STEP ONE: Draw a Lewis structure with all lone pairs and formal charges indicated.

1. Lewis Structure

Draw the Lewis structure for CH₃S⁻, CH₃CH₂CH₂Li, CH₃CH₂C(O)H. See Figure 1, part A for examples.

STEP TWO: Compute polarizations for all bonds between heteroatoms.

2. Polarizations

What tool (in the form of a table) do you use to determine what atoms take electrons from what other atoms?

A C-O bond is heteroatomic and is polarized. A C-C bond is homoatomic and is not. The C-H bond is between heteroatoms, but it is NOT polarized. Is a B-H bond polarized? Which way?

Assign polarizations to the structures that you drew in Section 1. Examples are shown if Figure 1, part B.

STEP THREE: There are two possibilities; which one is determined by whether or not one of the reagents is charged. If it is, Step 3A

3. Finding a site for electrons to leave from with charged reagents

If one compound is negatively charged and the other is neutral (or positive), which species do you think will want to donate electrons?
Figure 1: Figures for steps 1 through 3.
For the pair of reagents, \( \text{CH}_3\text{O}^- \) and \( \text{CH}_3\text{C(O)H} \), which will want to donate electrons? See Figure 1, Part C for an example with \( \text{OH}^- \) and \( \text{HCl} \).

If one compound is neutral and the other is positive, which species do you think will want to donate electrons?

**STEP THREE:** If both reagents are neutral, find the negatively charged atom that most wants to give up electrons. This is Step 3B.

Would a negative carbon atom or a negative chlorine atom prefer to give up electrons?

For the pair of reagents, \( \text{CH}_3\text{Li} \) and \( \text{CH}_3\text{C(O)CH}_3 \), which negatively polarized atom most wants to give up electrons? See an example in Figure 1, part D.

**STEP FOUR:** Draw a dotted line between the atom identified in Step 3 to a positively polarized atom on the other reagent.

4. *Finding the incipient bond*

For the pair of reagents, \( \text{CH}_3\text{Li} \) and \( \text{CH}_3\text{C(O)CH}_3 \), draw the appropriate dotted line. HINT: It goes between **atoms**. See Figure 2, part A, for an example.

**STEP FIVE:** Move the most weakly held electrons of the negatively polarized atom to the dotted line; then ask if that requires another epwa.

5. *The New Bond(s)*

For the pair of reagents, \( \text{CH}_3\text{Li} \) and \( \text{CH}_3\text{C(O)CH}_3 \), draw in the new bond where the dotted line is. An example is found in Figure 2, part B; the electrons on the negatively polarized carbon between that carbon and the Mg are the least tightly held because Mg best tolerates the positive charge that results when those electrons are taken away. If I had moved the electrons between the negatively polarized carbon and the \( \text{CH}_3 \) group to its left in the Figure, then carbon would have been positive: Not as good.

**STEP SIX:** Redraw the structure with the dotted bond now solid, and any broken bonds now gone. Be careful to put in any new lone pairs.

6. *Drawing Products*

Finish the problem with the pair of reagents, \( \text{CH}_3\text{Li} \) and \( \text{CH}_3\text{C(O)CH}_3 \), started above. For an example, see Figure 2, Part C.

**STEP SEVEN:** Check for formal charges. Ask if they make sense.
Figure 2: Figures for steps 4 through 6.