



## Math + Arts | Drum-Beating & Foot-Stomping

In this lesson, students watch African dance and calculate tempo.

### Lesson Summary

There are three options for this lesson, depending on class needs and time available:

1. Frame, Focus, and Reflection: students will watch "E Sin Mi D'Africa" and *DanceSense* from 8:04- 8:34 and record their own heartbeats at rest.
2. Short Activity: students will watch "Drum-Beating, Foot-Stomping African" and calculate the tempo of different portions in terms of stomps per minute, perform two movement sequences, and record their heartbeats after each sequence.
3. Project: students will choreograph an original dance workout with specified changes in tempo and level and teach it to their peers.

### Time Allotment

1. Frame, Focus, and Reflection (view and discuss): 1 class period
2. Short hands-on activity: 1 class period
3. Project: 3 class periods

### Learning Objectives

#### Math

I can calculate my heart rate in beats per minute at rest and after exercise.

I can calculate beats per second in two different dance movements.

I can convert beats per second to beats per minute.

#### Arts and Humanities

I can discuss purposes of dance.

I can identify changes in level (space) and tempo (time) in dance.

I can perform movements form a dance fitness routine.

I can collaborate with my peers to choreograph a dance fitness routine.

I can critique a dance (orally or in writing).

## Prep for Teachers

There are a variety of purposes for dance, generally divided into ceremonial, recreational, and artistic expression. Recreational dance includes dance done for fun, socialization, or exercise.

One element of dance is space, including the way that dancers move in space. One aspect of space is levels. Dancers moving with bent knees are said to be dancing at a low level. If they reach up, that is a high level.

Another element is time, including the tempo (or speed) of the dance.

Many traditional African dances incorporate changes in level and tempo.

## Supplies

Stopwatch (online or handheld) Here is a link to an [online stopwatch](#).

"Steady Beat" handout

## Media Resources

*DanceSense*: Elements of Dance

*DanceSense*: Understanding Dance

Bi-Okoto Drum and Dance Theatre: "E Sin Mi D'Africa"

"Drum-Beating, Foot-Stomping African"

## Learning Activities

Frame, Focus, and Reflection

This activity should be done when students have been at rest for about ten minutes (not right after recess or PE). Tell students that you are going to be exploring the tempo (or beat) of their hearts and tempo (or beat) in dance.

Watch *DanceSense*: "[Elements of Dance](#)" from 8:04-8:34. Distribute the "Steady Beat" handout.

Help students find their pulses. (To find your resting heart rate, press the index and middle fingers over the underside of the opposite wrist, just below the thumb. Press down gently until you feel your pulse.)

Project the stopwatch and tell students to start counting when you say, "Count." Let them count for 30 seconds and record the number of beats they counted. Lead them in the process of calculating their pulse in beats per minute. Briefly discuss the variations in pulses. Emphasize that this is not the kind of accurate results that they would get when checked by a doctor and that there is a wide variation in healthy pulse rates, so they should

not be alarmed if their pulse is higher or lower than their classmates' pulses. This is a math activity and not a health exam.

Circulate and check their math and have them put the handouts in their folders or collect them for use in the Short Activity.

Ask students why people dance. Allow some discussion and then watch *DanceSense: "Understanding Dance"* from 8:50 to about 13:23. Write *ceremonial*, *artistic expression*, and *recreational* on the board.

Tell students they are going to watch a performance of a dance based on ceremonial dances of welcome from the Yoruba people, who live in West Africa. Because it is a performance, it is considered both ceremonial and artistic expression. It would also be good exercise!

As they watch, you will want them to focus on the tempo, which means the speed of the dance. Tell them that the tempo of the dance they are going to watch will change. When they notice a change in the tempo, they should clap twice.

Tell them to also pay attention to changes in the level of the dance. During most of the dance, the dancers will have their knees slightly bent, so the dance will be at a low level, but occasionally the dancers will reach up with their arms or jump, taking them to a higher level. When the dancers reach up, students should raise their arms.

Watch "[E Sin Mi D'Africa](#)."

After watching the video, ask students to recall how the dancers entered and exited the stage. Ask them if the dancers danced in unison (all doing the same movements). Ask them if they think they could dance as fast as the dancers did at the end of the dance. Ask them how dancing might affect their pulse rate.

### Short Activity

Begin by distributing the "Steady Beat" handouts and having students calculate their pulses at rest, this time counting for 15 seconds and solving the ratio problem. (Expect some variations from Day One). Discuss how you can get the same result when counting for 15 seconds as when counting for 30 seconds by using ratios. If needed, have them repeat the activity counting for 30 seconds to see that the results are approximately the same.

Explain that dancing for exercise is one form of recreational dance. Ask if any students have ever taken a class in zumba. Explain that you are going to watch and try a dance fitness workout based on African dance.

Remind students that two characteristics they observed when they watched "E Sin Mi D'Africa" were changes in level and changes in tempo. Tell them that as they watch this workout video you want them to notice if there are changes in level and changes in tempo.

(To make an even stronger connection to Practical Living, be sure to show the short section on nutrition after the workout in the "[Drum-Beating, Foot-Stomping African](#)" video.)

After watching the video, discuss what the dance workout had in common with the dance they watched on Day One. Tell students they are going to calculate the beats per minute in two segments of the video that have the same movements done at different tempos. Watch the segment from 2:31 to 2:53 (earth and sky at a slow tempo) and have them count the number of times that the dancers stomp their feet (44). Lead students in calculating the beats per minute.

Then watch the segment from 4:59-5:05 (earth and sky at high tempo) and have them count the number of times that the dancers stomp their feet (16). Challenge students to work independently or with a partner to determine how to calculate the beats per minute by setting up and solving a ratio problem.

Discuss the results. Did the first or the second segment have more beats per minute? (*The one with the most beats per minute has a faster tempo.*)

Tell students they are going to explore how dancing will affect their pulse rate. You may select any section of the workout video for them to dance along with. Unless they are used to vigorous exercise, do NOT use the entire workout. Emphasize that they may not be able to keep up the first time and that they may need to stop to catch their breath, but they should try to keep moving during most of the segment.

Watch and move along with one segment of "[Drum-Beating, Foot-Stomping African](#)."

Immediately after moving, have students sit down and find their pulse. Project the stopwatch and have them count and record their heartbeats for 15 seconds. Have them calculate their pulse rate and lead them in comparing their pulse at rest with their pulse after vigorous exercise. Explain that increasing their pulse through daily exercise is beneficial to their health.

## Project

Ask students to recall two characteristics that "E Sin Mi D'Africa" and "Drum-Beating, Foot-Stomping African" had in common. Guide them to include changes in levels and changes in tempo. Ask them to identify differences. Guide them to consider purpose as one of the differences.

Tell students they are going to work in small groups to choreograph a dance fitness workout, which they will perform for classmates. It must have certain elements but they can also bring their creative imaginations to the process.

The dance fitness routine should:

- + Include different levels
- + Have at least one movement sequence that is repeated eight times at a slow tempo and eight times at a faster tempo
- + Provide good exercise—enough action to increase the heart rate.

In order to demonstrate the effectiveness of their dance fitness routine as exercise, the team members should create a chart of their pulse rates at rest and their pulse rates after performing their routine.

Project the scoring rubric and discuss it with your class, making any modifications you think are needed.

Allow two class periods for the groups to choreograph and rehearse their routines and to create a chart recording the change in their pulse from resting to after performing their routine. On the third day, each group should perform its routine. Students should use the rubric to self-assess and give themselves a score. The teacher may allow groups to assess one another or may elect to assess each group.

### **Formative Assessment**

What are the indicators of student progress toward or achievement of each learning target?

Math Assessment Problems

"Steady Beat" handout.

Chart created for original dance fitness routine.

Arts and Humanities

Frame, Focus, and Reflection: exit slip: What are three purposes of dance?

Short Activity: what are two characteristics common to traditional African dance?

Project: use the "Scoring Rubric for Dance Fitness Routine" and observation.

### **Program Review**

Where does this fit in? How should you document it?

This activity contributes to your school's overall efforts in art programming in several areas, depending on whether you implement just the Frame, Focus, and Reflection portion or you implement the entire project.

Curriculum and Instruction: Aligned and Rigorous Curriculum

a) To what extent does the school ensure that the arts curriculum encompasses creating, performing, and responding and is fully aligned with the Kentucky Core Academic Standards?

b) To what extent does the school ensure that the arts curriculum provides for the development of arts literacy in all four arts discipline and also utilizes the Common Core Standards for English/Language Arts?

c) To what extent does the school ensure that the school's curriculum provides opportunities for integration as natural cross-curricular connections are made between the arts and other content areas?

d) To what extent does the school ensure that the arts curriculum includes the study of representative and exemplary works of dance, music, theater, and visual arts from a variety of artists, cultural traditions, and historical periods?

#### Curriculum and Instruction: Instructional Strategies

a) To what extent do teachers systematically incorporate all three components of arts study: creating, performing, and responding into the arts?

b) To what extent do teachers provide models of exemplary artistic performances and products to enhance students' understanding of an arts discipline and to develop their performance/production skills?

c) To what extent do arts teachers provide for the development of artistic theory, skills, and techniques through the development of student performances or products that are relevant and developmentally appropriate for students?

#### Curriculum and Instruction: Student Performance

a) To what extent are students actively engaged in creating, performing, and responding to the arts?

b) To what extent do students identify a purpose and generate original and varied art works or performances that are highly expressive with teacher guidance?

c) To what extent do students, with teacher guidance, routinely use creative, evaluative, analytical, and problem solving skills in developing and/or reflecting in their artistic performances and products?

d) To what extent do students use written and verbal communication to objectively reflect on exemplary exhibits and live or technologically provided performances as classroom assignments?

#### Formative and Summative Assessment: Assessments

a) To what extent do teachers utilize formative and summative arts assessments for individual students and performing groups that are clearly aligned with the components of the Kentucky Core Academic Standards; and authentically measure a specific concept, understanding and/or skill and lead to student growth?

b) To what extent do teachers guide students to use developmentally or grade level appropriate peer review and critique to evaluate each other's work?

#### Formative and Summative Assessment: Expectations for Student Learning

a) To what extent do teachers utilize exemplar/models to encourage students to demonstrate characteristics of rigorous work in the appropriate art form in most instructional lessons/units?

b) To what extent do teachers share clearly defined rubrics or scoring guides with students before creating, performing, or responding assignments or other assessments; and students have the opportunity to provide input into the scoring guide?

Formative and Summative Assessment: Assessment for Teaching

To what extent do students regularly reflect on, critique, and evaluate the artistic products and performances of others and themselves as is grade level and age appropriate?

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