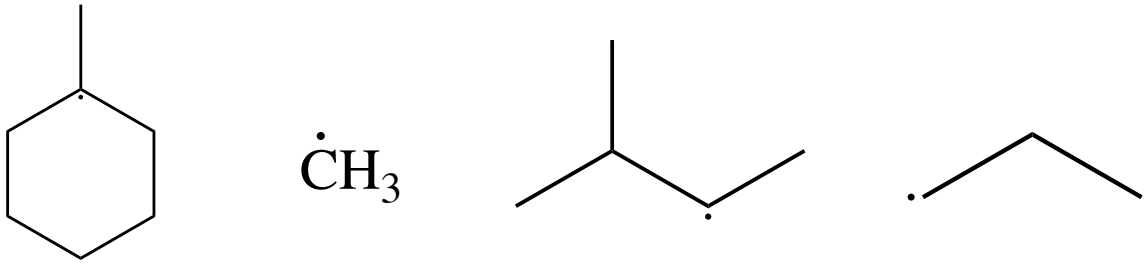
## Alkanes #5: Radical Stability and Free Radical Halogenation

Hey, gang. It's time to practice our first legitimate reaction: The Free Radical Chain Reaction. This worksheet will reinforce the organic principles that are involved with the free radical chain reaction as well as give us *plenty* of practice drawing out the mechanism of this reaction and predicting the products certain reactions yield. Let's get after it ☺.

**1.)**

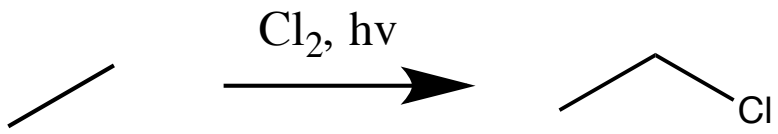
a.) Given the four radical alkane structures below, rank the stability of the 4 structures (4 being the ***most*** stable and 1 being the ***least*** stable).




b.) Now having ranked the structures, explain, **through a diagram**, why the radical structure ranked 4 is the most stable radical.

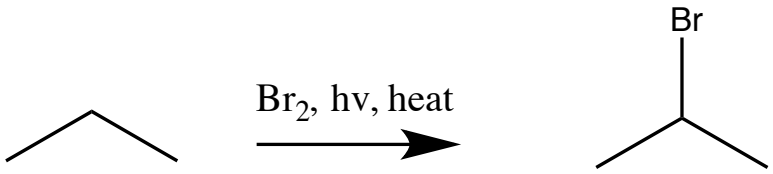
**2.)** Well done, guys and gals. Okay, moving on: Let's get to the Free Radical Chain Reaction. Just as we discussed in the previous video, we can illustrate how organic reactions proceed by drawing the ***reaction mechanism***.

Below, draw the reaction mechanism for the following reaction:



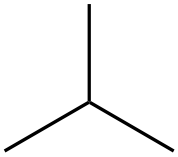
**3.)**

a.) Great job! Alright, because we just started drawing mechanisms, and I want to make sure you all have this one down pat—So let's give it another go, except this time with bromination instead of chlorination.

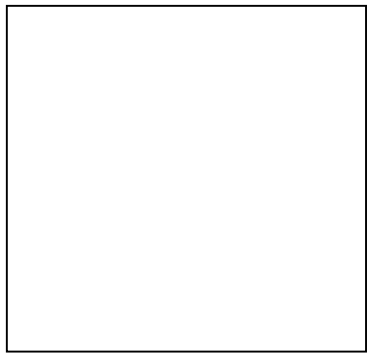


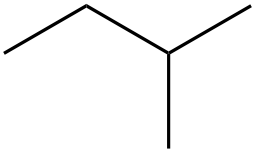

b.) In a short, concise explanation, detail why radical bromination is "more selective" than radical chlorination?

**4.)** Way to go, gang. One last question; we're almost done with this worksheet.
So now that we've drawn the reaction mechanism twice, it's time to **predict the products** of various reactions.

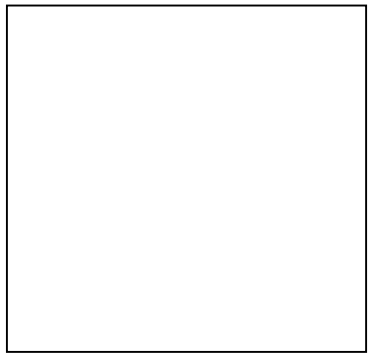


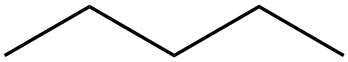
$Cl_2$, hv



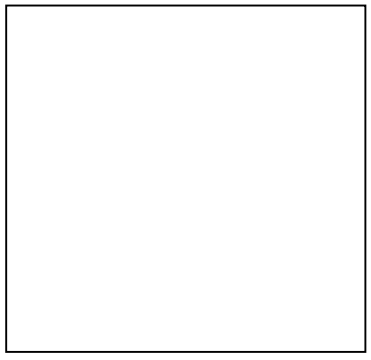


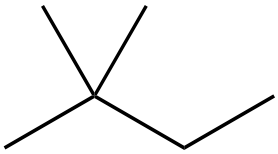
$Br_2$, hv, heat





$I_2$, hv, heat





$Br_2$, hv, heat