# Symmetry and Molecular Polarity Worksheet

Scoring guide · one credit per question · review written work against each rubric

## Symmetry and Molecular Polarity

### Question 1

Choice (1)

Equal dipoles in opposite directions add to zero.

### Question 2

The dipoles do not point in opposite directions. Their components along the angle bisector add, leaving a net dipole.

### Question 3

Choice (2)

Four equally sized, symmetrically arranged dipoles cancel.

### Question 4

There is only one bond dipole and no opposing dipole in the model. The molecule therefore has a net dipole.

## Comparing Molecular Structures

### Question 5

Choice (2)

The two water bond dipoles point at an angle and do not cancel.

### Question 6

The two dipoles point away from the central C toward O atoms on opposite sides. They have equal magnitudes and opposite directions, so their sum is zero.

### Question 7

Choice (2)

The linear $CO_2$ dipoles cancel in pairs. The four dipoles of tetrahedral $CF_4$ cancel by symmetry.

### Question 8

The four dipoles are no longer all equal. Changing one dipole leaves a nonzero vector sum, even if the four bond directions stay tetrahedral in the model.