

## Lesson Five: Dance of the Bees

Lesson One: Introduction to Biomimicry provides the foundation for the remaining five lessons in the Biomimicry unit. Dance of the Bees is the dance lesson of the unit.

### Objectives

1. Students will be able to collaborate with concentration and focus to communicate (a location) effectively.
2. Students will be able to use dance elements (body, action, space, time and energy) in a dance.

### Preparation

Preview Dance of the Bees PowerPoint. Use your internet browser to search for videos showing "waggle dance of bees" and select one of an appropriate length and complexity for your students. Make arrangements for your class to meet in a large open area, such as a gym or play ground. Browse the Internet for an outline of the Elements of Dance: body, action, space, time and energy.

### Resources and Supplies

[Dance of the Bees Power Point](#)

[Job Cards pdf](#)

[Location Cards pdf](#)

Seek other online videos (search: "waggle dance of bees")

large open area, such as a gym or play ground

balls, bean bags or other convenient objects to represent nectar in the Bee Game

smaller and larger containers for the Bee Game

Seek online outline for "Elements of Dance"

OPTIONAL: instructional resources from the ASU's Ask the Biologist website.

[Bee Dance Game](http://askabiologist.asu.edu/bee-dance-game) <http://askabiologist.asu.edu/bee-dance-game>

[About Honey Bees](http://askabiologist.asu.edu/honey-bees) <http://askabiologist.asu.edu/honey-bees>

[Virtual Bee Hive](https://askabiologist.asu.edu/virtual-bee-hive) <https://askabiologist.asu.edu/virtual-bee-hive>

### Activities

#### DAY ONE

Review: Review the theme in life that "Plants and animals have developed amazing ways to solve problems so they can live and thrive", the theme in science that "Scientists identify problems in today's world and explore sustainable solutions already working in the lives of plants and animals" and the theme in the arts that "Visual, performing and literary artists fascinated by the amazing abilities of plants and animals find exciting problems for their creative work."

Review the unit's key questions:

What inspiration can I find in nature for my own dance?

What elements of dance will I use (body, action, space, time and energy)?

Explain that students will be focusing on how scientists borrowed ideas from bees to solve computer network problems..

Introduction: Display Dance of the Bees PowerPoint slides 1 & 2 to:

- Explain the important role bees play in the life of human beings (slide 1).
- Introduce the idea that scientists have solved computer communication problems by studying how bees communicate (slides 2).
- Note that students will have a chance to communicate through their own dance.

Play a waggle dance online video of your choice.

Guided Practice: Display Dance of the Bees PowerPoint slides 3-6 to:

- Explain how bees use the waggle dance to communicate the location of food (nectar) (slide 3).
- Use diagrams of bee movements to show how the waggle dance makes a figure 8 (slide 4).
- Practice making figure 8s, first with different body parts and then with movement in through space (locomotor movement) (slide 5).
- Ask student/s to do the waggle dance to location to the rest of the class (slide 6).

## DAY TWO

Review: Dance of the Bees PowerPoint slides 7 & 8 to:

- Remind students how bees' solution to a communication problem helped solve a computer network communication problem (slides 7 & 8).

Place piles of various balls, bean bags etc. (nectar) around the room.

Guided Practice: Assignment: Dance of the Bees PowerPoint slides 9-16 to:

- Divide the students into four groups and distribute a job card to each student (slide 9).
- OPTIONAL: Show students carrying out their assigned roles (slide 10-14).
- As foragers/producers take turns doing the waggle dance to communicate a "nectar" source, students should perform their other assigned duties. Hive activities continue till integrators yell stop.
- If time permits, you may wish to introduce the dance assignment. Explain that dances are more effective if they use the five Elements of Dance: body, action, space, time and energy (slide 15 & 16).

## DAY THREE

Planning, Rehearsal and Performance: Dance of the Bees PowerPoint slides 15-18 to:

- Review dance assignment if students have already had an opportunity to brainstorm or introduce assignment (last two bullet points in DAY TWO) (slides 15 & 16).
- Show still photos of student dance performance asking students to match the location communicated and dance elements they can see in the stills (slide 17).
- Divide class into groups of three or four students and distribute location cards to each group.
- Explain the dance assignment providing time for planning and rehearsal (slide 18).
- Direct groups to take turns performing for classmates.

### **Dance Vocabulary**

locomotor movement

body

action

space

time

energy

rehearse

### **Other Vocabulary**

pollinate

hive

swarm

abdomen

imitate  
nectar  
computer network  
engineer

### Extension Ideas

Extend study to other honey bee dances, such as the "round dance" used when the food source is close to the hive, the "tremble dance" used to recruit additional receivers to receive food, and the "Stop Signal" used when a bee detects her sister waggle dancing to a place that is dangerous.

Extend study to insect-inspired biomimicry such as insect joints that inspired new rubber production, curved, compound eye that inspired Nissan to develop a laser range finder, and hexagonal shaped honeycomb, which is efficient for space and for insulating buildings.

View excerpts of dances inspired by animal movements, such as *Swan Lake*, *Firebird* and *Afternoon of the Faun*.

### Assessment Guides

OBJECTIVE 1. Students will be able to collaborate in movement with concentration and focus to communicate (a location) effectively.

Exceeds Expectations: Dance shows concentration and focus and effectively communicates the group's assigned location, which classmates are able to identify without teacher guidance or prompting.

Meets Expectations: Dance communicates the groups' assigned location, which classmates are able to identify **without** teacher guidance or prompting.

Approaches Expectations: Dance communicates the groups' assigned location, which classmates are able to identify **with** teacher guidance or prompting.

Fails to Meet Expectations: Classmates are unable to identify the group's assigned location, even **with** teacher guidance or prompting.

OBJECTIVE 2. Students will be able to use dance elements (body, action, space, time and energy) in a dance.

Exceeds Expectations: Dance is enhanced with all five dance elements.

Meets Expectations: Dance is enhanced with three or four dance elements.

Approaches Expectations: Dance is enhanced with one or two dance element.

Fails to Meet Expectations: Dance is attempted.