Announcements – Lecture XII – Thursday Oct 22nd

1. **Fourth Lab – Saturday, October 31st … 1-4pm … ISB 155/160 (A-E)**

   a) Print lab prior to coming to lab -- use the 'Print Friendly Version' located on the top left hand side of the page – this is the version that contains the 'Data Sheet' that you will hand in upon completing the lab.

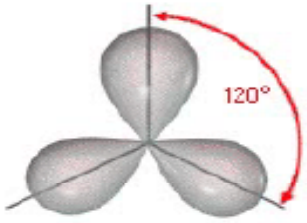
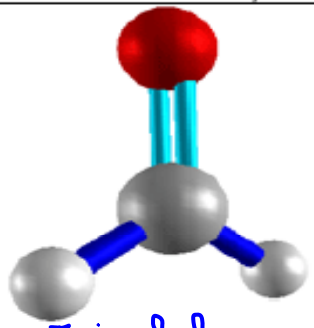
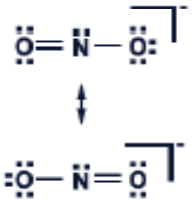
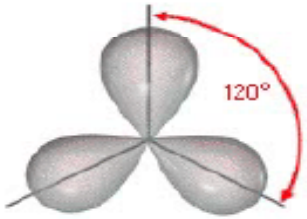
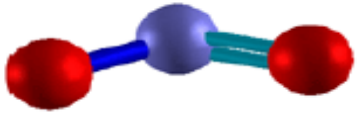
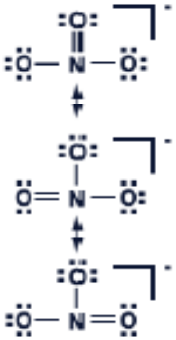
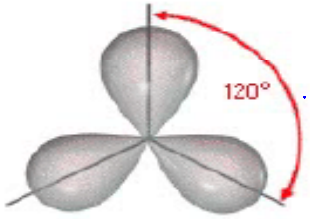
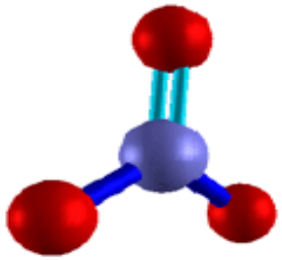
   b) Third set of Lab Owls will appear in Owl after this lab. There are a total of 4 sets of Lab Owls and they are worth 25% of the Lab Grade.

2.

iClicker:
Choose any letter: A-E

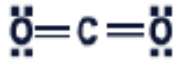
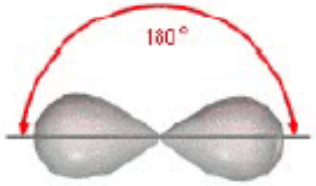
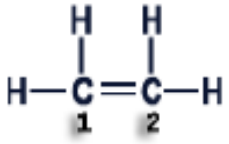
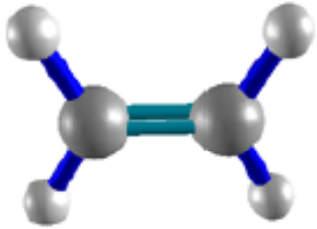
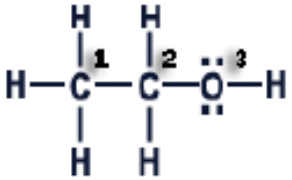
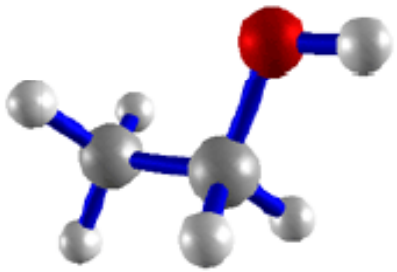
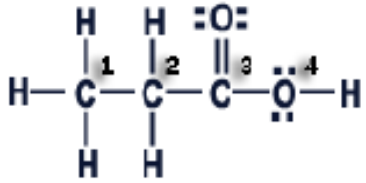
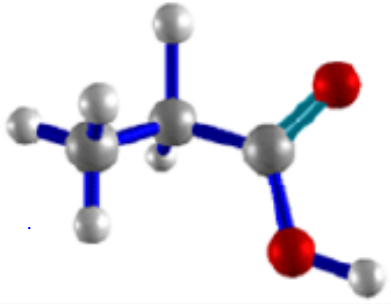
3.10 Molecular Geometries and Bond Angles

Molecular Geometry Worksheet ... Fall 2008 ... Whelan ... Page 2

Lewis Structure	Classification	X+E	Parent Geometry	Molecular Geometry	Bond Angle	Polarity
H_2CO	AX_3E_0	3	 Trigonal planar	 Trigonal planar	120°	
NO_2^- 	AX_2E_1	3	 Trigonal planar	 Angular / Bent (120°)	120°	
	AX_2E_1	3				
NO_3^- 	AX_3E_0	3	 Trigonal planar	 Trigonal planar	120°	
	AX_3E_0	3				
	AX_3E_0	3				

3.10 Molecular Geometries and Bond Angles

Molecular Geometry Worksheet … Fall 2008 … Whelan … Page 3

Lewis Structure	Classification	X+E	Parent Geometry	Molecular Geometry	Bond Angle	Polarity
CO_2 	AX_2E_0	2	 Linear	Linear	180°	
C_2H_4 	1: AX_3E_0 2: AX_3E_0	3 3	1: Trigonal planar 2: Trigonal planar		1: 120° 2: 120°	
C_2H_5OH 	1: AX_4E_0 2: AX_4E_0 3: AX_2E_2	4 4 4	1: Tetrahedron 2: Tetrahedron 3: Tetrahedron		1: ~109° 2: ~109° 3: ~109°	
C_2H_5COOH 	1: AX_4E_0 2: AX_4E_0 3: AX_3E_0 4: AX_2E_2	4 4 3 4	1: Tetrahedron 2: Tetrahedron 3: Trigonal planar 4: Tetrahedron		1: ~109° 2: ~109° 3: 120° 4: ~109°	

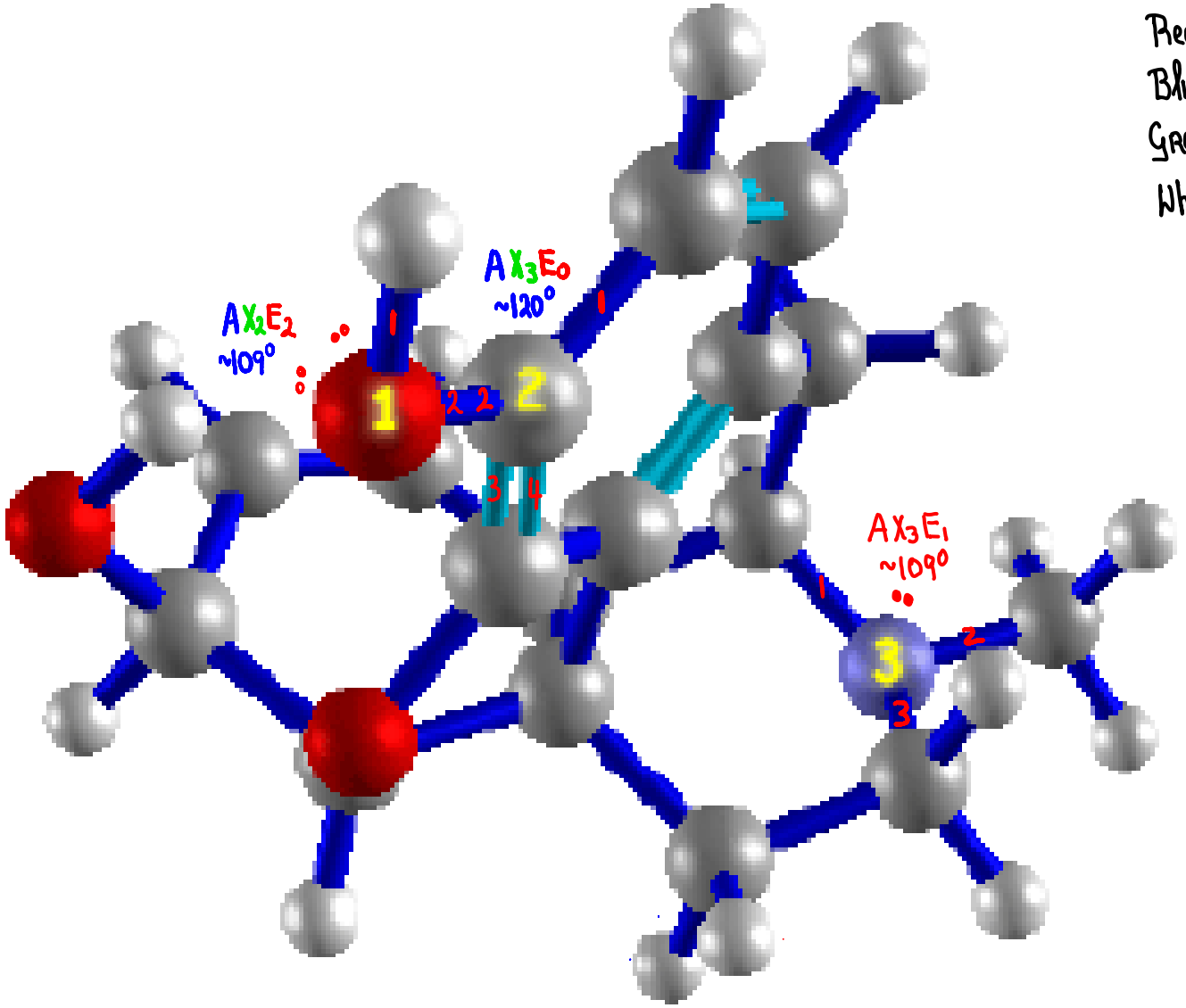
3.10 Molecular Geometries and Bond Angles

Summary

	Electron Pair Geometry	Molecular Geometry
X + E = 4	Tetrahedron (~109°)	E = 0: Tetrahedron E = 1: Trigonal pyramid E = 2: Angular / Bent ~109°
X + E = 3	Trigonal planar (120°)	E = 0: Trigonal planar E = 1: Angular / Bent 120°
X + E = 2	Linear (180°)	E = 0: Linear

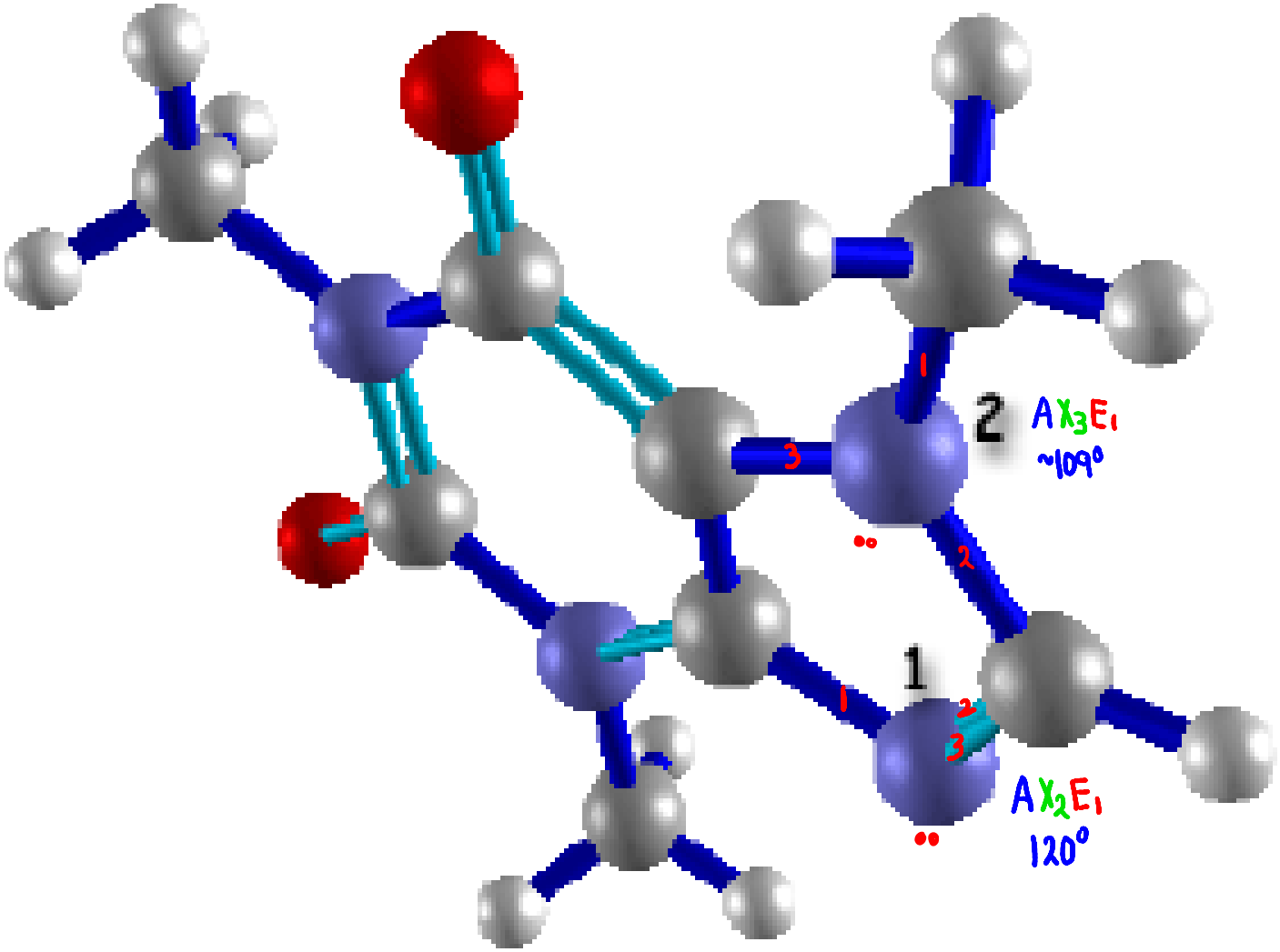
3.10 Molecular Geometries and Bond Angles

Morphine



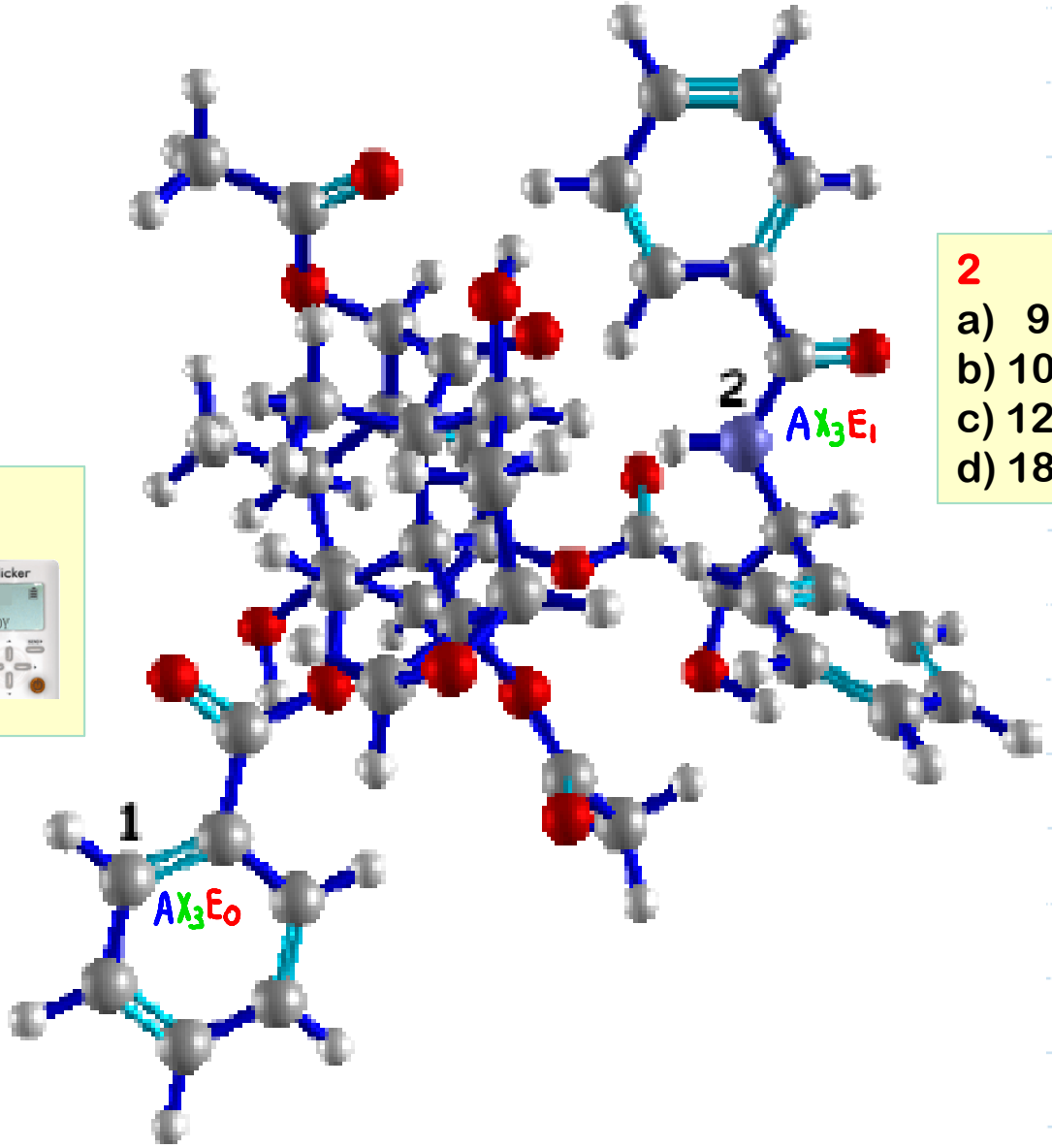
3.10 Molecular Geometries and Bond Angles

Caffeine



3.10 Molecular Geometries and Bond Angles

Taxol



1

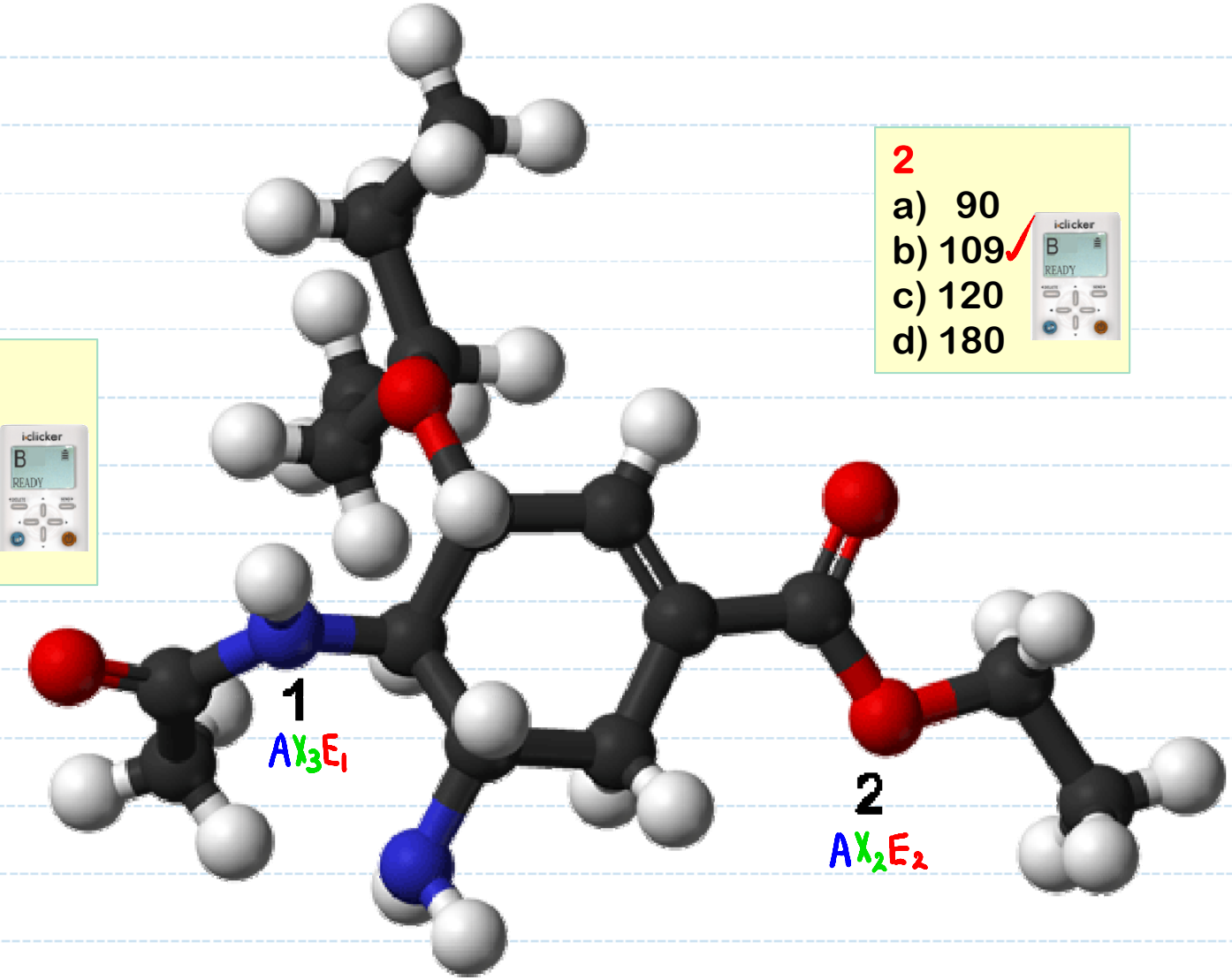
a) 90
b) 109
c) 120 ✓
d) 180

2

a) 90
b) 109 ✓
c) 120
d) 180

3.10 Molecular Geometries and Bond Angles

Tamiflu



1

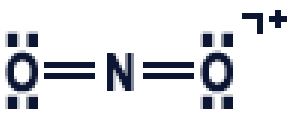
a) 90
b) 109 ✓
c) 120
d) 180

2

a) 90
b) 109 ✓
c) 120
d) 180

3.10 Molecular Geometries and Bond Angles

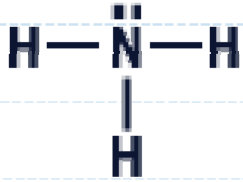
a



b

c ✓

d



Which of the above molecules has the smallest bond angle?

AX_2E_0	AX_2E_1	AX_2E_2	AX_3E_1
Linear	Trigonal planar	Tetrahedron	Tetrahedron
180°	120°	~109°	~109°
		2 lone pairs	1 lone pair