

# Facilitation Score: Bee-longing in STEM: Movement-Based Activities for Bee Conservation Science Engagement and Education

**Estimated Total Time with Personal Meaning Mapping: 75 minutes**

## Materials (optional)

- Two pieces of paper
- Writing utensil (pen, pencil, etc.)

## 1. Warm-up (~2 minutes)

Start with stretching and movement. Feel free to interchange the following stretches with your own stretches. Starting immediately with movement prior to any substantive introduction of the activities reduces the amount of time it would otherwise take to get students accustomed to using their bodies and movement.

- Arms out to the sides
- Arms up in the air
- Self-Hug (Mindful breathing)
- Move closer to camera, then further
- Move head side to side
- Move head forward and backward

## 2. Introductions and Overview

### *Individual Introductions* (~4 minutes)

The amount of time allocated to introductions depends on how familiar students are with each other. However, even if students are very familiar with each other, it is still important to do introductions because it further normalizes the use of movement to communicate.

Introduction Questions:

- What is your name?
- Where are you from?
- Show us a movement that you did either yesterday or today (e.g., brushing teeth, basketball, etc.)

### *Project Overview* (~2 minutes)

The project overview is an opportunity to emphasize that these activities are more of a celebration of the knowledge and experiences the students already possess about bees and conservation rather than a lesson for a quiz or test. These activities are intended to facilitate personal and group meaning making. Inform them that there will be three activities. Each starts with a short video that will provide the visual and informational foundation for their movements and gestures. At the end of each activity, each person will have a movement that represents a chapter in their story of a “day in the life of a bee”. At the end of the three activities, they will have three movements that they will tie together to create a short story.

## 3. Pre-Personal Meaning Mapping

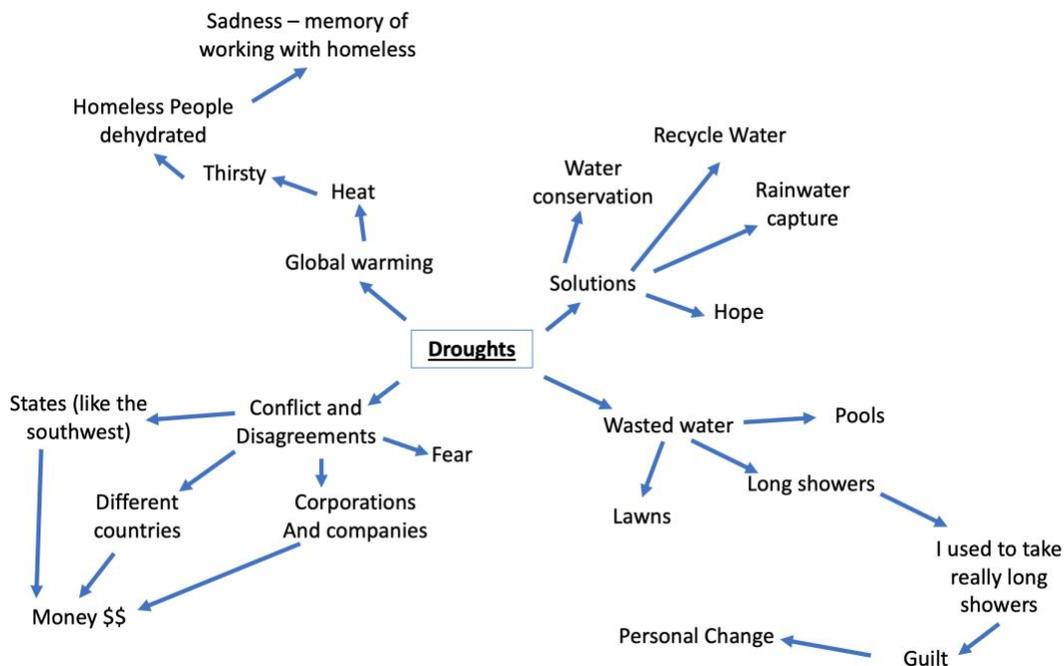
### *Introduction and Demonstration* (~7 minutes)

Personal meaning mapping is one possible evaluation metric for this program. Personal meaning mapping a.k.a. brain mapping allows students to visualize their “trains of thought” on a given topic. This can include personal experiences, questions, images, concepts, emotions, etc. If you decide to use personal meaning mapping, it is best to have two phases: one before the program and one afterward. Doing so can help give you insight into what students took away from the series of activities. Personal meaning mapping (PMM) is a more holistic evaluation tool than quizzes in that there is no specific expectation of what knowledge a student has or will gain. Instead, it is an opportunity to witness the unique learning processes each student has.

The following is an outline of a script that you can adapt for your own use:

“The first thing we will do is to try to better understand what personal meaning you associate with the term “bee conservation”. To do that, we will be doing what is called personal meaning mapping or sometimes brain mapping. This is what you’ll need your first blank piece of paper for. As an example, here is one about an entirely different concept. This doesn’t have anything to do with the bee conservation; it’s just an example of the kind of thing we are looking for.”

[Facilitator: show example PMM point out target word; linked concepts; examples of second and third order concepts included & links between concepts. Share screen and walk through the process. Below is an example of a PMM, but feel free to create your own.]



“What I would like you to do is to add to the term “bee conservation” that you will have written in the center of your paper any experiences, ideas, words, images, questions, or feelings that come to mind when you see this phrase. You can add anything that you prefer.”

**\*Zoom: Put in chat\***

Just some of the things you can include

- experiences
- ideas
- words
- images
- questions
- feelings
- pop culture (movies, songs, art, etc.)

“There are no right or wrong answers as we are just interested in seeing what you associate with this term and to show any links you can think of between the ideas that you include. We are particularly interested in the connections that you see and think about between different ideas, so be sure to use lines to show those connections. OK before you start do you have any questions about what you need to do?”

***Their Turn*** (~6 minutes)

“Please turn off your cameras while you work on your personal meaning map. I’ll give you a notice when you have 1 minute left and then I’ll turn the music off once the time is up and please turn your camera back on when you’re done so I know who’s done.”

**Music:** You may find it helpful to play music during quiet work times for the personal meaning mapping to continue to engage students while their cameras are off.

**A Day in the Life of a Bee Activities (Steps 4-6)**

If you have time, you can have students talk about their initial meaning maps. Otherwise, have them set those to the side and begin the activities.

**4. Waggle Dance** (~10 minutes)

- Play full video: [Watch Video](#) (~3 minutes)
  - Ask students to pay specially attention to the way the bees move, interact, and communicate with each other.
- Once video is over, have students get the attention of their fellow classmates with movement just as the bees would do prior to their waggle dance.
- Have student’s do the waggle dance with index finger while imagining their finger is a bee.
  - Both index fingers. Have students decide whether the two bees represented by their fingers like each other. Their movements should differ depending on their answer.
  - Back to one while fluctuating between fast waggles and slow waggles
- Waggle Dance with full hand
  - Have everyone make a square with hand waggle
  - Freestyle shapes with hand waggle
    - Ask group to guess a shape 1-2 people are making
- Freestyle waggle dance
  - Have students use any part of their bodies or even full body – “whatever feels natural”

**\*First Movement of their Personal Storyline\*:** Instruct students to come up with a movement or gesture that represents something that they are passionate about whether that is an action, person, place, thing, etc. Allow them to share with the group if they'd like. Then instruct them to remember this movement because they will be asked to recall it at the end.

## 5. Busy Bees (~12 minutes)

- [Watch Video](#) ~ **2 minutes and 30 seconds** (Start video at 1:00)
  - Have students pay special attention to the different jobs bees have and the different stages of their lives. You will put the following list in the zoom chat after the video to help remind them of the different jobs mentioned.

### **\*Zoom: Put in chat\***

-build cells  
-tend to queen  
-store honey  
-forage  
-pollinate  
-guard the nest  
-feed the drones  
-maintain cleanliness

- Start everyone with same job – build hexagonal cells with their fingers or hands
  - Make the cells faster and then slower
  - Bigger and smaller cells
  - Different shape cells
- Each participant picks their own job from the list above
  - Have group guess what jobs 1-2 people are engaging in
    - Ask that person why they picked the movements and job they did
  - Have group think about how each job is important for each other
    - Use two people as examples e.g., why does someone need to guard the nest while someone else forages?
    - Break out room: share movements and answer the above question based on the jobs represented

**\*Second Movement of their Personal Storyline\*:** Have students return to their movement for their job and tell them to remember it as the second part of their dance storyline.

## 6. Imagining Possible Futures (~25 minutes)

- [Watch Video](#) ~ **6 minutes** (Start at 2:00 and end at 8:00)
  - Have participants pay special attention to the following topics: bee diversity, extinction, and conservation. Also have them keep note of different factors that can either help or hurt bee populations.
- Introduce the two possible futures: extinction of wild bees and conservation of bees
  - Future #1: extinction of wild bees

- Have participants come up with a gesture that represents extinction
    - Take two volunteers to each showcase their movements.
    - Then, ask the group to come up with a movement that combines those two movements
  - Ask what is happening right now that would lead to this?
    - (examples: pesticides, habitat loss, industrial agriculture, honeybee competition)
  - What are the effects of these?
    - (examples: food insecurity, harm ecosystems, etc.)
  - Have participants recall their second gesture (jobs) and ask them “what happens to your job dance if these problems persist? Show how your gesture would change.
- Future #2: Conservation and change
    - Have participants come up with a gesture that represents conservation
      - Identify values behind conservation
    - Ask participants what can be done to prevent extinction and instead promote conservation?
      - (examples: local agriculture, native plants, protect wild bees with log habitats)
    - Have participants recall their first gesture (waggle dance) and ask them “what happens to your waggle dance if people like you fight to protect and conserve bees? Show how your gesture would change.”
      - Emphasis on emotions of bees: gratitude, happiness, etc.

**\*Third Movement of their Personal Storyline\*:** Instruct students to imagine themselves as a filmmaker, author, or dance choreographer and pick either conservation or extinction to be the imagined future for their storyline. Have them pick the movement they used for the given future they choose as the third and final movement of the story line. Additionally, they have the option to change their waggle movement and/or busy bee movement depending on the future they chose.

- Provide about 2 minutes for students to practice their movements and storyline before having them showcase them to the larger group.
  - Have them reflect on the changes over time and how other people’s movements influenced them

## **7. Post-Personal Meaning Mapping (~6 minutes)**

Now that the activities have been completed, have students use a second piece of paper to make a new personal meaning map. The instructions are the same from the first one done prior to the activities. This time, however, instruct them to try to incorporate new ideas, values, images, and emotions that they took away from the activities. It is okay for them to include some things from the initial meaning map, but that content should be built upon with the new takeaways.