



# “Weather on the Move”

## Grades 6 - 8

with  
**Harlan Brownlee**

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*"Scientific principles and laws do not lie on the surface of nature. They are hidden, and must be wrested from nature by an active and elaborate technique of inquiry."*

— John Dewey (Reconstruction in Philosophy)



The Kennedy Center

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# Introduction

## Purpose of the Workshop

- To share with teachers structures and activities that integrate weather phenomena and dance concepts
- Explore and experience the Elegant Fit between Dance and Physics
  - Movement is the medium through which we experience the world
  - The relationship of Time, Space, and Energy

## Enduring Understandings/Essential Questions

### Enduring Understandings

- Arts Integration is an approach to teaching in which students construct and demonstrate understanding through an art form.
- The Creative Process involves imagination, examination, and perception.
- Individuals engaged in the Creative Process explore, experiment, reflect, revise, share, and ultimately create something new or unique that did not exist prior to their efforts.
- Dance is a language through which I can communicate my understanding of the world.

### Essential Questions

- What are the elements of dance and how do I integrate them into my classroom?
- What are the connections between weather phenomena and dance?
- How do I do develop my students' movement literacy or ability to communicate using movement?

## Overview of Workshop and Instructional Materials Packet

<b>Introduction &amp; Overview</b>
<b>Sphere's Density Dance - Activity #1</b>
Preparation Activities #1 - #5
Sphere's Density Dance
Teacher Reflection
<b>Kaleidoscopic Cloud Dance - Activity #2</b>
Preparation Activities #1 - #4
Kaleidoscopic Cloud Dance
Teacher Reflection
<b>Dancing Winds - Activity #3</b>
Preparation Activities #1 - #3
Dancing Winds
Authentic Assessment – Pilot's Logbook
Teacher Reflection
<b>Closure</b>

# The Kennedy Center's Definition of Arts Integration

**Arts Integration is  
an APPROACH to TEACHING  
in which students  
construct and demonstrate  
UNDERSTANDING  
through an  
ART FORM.**

**Students engage in a  
CREATIVE PROCESS  
which CONNECTS  
an art form and another subject area  
and meets**

**EVOLVING OBJECTIVES  
in both.**

## Rationale for the Kinesthetic Learner & Arts Integration

A teacher who integrates the arts recognizes that learning happens when students take in and express themselves in the world using verbal, visual, and kinesthetic modalities. Creating an artistic product is a process where skills and knowledge are interconnected and reinforce each other. Referred to as Habits of Mind and the four C's of the 21<sup>st</sup> Century Learning Skill Set (Communication, Critical Thinking, Creativity, and Collaboration) the arts develop a unique set of skills. These skills allow students to engage and persist in problem solving, imagining the next steps for the creation of a work of art, and reach beyond their capabilities to embrace opportunities from which they grow and learn.

The Kinesthetic intelligence is a way of teaching, learning, and knowing which addresses the ability to use physical movement and the wisdom of the body to create a product or solve a problem. Older students may be good dancers or athletes, or particularly good at mimicking others. Athletes, surgeons, and craft people use all or part of their bodies in this highly skilled intelligence. This way of learning is most evident in the young student who has a hard time sitting still; I often call these pupils my classroom movers.

Movement classes build basic skills that all children should possess and dance gives students an important tool to understand and express who they are in the world. Dance engages a child to observe, focus, collaborate, persevere, make decisions, and receive constructive feedback. Dance enables a student to learn to evaluate one's own work and working process and the work of others in relation to a set of standards. As a result, students are better equipped to create and respond to the world and to their immediate environment. These students are better prepared for employment that requires broad access to multiple means of communication and strategies for creativity and collaboration.

# Learning Activity 1: Sphere's Density Dance

## Summary:

Focusing on the structure of the earth's atmosphere, this lesson introduces the concepts of layering, air density, and particles and relates these directly to dance concepts of level, kinesphere, and shape. Participants use movement skills to learn and communicate information about the structure of the atmosphere.

## Objectives

Students will:

- relate their own personal body space to the concept of spheres, and specifically, the atmosphere.
- identify the three basic levels of space and relate them to the layers of the atmosphere.
- examine and experience the making of body shapes.
- use movement and dance as a means of communicating information.
- identify particles in space and changes in air density.
- explore the basic composition structures of motif, variation, and canon.

National Science Standards (Earth and Space Science)	National Dance Standards	Common Core State Standards
Understands the structure and properties of matter	Identifies and demonstrates movement elements and skills	<b>Integration of Knowledge and Ideas</b> - Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
Understands the structure of the Earth system	Understands dance as a way to create and communicate meaning  Understands choreographic principles, processes, and structures	

# Procedure for Sphere's Density Dance

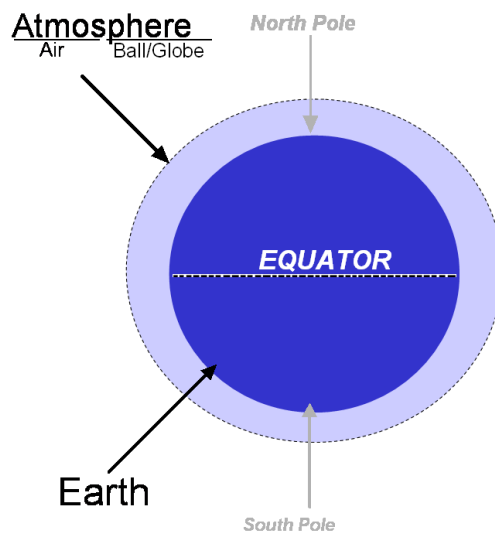
## Preparation

### Materials

- Masking tape – prepare atmosphere markings in advance of the lesson (see page 33).
- Hand Drum – for giving aural cues for the movement exercises
- Blackboard or whiteboard – appropriate markers
- Music – Teacher's or student's choice. Recommended - Mickey Hart's, *Planet Drum*.

Draw and review a diagram of the Earth and Atmosphere with students (see Diagram 1).

- Point out the Equator that divides the Earth between two hemispheres – North and South
- Note the North and South Poles
- Note the Atmosphere and its meaning as an air ball or globe that surrounds the Earth



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Diagram 1

### Preparation Activity #1 – Establishing the Space Bubble (a.k.a. Atmosphere)

**Purpose:** All movement activities require students to have a basic awareness of how they are using the space both as an individual and as a member of the entire group. The following warm-ups are intended to develop that awareness.

#### Directions:

- 1) Establish the perimeter of the movement space in the classroom.
- 2) Ask the students to walk into the space and spread out evenly throughout the space. Placing themselves as far from each other as possible using all the available space.
- 3) Next, have the students define their kinespheres. The kinesphere is an imaginary bubble of space that surrounds the body. Using the tips of their fingers and stretching their arms out and away from their bodies, ask the students to draw their kinespheres. Introduce moving from high to low level and turning in place to define the space around them. Make sure students understand the metaphor of the space bubble as their “atmosphere” to their bodies like the atmosphere is the “space bubble” to the earth.

## Preparation Activity #2 – Creating Shapes to Communicate Ideas

**Purpose:** Choreographers use shapes to communicate an idea. Students need to develop a beginning movement vocabulary that enables them to be able to speak with their bodies or communicate ideas with different shapes.

### Directions:

1) Let the students experiment with making different shapes with their bodies. Encourage them to try to make the shapes different each time.

2) Give them cue words or suggestions to help them make shapes such as,

- Geometric
- Arched
- Angular
- Curved
- Hard
- Soft
- Twisted
- Stretched

3) Ask the students to form a seated semi-circle in front of you. Explain while drawing, that you are going to zoom in on the previous diagram (see Diagram 2).

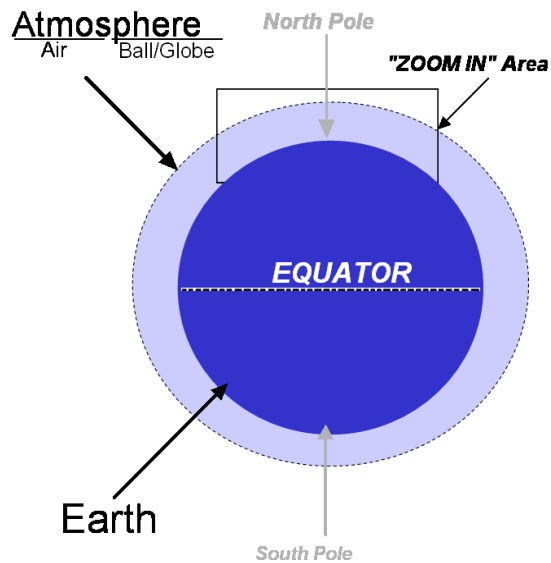
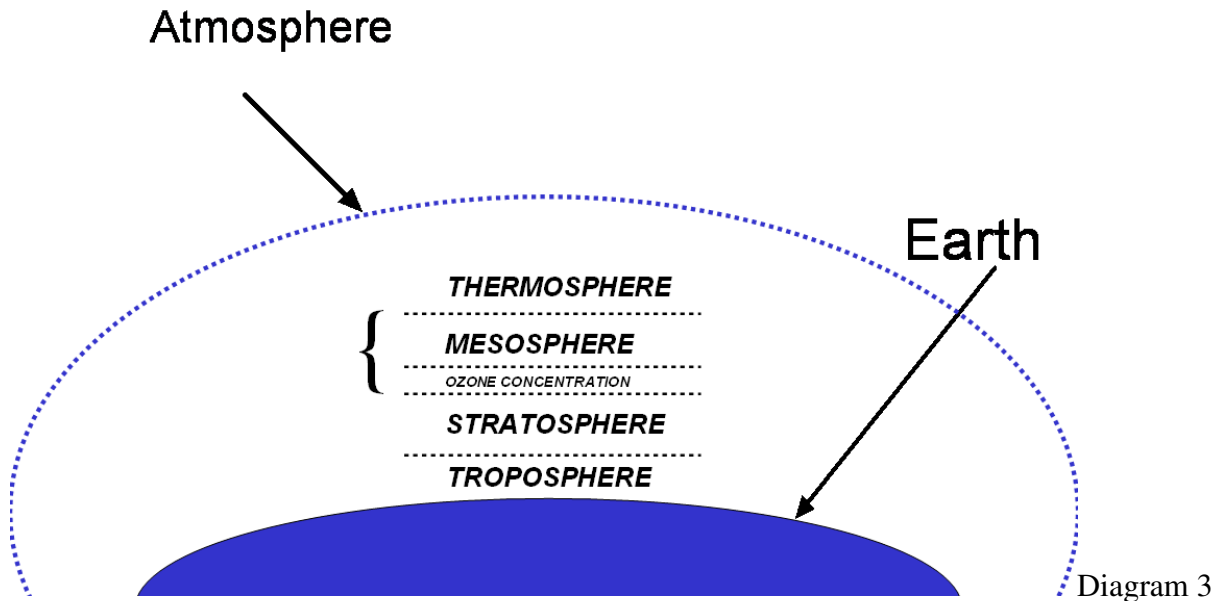


Diagram 2

4) Redraw just the zoom area and show the students how you can divide the atmosphere into its four basic layers and label the layers. Please note that the ozone concentration area is part of the Mesosphere (see Diagram 3).





5) Make sure students see the connection of levels in the atmosphere to physical levels introduced during Preparation Activity #1.

6) Instruct the students to blow on the back of their hands. Ask, “What do you feel?” The students will feel air on the back of their hands. Explain to them “You can’t see it, but the air is made up of tiny particles that you can feel.” Ask the students to go back out into the dance space.

### Preparation Activity #3 – The Stop & Go Dance

**Purpose:** The Stop & Go Dance is a basic exercise that allows students to self-direct the creation of a simple dance. It combines the dance concepts of shape and locomotion through space.

#### Directions:

1) Ask the students to walk through the space to a drum beat, clap, or type of musical accompaniment. Remind the students of the ground rules (see below) they need to follow.

#### Moving Through Space – Ground Rules

##### Maintain Awareness of:

The Other Dancers,  
The Space between Dancers,  
The Kinespheres (space bubble or atmosphere) around each Dancer,  
and your own Kinesphere.

2) The students need to use all of the available space and be aware of each other's kinespheres. Show them how they must see three aspects of space: the other people, the other dancers' "atmospheres" (space bubbles), and the space between the bubbles. Show the students how dancers use the space bubbles to let them know they are getting close.

3) You can suggest that students are on a "treasure hunt" for space; trying to fill all the empty spots of space. When the musical accompaniment stops, students must freeze in a shape and remain in place. The shape can be in any level.

4) Ask the dancers to watch out for each other's "atmosphere" (space bubbles) as they change the way they move through the space. They can:

- walk,
- gallop,
- hop on one foot,
- jump on two feet,
- skip,
- leap

5) The students should practice this exercise of maintaining awareness of the space and freezing when the music accompaniment stops until they have demonstrated some mastery or proficiency with the task.

#### **Preparation Activity #4 - The Moving Wall**

**Purpose:** To increase the students' awareness of space by decreasing the amount of available space to move in.

**Directions:**

1) Ask students to walk in any direction throughout the room; using all the available space. You, as the teacher, slowly walk toward one of the other walls in the room with your arms extended. Nobody can go past your imaginary moving wall.

2) As you proceed toward the other wall, the students' available space shrinks. As the space shrinks, students need to slow down and pay closer attention to the space between them and the entire group.

3) After you reach the smallest space the students can work with, you open the space back up and ask the students to use the entire space as they walk.

4) You can repeat *Moving Wall* a number of times to increase spatial awareness.

#### **Habits of Mind Framework - Observe**

*Learning to attend to visual contexts more closely than ordinary "looking" requires, and thereby to see things that otherwise might not be seen.*

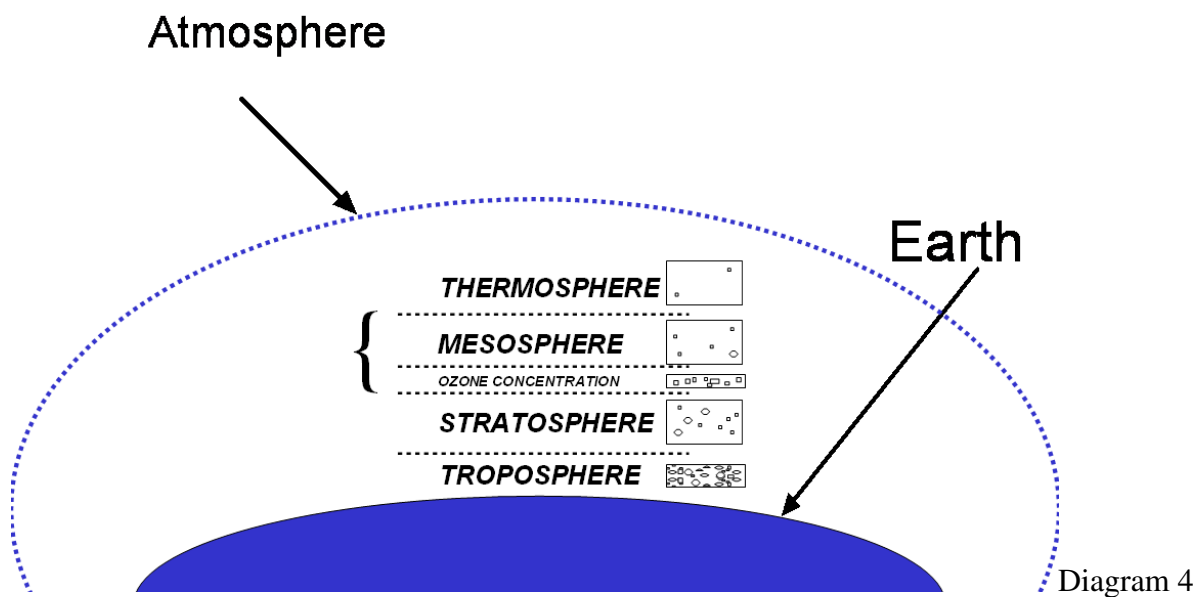
## Preparation Activity #5 – Connecting Moving Wall to Air Density

**Purpose:** To relate the shrinking wall warm-up to the air density of the four levels of the atmosphere, and to finish preparation for the Sphere's Density Dance.

### Directions:

1) Ask the students to form a seated semi-circle in front of you. Explain while drawing Diagram 4, the difference in the distance between the particles of air.

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2) Tell the students that their bodies are like the particles of air. Go into the space and repeat the shrinking wall exercise, this time telling them that they are like the air particles in the thermosphere with lots of space between. As the space shrinks, they become like the air density in the mesosphere, the stratosphere and finally the troposphere. Ask the students to tell you which spheres' air density they are like, as you repeat the exercise.

3) Show them the tape marks you have placed on the floor, and define the space that is the thermosphere, mesosphere, stratosphere, and troposphere. Be sure to point out the ozone concentration area. The ozone concentration area is part of the mesosphere.

4) Divide up the students so that you have the largest number of students in the troposphere, the next largest in the stratosphere and mesosphere and the least number of students in the thermosphere. An example of this for a class of thirty students would breakdown to:

1. Troposphere – 75 % = 22 students\*
  2. Stratosphere – 10% = 3 students\*
  3. Mesosphere – 10% = 3 students\*
  4. Thermosphere – 5% = 2 students\*
- (\* = number of students rounded off)

5) Starting with the thermosphere, demonstrate how the number of dancers in the space dictates the movement possible. For example, in the thermosphere because there are only a few dancers for the space, so the movement is broad and expansive. However, because of the increased density in the troposphere there are a large number of dancers for the limited space and as a result the movement is very restricted.

6) In addition you will need to demonstrate that the movement for the mesosphere is more restricted. When moving in the mesosphere, the students remain primarily in the ozone concentration area. Only for a few seconds at a time may they move out into the rest of the mesosphere. The ratio of movement in the ozone concentration area to the rest of the mesosphere is 16 to 2, i.e., for every 16 counts, they can use 2 of those counts in the area of the mesosphere outside of the ozone concentration area

7) All of the students in the spheres move for a short period of time in their assigned spheres. Notice that because there are more dancers in some of the spheres, their awareness of their space is challenged and their movement or locomotor skills choices are limited. Be sure to instruct the students to be aware of these two challenges.

### **Habits of Mind Framework - Express**

*Learning to create works that convey an idea, a feeling, or a personal meaning.*

### **Student Reflection**

At this point in the lesson, take time to have the students reflect on what they have learned.

Questions you might ask:

#### **Dance questions**

- How did the amount of space and dancers in the space affect your movement choices?
- Which locomotor skills could you use in the different spheres?

#### **Weather questions**

- Which sphere is the densest? How do you know?
- Why do the lower spheres have greater density than the higher ones?

#### **Assessment Moment**

- “What did you notice about the work of your fellow students?”
- “Did you have any ideas you didn’t use?”
- “What do you think others observed in your work?”
- “What would you do differently next time?”
- “What does this work make you want to do next?”

## Sphere's Density Dance

**Purpose:** To connect the concepts of air density and the four levels of the atmosphere to the dance concepts of level, kinesphere, and shape.

### Directions:

1) Create a structured improvisation<sup>^</sup> by connecting the element of time with the “Stop and Go” form.

**<sup>^</sup>A structured improvisation is an unplanned sequence of movement that follows a set of rules or boundaries.**

2) First, you will need to teach the students to move for eight counts and freeze for eight counts. Clap your hands or beat a drum, counting up to eight to help the students stay aware of the beats. Show the students a phrase of moving for eight and freezing for eight. Have the students move for eight counts and then freeze for eight counts twice, or until they have demonstrated an understanding of “Stop and Go.”

3) Now you can have the students create a sphere dance using the classical composition form of canon. First, explain the structure of the form. A canon is a round (e.g., *Row, Row, Row Your Boat*) except this one uses movement instead. Each sphere represents a motif\*.

**\*A motif is a recurring theme or subject; many times it is distinctive in form and represents a central or dominant idea.**

4) What distinguishes the different spheres, besides where they are located in the space, is the different ways the dancers must move depending on which sphere they are in. Because the amount of space and number of dancers varies in each sphere, the movement choices that each dancer makes will be different with each sphere.

5) The Troposphere group starts first and after they finish just four counts of their 16-count phrase, the Stratosphere group starts and so on for each sphere. Each sphere completes 32 counts (8 going - 8 frozen in a shape - 8 going - 8 frozen in a shape). This creates an overlapping effect to the movement. Diagram 5 shows how this works.

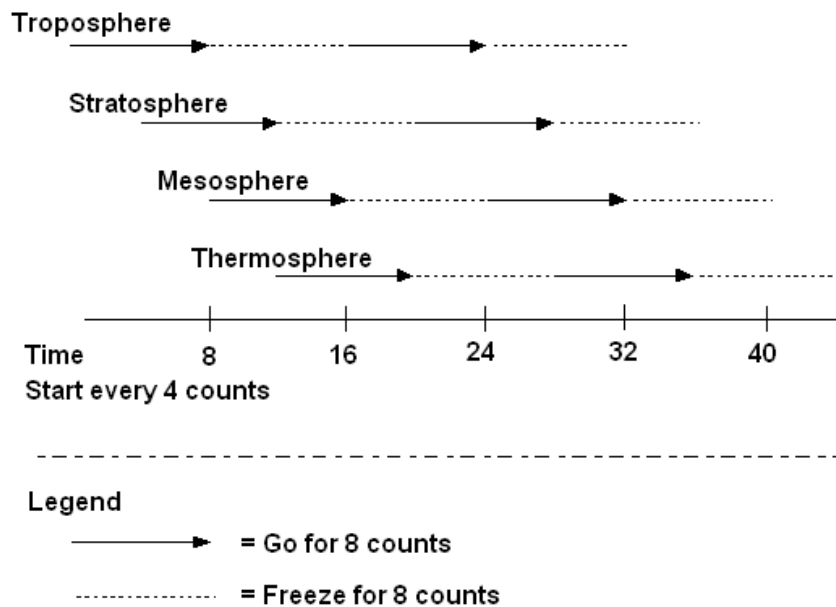


Diagram 5

6) There are more variations your students can create by manipulating the elements of dance. For example, to develop the time element, you could:

- change the order in which the spheres start.
- change the length of the phrase to 4 counts instead of 8 counts.
- change the length of time at which the motifs start in the cannon. For example, have the motifs start after 8 counts instead of 4.
- change the length of time that the dancers stop and go. For example go for 6 counts and hold for 4 or go for 10 counts and hold for 12.

For the element of space, you could:

- stop in different shapes that represent the various chemical compositions of the different spheres
- have the dancers move at lower level for the lower spheres and move at higher levels for the higher spheres

For the element of energy, you could:

- move with more vibratory action for the lower warmer spheres than the higher cooler spheres

7) To evaluate the students' performance of this activity, either by the teacher or the students, please see Table 1 – Sphere's Density Dance Rubric/Checklist on the next page.

### Teacher Reflection

- How was the activity organized? What was the sequence of activities that guided the creative process?
- What structures were used to manage the movement of the students and help them establish the needed skill set?
- What movements did the students create or construct that demonstrated they had learned or understood the concepts taught in the activity?
- What aspects of differentiated learning were incorporated into this activity?
- What concerns do you have for implementing the lesson presented into your classroom?

**Table – 1 Sphere's Density Dance Rubric / Checklist**

<b>Criteria</b>	<b>Advanced</b>	<b>Proficient</b>	<b>Novice</b>
Awareness of personal space and group space	Seldom loses track of personal space. Immediately identifies and moves into space that is empty.	Occasionally loses track of personal space. Identifies and moves into space that is empty.	Attempts to maintain personal space, but bumps into other students on regular basis.
Varies locomotor skills	As amount of available space changes, immediate changes are made in size, direction, and speed of locomotor skills.	As amount of available space changes, delayed changes are made in size, speed, and direction of locomotor skills.	As amount of available space changes, attempts to make changes in size, speed, and direction of locomotor skills.
Varies levels	Uses all three levels fluently in stationary movements and can change levels while traveling through space with a variety of locomotor skills.	Uses all three levels in stationary movements and can change level while traveling through space.	Attempts to use all three levels in stationary movements.
Varies body shapes and maintains them with stillness	Uses all three levels in shape choices. Can maintain a still shape for at least 15 seconds, including balancing on one foot and while moving through space.	Uses all three levels in shape choices. Can maintain a still shape for at least 5 seconds. Can maintain a shape while moving through space.	Attempts to use all three levels in shape choices. Attempts to maintain a still shape for at least 5 seconds.
Identify specific shapes and locomotor skills	Can identify the levels of shapes including those that are in-between levels. Identifies and demonstrates basic locomotor skills and can recombine them with changes in levels.	Can identify the levels of shapes and demonstrate basic locomotor skills.	Attempts to identify the levels of shapes and the seven basic locomotor skills.
Track and count beats in a musical phrase	Can accurately keep a steady beat, change tempos, and find the downbeat in a musical phrase.	Can accurately keep a steady beat.	Attempts to keep a steady beat.
Communicates with the body an understanding of the layers of the atmosphere and air density	Consistently and accurately demonstrates atmosphere layers and air density by moving the body to represent the intended concept in inventive or surprising ways.	Most of the time accurately demonstrates atmosphere layers and air density by moving the body to represent the intended concept in typical or expected ways.	Attempts to demonstrate atmosphere layers and air density by moving the body to represent the intended concept.
Demonstrates composition forms of motif and variation and canon	Creates phrases of movement that are repeatable and organized with composition forms/structures in inventive or surprising ways. Transitions between phrases are smooth and clear.	Creates phrases of movement that are repeatable and organized with composition forms. Transitions between phrases are rough or unclear.	Attempts to create phrases of movement that are repeatable. Attempts to organize them with classical composition forms.

## Learning Activity 2: Kaleidoscopic Cloud Dance

### Summary:

Focusing specifically on clouds in the troposphere, this lesson introduces cloud types and their associated altitudes directly to dance concepts of level, motif and shape. Participants use movement skills to learn and communicate information about the structure of the atmosphere and objects in the sky

### Objectives

Students will:

- demonstrate control of the hand and body to create and hold a shape, connect it to a partner's hand or body and maintain a light touch.
- identify and sequence the correct order of movement or events.
- create meaning and relationships with body shapes and placement.
- relate specific cloud types and their associated altitudes to dance concepts of level and body shapes.
- explore and contribute to the creation of a group improvisational dance with a central theme of clouds.

National Science Standards (Earth and Space Science)	National Dance Standards	Common Core State Standards
Objects in the sky Changes in earth and sky Structure of the earth system	Identifies and demonstrates movement elements and skills  Understands dance as a way to create and communicate meaning  Understands choreographic principles, processes, and structures  Applies critical and creative thinking skills in dance	<b>Key Ideas and Details -</b> Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.  Determine the main idea of a text and explain how it is supported by key details; summarize the text.



# Procedure for Kaleidoscopic Cloud Dance

## Preparation

### Materials –

- Hand Drum – for giving aural cues for the movement exercises
- Blackboard or whiteboard – appropriate markers
- Music – Teacher’s or student’s choice. Recommended, Trammel Starks’, *Evening Storms*.

## Preparation Activity #1 – Hand Sculptures (a.k.a. “The ABCD Game”)

**Purpose:** To give students a simple structure for creating shapes together.

### Directions:

- 1) Start by demonstrating with another student, “Hand Sculptures”. Each hand of the two partners is given a letter name. A and C are given to the first partner and B and D are assigned to the second partner. The first partner's hand (A) makes a shape in the space between the partners, and then the second partner makes a shape with his or her hand (B) and connects that hand to shape A.
- 2) Next, the first partner adds their second hand shape (C) to the group shape and last, the second partner connects his or her second hand (D). The result is a unique hand sculpture. While you are demonstrating the making of a hand sculpture, remind the students of some basic rules:

### Hand Sculptures & the ABCD Game – Ground Rules

Remember the sequence (ABCD).  
When connecting shapes, there is a weightless or light touch used.  
Once a shape is added on, stay in the original shape.  
When adding on, do not disturb or change the other shapes.

- 3) The hand sculpture is then taken apart in the same order with A leaving first, followed by B, C, and then D. When you take apart the group shape, be sure to leave all the other hands exactly where they are in the space, until it is their time to leave.
- 4) Have the students choose a partner, or assign one. Let each duet create and take apart hand sculptures for awhile. Observe and make corrections where necessary.

## Preparation Activity #2 - Body Twister

**Purpose:** To give students a structure that allows them to experience new ways of creating shapes together.

### Directions:

- 1) Demonstrate Body Twister with a student.
- 2) Assign or let students chose a partner.
- 3) Remind them that for the next activity, they must follow the same rules as with the hand sculptures, and not put weight on each other, or change each other's shape when connecting.
- 4) Both students connect their whole-body shapes following cues you give them. Each student makes their own shape, but the shapes are connected by the body part(s) you ask them to connect. For example, instruct them to connect a shape that is "elbow to elbow", "foot to foot", "knee to knee", or "shoulder to shoulder".
- 5) Next, give them cross connections: one partner's elbow and the other partner's knee for an elbow to knee connection. Give them the body part(s) connection(s) to cue them to make a shape together. Play around with different combinations, and gradually make the connections more complex, i.e., the finished shape has three points of contact: "hand to shoulder", "foot to foot", and "elbow to knee."
- 6) Let the students arrive at their own spontaneous combinations. Encourage them to avoid planning. You want them to be just reacting and improvising.

## Preparation Activity #3 - Free Form Tableau\*

**Purpose:** To illustrate that grouping or connecting whole body shapes together can communicate an idea, scene, or situation.

**\*A Tableau is a picture or scene. It can involve a grouping of persons striking a scene or situation. It can also represent an object or objects. Generally, a tableau is still or frozen and represents a moment in time.**

### Directions:

- 1) Pair a duet (2 students) with another duet and form quartets (4 students). If you don't have an even number of students, five in a group is OK. Have them repeat the hand sculptures exercise, except this time with their whole bodies. Each student is assigned a letter (A, B, C, or D). Student A makes the first shape and the other students add on in order. After the group shape or tableau is completed, the students take it apart in the ABCD order. Have the students practice this without the teacher leading. Observe their work and make necessary corrections.
- 2) Have each group build a group shape or tableau, one group at a time, and ask the rest of the class to observe. Ask the students who are observing to give each group sculpture a title.

Make sure the students understand that there is no one correct answer and that the sculpture can be anything they imagine. After all the groups have demonstrated, ask them if they had a plan before they made the sculptures. The answer, of course, is that they didn't. They just simply put some forms (bodies) together to make a group sculpture, and each person was free to interpret what they saw.

3) Refer to Diagram 6 and show the students how you are going to zoom in on the troposphere.

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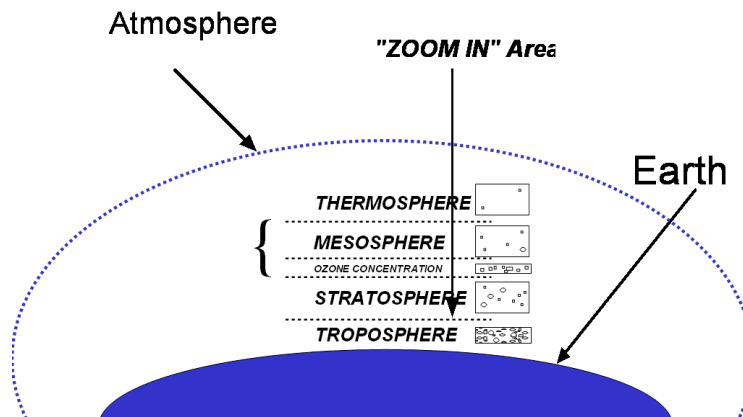


Diagram 6

4) Refer to Diagram 7 and show the students how the troposphere is divided into three levels.

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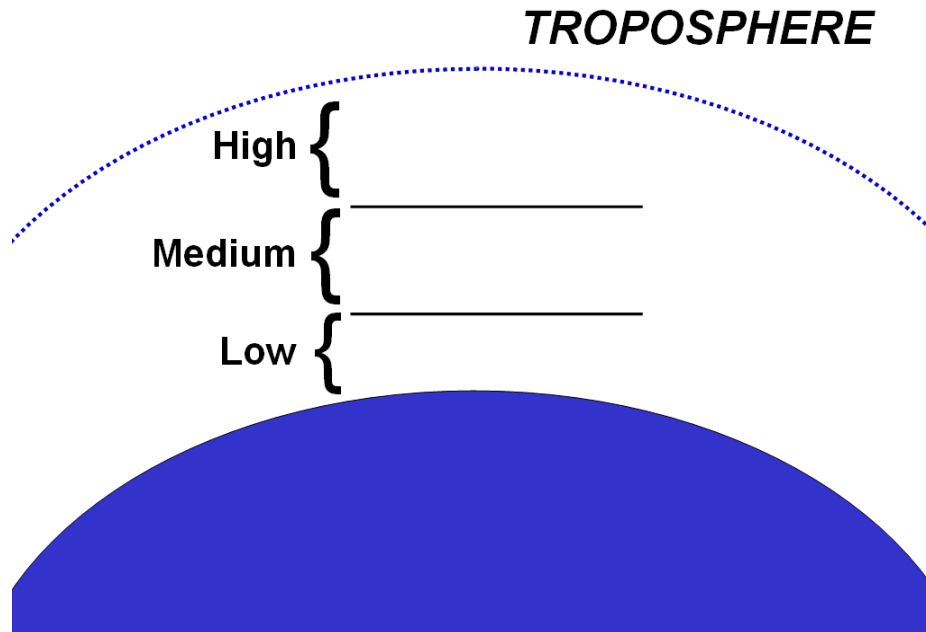


Diagram 7

5) Explain to the students that specific cloud types form at specific levels in the troposphere (see Diagram 8).

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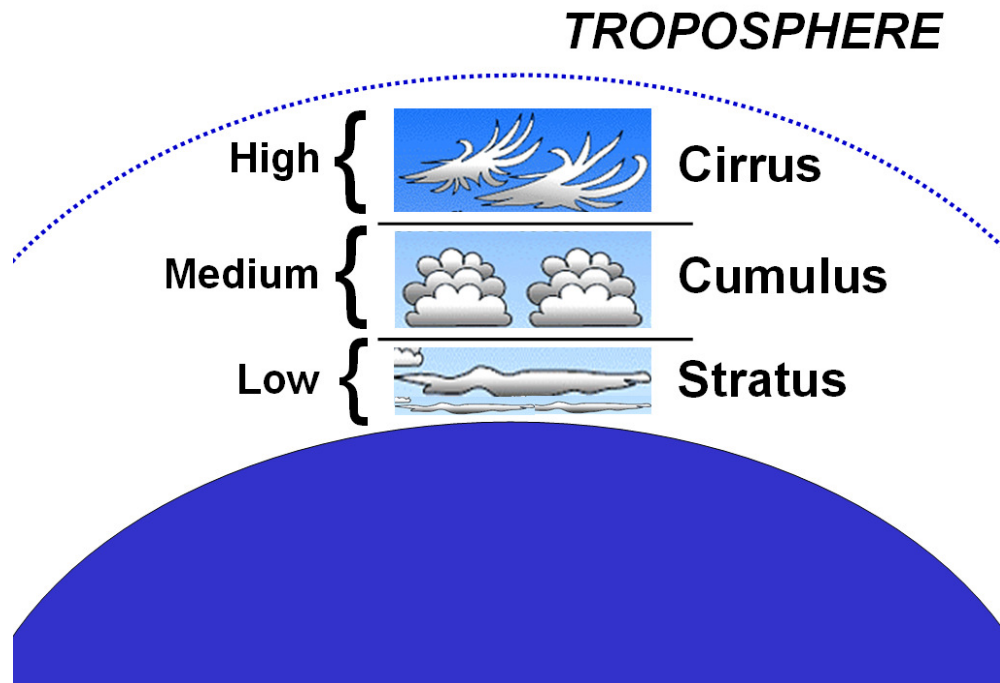


Diagram 8

#### Preparation Activity #4 - Cloud Tableaux

**Purpose:** To use the Tableau structure to create stratus, cumulus, and cirrus cloud pictures

**Directions:**

- 1) Have the students go back to their quartets (or quintets) and ask them to create a tableau (picture) of the clouds. Explain that you want them to pick a cloud type and use their bodies to represent that cloud.
- 2) They will show the shape as well as the correct level of a particular cloud type. For example, a cirrus tableau will have everybody in a high level with long wavy shapes connected together. Give them two or three minutes to do this.

## Kaleidoscopic Cloud Dance

**Purpose:** To create a structured improvisation about clouds using the Stop & Go and Tableau structures together.

### Directions:

- 1) Now you can combine the tableaux with the previous structure of "Stop and Go" to make an improvised cloud dance.
- 2) Explain to the students that they are no longer working in the quartets, but with the whole group.
- 3) Tell the students that when they stop to make a shape in the dance, they need to use only cloud shapes. Explain further that when they are in the cloud shapes, it is an opportunity for other students to connect onto the shape they are making. The students are free to connect any cloud shape and leave the group shape whenever they want.

### Habits of Mind Framework - Envision

*Learning to picture mentally what cannot be directly observed and imagine possible next steps in making a piece.*

- 4) The resulting dance is a kaleidoscopic effect of cloud shapes coming together and separating with varying timing and groupings. For this part of the activity you can use the *Evening Storms* music by Trammel Starks.

### Assessment Moment

- "What did you notice about the work of your fellow students?"
- "Did you have any ideas you didn't use?"
- "What do you think others observed in your work?"
- "What would you do differently next time?"
- "What does this work make you want to do next?"

- 5) To evaluate the students' performance of this activity, either by the teacher or the students, please see Table 2 – Kaleidoscopic Cloud Dance Rubric/Checklist on the next page.

## Teacher Reflection

- Why did constructing my understanding of the science concepts through dance deepen my comprehension of the science concepts presented in the lessons?
- What other skills or competencies are students learning in this activity?
- What other subject areas or concepts can be taught with the tableau structure?
- What concerns do you have for implementing the lesson presented into your classroom?

**Table – 2 Kaleidoscopic Cloud Dance Rubric / Checklist**

<b>Criteria</b>	<b>Advanced</b>	<b>Proficient</b>	<b>Novice</b>
Holds a shape and connects to partner's body with control and awareness	Maintains awareness of personal space. Demonstrates a light touch while connecting a balanced or challenging fixed shape to a partner. Uses a range of levels and parts of the body when creating and connecting shapes.	Maintains awareness of personal space. Demonstrates a light touch while connecting a fixed shape to a partner.	Attempts to be aware of personal space. Attempts to maintain a light touch while connecting a fixed shape to a partner.
Memorizes the ABCD order or new sequence	Constructs and deconstructs the tableaux in the correct order without assistance. Can easily reverse sequence order or memorize new sequences	Constructs and deconstructs the tableaux in the correct order without assistance.	Attempts to construct and deconstruct the tableaux in the correct order.
Understands meaning is created with body shapes and placement	Makes inventive, unexpected, or surprising choices with body shapes and placement that demonstrates an ability to communicate many different ideas or concepts.	Makes choices with body shapes and placement that demonstrates an ability to communicate a specific idea or concept.	Attempts to make choices with body shapes and placement that demonstrate an ability to communicate an idea or concept.
Relates specific cloud types and their associated altitudes to level and body shapes	Makes choices with body shape, level, and placement that exemplify the form, structure and altitude of cirrus, cumulus, and stratus clouds. Can mix cloud types and represent them accurately with the body, i.e., cirrocumulus or cumulostratus.	Makes choices with body shape, level, and placement that exemplify the form, structure and altitude of cirrus, cumulus, and stratus clouds.	Attempts to makes choices with body shape, level, and placement that exemplify the form, structure and altitude of cirrus, cumulus, and stratus clouds
Contributes to the creation of a group improvisational dance with a central theme of clouds	Contributes to developing cloud tableaux's by consistently making concise movement decisions that demonstrate an awareness of the others dancers' use of motif and variation to communicate cloud types. Transitions from one cloud type to another cloud type in a manner that is specific and clear	Contributes to developing cloud tableaux's by making movement decisions that demonstrate an awareness of the others dancers' use of motif and variation to communicate cloud types.	Attempts to contribute to developing cloud tableaux's.

# Learning Activity 3: Dancing Winds

## Summary:

This lesson introduces the expanding and condensing properties of air masses and the unequal heating of the earth as the force behind the wind. Working with principles of choreography, participants use movement skills to learn and communicate information about the structure and attributes of the atmosphere.

## Objectives

Students will:

- create meaning and relationships with body movement, shapes and placement.
- relate movement to rising heating air and sinking cooling air.
- create a movement motif that demonstrates the movement characteristics of air masses and the wind.
- create variations on a movement motif.

National Science Standards (Earth and Space Science)	National Dance Standards	Common Core State Standards
Objects in the sky Changes in earth and sky Structure of the earth system	Identifies and demonstrates movement elements and skills  Understands dance as a way to create and communicate meaning  Understands choreographic principles, processes, and structures  Applies critical and creative thinking skills in dance	<b>Integration of Knowledge and Ideas</b> - Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).  Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

# Procedure for Dancing Winds

## Preparation

### Materials –

- Hand Drum – for giving aural cues for the movement exercises
  - Blackboard or whiteboard – appropriate markers
  - Music – Teacher’s or student’s choice. Recommended, Trammel Starks’, *Evening Storms*.
- Draw and explain to the students how a thermometer works (see Diagrams 9 & 10).

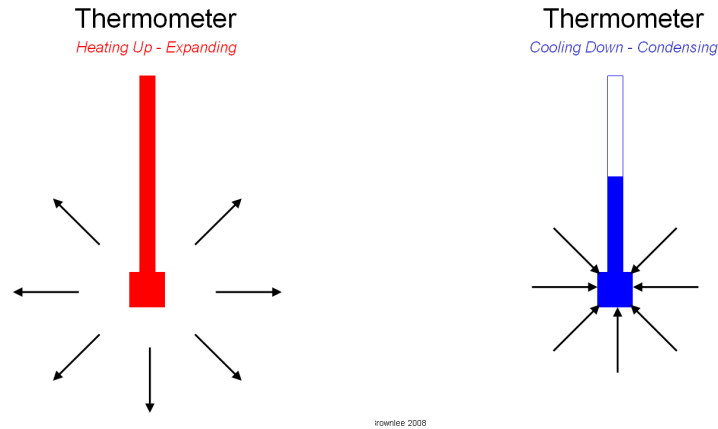
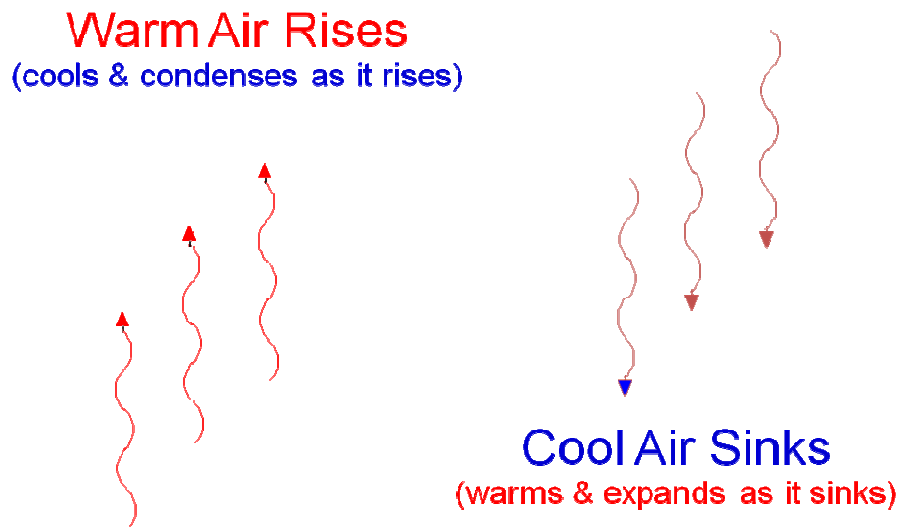


Diagram 9



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Diagram 10

- Reiterate the concept of space between the molecules, as in the shrinking wall exercise. As the mercury in the thermometer warms, it rises. As the mercury in the thermometer cools, it sinks. The same is true of air.



## Preparation Activity #1 - Properties of Air

**Purpose:** To demonstrate the concept that warm air rises and cool air sinks and demonstrate how the unequal heating of the earth is responsible for the phenomena of wind and weather on the earth.

### Directions:

- 1) Have the students go into the dance space. Using your hand or the scales of a musical instrument as a guide, raise your hand slowly or ascend a musical scale and the students slowly rise to a high level. Lower your hand and the students sink down to a low level.
- 2) Now, to make this as realistic as possible, tell the students they are just like a parcel of air. Start in a high level with a tight shape and sink while simultaneously expanding, then from a low level in an expanded shape, rise while simultaneously condensing. Play around with the timing, sometimes fast, sometimes slow. Let the students try it with their own timing.
- 3) Give the students the opportunity to experiment with the two ideas, while moving about the space. Challenge them, by asking them to try a galloping, shrinking rise, or a sinking, expanding hop.
- 4) Show them Diagram 11 and tell them that now they are going to learn the reason we experience weather phenomena on our planet and how the wind is created.

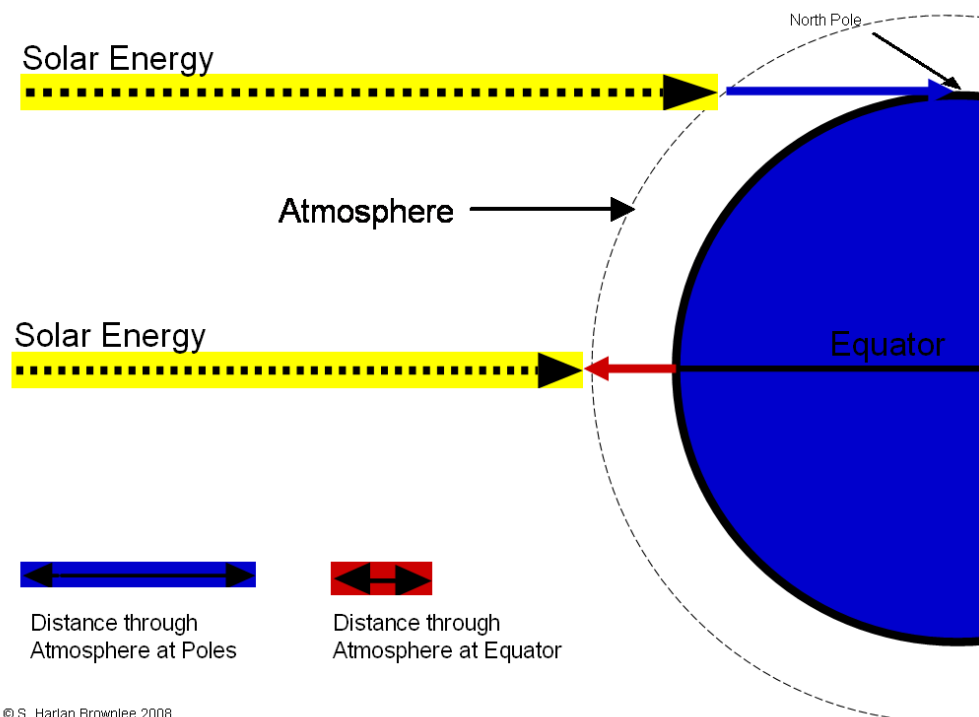
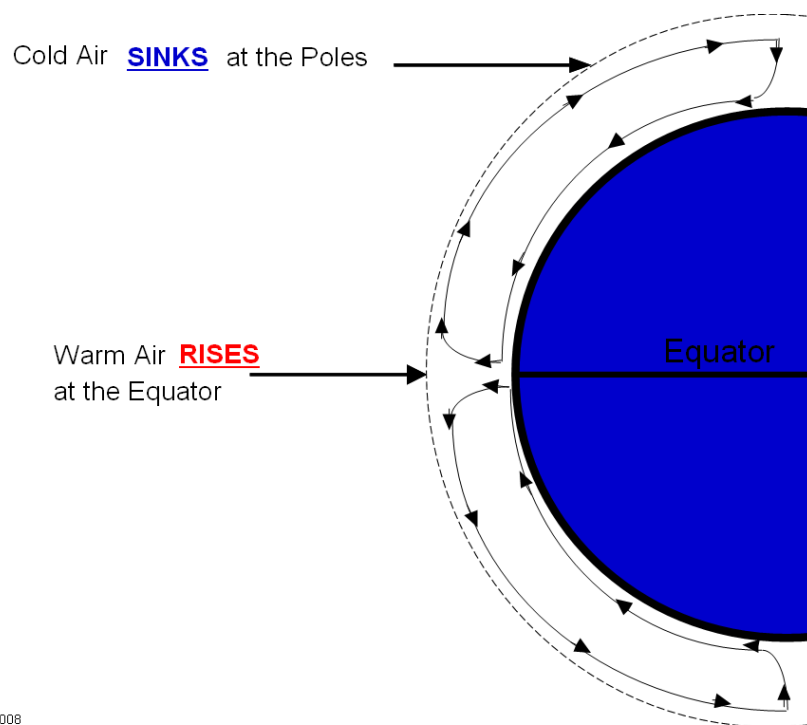


Diagram 11

5) Explain that solar energy from the sun does not heat the earth equally. From Diagram 11, show them that energy traveling through the atmosphere, at the equator, must pass through a smaller amount of atmosphere than at the poles. Explain that when the solar energy reaches the earth's atmosphere, it is very intense. But as the solar energy passes through the atmosphere, it loses intensity. The solar energy passing through at the equator does not lose as much energy as the solar energy at the poles, because it passes through less atmosphere.

6) Show them Diagram 12 and illustrate how, at the equator, the large amount of solar energy heats the earth, which in turn heats the air and it rises. Conversely, at the poles the lower amounts of solar energy heat the earth very little and the cooling air sinks.



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Diagram 12

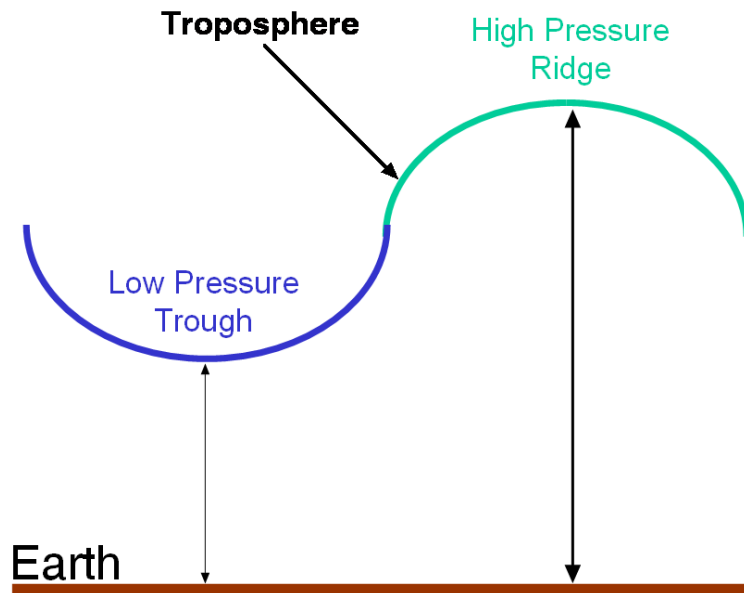
7) Help the students understand that as the air from the equator rises and the air at the poles sinks, it creates a cycle of air motion that becomes the wind.

## Preparation Activity # 2 - Air Pressure

**Purpose:** To demonstrate the concept of air pressure through a kinesthetic activity.

**Directions:**

1) High and Low Pressure Areas - Show the students Diagram 13 and explain how the troposphere is not smooth, but has ridges and troughs in it.



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Diagram 13

2) Explain that air has weight. When the column of air is high, there is more air to exert pressure or weight. When the column of air is low, there is less air weight or low pressure. We don't usually notice air pressure, because it is there from the moment we are conscious. Ask the students if they have ever swam deep in a pool, perhaps lower than ten feet. Did they notice the pressure on their ears? Have they ever been in a plane or elevator and noticed their ears popping? These are examples of air pressure changes.

3) Pair the students up with a partner close to the same size and weight. Ask them to stand across from each other and very slowly lean hand to hand into each other. Ask them to be very careful. Look for those students that are being careful and use them as an example of what you want.

4) Demonstrate to the students that as you stand farther apart from each other and lean in, you experience or feel more pressure or weight in your hands. When you stand close and lean in, you feel less weight or pressure. Relate this experience back to Diagram 13.

### Preparation Activity # 3 - Low & High Pressure Systems

**Purpose:** To demonstrate how the properties of air (warm vs. cool, expanding vs. contracting, and, low pressure vs. high pressure) all contribute to the properties of low and high pressure systems.

**Directions:**

- 1) The next step is to ask the students to re-create the air motion of high and low-pressure areas. Show them what clockwise and counter-clockwise motion looks like. Place yourself at the center of the room, and having the students circle around, is a good way to demonstrate the motion around a center point.
- 2) You tell the students in which direction to move and when to change.
- 3) After the students have learned the directions, you can have them repeat the exercise, except this time you either rise in place or sink in place, depending on which circling action you have asked for. For example, you call out "low pressure" and the students begin to circle you in a counter-clockwise motion, and simultaneously you (the teacher) move from low level to high level.
- 4) You can then add on, asking the students to incorporate rising or descending action depending on their circling action. For example, you call out "high pressure"; the students circle you in a clockwise motion and both you and the students simultaneously sink from high to low.
- 5) Next, you can examine how the pressure areas also contract or expand. If you were working on a low-pressure area, you would ask the students to go from low to high in a counter-clockwise motion and simultaneously move from the outer edges to the center of the room.
- 6) High pressure is exactly the opposite. See diagrams 14 & 15 for a visual representation of the air motion around high and low pressure areas.

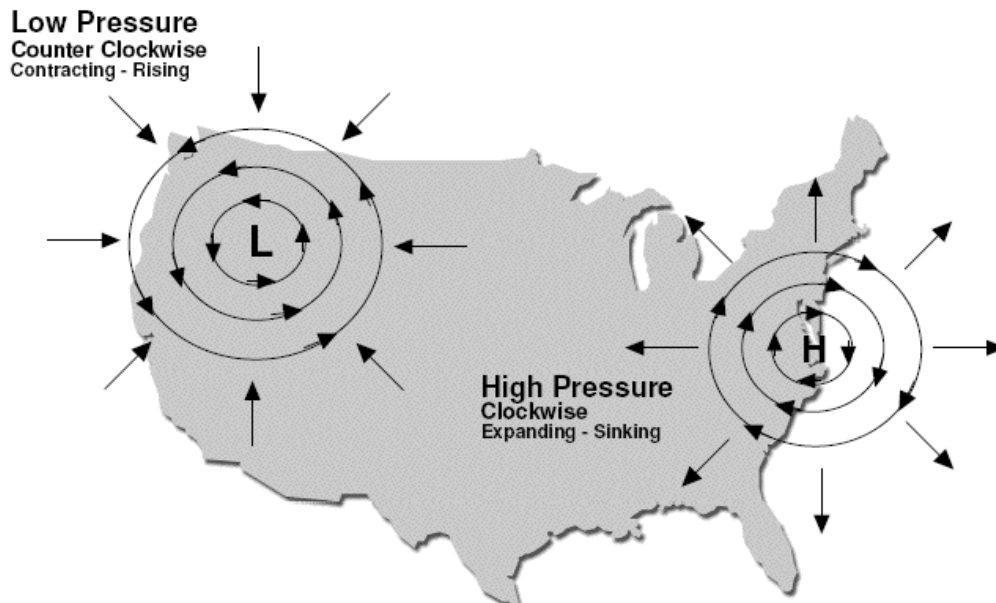
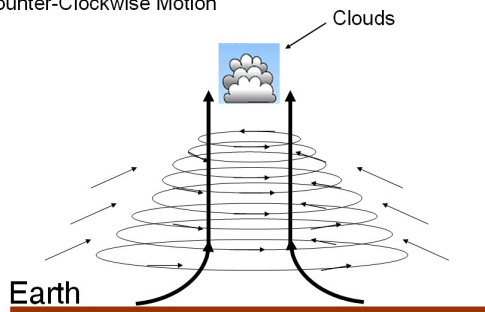


Diagram 14

## Low Pressure

Contracting – Rising  
Counter-Clockwise Motion



## High Pressure

Expanding – Descending  
Clockwise Motion

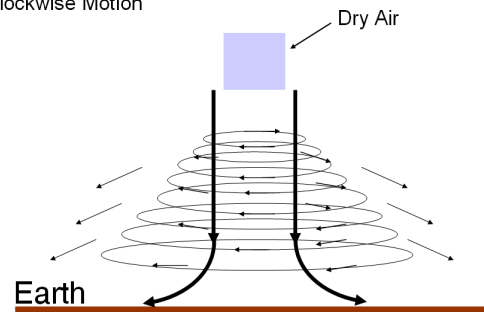


Diagram 15

### Authentic Assessment - the "Pilot's Logbook Dance"

**Purpose:** To assess the students' understanding of weather concepts through the creation of a choreographed\* Pilot's Logbook Dance based on a pilot's logbook entry.

**\*Choreography is the art of composing or planning and arranging the movements, steps, and patterns of dancers.**

#### Directions:

1) The first task for the students is to read the Pilot's Logbook entries (see below). Pilots keep track of their hours, type of flight, destination, flight circumstances and weather conditions. Listed below are the flight circumstances and weather conditions.

#### Pilot's Logbook Entries

A. Today, winds aloft were westerly and 15 knots at both 3,000 and 12,000 feet. So, I decided to climb to 12,500 feet. Ground speed increased from 125 mph at 3,000 feet to 155 mph at 12,500 feet. Saved about 28 gallons of fuel.

B. Intended route today takes me directly into an approaching warm front. Cloud cover started with high cirrus and ended with nasty visibility and multiple stratus layers.

C. This leg of my trip was my fastest. My intended route took me south with a low-pressure area to my east and a high-pressure area to my west. The combined winds of the two pressure areas contributed to my fastest ground speed yet, 204 mph!

2) As the students examine each entry and decide what are the forces or dynamics at work creating the weather phenomena described. At this point in the lesson, the students need to be critically analyzing each entry.

**Habits of Mind Framework - Engage & Persist**

*Learning to embrace problems of relevance within the art world and/or of personal importance, to develop focus and other mental states conducive to working and persevering at art tasks.*

3) Review with the students the major concepts of wind motion in the Northern Hemisphere that you have just covered:

- a. Wind related concepts:
  - i. Air masses rise and condense or descend and expand.
  - ii. The wind moves in a circle or cycle.
  - iii. The wind turns clockwise and expands, or counterclockwise and condenses. See Diagrams 14 & 15.
  - iv. A combination of the above concepts, e.g., counterclockwise motions that is rising and condensing like a low-pressure area.

4) Put the students into groups of 3, 4, or 5. Either assign or let the students decide which one of the Pilot's Logbook entries they want to re-create. Let them work together. Be sure to let them know that there is a time limit (15 to 20 minutes) on completing each segment of the "Logbook Dance" and you will want to see their completed work.

5) Once the decision is made regarding which of the entries in the Pilot's Logbook to use, the students can ask and answer the following questions to assist them in clarifying what they want to communicate in their wind dance

- a. Which weather concepts that we have previously studied are mentioned?
- b. How do these concepts help or hinder the pilot?
- c. What are the unique qualities of the chosen concept and how is it different from the other weather related concepts?
- d. How will we communicate these concepts through movement?

6) For example, if you chose item A, you create a phrase of movement that shows the characteristics of higher air density creating greater drag on the airplane. Knowing that the only difference in conditions described in item A is the higher altitude, you reason that a climb will reduce air density resulting in less resistance and a faster ground speed.

7) The movement sequence should be 20 to 30 seconds long and as simple or complex as the students wish. Parts of the movement sequence can be repeated within the body of the phrase.

8) After the students create their choreographed Pilot's Logbook Dance, ask them to set the movements to counts. This will help them do the choreography together and give it some cohesiveness.

9) Check to see that the students have some mastery of the choreography. They should have it memorized and be able to physically and technically accomplish what they have decided to do.

## Pilot's Logbook Dance -Variation

**Purpose:** To illustrate how a variation on the choreographed Pilot's Logbook Dance can be created using the elements of dance.

### Directions:

- 1) Distribute the Elements of Dance sheet.
- 2) Introduce the Elements of Dance by briefly discussing and demonstrating the concepts presented. You will want to give examples of each concept with a physical demonstration. The best way to do this is pick a simple movement, ask the students to help you describe the movement you chose in terms of the elements of dance, and then show them how the movement can change with the application of each concept.
- 3) For example, choose a movement that has you standing with your arms at your side, palms facing your legs and you lift your arms up, fully extended, to the height of your shoulders, palms up. Ask the students to help you describe the movement.
- 4) Using the Elements of Dance sheet, explain to the students that the movement had the following characteristics: the hands move from low to high, the arms move away from the body (abduction) , the motion is smooth in its use of energy, and the body remains in one place (axial movement).
- 5) Now you will demonstrate to the students the creation of a variation on the original motif. In dance, variation is a formal technique where the motif is altered with changes. In this lesson, the changes will involve the elements of dance; body, energy, space, and time.
- 6) Working with the element of body you can show this same motif, but you can create a variation by lifting your elbows or your legs. Working with the element of Time, you can take the original movement and show it faster or slower. Working with Energy you can take the original movement and execute it in a very sudden and percussive manner.
- 7) As you demonstrate the application of the elements to create variation, ask the students to try out the concepts with you.
- 8) You will want to go through the listing of the concepts on the Elements of Dance handout and apply them to your original movement to show and let the students experience how the concepts relate to your original movement.
- 9) Once the students perform the choreographed Pilot's Logbook Dance, encourage them to change the movement by using the elements of dance that you have just demonstrated for them. For example, slow or speed up the choreography; do the movements with just one or two parts of the body; change the pathway of the choreography, etc.

### Habits of Mind Framework - Stretch & Explore

*Learning to reach beyond one's capacities, to explore playfully without a preconceived plan, and to embrace the opportunity to learn from mistakes and accidents.*

## Student Reflection

Questions you might ask:

### Weather question

- Which weather concept(s) did you choreograph?

### Dance questions

- What movement decisions did you make to show us the concept?
- Which of the elements of dance did you use to change the movement?

### *Assessment Moment*

- *“What did you notice about the work of your fellow students?”*
- *“Did you have any ideas you didn’t use?”*
- *“What do you think others observed in your work”*
- *“What would you do differently next time?”*
- *“What does this work make you want to do next?”*

To evaluate the students’ performance of this activity, either by the teacher or the students, please see Table 3 – Dancing Winds Rubric/Pilot’s Logbook Dance Checklist on the next page.

## Teacher Reflection

- How do we change the activity from a movement exercise into a dance?
- How did the various groups incorporate the elements of dance?
- How will the creative process used in the workshop enhance the students’ movement literacy or ability to communicate using dance and movement?
- What are the benefits of teaching incorporating movement and dance?
- What concerns do you have for implementing the lesson presented into your classroom?



**Table – 3 Dancing Winds Rubric / Pilot’s Logbook Dance Checklist**

<b>Criteria</b>	<b>Advanced</b>	<b>Proficient</b>	<b>Novice</b>
Works successfully with a partner or small group.	Pays attention to and remains engaged in the activity involving a partner or small group. Contributes ideas and considers the ideas of others for the task at hand. Takes a leadership role when working with less experienced partners or group members	Pays attention to and remains engaged in the activity involving a partner or small group. Contributes ideas and considers the ideas of others for the task at hand.	Attempts to pay attention to and remain engaged in the activity involving a partner or small group. Does not contribute ideas for the task at hand.
Creates a movement motif that demonstrates one of the characteristics of air masses	Creates a movement motif that accurately and with detail has the attributes of air masses.	Creates a movement motif that has attributes of air masses.	Attempts to create a movement motif that has attributes of air masses.
Creates variations on a movement motif	Creates and combines variations on a motif that cross over using more than one element or sub-element of dance.	Creates a variation on a motif using only one of the basic elements of dance.	Attempts to create variation on a movement motif.
Analyzes and interprets each entry of the Pilot's Logbook and creates a movement study explaining the forces or dynamics at work for the weather phenomena and/or scenario described	Makes movement choices that demonstrate an advanced understanding of the weather phenomena described. Movement choices are literal and metaphorical with elaboration and/or insight and are presented integrating multiple concepts together.	Makes movement choices that demonstrate a basic understanding of the weather phenomena described. Movements are literal with little elaboration or insight and presented one concept at a time.	Attempts to make movement choices that demonstrate a general or basic understanding of the weather phenomena described.

**Closure**

- A. Summary of the Workshop
- B. Evaluations

# Arts Integration...Online!

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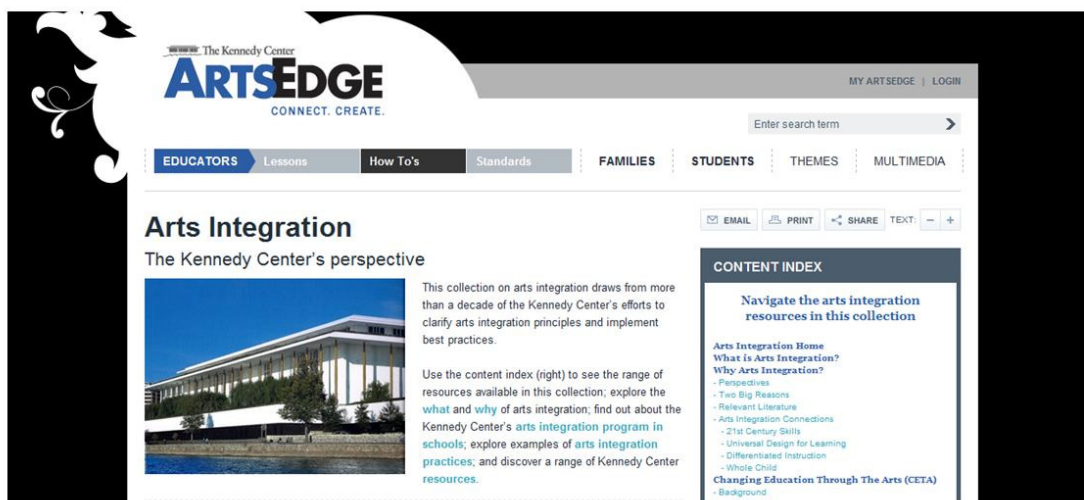
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## Classroom Management Strategies

**Expectations:** Let the students know that you expect them to work and behave with the discipline of a dancer. Dance class is a time to focus and work with the body. Be clear that you expect the students to use and remember the space bubble. Be sure to communicate to the students what the rewards and consequences are for their behavior.

**Preparing the room:** Since many times a gym or large space is not available, the classroom is the place for a movement lesson. Work on establishing a routine for putting all the desks to the sides of the room and getting the desks back in place at the end of the lesson. Have the students rehearse and memorize it.

**Cues:** The more sounds, visual cues and the greater variety of those aural and visual cues you can provide for students, the better. You can use handclaps, a tambourine, a drum, electronic keyboard, or any other number of percussive instruments. The word "freeze" is very effective for stopping a student immediately.

**Spatial Arrangements:** Use different arrangements of student groups in class, i.e., student sit or stand in lines, circles, groupings. Students can work as a whole group, divided into two or three large groups, multiple small groups, and partner with one other individual.

**Working with Partners:** You can either select a partner for students or let them choose. Younger children sometimes have more difficulty picking their own partners. If you assign partners, tell students that you expect them to work with their assigned partner(s). If they select their own partners and they are not working well together, change their partners. Be sure to review all of the rules of an activity before the students start working with their partner.

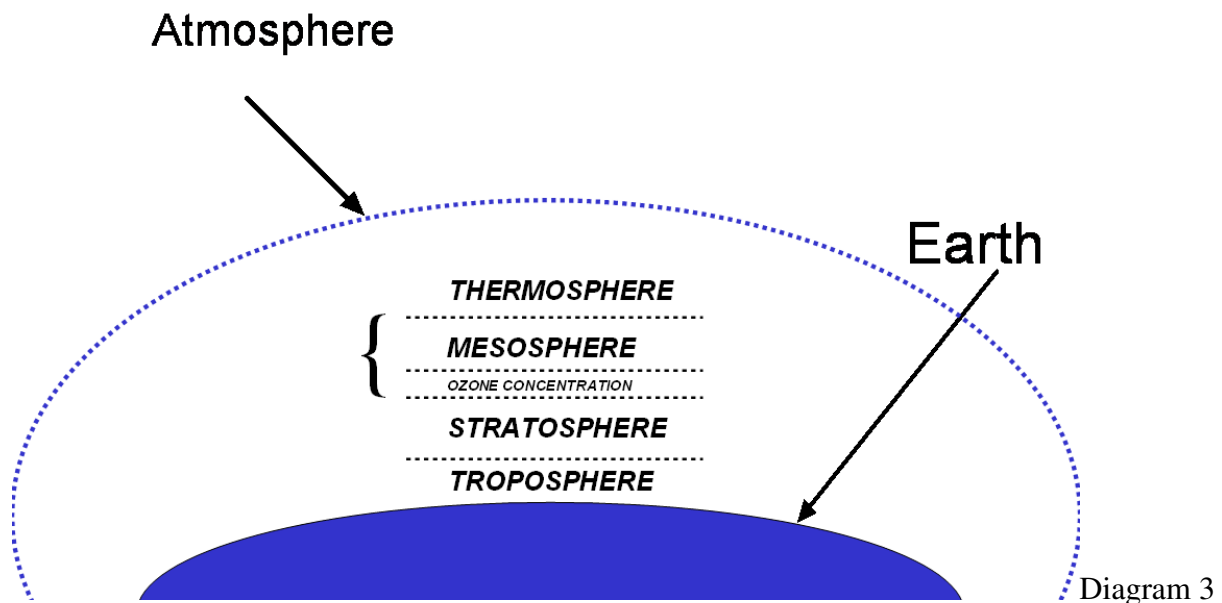
**Time Limits:** To keep students on task, give them time limits. This is especially important when students are working in groups or with partners.

**Commenting on students' work:** Make sure when you respond to a student work that you describe it with the vocabulary of the dancer or choreographer. For example, "*I see John turning in a clockwise fashion with movement that is expanding and moving from high to low*" or "*I see Sally creating long wispy shapes in a high level that remind me of cirrus clouds.*" Be generous with praise and use thoughtful corrections. Remember that dance is a language and a physical skill. It does take time to acquire some fluency and skill. When first starting with movement in a classroom, be patient. You will discover that with consistent practice, the students will become quite good at using movement to communicate ideas and concepts.

## Directions for Atmosphere Tape Markings

- 1) Using making tape, create a model of the four levels of the atmosphere.
- 2) First decide which side of the room will be the earth. It is not necessary to have any space representing the earth, other than the wall.
- 3) You can prepare the model either in advance of conducting the lesson or at the time you conduct the lesson. Plan on about five minutes to put the masking tape down on the floor and ask for several students to assist you.
- 4) Use Diagram 3 below as your guide. You do not need to label the different spheres, but you do need to put down tape markings denoting the ozone concentration area.
- 5) The Troposphere, Stratosphere, Mesosphere should all be relatively the same size, the Thermosphere extends the furthest into space and should be the largest extending to the wall opposite the earth end. The ozone concentration area is a part of the Mesosphere and will be the smallest space in the model.

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## The Elements of Dance and Movement

Body	Energy
<p style="text-align: center;"><b>Body Parts</b> head, trunk, arms, hands, etc.</p> <p style="text-align: center;"><b>Body Action</b> flexion, extension, rotation, adduction, abduction</p> <p style="text-align: center;"><b>Shift of Weight</b> in place (axial) moving through space (non-axial)</p>	<p style="text-align: center;"><b>Basic</b> sustained, shaking, percussive, swinging</p> <p style="text-align: center;"><b>Advanced</b> <b>Force</b> strong, medium, light <b>Flow of energy</b> free, bound <b>Direction of energy</b> expansive, contracting</p>
Space	Time
<p style="text-align: center;"><b>Level</b> high, medium, low, ground, air</p> <p style="text-align: center;"><b>Direction</b> forward, backward, sideways, diagonals</p> <p style="text-align: center;"><b>Locomotor Skills</b> walk, skip, gallop, hop, jump, leap, run</p> <p style="text-align: center;"><b>Pathway</b> curved, zigzag, straight indirect, combination</p> <p style="text-align: center;"><b>Focus</b> inward, outward, broad, specific</p> <p style="text-align: center;"><b>Spatial Planes</b> vertical, horizontal, lateral</p> <p style="text-align: center;"><b>Range of Action</b> small, medium, large</p>	<p style="text-align: center;"><b>Tempo (speed)</b> slow, medium, fast, accelerate, decelerate</p> <p style="text-align: center;"><b>Rhythm</b> pulse, accent, meter, syncopation</p>

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- Stagestep - Catalog for CDs, Books, and Films on Dance, 2000 Hamilton Street, Suite C200, Philadelphia, PA 19130  
800.523.0960 Fax 800.877.3342 / <http://www.stagestep.com>

## Web Sites

### 1. Lesson and Extension Specific Resources:

- a. Title: Highs & Lows

<http://www.col-ed.org/cur/sci/sci84.txt>

Description: The movement of air masses can be confusing and difficult for students to conceptualize. This activity aids in the understanding of high and low pressure behavior, vacuums, and molecular structure.

b. Title: Topic - Air

<http://www.lessonplanspage.com/ScienceLessonAir.htm>

Description: The students will be able to explain how air has weight and occupies space, although we cannot see it. Students will also understand that still air has more pushing power than does moving air.

## 2. General Internet Resources:

a. Title: Energy & Science Lesson Plans

[http://www.energyquest.ca.gov/teachers\\_resources/lesson\\_plans.html](http://www.energyquest.ca.gov/teachers_resources/lesson_plans.html)

Description: This website is a snapshot of some of the resources and lesson plans currently available on the Internet (and a couple of books) that deal with energy and science education.

b. Title: Lesson Plans / The Arts

[http://LessonPlanz.com/Lesson\\_Plans/The\\_Arts/](http://LessonPlanz.com/Lesson_Plans/The_Arts/)

Description: LessonPlanz.com is a searchable directory of free online lesson plans and resources for all grades and subjects. LessonPlanz.com was designed to provide an easier way for teachers to find online lesson plans and teaching resources. There are nearly 4,000 hand-selected and reviewed links to choose from.

- ArtsEdge, Collaboration with the Kennedy Center, The National Endowment for the Arts, and the U.S. Department of Education (links & lesson plans)  
<http://artsedge.kennedy-center.org/>
- Federal Resources for Educational Excellence - Arts  
<http://www.ed.gov/free/s-arts.html>
- Association for the Advancement of Arts Education  
<http://www.artslynx.org/artsed/>
- Arts Education Partnership  
<http://aep-arts.org/>

## Discography

- Enya, *Watermark*, New Age (great for mirroring - very calming)
- Starks, Trammel, *Evening Storms*, New Age with weather sound effects
- Hart, Mickey, *Planet Drum*, percussion - upbeat
- Tangerine Dream, *The Dream Mixes*, combination of Hip-Hop & Electronic
- *Three Hundred Spectacular Sound Effects* - Audio CD (September 20, 1995)  
Number of Discs: 3 ; ASIN: B000000LOL

## Sphere's Density Dance – Summary Sheet

### Preparation

#### Materials

- Masking tape – prepare atmosphere markings in advance of the lesson
- Hand Drum – for giving aural cues for the movement exercises
- Blackboard or whiteboard – appropriate markers
- Music – Teacher's or student's choice. Recommended - Mickey Hart's, *Planet Drum*.

#### Preparation Activity #1 – Establishing the Space Bubble (a.k.a. Atmosphere)

- 1) Establish the perimeter of the movement space in the classroom.
- 2) Ask the students to walk into the space and spread out evenly throughout the space. Placing themselves as far from each other as possible using all the available space.
- 3) Next, have the students define their kinespheres.

#### Preparation Activity #2 – Creating Shapes to Communicate Ideas

- 1) Let the students experiment with making different shapes with their bodies. Encourage them to try to make the shapes different each time.

#### Preparation Activity #3 – The Stop & Go Dance

- 1) Ask the students to walk through the space to a drum beat, clap, or type of musical accompaniment. Remind the students of the ground rules they need to follow.
- 2) The students should practice this exercise of maintaining awareness of the space and freezing when the music accompaniment stops until they have demonstrated some mastery or proficiency with the task.

#### Preparation Activity #4 - The Moving Wall

- 1) Ask students to walk in any direction throughout the room; using all the available space. You, as the teacher, slowly walk toward one of the other walls in the room with your arms extended. Nobody can go past your imaginary moving wall.
- 2) You can repeat *Moving Wall* a number of times to increase spatial awareness.

#### Preparation Activity #5 – Connecting Moving Wall to Air Density

- 1) Ask the students to form a seated semi-circle in front of you. Explain the difference in the distance between the particles of air.
- 2) Tell the students that their bodies are like the particles of air. Go into the space and repeat the shrinking wall exercise, this time telling them that they are like the air particles in the thermosphere with lots of space between
- 3) Show them the tape marks you have placed on the floor, and define the space that is the thermosphere, mesosphere, stratosphere, and troposphere. Be sure to point out the ozone concentration area.
- 4) Divide up the students so that you have the largest number of students in the troposphere, the next largest in the stratosphere and mesosphere and the least number of students in the thermosphere.
- 5) Starting with the thermosphere, demonstrate how the number of dancers in the space dictates the movement possible. For example, in the thermosphere because there are only a few dancers for the space, so the movement is broad and expansive. Repeat this for each sphere.

### Student Reflection

- 1) At this point in the lesson, take time to have the students reflect on what they have learned.

### Sphere's Density Dance

- 1) Create a structured improvisation by connecting the element of time with the "Stop and Go" Dance.
- 2) Teach the students to move for eight counts and freeze for eight counts. Show the students a phrase of moving for eight and freezing for eight. Have the students move for eight counts and then freeze for eight counts twice, or until they have demonstrated an ability to this on their own, without your direction.
- 3) Now you can have the students create a sphere dance using the classical composition form of canon.
- 4) What distinguishes the different spheres, besides where they are located in the space, is the different ways the dancers must move depending on which sphere they are in. Because the amount of space and number of dancers varies in each sphere, the movement choices or motif that each dancer creates will be different with each sphere.
- 5) The Troposphere group starts first and after they finish just four counts of their 16-count phrase.
- 6) To evaluate the students' performance of this activity, please see Sphere's Density Dance Rubric/Checklist.



## Kaleidoscopic Cloud Dance –Summary Sheet

### Preparation

#### Materials –

- Hand Drum – for giving aural cues for the movement exercises
- Blackboard or whiteboard – appropriate markers
- Music – Teacher’s or student’s choice. Recommended, Trammel Starks’, *Evening Storms*.

### Preparation Activity #1 – Hand Sculptures (a.k.a. “The ABCD Game”)

1. Start by demonstrating with another student, “Hand Sculptures”.
2. Have the students choose a partner, or assign one. Let each duet create and take apart hand sculptures for awhile. Observe and make corrections where necessary.

### Preparation Activity #2 - Body Twister

1. Demonstrate Body Twister with a student. Assign or let students chose a partner.
2. Remind them that for the next activity, they must follow the same rules as with the hand sculptures, and not put weight on each other, or change each other’s shape when connecting.
3. Transition to whole body shapes.
4. Students connect their whole-body shapes following cues you give them. Each student makes their own shape, but the shapes are connected by the body part(s) you ask them to connect. For example, instruct them to connect a shape that is “elbow to elbow”, “foot to foot”, “knee to knee”, or “shoulder to shoulder”.
5. Next, give them cross connections: one partner’s elbow and the other partner’s knee for an elbow to knee connection. Give them the body part(s) connection(s) to cue them to make a shape together.
6. Let the students arrive at their own spontaneous combinations. Encourage them to avoid planning. You want them to be just reacting and improvising.

### Preparation Activity #3 - Free Form Tableau

1. Pair a duet (2 students) with another duet and form quartets (4 students). Five in a group is OK, if necessary. Have them repeat the hand sculptures exercise, except this time with their whole bodies. Each student is assigned a letter (A, B, C, or D). Student A makes the first shape and the other students add on in order. After the group shape or tableau is completed, the students take it apart in the ABCD order. Have the students practice this without the teacher leading. Observe their work and make necessary corrections.
2. Have each group build a group shape or tableau, one group at a time, and ask the rest of the class to observe. Ask the students who are observing to give each group sculpture a title. Make sure the students understand that there is no one correct answer and that the sculpture can be anything they imagine.

### Preparation Activity #4 - Cloud Tableaux

1. Explain to the students that specific cloud types form at specific levels in the troposphere
2. Have the students go back to their quartets (or quintets) and ask them to create a tableau (picture) of the clouds. Explain that you want them to pick a cloud type and use their bodies to represent that cloud.
3. They will show the shape as well as the correct level of a particular cloud type. For example, a cirrus tableau will have everybody in a high level with long wavy shapes connected together. Give them two or three minutes to do this.

### Kaleidoscopic Cloud Dance

1. Now you can combine the tableaux with the previous structure of the “Stop and Go” Dance to make an improvised cloud dance.
2. Explain to the students that they are no longer working in the quartets, but with the whole group.
3. Tell the students that when they stop to make a shape in the dance, they need to use only cloud shapes. Explain further that when they are in the cloud shapes, it is an opportunity for other students to connect onto the shape they are making. The students are free to connect any cloud shape and leave the group shape whenever they want.
4. The resulting dance is a kaleidoscopic effect of cloud shapes coming together and separating with varying timing and groupings. For this part of the activity you can use the *Evening Storms* music by Trammel Starks.
5. To evaluate the students’ performance of this activity, either by the teacher or the students, please see Table 2 – Kaleidoscopic Cloud Dance Rubric/Checklist.

## Dancing Winds – Summary Sheet

### Preparation

#### Materials –

- Hand Drum – for giving aural cues for the movement exercises
- Blackboard or whiteboard – appropriate markers
- Music – Teacher’s or student’s choice. Recommended, Trammel Starks’, *Evening Storms*.

### Preparation Activity #1 - Properties of Air

1. Students go into the dance space. Start in a high level with a tight shape and sink while simultaneously expanding. Then from a low level in an expanded shape, rise while simultaneously condensing. Change the timing.
2. Experiment with the two ideas, while moving about the space. Challenge the students to try a galloping, shrinking rise, or a sinking, expanding hop.
3. Explain that solar energy from the sun does not heat the earth equally. Help the students understand that as the air from the equator rises and the air at the poles sinks, it creates a cycle of air motion that becomes the wind.

### Preparation Activity # 2 - Air Pressure

1. Explain how the troposphere is not smooth, but has ridges and troughs in it. Air has weight. When the column of air is high, there is more air to exert pressure or weight. When the column of air is low, there is less air weight or low pressure.
2. Pair the students up with a partner close to the same size and weight. Ask them to stand across from each other and very slowly lean hand to hand into each other. Ask them to be very careful.
3. As you stand farther apart from each other and lean in, you experience or feel more pressure or weight in your hands (high pressure). When you stand close and lean in, you feel less weight or pressure (low pressure).

### Preparation Activity # 3 - Low & High Pressure Systems

1. Re-create the air motion of high and low-pressure areas. Show them what clockwise and counter-clockwise motion looks like. Place yourself at the center of the room.
2. You call out "low pressure" and the students begin to circle you in a counter-clockwise motion, and simultaneously you (the teacher) move from low level to high level.
3. You call out "high pressure"; the students circle you in a clockwise motion and both you and the students simultaneously sink from high to low.
4. Next, you can examine how the pressure areas also contract or expand. If you were working on a low-pressure area, you would go from low to high in a counter-clockwise motion and simultaneously move from the outer edges to the center of the room. High pressure is exactly the opposite.

### Authentic Assessment - the "Pilot’s Logbook Dance"

1. The first task for the students is to read the Pilot’s Logbook entries (see below). The students need to be critically analyzing each entry.
2. Review with the students the major concepts of wind motion in the Northern Hemisphere that you have just covered:
3. Put the students into groups of 3, 4, or 5. Either assign or let the students decide which one of the Pilot’s Logbook entries they want to re-create. Be sure to let them know that there is a time limit (15 to 20 minutes). For example, if you chose item A, you create a phrase of movement that shows the characteristics of higher air density creating greater drag on the airplane. Knowing that the only difference in conditions described in item A is the higher altitude, you reason that a climb will reduce air density resulting in less resistance and a faster ground speed. After the students create their choreographed Pilot’s Logbook Dance, ask them to set the movements to counts. Check to see that the students have some mastery of the choreography.

### Pilot’s Logbook Dance -Variation

1. Introduce the Elements of Dance by briefly discussing and demonstrating the concepts presented.
2. Demonstrate to the students the creation of a variation on the original motif. As you demonstrate, ask the students to try out the concepts with you.
3. Once the students perform the choreographed Pilot’s Logbook Dance, encourage them to change the movement by using the elements of dance. For example, slow or speed up the choreography; do the movements with just one or two parts of the body; change the pathway of the choreography, etc.

### Student Reflection

1. Evaluate the performance of this activity; see Table 3–Dancing Winds Rubric/Pilot’s Logbook Dance Checklist.