

Student Discussion Worksheet

Directions: Use the article "[A single molecule may entice normally solitary locusts to form massive swarms](#)" and the [PubChem](#) chemistry database, run by the National Institutes of Health, to answer the first set of questions. Then, select and research a pheromone that interests you and answer questions about it in the section titled "Cued behaviors." Share your answers for your selected pheromone and discuss the final prompts with a partner.

A pheromone's chemistry

1. What is the pheromone identified in the *Science News* article? Give both the common name and formal scientific name.
2. Using [PubChem](#), find and state the molecular formula of the pheromone. What elements does the molecule contain? How many atoms of each element does one molecule contain?
3. Use [PubChem](#) to list two additional properties given for your molecule. Are the properties physical or chemical? Explain.
4. Using the "3D Conformer" section on [PubChem](#) along with the pheromone's molecular formula, draw the pheromone's molecular structure. Label each element within the molecule (make sure to use elemental symbols) and include all bonds. How many single bonds does the molecule contain? What about double bonds? Triple bonds?
5. What information does the molecular structure tell you that the molecular formula doesn't?
6. Optional extension question: What types of bonds exist within the molecule? If bonds are covalent, are they likely nonpolar covalent or polar covalent? Explain.

Cued behaviors

7. What pheromone have you chosen to research? Why does it interest you?
8. What organism releases the pheromone? What behavior does the pheromone appear to cue?
9. How might the behavior cued by the pheromone benefit the organism?
10. What do scientists know about how the pheromone is produced or detected by individuals?
11. How might humans benefit from knowing about this pheromone? Explain.

Final group prompts

12. Based on what you have learned from this exercise, how would you define a pheromone?
13. Why is it beneficial for scientists to know the structure of the pheromone molecule? Include the terms physical and chemical properties in your answer.
14. List as many other examples of group and individual behavior as you can think of. Indicate which category (group or individual) each behavior belongs to. If a behavior could be categorized as group and individual, explain why.
15. What factors besides chemicals might influence behavior?