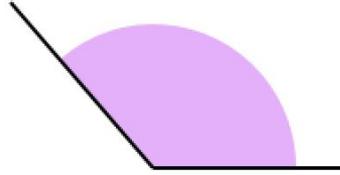
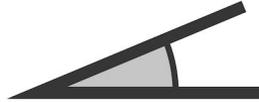
$$\frac{1}{2} + \frac{1}{2} = \frac{4}{4} \text{ OR } 1 \text{ whole}$$



# Recall, Evaluate & Revise

Revising angles, corners and right angles

Show me how to make a RIGHT angle with your arm.  
Point to an angle that your arm has made.  
Make the angle bigger.  
Make the angle very small.



Now show me a right angle using  
your arm and point to the angle.  
Show me how you can make your  
leg create a right angle

Look at the square.  
How many sides/edges does it have?  
Look at “right angle man”  
How many right angles is he making?



# Learning Goals

- Read and discuss
- Corners, quarter turns and right angles  
Traveling - changing directions  
Jumping - who remembers our quarter turn jumping sequence?  
Still shapes
- Traveling clockwise-clock is working  
Traveling counterclockwise-broken clock

## Why might we make a dance about math?

To teach classmates what some important math ideas mean!

# Traveling and Turning-Clockwise/Counterclockwise

Let's add some music!

Remember our big floor squares?

Students will be placed in groups of four

Each student stands on a corner of the square

Students find a spot to stand on a side/edge of the square

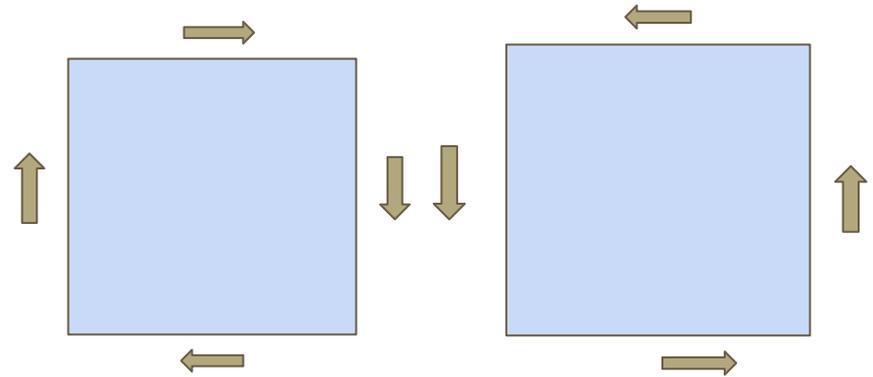
Remember clockwise and counterclockwise

Students are asked to show walking clockwise together and counterclockwise together around the square.

**How many right angles did you make to get back to where you started?**

**Each time you made a right angle, you were turning a corner.**

**What does TURN mean?** (to change direction)



Repeat traveling with the music.

EXPLORE traveling with different locomotor movements: jumping, marching, tiptoeing, crawling and walking sideways

# Recall, Evaluate & Revise

Revise the quarter turns to the right.

How many quarter turns did we make before we arrived back at the start?

Four quarter turns make a full turn.

Think about how you perform your quarter turns

Try jumping with 2 feet together, Try again but keep your body straight and your tummy button over your toes so you stay balanced.

Try and keep your feet together, but remember to bend your knees when you land so that you don't hurt yourself. See if you can find a spot on each wall to look at when you turn.

## Explore performing

2 feet jumping quarter and half turns

With a partner, take turns to watch each other.

Discuss how straight their body is and if you see something they may improve on.

## REVISE the sequence

To right: 4 x 2-2 quarter turns

### What arm movements can we make?

To left: 4 x 2-2 quarter turns -

### Can we make up new arm movements?

To the right: straddle, 2-2 to the left: straddle, 2-2

To the left: straddle, 2-2 to the right straddle, 2-2

To the right: 2 x half turns

To the left: 2 x half turns

**On the spot:** a 2 feet jump to finish in a fancy right angle shape

# Making Right Angles

Define a right angle once more?  
Right Angle Man brought along some friends  
Discuss the different body bases they are using.

Copy the right angle people and make  
each of their right angle shapes  
Work with your partner and pick 2 right angle  
People shapes. Rehearse performing them.

Make sure that the corners are clear and sharp.



# Putting the Dance Together

Revise the three parts to the dance traveling, jumping and on the spot with still shapes.

Rehearse walking in a clockwise direction for 8 counts, and walking in a counterclockwise direction for 8 counts  
Now rehearse with music.

## **Evaluate and Revise our Performance.**

How can we make it more interesting?

How can we make our corners sharp and clear?

Revise the jump sequence.

Rehearse with the walking section and then the jumps

## **Evaluate and Revise our Performance.**

What do we need to improve?

**Rehearse once more**

**Add in still shapes**

**Revise them and then add to the dance**

## **Evaluate and Revise**

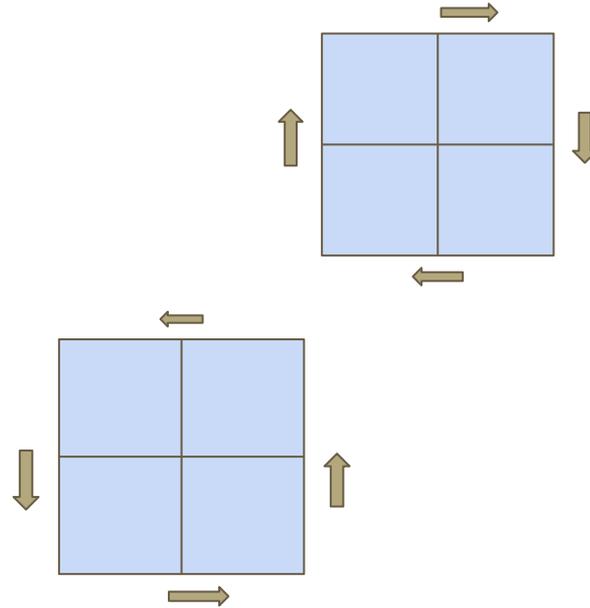
What do we need to improve or develop or perform better?

How would we like to finish? Let's make it good!  
Try walking clockwise and counterclockwise once more after the second still shape and then walking to the middle and making your favorite right angle shape.

Now perform it as one dance.

# Reflection

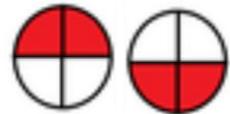
1. What do you THINK of the dance we made?
2. What were we trying to show in the dance?
3. What do we know about corners, quarter turns, and right angles?
4. What do we know about the fractions?
5. What do we know about vertex (vertices)?
6. What do we know about time?
7. How well did we participate?
8. Review our learning goals once more and discuss.
9. Where to next?



$$\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$$



Quarter turn  
Half turn  
Whole turn



$$\frac{1}{2} + \frac{1}{2} = \frac{4}{4} \text{ OR } 1 \text{ whole}$$



	Quarter turn clockwise 	
	Half turn anticlockwise 	
	Full turn clockwise 	
	Quarter turn anticlockwise 	
	Half turn clockwise 	
	Quarter turn anticlockwise 	

# References

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[Activity 3: Moving Maths / Dance Across the Curriculum / Units and sequences / Primary teaching resources / Teaching and Learning / Home](#)

Appendix B, Disciplinary Literacy in Math, Disciplinary Literacy in Action and Appendix E, Disciplinary Literacy in Art, Disciplinary Literacy in Action

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