Sample Problem Solving Flow Charts

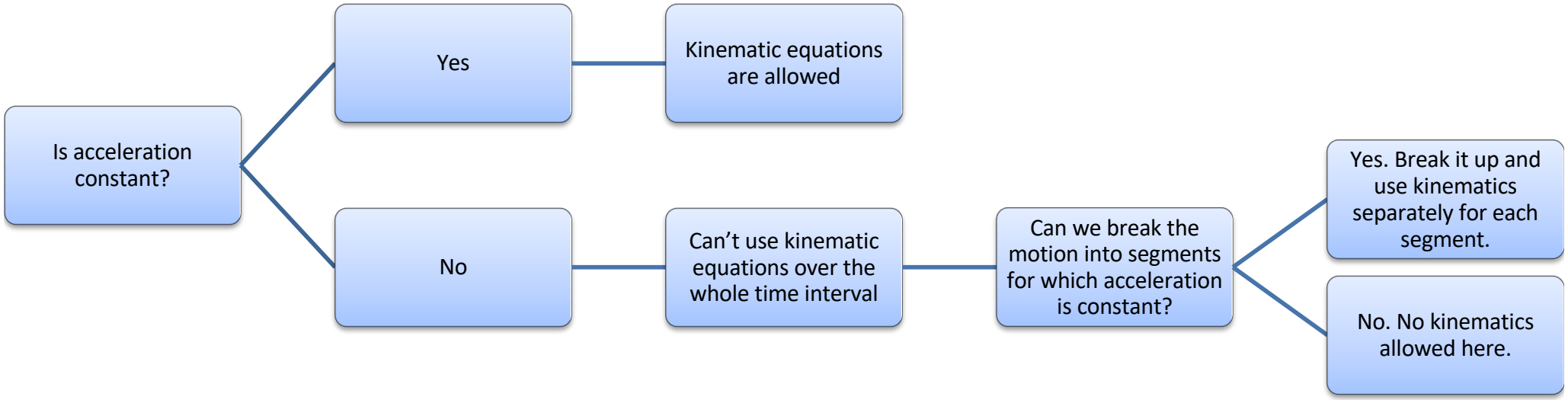
Sample flow charts

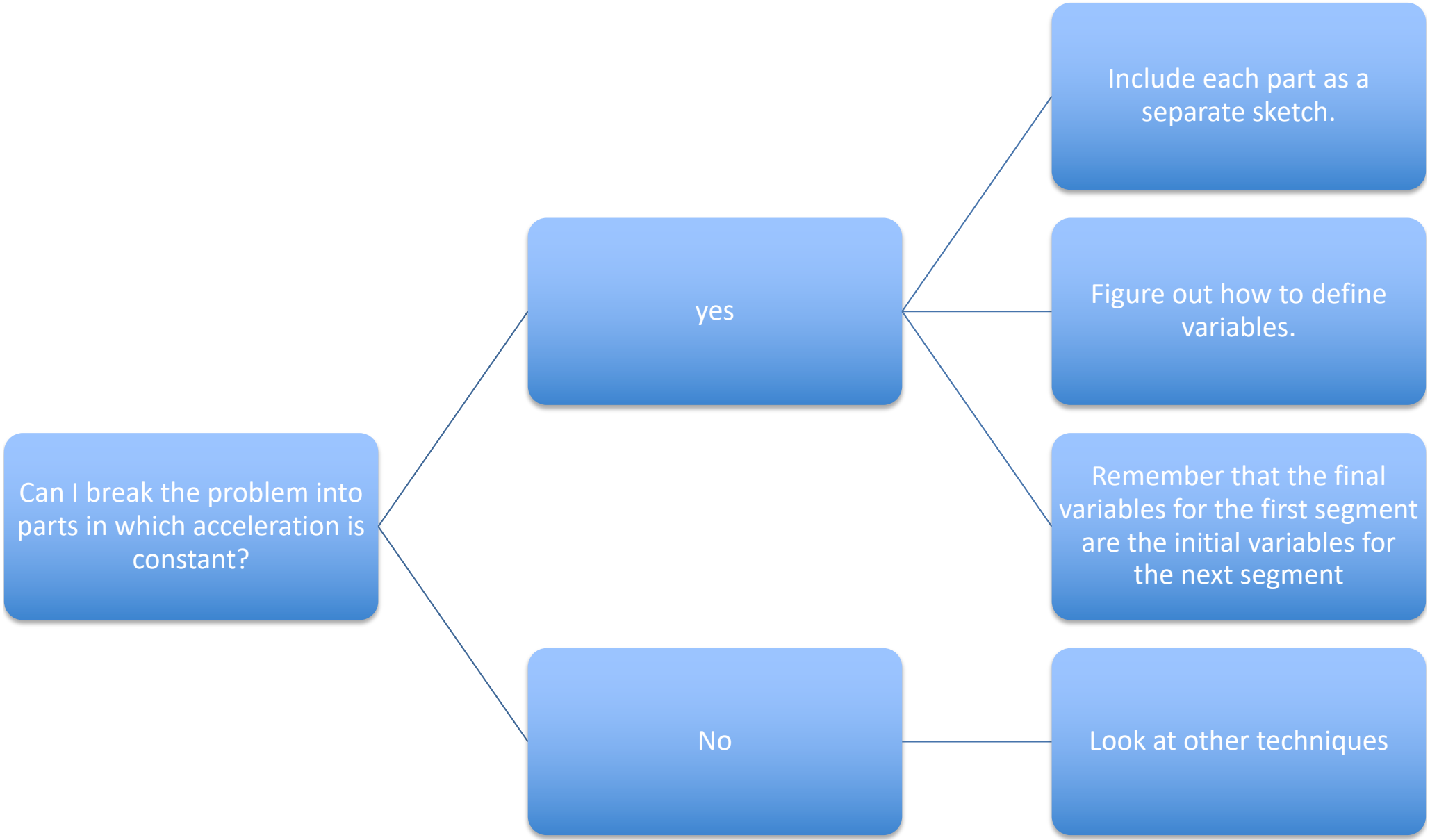
- You should be creating your own flow charts, in order to help you see how to solve problems, and how the ideas are interconnected.
- These are some samples to get you started as you study for the final exam.
- Notice that these aren't example problems – instead these are a graphic organizer to help you find and sort through information so that you have a strategy to use in solving physics problems.

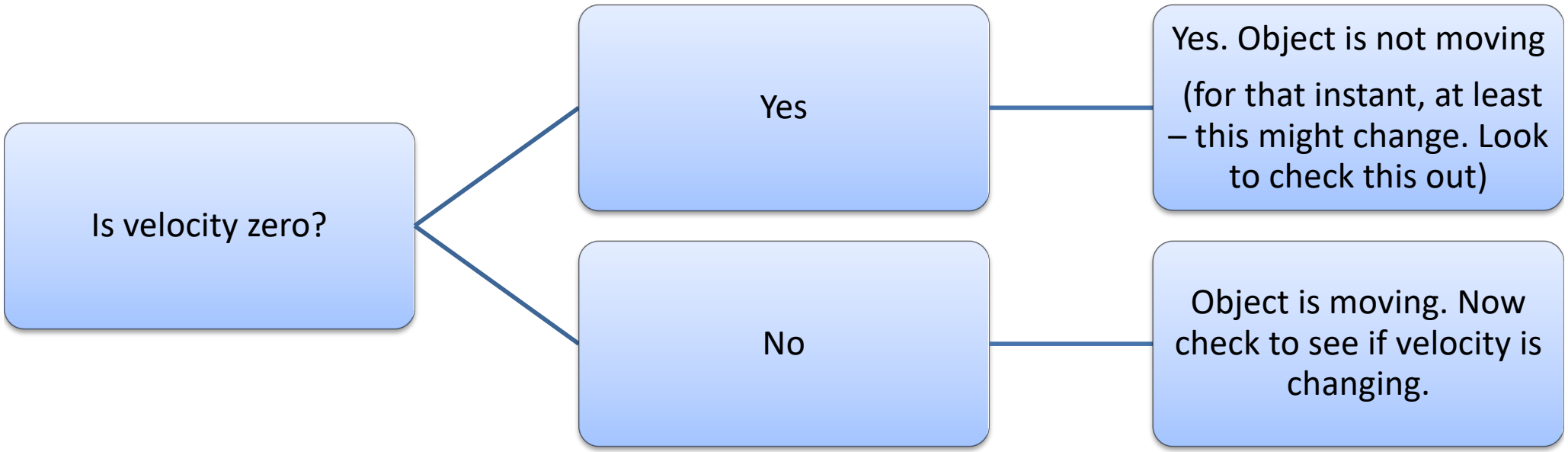
So – how?

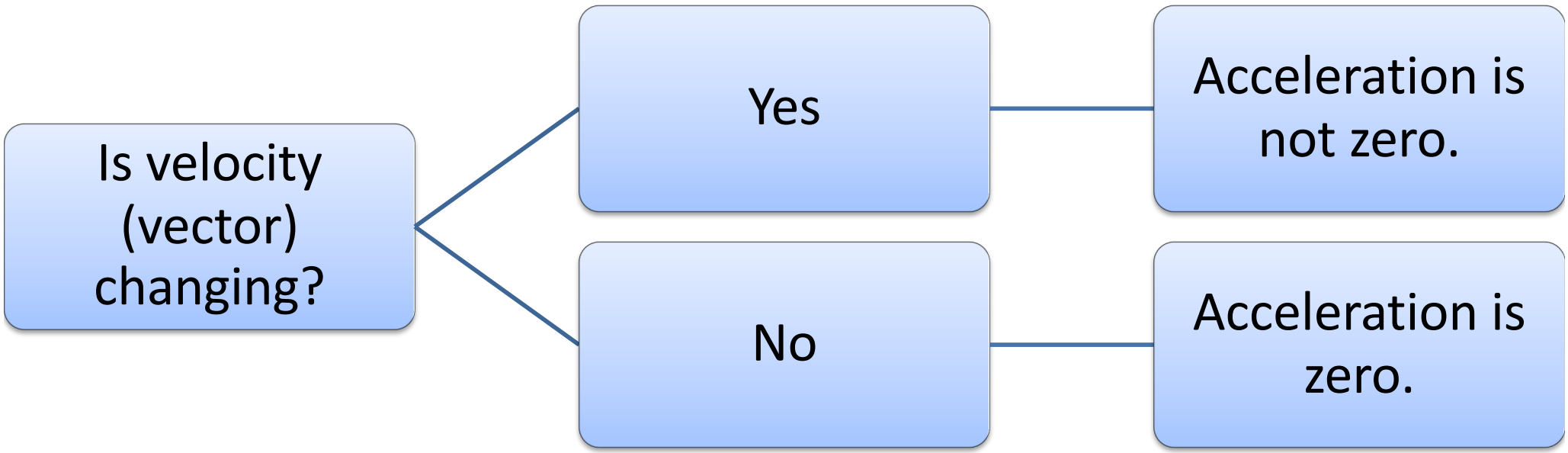
- First – this is what the problem solving strategy is designed to help with
- But also – think back. I ask a lot of questions. Those questions help find the way…….
- You do not have to use this format if you find that another one is more helpful.

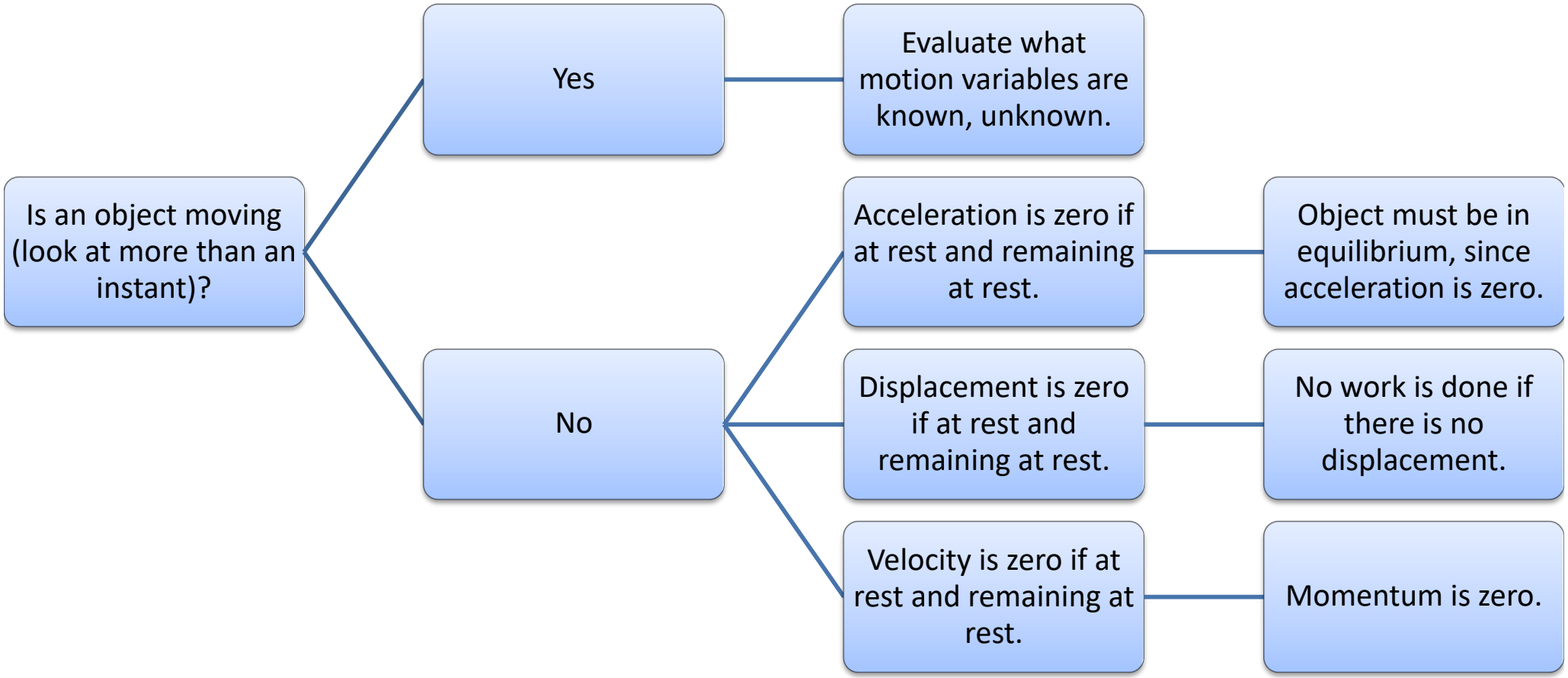
- Following – examples of SOME of what you can do…

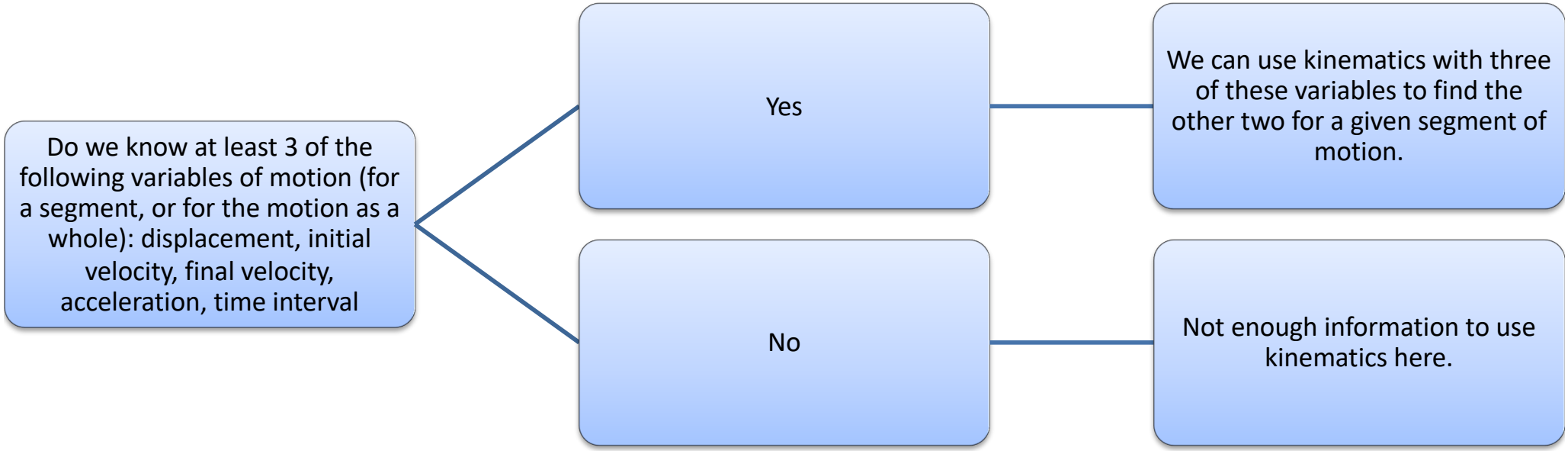

Is acceleration constant?
Yes
Kinematic equations are allowed
No
Can't use kinematic equations over the whole time interval
Can we break the motion into segments for which acceleration is constant?
Yes. Break it up and use kinematics separately for each segment.
No. No kinematics allowed here.

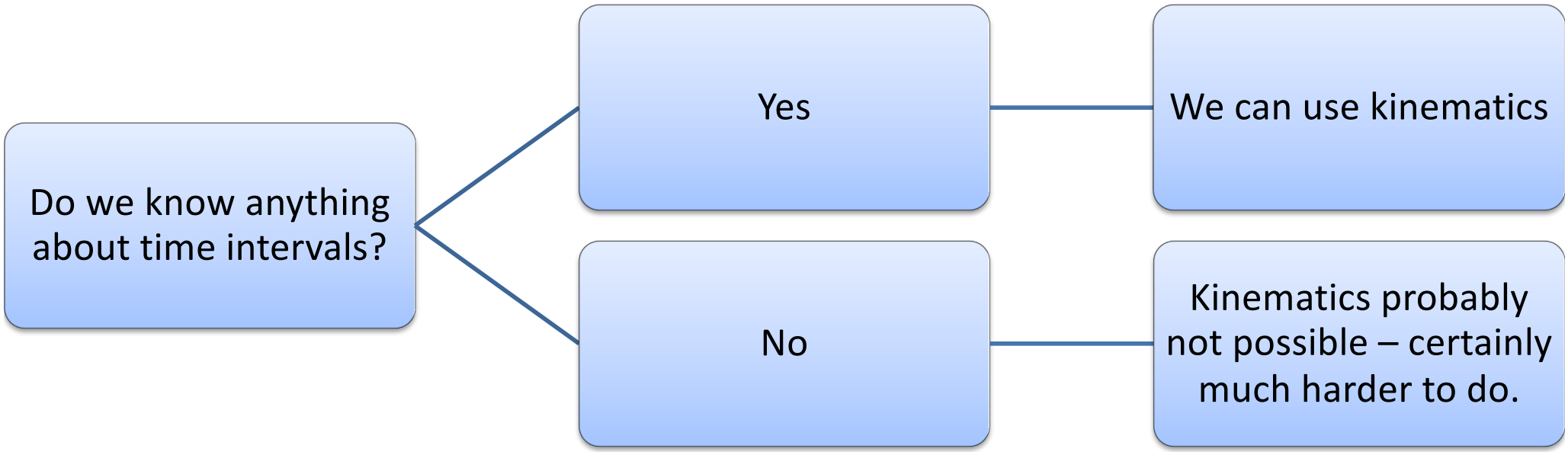

Can I break the problem into parts in which acceleration is constant?
yes
No
Include each part as a separate sketch.
Figure out how to define variables.
Remember that the final variables for the first segment are the initial variables for the next segment
Look at other techniques

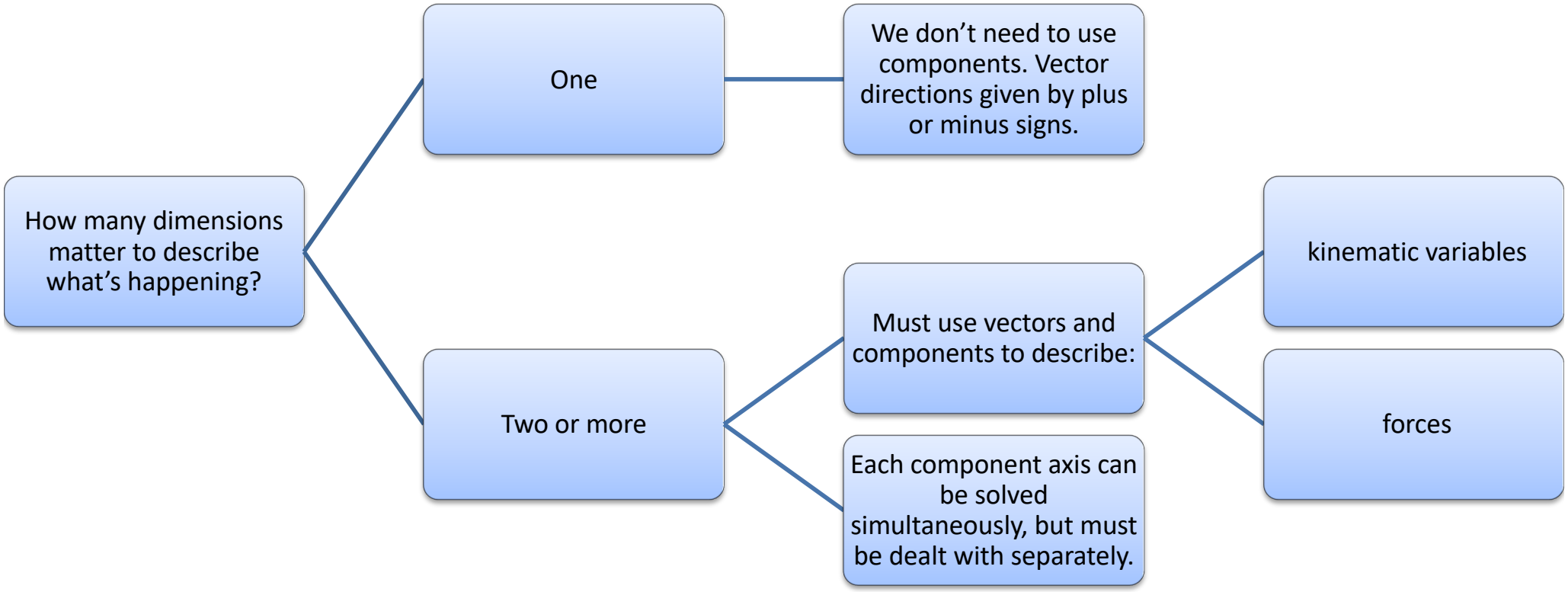

Is velocity zero?
Yes
No
Yes. Object is not moving
(for that instant, at least – this might change. Look to check this out)
Object is moving. Now check to see if velocity is changing.

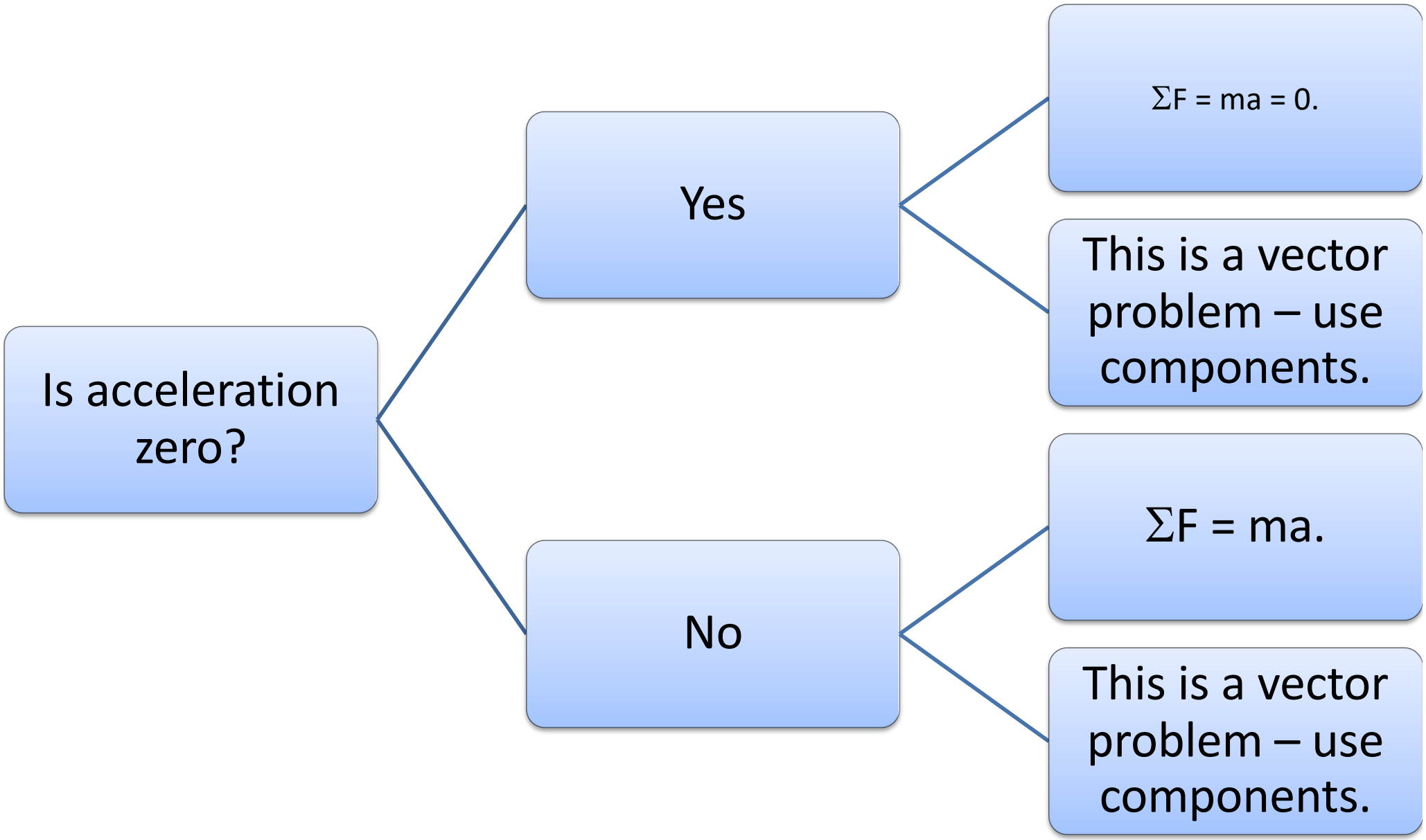

Is velocity (vector) changing?
Yes
No
Acceleration is not zero.
Acceleration is zero.


Is an object moving (look at more than an instant)?
Yes
Evaluate what motion variables are known, unknown.
No
Acceleration is zero if at rest and remaining at rest.
Object must be in equilibrium, since acceleration is zero.
Displacement is zero if at rest and remaining at rest.
No work is done if there is no displacement.
Velocity is zero if at rest and remaining at rest.
Momentum is zero.


Do we know at least 3 of the following variables of motion (for a segment, or for the motion as a whole): displacement, initial velocity, final velocity, acceleration, time interval
Yes
No
We can use kinematics with three of these variables to find the other two for a given segment of motion.
Not enough information to use kinematics here.


Do we know anything about time intervals?
Yes
No
We can use kinematics
Kinematics probably not possible – certainly much harder to do.


How many dimensions matter to describe what's happening?
One
We don't need to use components. Vector directions given by plus or minus signs.
Two or more
Must use vectors and components to describe:
kinematic variables
forces
Each component axis can be solved simultaneously, but must be dealt with separately.


Is acceleration zero?
Yes
No
ΣF = ma = 0.
This is a vector problem – use components.
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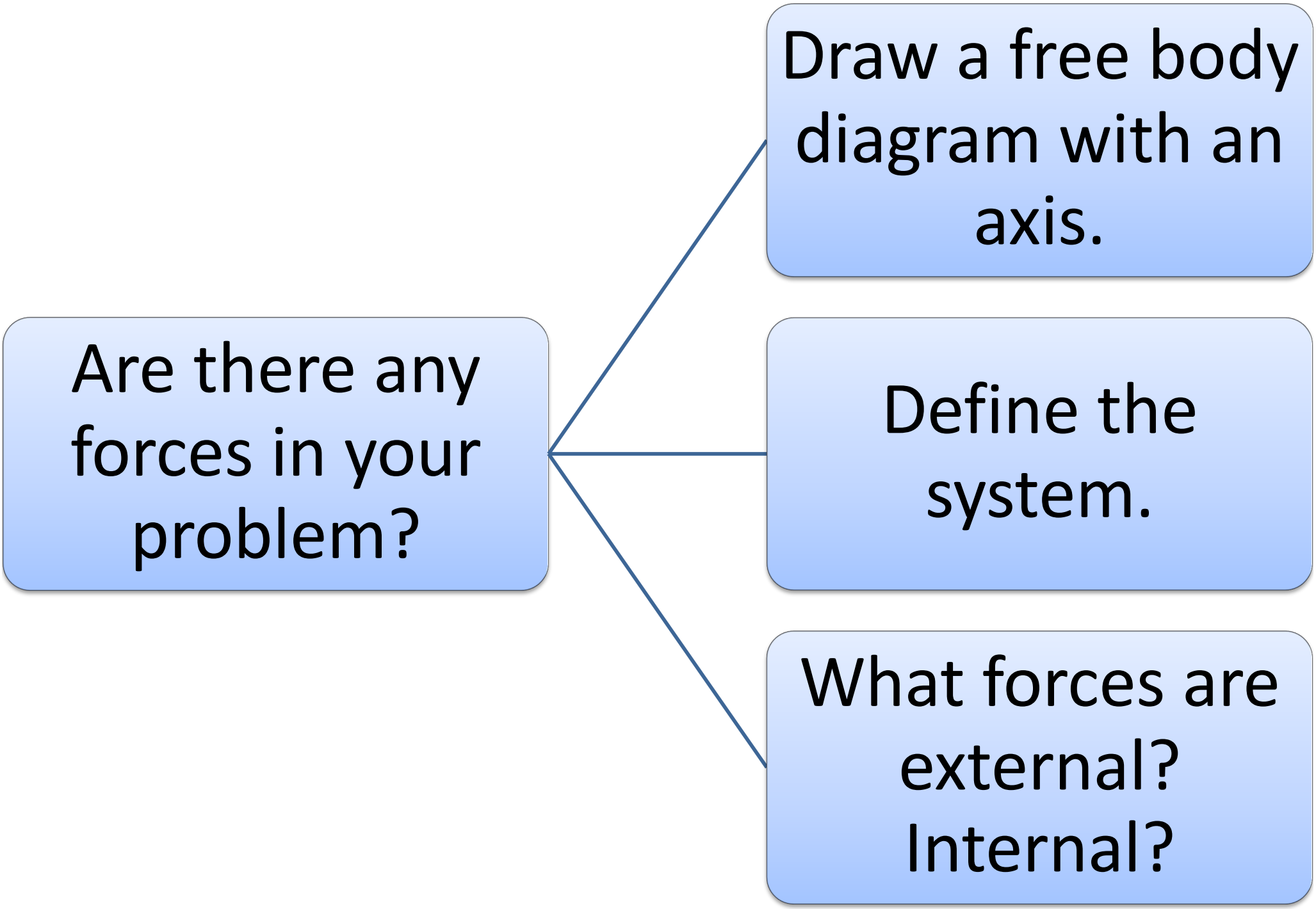
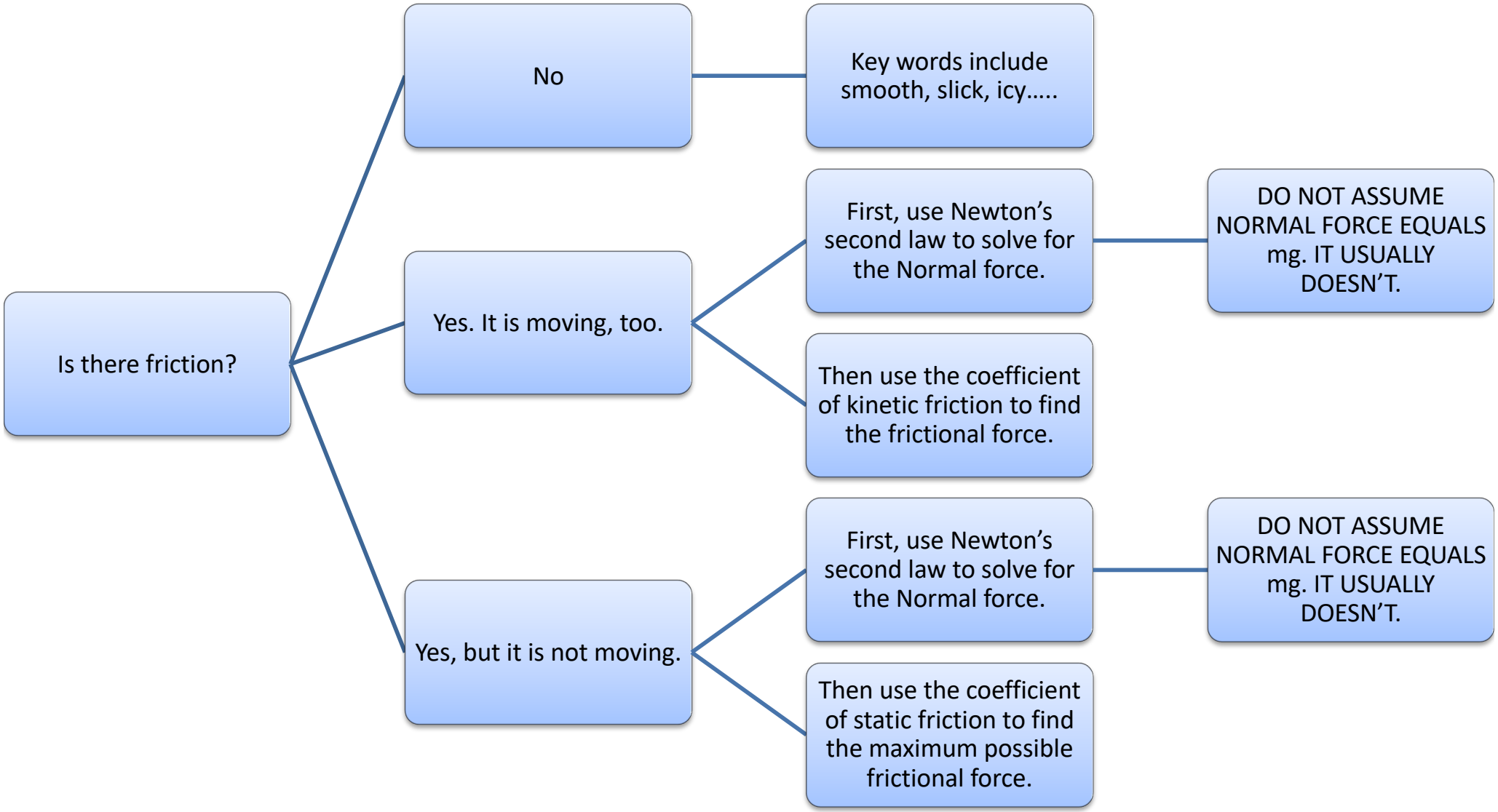
This is a vector problem – use components.


Are there any forces in your problem?
Draw a free body diagram with an axis.
Define the system.
What forces are external? Internal?


Is there friction?
No
Key words include smooth, slick, icy…..
Yes. It is moving, too.
First, use Newton's second law to solve for the Normal force.
DO NOT ASSUME NORMAL FORCE EQUALS mg. IT USUALLY DOESN'T.
Then use the coefficient of kinetic friction to find the frictional force.
Yes, but it is not moving.
First, use Newton's second law to solve for the Normal force.
DO NOT ASSUME NORMAL FORCE EQUALS mg. IT USUALLY DOESN'T.
Then use the coefficient of static friction to find the maximum possible frictional force.