

Topic	Enthalpy changes and energy level diagrams	Level	GCSE (or any course for students aged 14-16)
Outcomes	<ol style="list-style-type: none">1. To understand the terms exothermic and endothermic2. To be able to draw energy level diagrams for endothermic and exothermic reactions		
Information for teachers	<ul style="list-style-type: none">• These slides take students through a series of steps to help understand energy level diagrams for exothermic and endothermic reaction. You could use these slides once students have been taught the basics. Students will initially struggle to understand why an exothermic reactions has a negative enthalpy change.		

The men in this picture are being kept warm by the fire. We can use a diagram to show what energy changes are taking place when the wood burns.

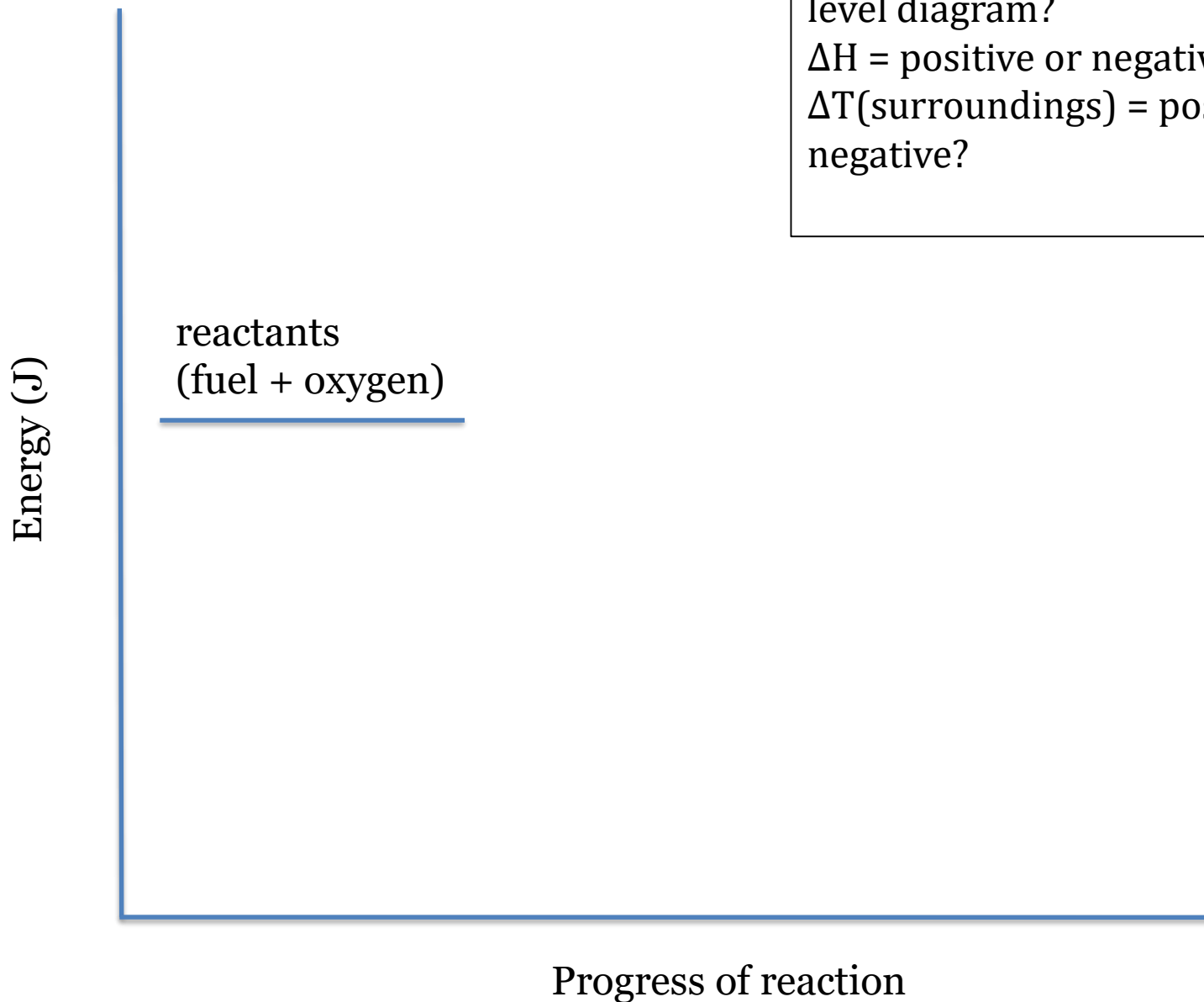


Questions

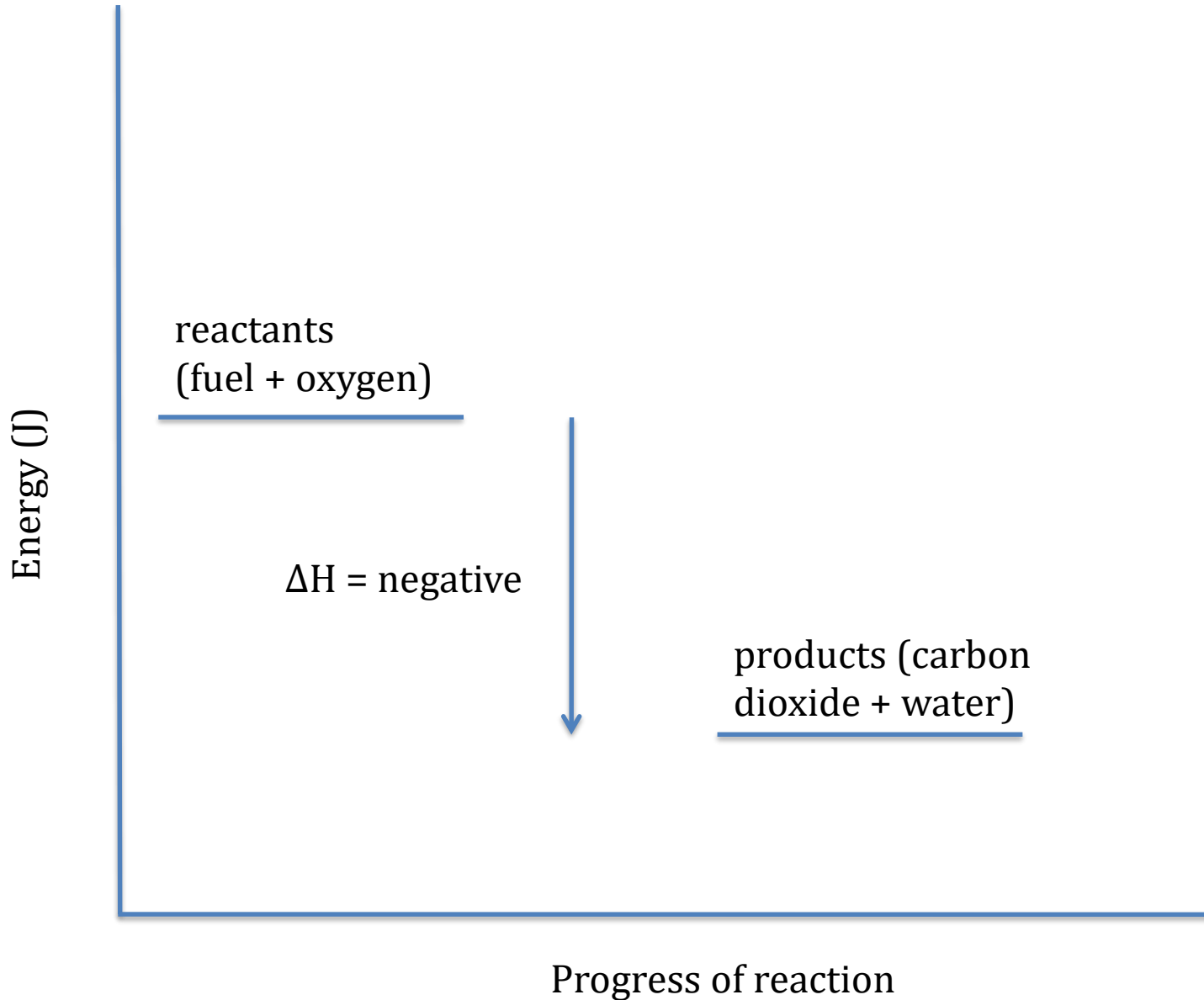
Where are the products on this energy level diagram?

ΔH = positive or negative?

$\Delta T(\text{surroundings})$ = positive or negative?



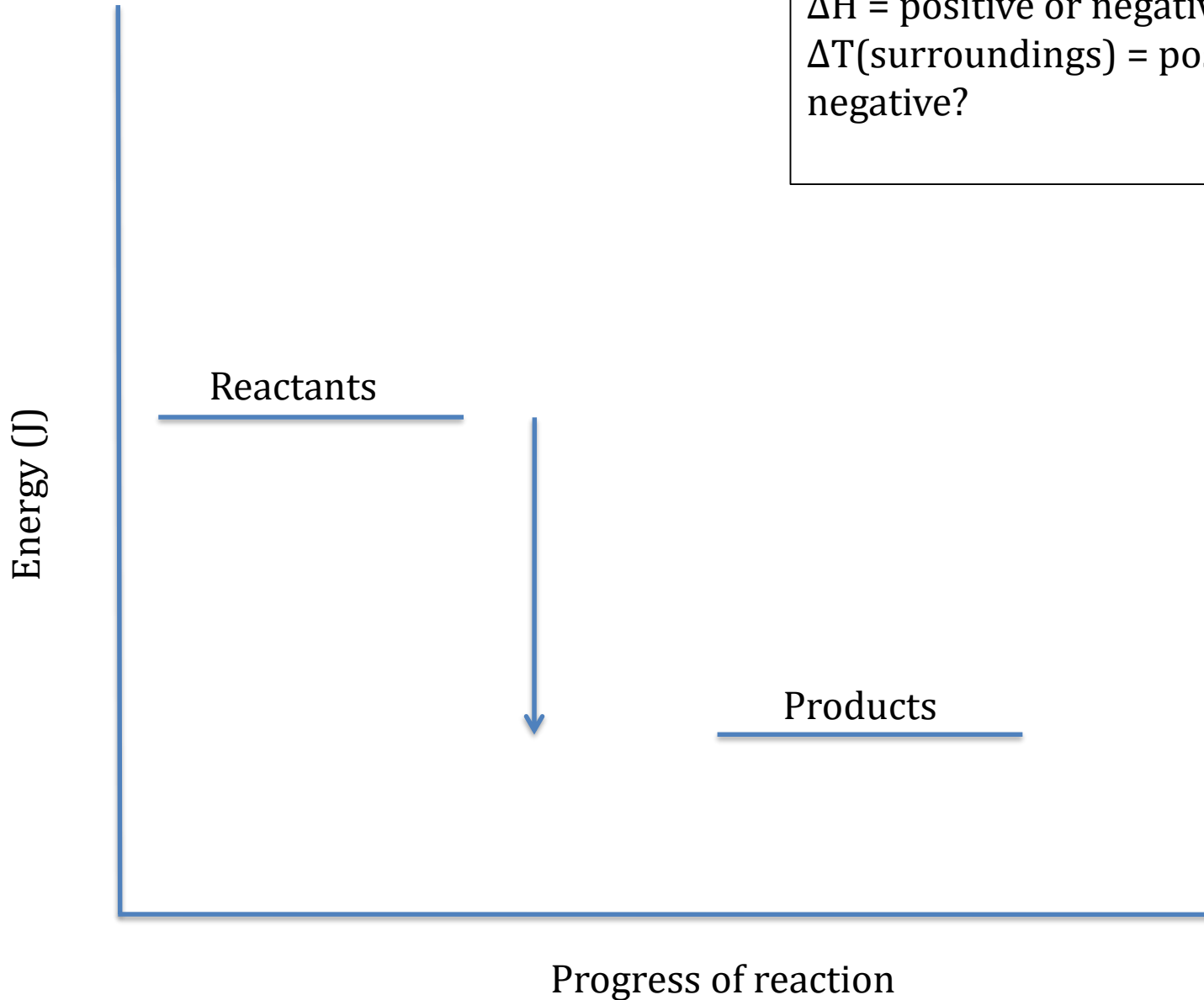
Temperature of surroundings
would increase.



Questions

ΔH = positive or negative?

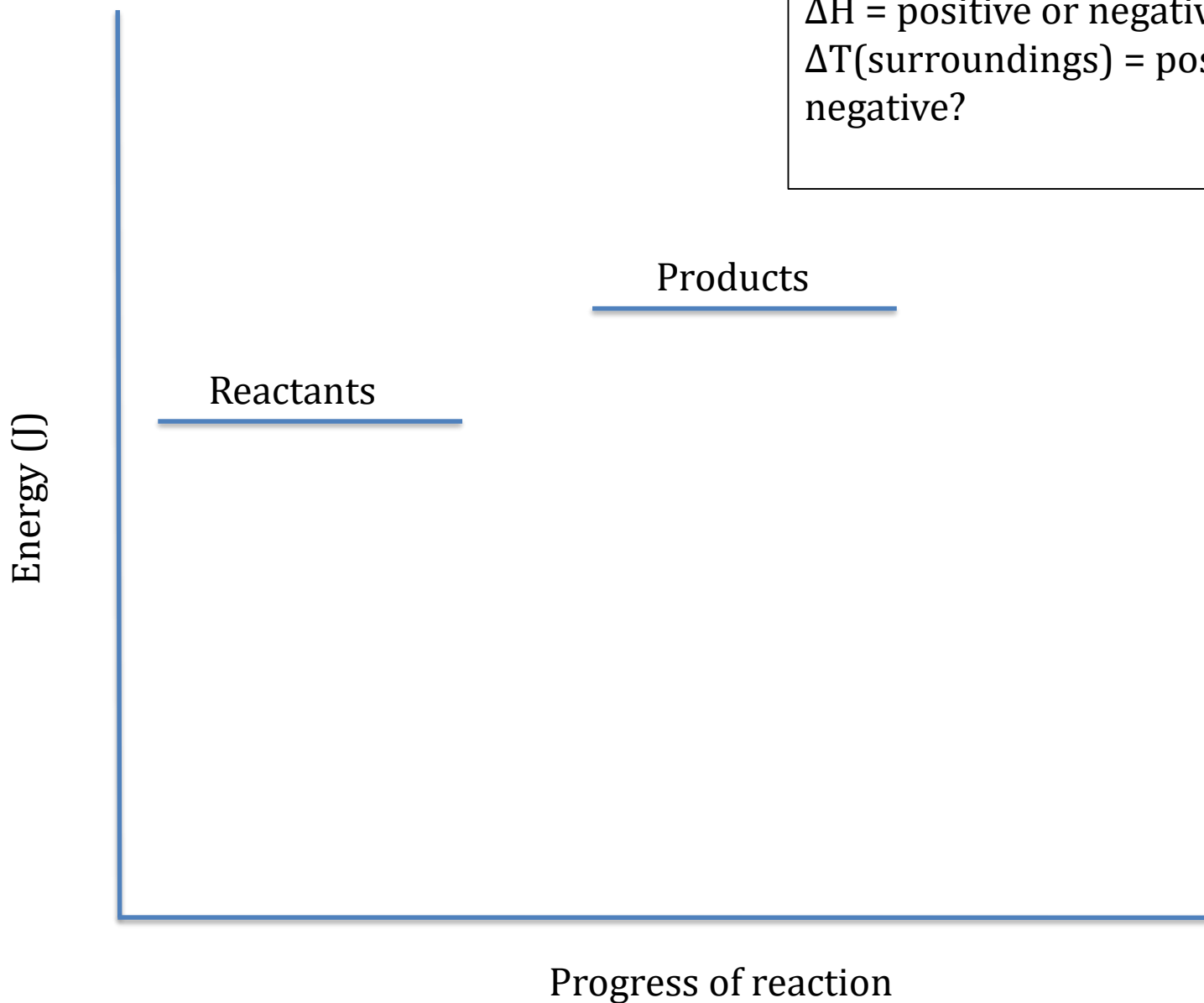
$\Delta T(\text{surroundings})$ = positive or negative?



Questions

ΔH = positive or negative?

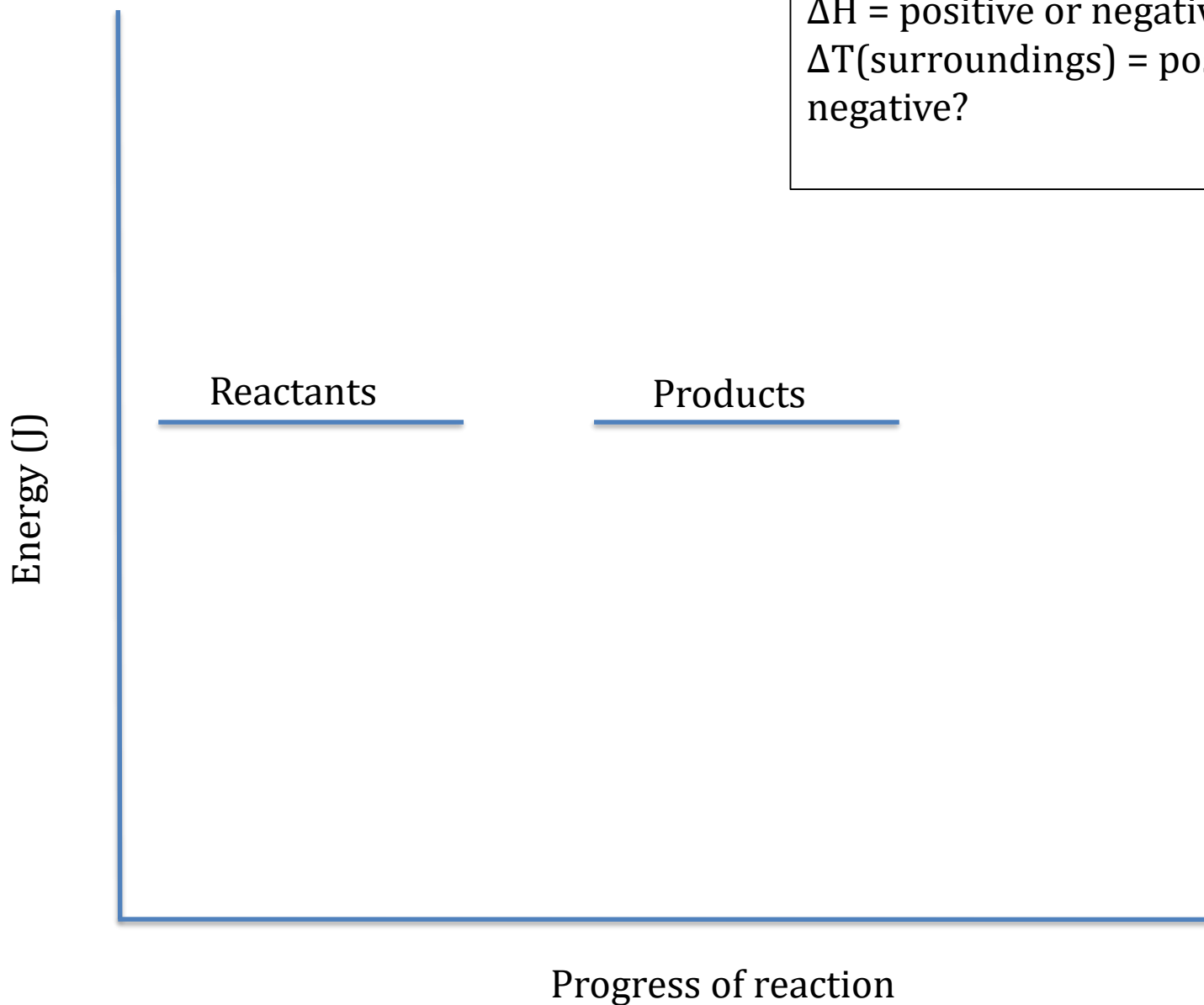
$\Delta T(\text{surroundings})$ = positive or negative?



Questions

ΔH = positive or negative?

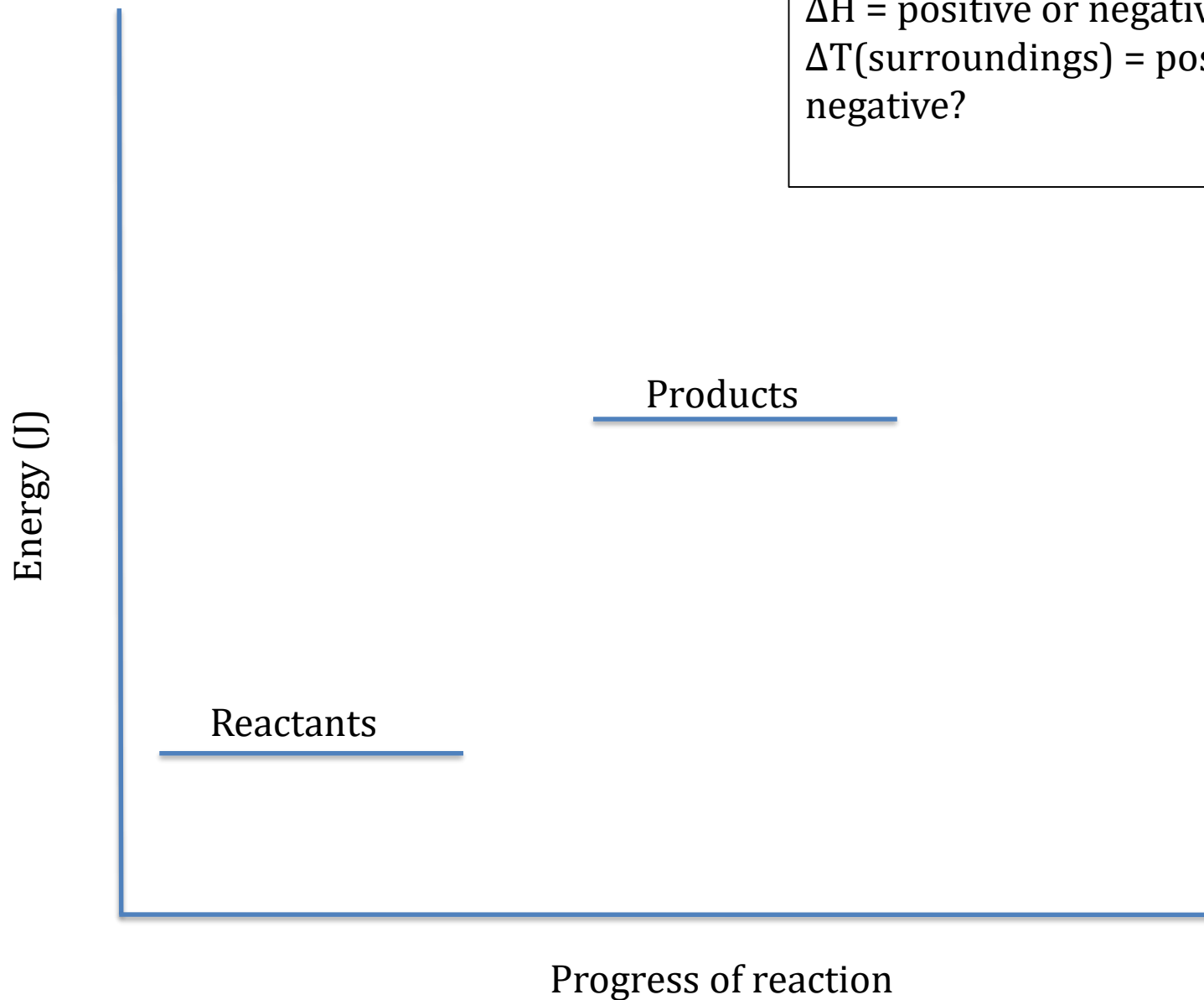
$\Delta T(\text{surroundings})$ = positive or negative?



Questions

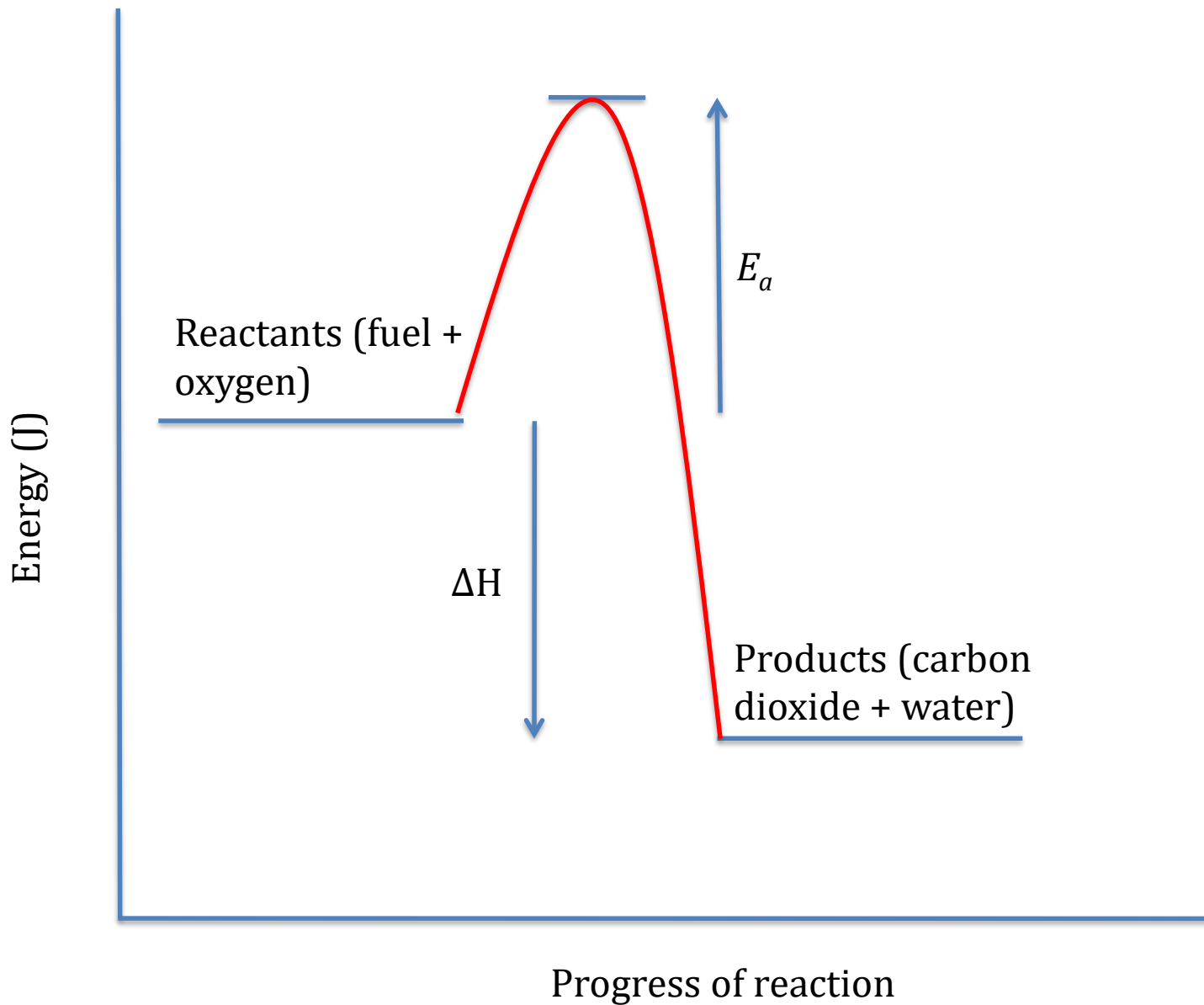
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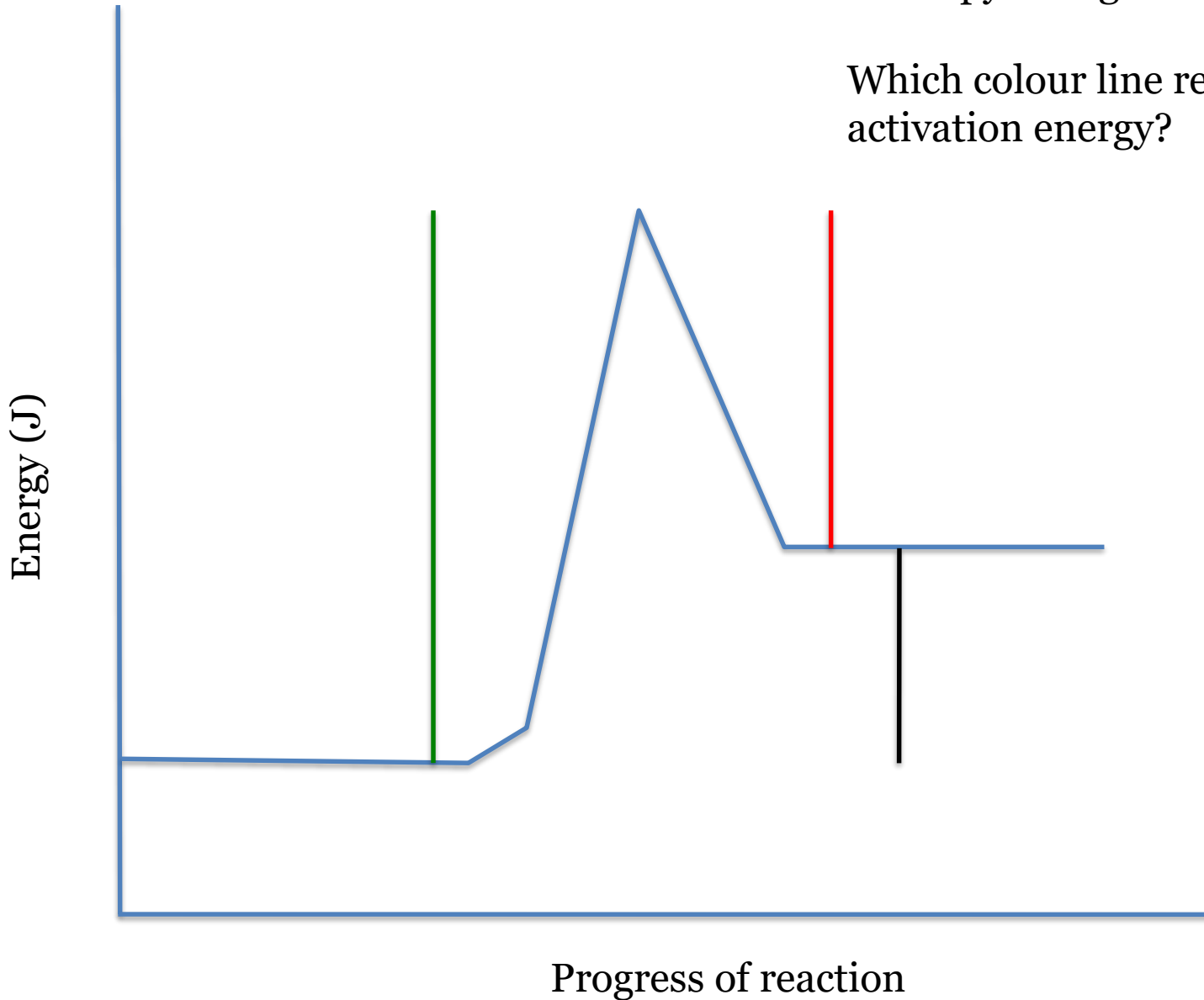
Before the reaction could begin, the man had to light the fire with a match. Can you show this on your energy level diagram? We call the minimum energy needed to start a reaction the activation energy or E_a .





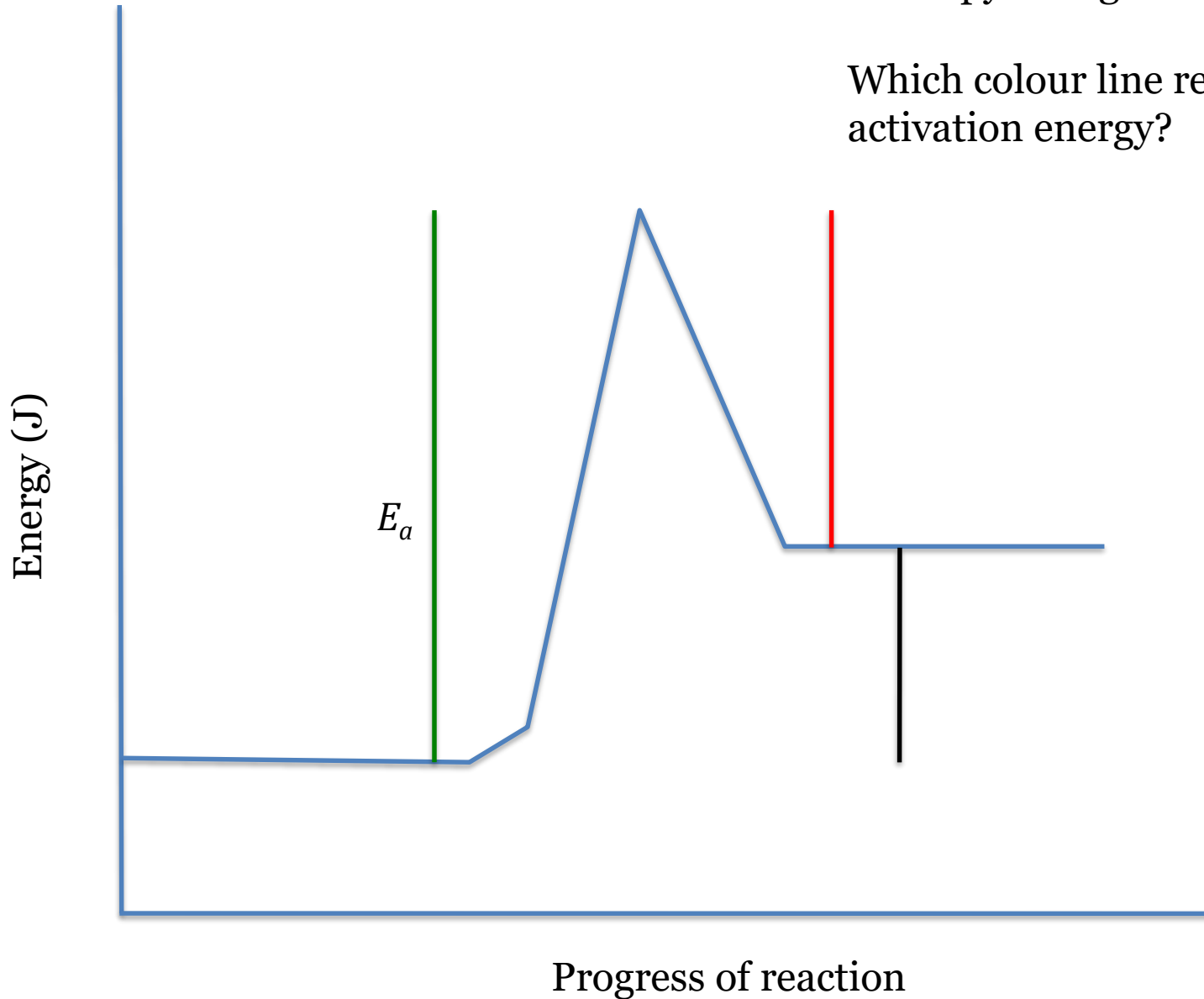
Which colour line represents the enthalpy change?

Which colour line represents the activation energy?



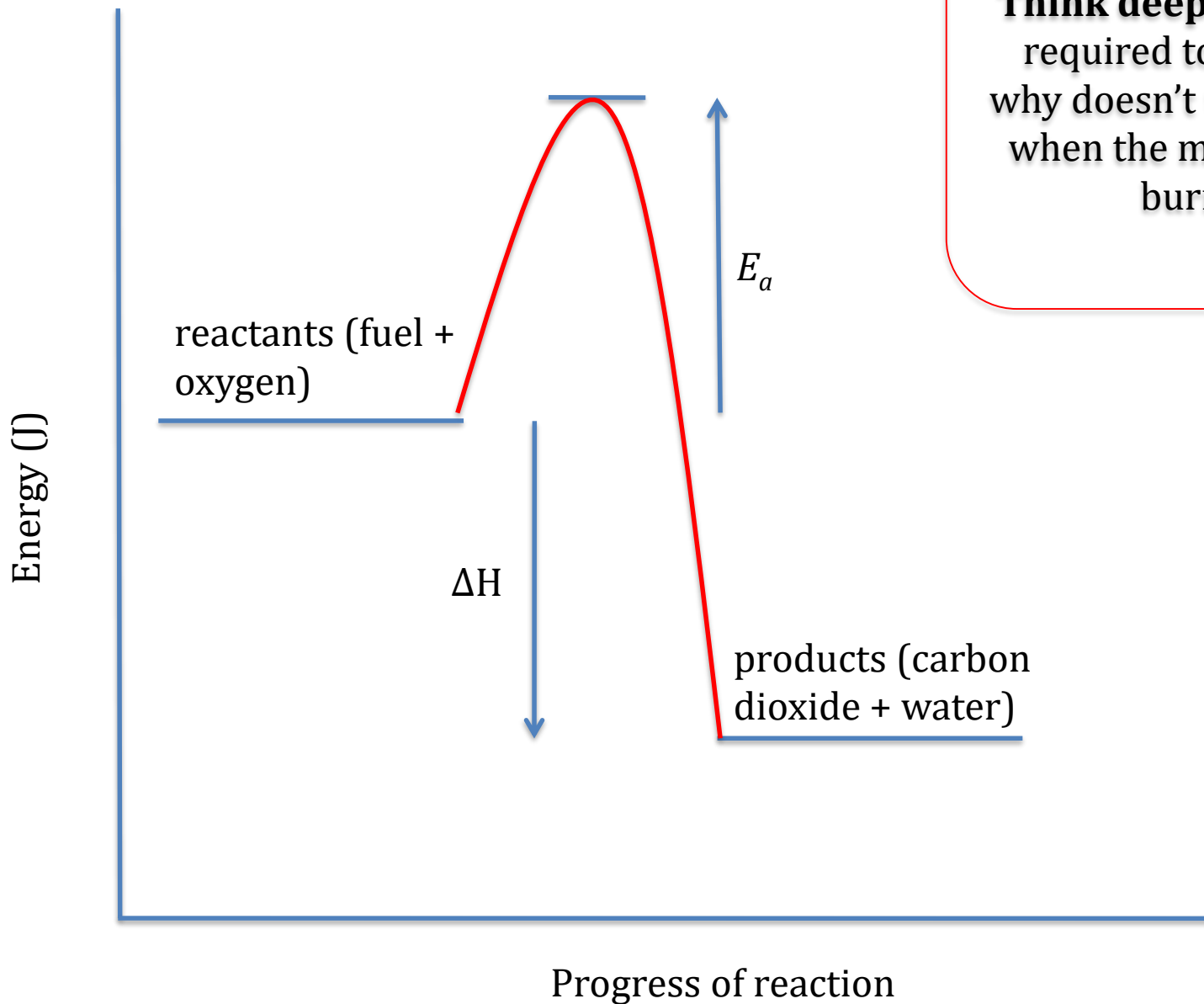
Which colour line represents the enthalpy change?

Which colour line represents the activation energy?



Sketch your own energy level diagrams

1. A reaction with a small activation energy where ΔH is negative
2. An endothermic reaction with a large activation energy
3. The reaction between Mg and O_2
4. The combustion of petrol
5. The reaction inside an ice pack
6. Melting snow



Think deep! If a match is required to start a fire, why doesn't the fire go out when the match finishes burning?