SCIENCE AND DANCE: FINDING WHAT WORKS

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BEST: **B**ody, **E**nergy, **S**pace and **T**ime

BODY (Parts and Movements):

axial/non-locomotor (in self/personal space)
bend, twist, stretch, melt, spin, etc.

locomotor (through general space)
jump, gallop, leap, crawl, roll, etc.

ENERGY/FORCE (Quality of Movement)

How movement looks and feels:

heavy or strong (elephant walking) vs. light (feather floating)
smooth (spaghetti wiggling) vs. sharp (knife cutting, robot walking)
tight/bound (rope knotting) vs. loose/free (water flowing)

SPACE (Personal and General):

level	**size**	**shape**	**direction**	**pathway**	**relationship**
low	small	flat	forward	straight	shadow
middle	medium	wide	backward	curvy	mirror
high	big	narrow	up	zig-zag	connected
		twisted	down	spiral	unison

TIME:

speed or tempo - fast, medium, slow, freeze, suspended
relationship – before, after, next, etc.
rhythm – beat, rhythm pattern, accent

Rapid Earth Changes – Dance Notes
Student Name: _____
Group (A, B, C or D): _____
Rapid Earth Change (tsunami, volcano, etc.): _____

Body Movement: Is the movement axial or locomotor? What type of movement could the body do to simulate the movement observed in the video? (shaking, spinning, jumping, etc.)

Energy: How is the object moving? What smooth energy, sharp energy, vibrating energy, strong energy, light energy, free energy, bound energy, etc.

Space: How does the object use the elements of space? What levels, size, shapes, direction, pathway, relationship to other things?

Time: Are the movements fast, moderate or slow? Does the movement happen at a steady or changing tempo? Which movements happen first? Next? Do the movements occur with regularity or sporadically?

As you watch the video of the rapid earth change think about the elements of dance (BEST). Identify the objects involved and describe how they move using the descriptions of BEST above to guide you. Note anything that you think will help you as you choreograph your dance.

Name of Object	Body Movement	Energy	Space	Time

Earth's Rapid Changes: Dance Outline

Name of Rapid Change: (landslide, earthquake, etc.)

_____

Group Letter (A, B, C, or D) _____

Names of Dancers in Group:

_____

Beginning: What causes the rapid change?	Middle: What happens during the rapid change?	End: What is the effect of the rapid change?

TEACHING TIPS AND POSSIBLE PITFALLS

- **Cover Content First:** Before trying to integrate dance and science, be sure the students have the dance skills they will need and an understanding of the science concepts. Both the dance skills and concepts and the science understanding will be deepened through the integration process but the students should have some knowledge of both first. Sometimes you may want to use dance to teach a science concept. That is a great use of dance as a teaching tool and it can be very effective. However, that would be considered enhancement. The focus for this presentation is integration.

- **Provide Movement Models:** Movement begets movement! I have written often about this because I really believe it is key for a richer integration experience. Be sure the students have models of movement. They should be exposed to professional dancers and be given time to really analyze and even imitate the movement. Dance videos allow for repeated viewings. Students should also see the science movement. Before creating a dance about the circulatory system, my students viewed a video demonstrating that system. They needed to see how the valves coordinate when they open and close and in which direction, where and how the blood flows, etc. Before creating a dance about volcanoes, the students watched actual footage of volcanic eruptions in order to inform the choreography they created to be as scientifically accurate as possible. When choreographing dances about the movement of molecules in different states of matter, I showed the students a balloon filling up as the baking soda and vinegar produced carbon dioxide so they could better

represent the movement of gas molecules.

- **Keep the Process Active:** As every teacher knows, the goal is to keep all students engaged at all times. The best way to do this during a dance integrated lesson is to be sure as many students are moving as possible at all times or are engaged in the learning and choreographic process at all times. The first time I tried to integrate dance and the circulatory system there was too much waiting. I did too much whole group discussion in getting ideas for movement rather than breaking them into groups and letting them experiment. I also had different students working on different parts of the system. I learned from that experience. Instead of having just one group of students creating choreography for the valves of the heart, for example, have all the students break into small groups and create choreography for that. When all parts of the circulatory system have been choreographed and the movements that best convey the science concepts have been determined by the class considering the unity and variety of the different parts of the final piece, allow students to self-select or assign students to different aspects. This will entail some wait time but ultimately will maximize not only active participation but greater understanding of the science for all students.

- **Be Balanced:** This can be tricky. You don't want the art to overtake the science nor do you want the science to overtake the art. Being sure to use terminology for science and art as you go through the process will help. Have related vocabulary posted for reference. Posting the terms will help you and the students remember to use the art and science language. Constantly refer back to BEST, having the students articulate how the science can be represented with body movement, energy, use of

space and time When choreographing, the science concept should be represented as accurately as possible but it should also be interesting to watch as dance. If students are creating and performing choreography, they need to consider what makes good choreography and performance. The models of professional dancers will help with that. Armed with knowledge of both the dance and the science the students can make conscious choices to sacrifice scientific accuracy for artistic purposes. They should be aware that as people we cannot always represent the science perfectly as it occurs in nature, we have limitations, but they should be knowledgable enough to know where they are making those artistic choices or accepting our human physical limitations. This can inspire great creativity! Those conscious choices and explaining or defending those choices are part of what makes the process so rich and deepens the understanding of both the science and the dance.

- **Break It Down:** Before you start the integration process be really clear how you expect students to demonstrate the objectives and how you will break that down into its component parts. More than once I have made the mistake of giving an assignment thinking I had broken it down so clearly and then setting the students loose only to find that students got lost in the process, got frustrated and finished the assignment at wildly different times. Students will always have their own pace but when you have a class full of students, guiding pacing is important! Learning from that experience, when I had fourth graders creating choreography to show rapid earth changes, I first broke down the process into a beginning, middle and end format included in the handouts. Next, I had them think about how to frame the choreography and start brainstorming movements. After that, I introduced the music so they understood what

the tempo and counts would be. Finally, I had them start to create the choreography for each section. I would say, "You have x number of minutes to choreograph section one." I would play the music so they could coordinate the movement with the music as they went through the choreographic process. When they reached the end of the time, I would stop everyone, have them get into their starting positions, play the music and count them in so they all started at the same time. I would give them time (about a minute) to discuss how it went and then play the music again so they could start to finalize that section. I would repeat the process of groups discussing and dancing it again with the music. Once the groups could all consistently perform that section of choreography I would repeat that whole process again with the next section until all 3 sections had been choreographed. I also videotaped the process so they could refer to the video if they needed a reminder in subsequent weeks.

- **Know the Content:** Just as the students need to know the dance and the science in order to create successfully integrated movement pieces, so must the teachers. In a perfect world, both the dance teacher and the science teacher would be present for the actual integration process. However, if that is not possible each teacher should have a sense of the other content to best facilitate the learning process. Before I presented an integrated lesson as the dance teaching artist, even though the classroom teacher was present, I spent LOTS of time researching the science concepts and even performing science experiments at home that the students were doing in school. I wanted to have a deeper understanding of the content than the students so I could answer questions as they arose and help to facilitate movement that really reflected the science. What if you are a classroom teacher and you don't

have dance experience but you still want to use it in your classroom? Do your research! Watch dance videos, read the dance standards, learn the pertinent dance terms and try to create your own movements. You don't necessarily have to dance in front of your students (although they will love you if you do!) but if you have tried it yourself on your own, you can better understand the process in which your students will be engaged and be a better facilitator of that process.

- **Consider the Music:** As alluded to in "Break It Down", I have found when integrating that the best way to start the choreography process is to focus on the movement. I allow the students to experiment with the types of movement they might use. Then I introduce the music I plan to use so they can start to refine the movement and coordinate it with the music. In choosing the music, you may want the music to create a mood and help inspire the movement and/or you may want the music to create a steady beat and sets of counts. For the rapid earth change dances, I had each section last for 8 slow counts so the whole dance was a total of 24 counts. I also used the same music for each group so they could all rehearse together regardless of what process each group was portraying. I almost always use instrumental music or music with lyrics sung in an unfamiliar language so as not to detract from the choreography unless the lyrics are crucial to the message being danced.

- **Allow the Students to Choreograph:** I generally have the students create the movements themselves. I may teach specific dance steps that could be useful to their choreography (like chasse which is basically a sideways gallop) or a skill like using a focal point to bring in the audience or help a

dancer "spot" while turning. That is part of the dance content teaching. Ultimately, allowing the students to decide on what movements would best show the science concept is where all that rich learning happens. They have to know dance and science in order to create effective choreography and as you facilitate that process, their understanding of each will deepen and grow. **VOLCANO dance**

- **Plan Ample Reflection Time**: I feel like a charlatan as I write this because I repeat this mantra often and don't do it nearly enough in my own practice. In the case of the rapid earth change dances, the students had not learned the science concepts early enough in the term for the students to apply what that had learned in science and dance to both choreograph a dance and then reflect and revise. The students did not have an opportunity to view their own pieces and make changes based on what they saw. I allowed for discussion in rehearsal to revise as they choreographed but there was no time for peer feedback or self-critique. I gave some feedback myself but even that did not have time for follow-through. For example, I had spoken to one group that was representing a tornado and began by showing the warm and cold air masses colliding. When I challenged them to use BEST to show the difference between the air masses, they suggested moving at a high level for warm air since heat rises and at a low level for cold air. I added perhaps they should use a different locomotor movement and energy for each as well like sharp energy for cold air and smooth energy for warm air but there was not enough time to follow-up on whether they had applied that to their choreography (which they did not). The ideal situation would be for those ideas and that feedback to come from within their own groups and from their peers. If you have the technology, students could group up and

watch their performances on tablets or computers and self and peer critique. That takes time and planning which, again, is especially crucial if you are collaborating with another teacher.