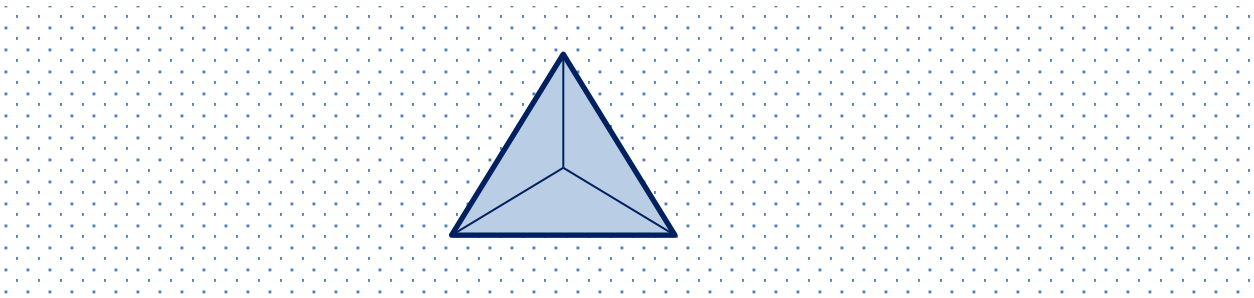
Teacher Answer Key

Modeling Silicates

1. Use the dots below to draw a single tetrahedron of silicate



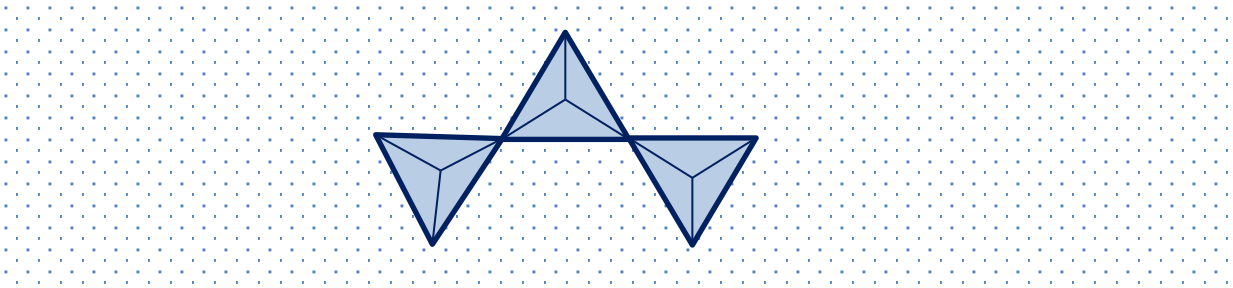
What is the charge of the tetrahedron? **SiO_4: Si=+4, each O=-2 Total = -4**

If Iron has a charge of +2, how many Fe^{+2} cations are needed to balance the charge? **2**

Write out the formula, including Iron: **Fe_2SiO_4**

What is the name of this mineral? **Olivine**

2. Use the dots below to draw a single chain silicate



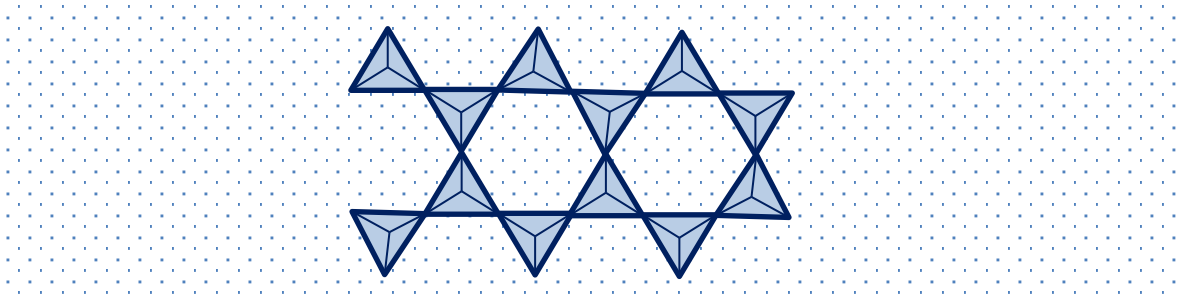
What is the charge of each tetrahedron? **SiO_3: Si=+4, each O=-2 Total -2**

If Iron has a charge of +2, how many Fe^{+2} cations are needed to balance the charge? **1**

Write out the formula, including Iron: **$FeSiO_3$**

What is the name of this mineral? **Augite**

3. Use the dots below to draw a double chain silicate



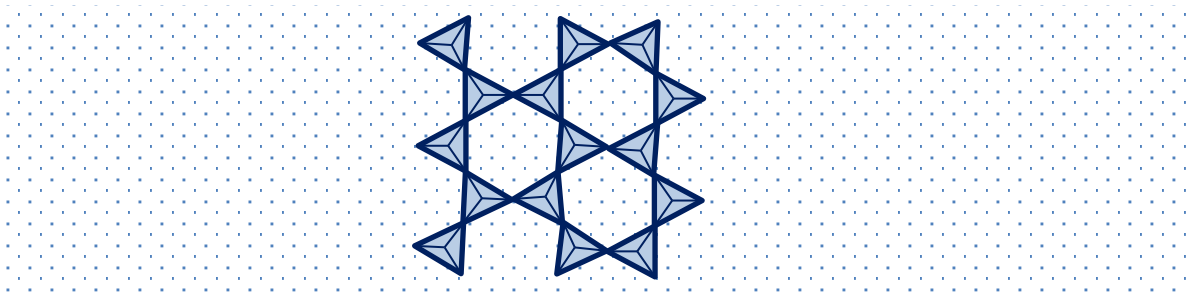
What is the charge of each tetrahedron? **$SiO_{2.5}$ inside, SiO_3 outside: Si_4O_{11} Total -6**

If Iron has a charge of +2, how many Fe^{+2} cations are needed to balance the charge? **3**

Write out the formula, including Iron: **$Fe_3Si_4O_{11}$**

What is the name of this mineral? **Amphibole**

4. Use the dots below to draw a sheet silicate:



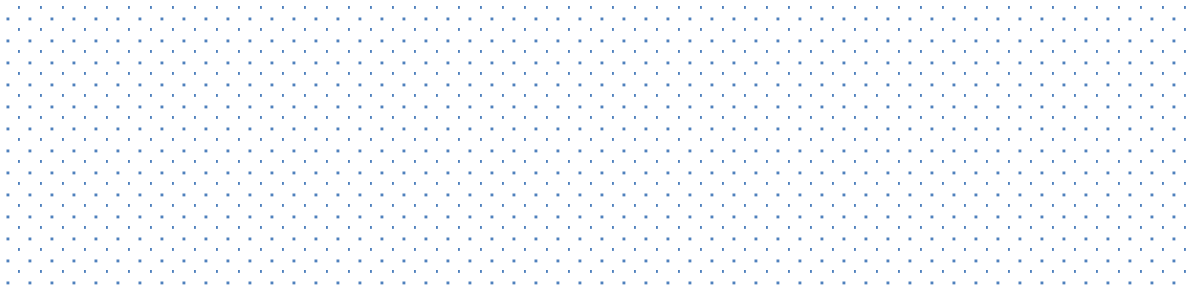
What is the charge of each tetrahedron? **Si_2O_5 Total -2**

If Iron has a charge of +2, how many Fe^{+2} cations are needed to balance the charge? **1**

Write out the formula, including Iron: **$FeSi_2O_5$**

What is the name of this mineral? **Biotite**

Challenge: Use the dots to draw a framework silicate (Hint: You can still build upward)



What is the charge of each tetrahedron? **SiO_2 Total 0**

If Iron has a charge of +2, how many Fe^{+2} cations are needed to balance the charge? **0**

Write out the formula, including Iron: **SiO_2**

What is the name of this mineral? **Quartz**