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***Building a Just and Sustainable World***

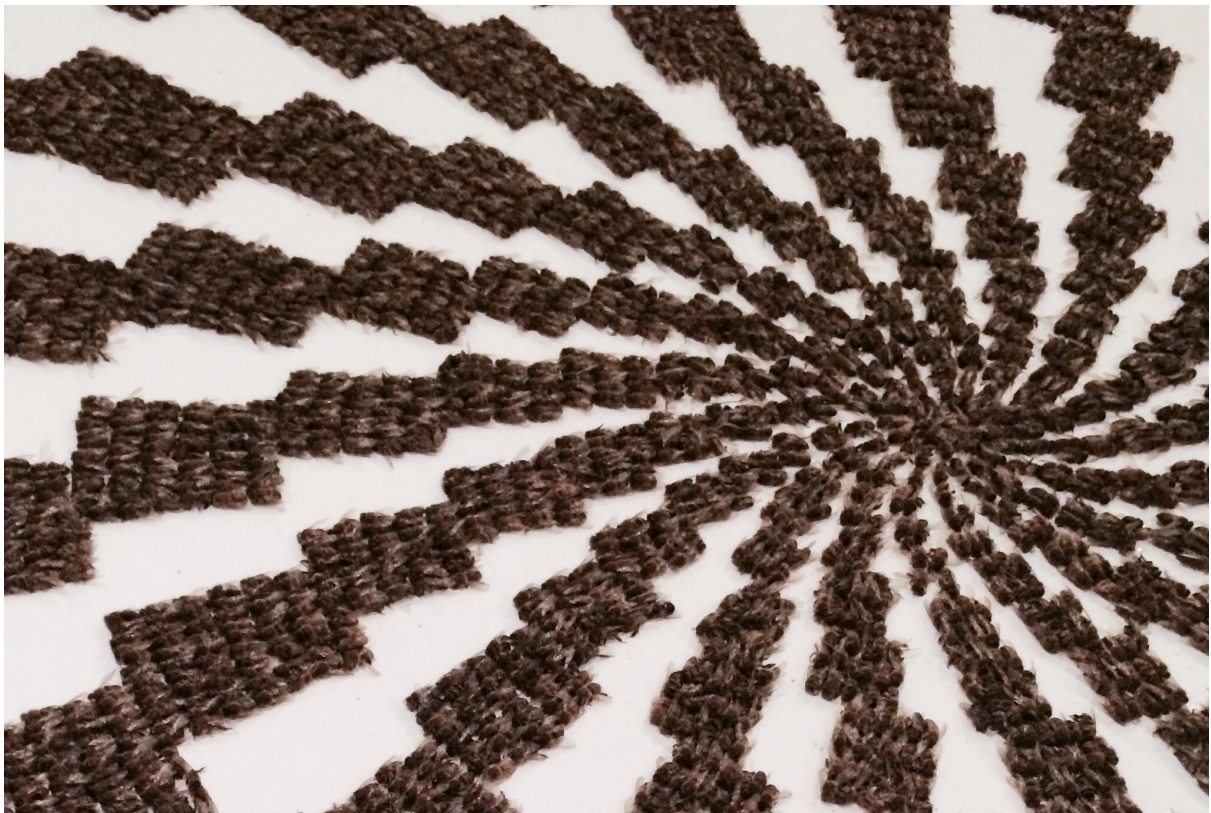
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**EDUCATION CONNECTION | VISUAL LEARNING**

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Images, photos, and pictures stimulate the mind. For the viewer, they offer a chance to connect and question. They also offer potential for play and imagination, and pulling the observer into purposeful messages.

Most often, newspaper and magazine readers quickly glance at photos and their captions. With this YES! lesson plan, you and your students can pause to truly understand an image, its message, and why it's interesting (or not).



### What's the Buzz?

#### Step 1: What do you notice?

Ask your students to make sense of the photograph by trusting their instincts of observation and inference. In doing so, the image offers possibilities and interpretations beyond a typical reading where the reader glances at a photograph to reinforce its title or caption. Do not introduce any facts, captions, or other written words.

In response to the question, "What do you notice?" you may hear: *black and white pattern, black rectangles, geometric swirl design, small fuzzy, bumpy objects.*

#### Step 2: What are you wondering?

After you've heard your students' first observations, you may hear a peppering of questions: *What are those small black bumpy objects? How does it feel to touch them? Why is this image making me dizzy? Does this spin or move?*

This is a good time to reveal the photo's caption and other information about the photo (below). Watch how the conversation shifts from what they believe to be true to discerning the facts about the photo.

#### Photo caption

The link between neonicotinoid pesticides and the worldwide decline of bee populations is a crisis that cannot be ignored.

I have arranged thousands of dead honeybees in mathematical patterns symbolically linked to monoculture crops, such as the Fibonacci spiral found in the seed head of the sunflower.

The viewer experiences the vertigo of this lifeless swarm, a dizzying optical illusion that echoes the bees' loss of ability to navigate due to the toxins locked within the very source of their sustenance.

Sarah Hatton: Circle 6 (detail). Honeybees, resin on panel, 2014. Photograph: Pierre Laporte Photography.

#### Photo facts

- Pollinators, such as bees, birds, bats, and butterflies, are essential to our planet because they transfer pollen between flowers of the same species. This fertilization allows the plant to produce healthy fruits and seeds. According to the National Resources Defense Council,

cross-pollination helps at least 30 percent of the world's crops and 90 percent of our wild plants to thrive.

- The Fibonacci sequence is a mathematical system of numbers that starts 0, 1, 1, 2, 3, 5, 8, 13, 21, 34... By adding the two previous numbers one can obtain the next number in the order. This mathematical system of numbers is found in patterns all over the natural world, including the number of petals on a flower, the pattern of a sunflower's seeds, and the spiral of a nautilus shell.
- Neonicotinoid is a new type of pesticide used in commercial agriculture to kill insects that can harm plants. When bees approach to pollinate these plants, this pesticide causes them to feel disorientated and can shorten their lifespan. This pesticide is the leading suspect in causing bee colony collapse disorder. According to the North American Pollinator Protection Campaign, in the past 10 years, the U.S. lost over half of its commercially managed honey bee colonies.
- Bees flap their wings 11,400 times per minute and fly at an average of 15 mph! This is about the same speed as a professional human sprinter.
- Just like humans, bees are attracted to sugar. Nectar in flower heads is a sugar-filled liquid that bees love. A pesticide-free garden, and planting a medley of nectar-rich plants, such as red clover, foxglove, bee balm, joe-pye weed, and native plants will give bees a boost to make it through cold months.

#### Step 3: What next?

1. Certain animals can be used to detect toxins in the environment because they are more sensitive than humans. For example, canaries were used to detect poisonous gases in coal mines, and cats in Japan were the first to show signs of mercury poisoning in seafood. Why is it important to pay attention to the cautioning behaviors of animals? Describe why you think colony collapse disorder is a threat (or not) to humans?
2. When architects and inventors mimic biological patterns in their designs it is called biomimicry. A notable example is the creation of Velcro. Swiss engineer George de Mestral got the idea from the burrs that were often stuck to his dog's hair. What are some examples of biomimicry in your world?
3. Honey bees' hive instincts enable them to stay warm as a group (an individual might freeze), gather and store food for other members of the community, and repel intruders from the hive. What parallels can you draw between a bee hive and your own school?