

# New Smells, New Ideas

## Ball-and-Stick Models

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

### Purpose

To examine ball-and-stick models of molecules and compare them to structural formulas.

### Part I: New Smell Molecules

Test the samples for smell. Fill in the table, then answer the questions.

Vial	Molecular formula and name	Functional group	Compound type	Structural formula	Smell
I	C <sub>10</sub> H <sub>20</sub> O citronellol			<pre>       H               O             H-C-H             H-C-H                H-C-C-H                H-C-H             H-C-H             H-C      //         C-C-H                H-C-H               H           </pre>	
J	C <sub>10</sub> H <sub>18</sub> O fenchol			<pre>       H   H   H                     H-C   C   C-H                     H-C   C   C-H                     H-C   C   C-H                     H-C   C   C-H                           H   O-H                     H-C-H                       H           </pre>	

Vial	Molecular formula and name	Functional group	Compound type	Structural formula	Smell
K	$C_{10}H_{18}O$ geraniol				
L	$C_{10}H_{20}O$ menthol				
M	$C_{10}H_{18}O$ borneol				

### Questions

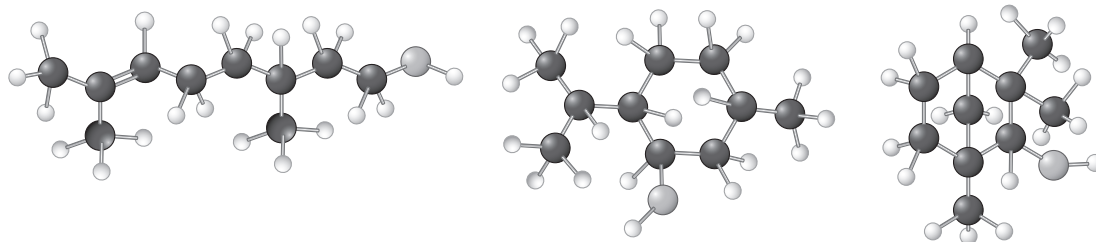
- Circle and identify the functional group in each structural formula.
- Can functional group alone be used to classify these five molecules according to their smell? Why or why not?

- Is the molecular formula alone enough information to allow these five molecules to be classified according to their smell? Why or why not?
- Are there any structural similarities besides functional group that might be used to classify these molecules? If so, what are they?

### Part 2: Three-Dimensional Models

Examine the three ball-and-stick models. They represent the molecular compounds you smelled today. Figure out the molecular formula, name, and smell of each and write them in the table.

	Molecule 1	Molecule 2	Molecule 3
Molecular formula			
Name			
Smell			



### Questions

- Compare the three models. List at least three physical differences that you notice between them.
- Making Sense** How is a ball-and-stick representation different from a structural formula? What additional information does it convey?
- If You Finish Early** Exactly what molecular model pieces would you need in order to construct a ball-and-stick molecular model of menthol?