



The Conceptual Model with Life Cycle Considerations

Green Ribbon Science Panel

October 20-21, 2014



Department of Toxic Substances Control



CalEPA

Use of the Conceptual Model in AA

- Graphical depiction
 - chemical use, release and exposure
 - different product phases
- Starting step for the AA process
 - Useful throughout AA
- Helps identify relevant factors
 - Enhances analytical completeness and transparency



Conceptual Model Example

Chemical X – the Chemical of Concern, a flame retardant in an electronic device casing

Alternative A – chemical substitution for flame retardant

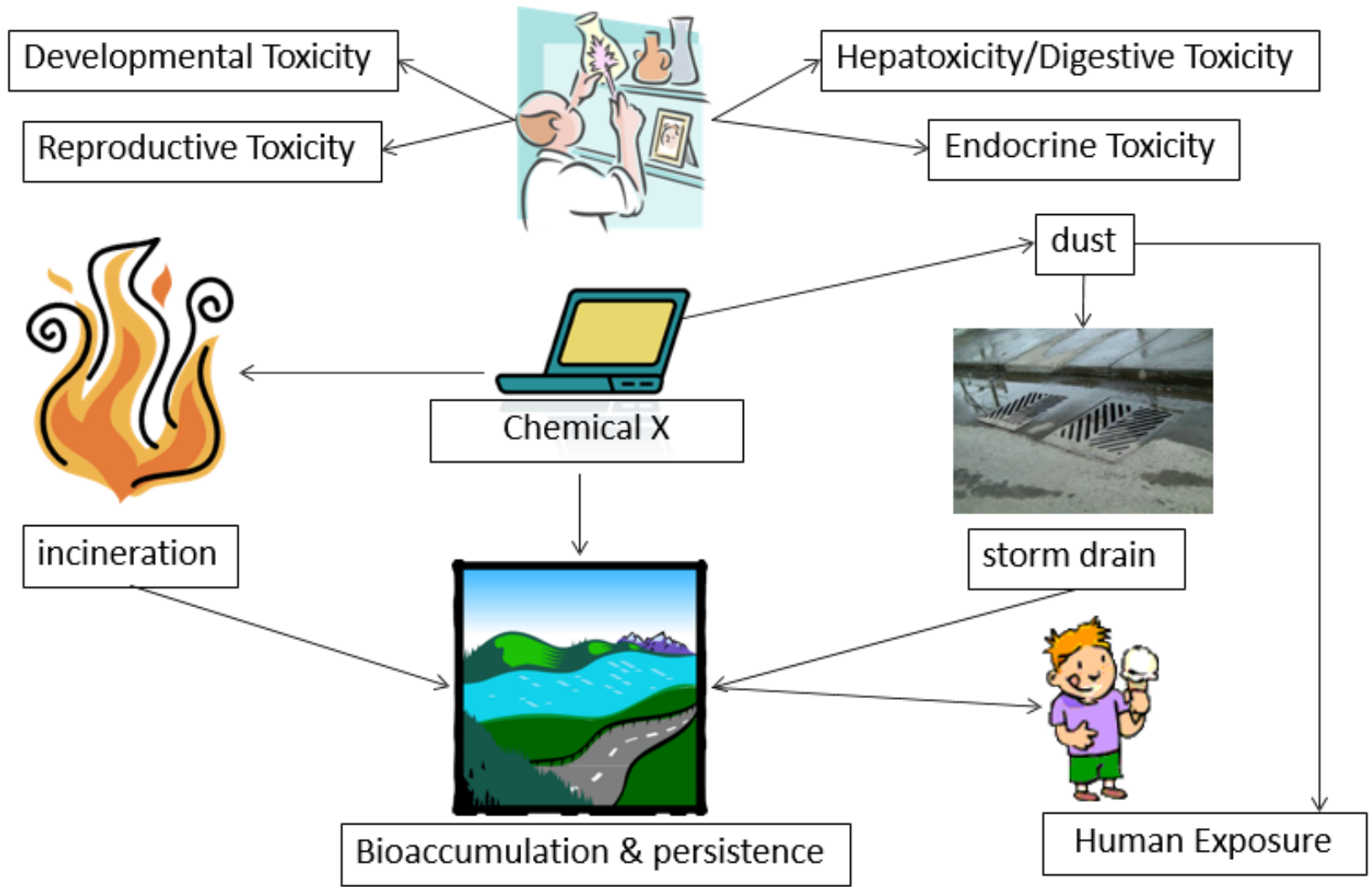
Material B – material replacement for casing

Illustrates:

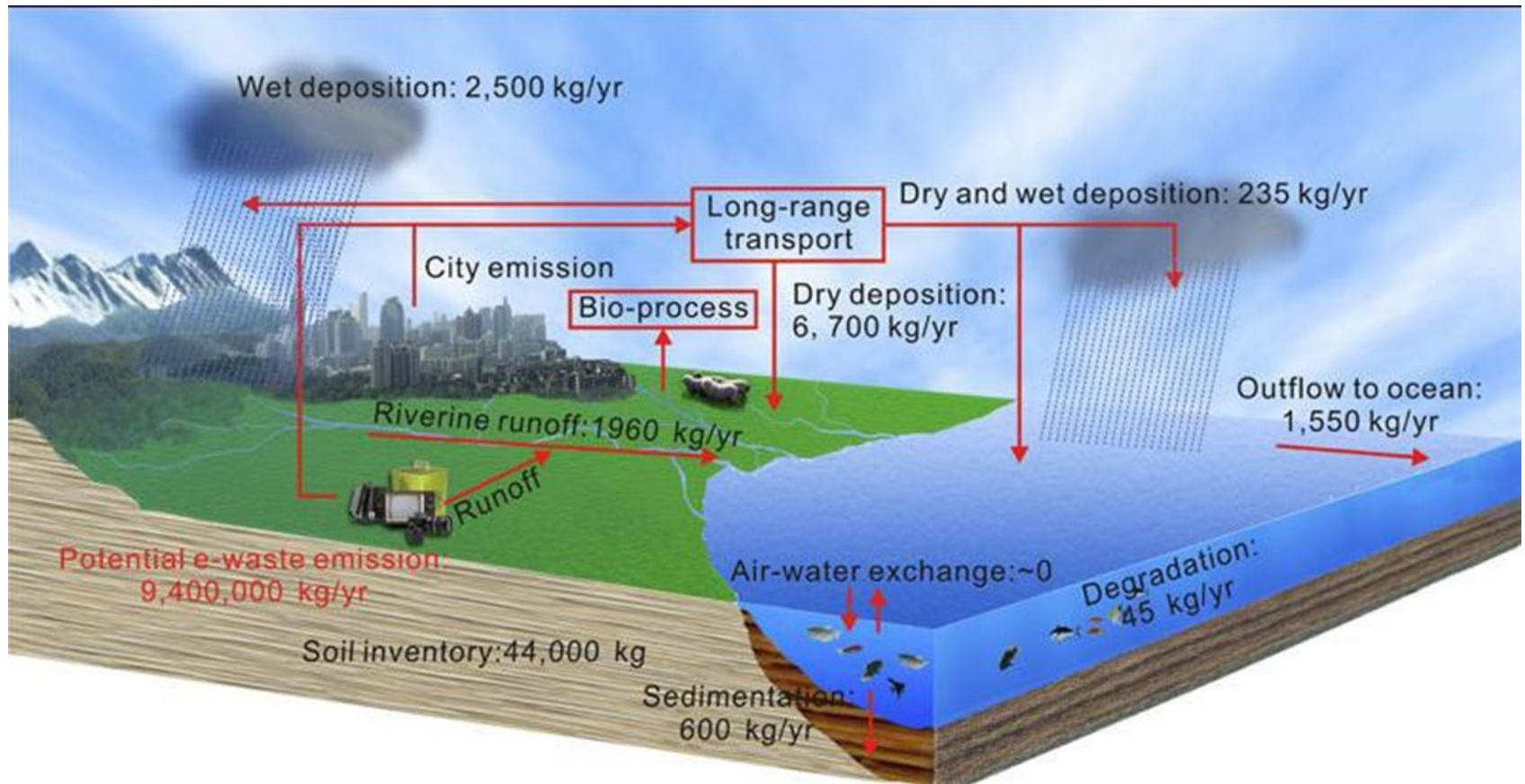
- Initial exposure during use phase
- Fate & transport with potential exposure implications
- Life cycle considerations for the chemical & alternatives



Why was the CoC listed?



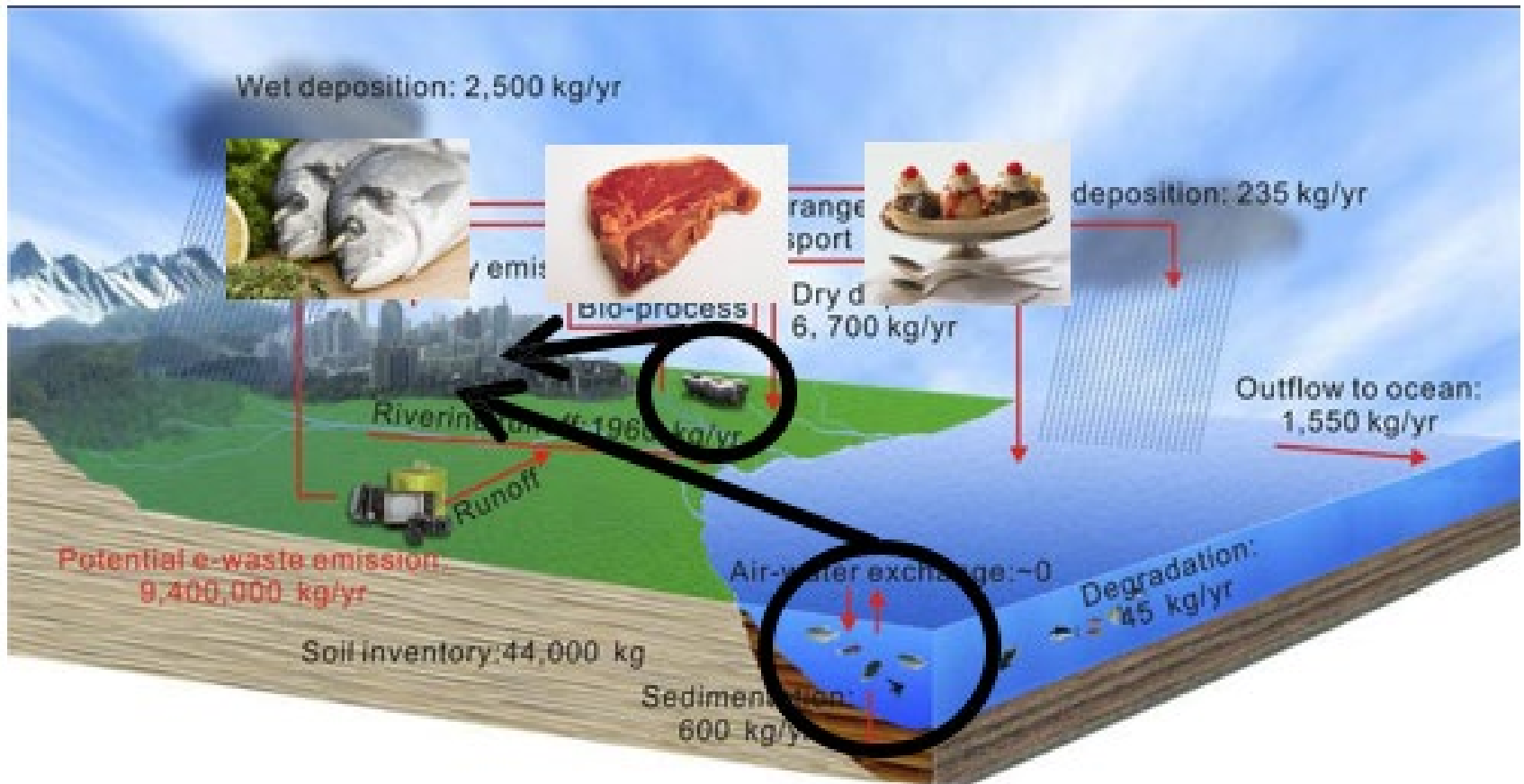
Chemical X fate and transport



Source: Zeng, Eddy Y. *Geochemical Processes of Organic Pollutants in a typical Subtropical Watershed: A case Study with Decabromodiphenyl Ether*. *Geochemical News* Article 143. 28 April 2010. Web. August 2014.
<http://www.geochemsoc.org/files/6213/4436/8119/gn143Zeng.pdf>



Chemical X fate and transport

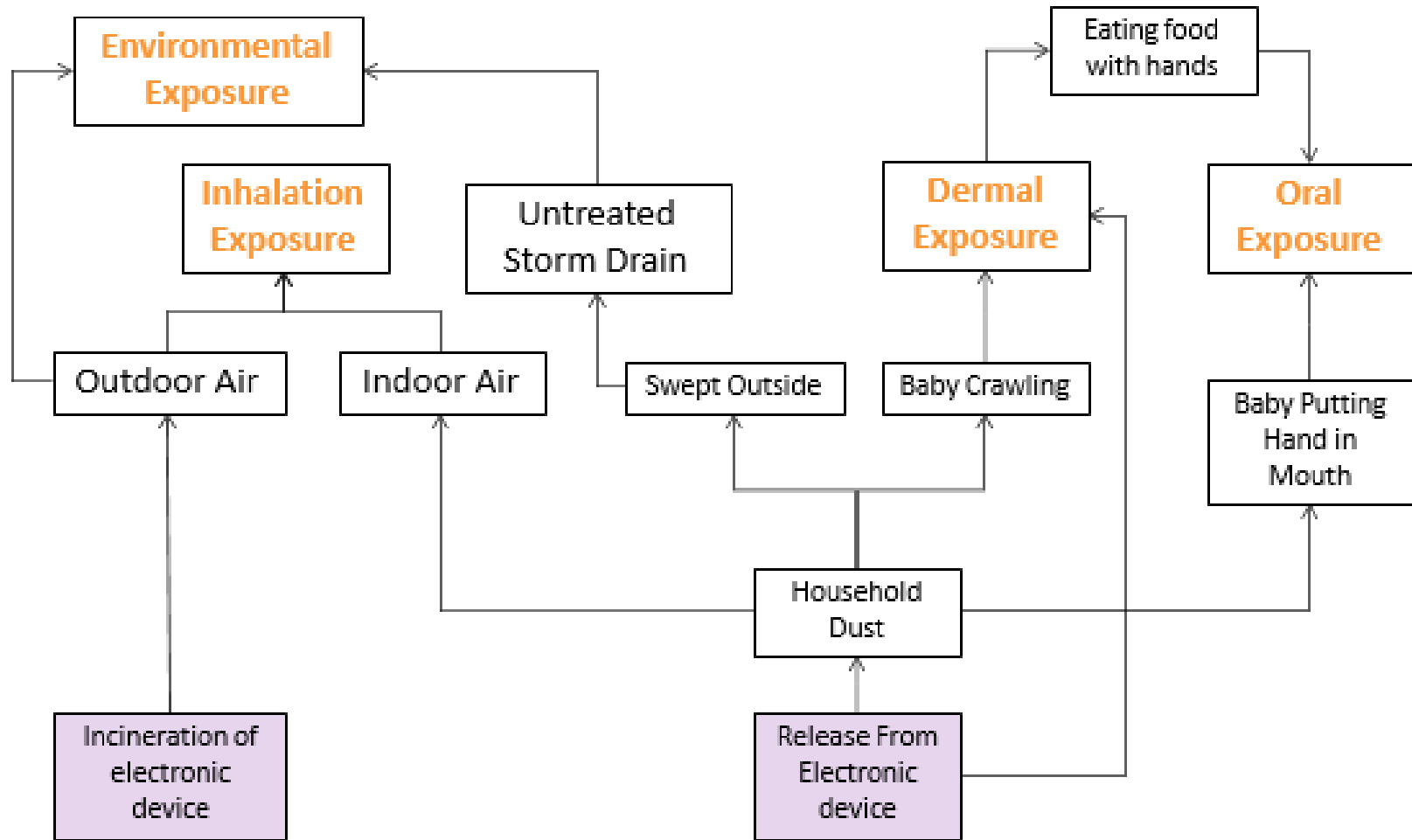


Source: Zeng, Eddy Y. *Geochemical Processes of Organic Pollutants in a typical Subtropical Watershed: A case Study with Decabromodiphenyl Ether*. *Geochemical News* Article 143. 28 April 2010. Web. August 2014.

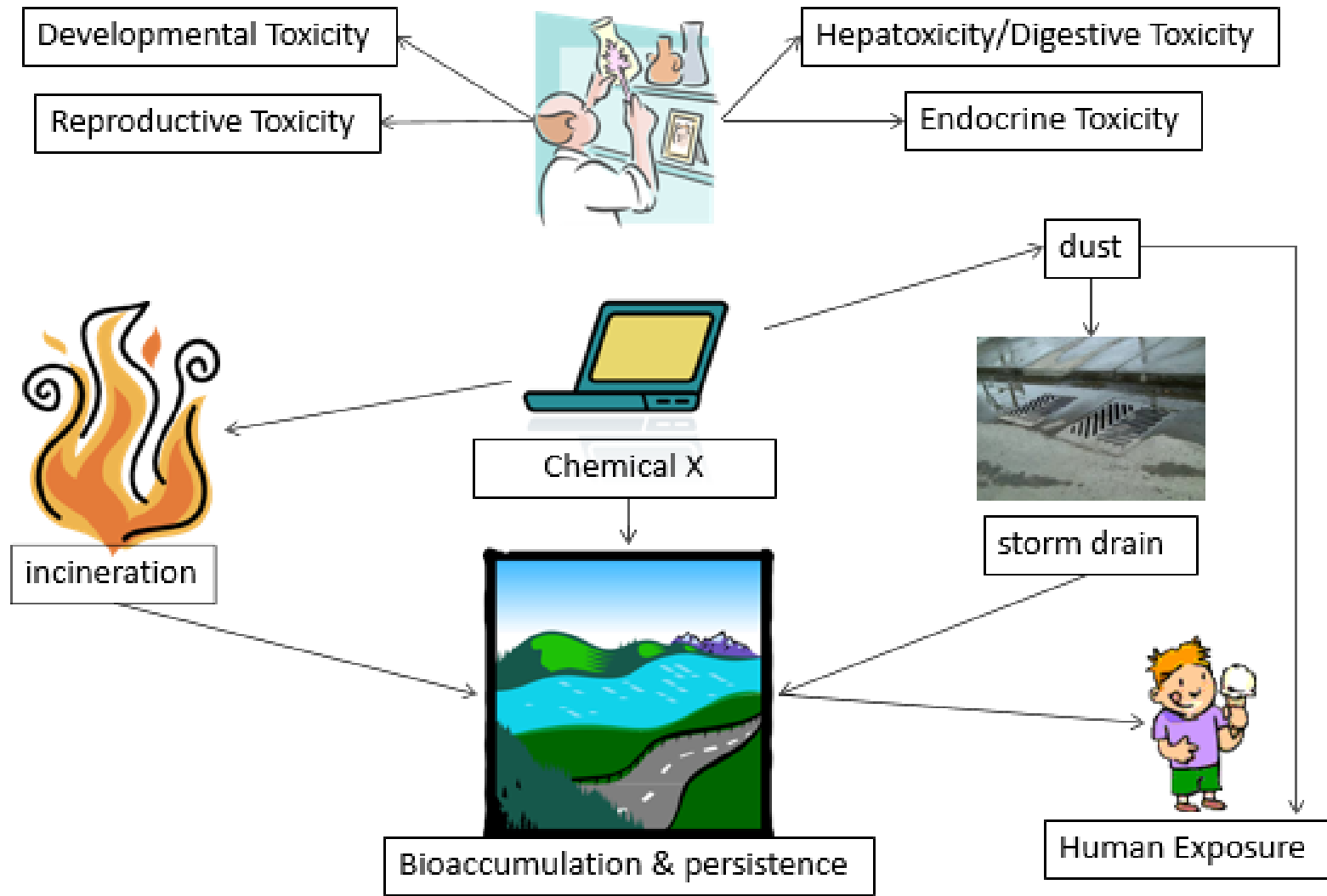
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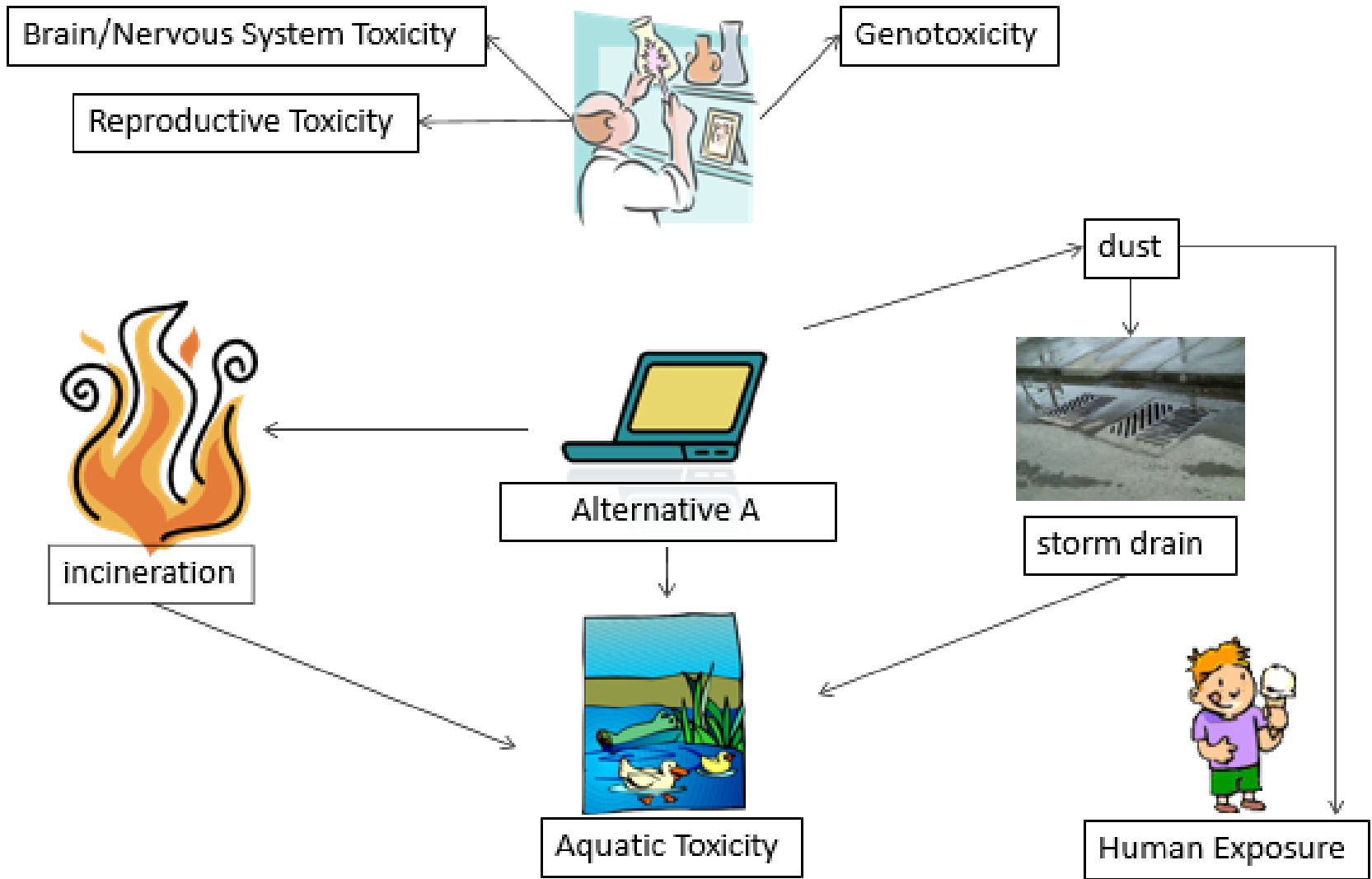
Conceptual Model of Exposure to Chemical X



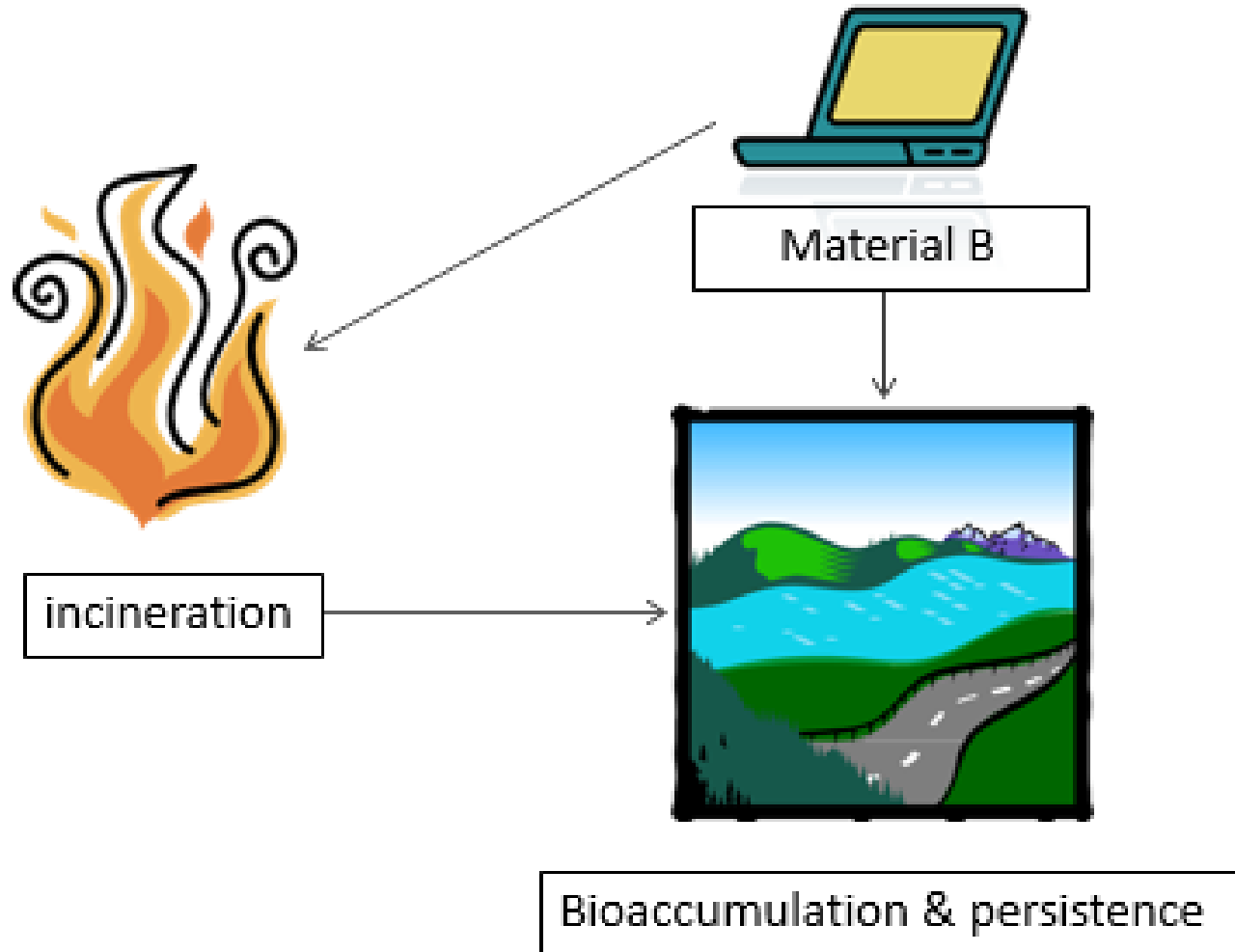
Fate & Transport of Chemical X



Fate & Transport of Alternative A



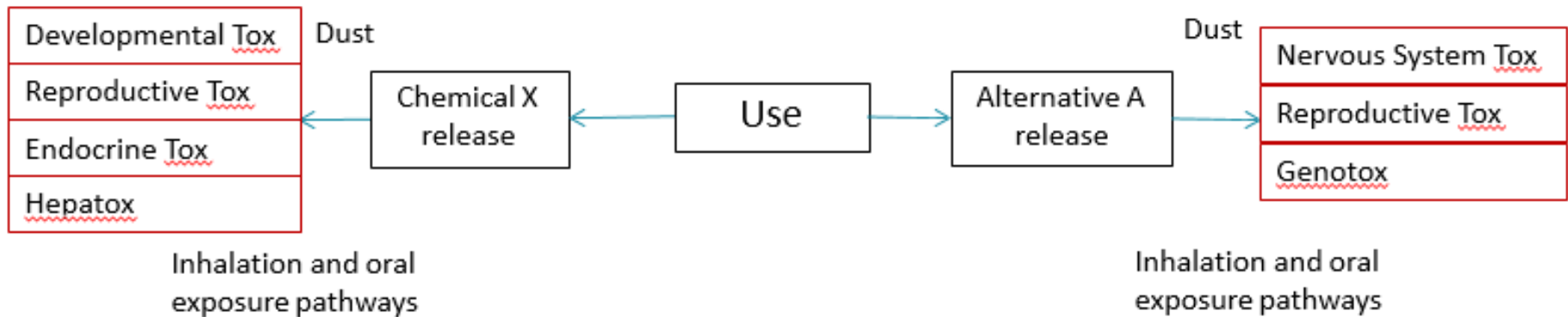
Fate & Transport of Material Switch-Out



Determining Potential Relevant Factors by Life Cycle Stages

Chemical X

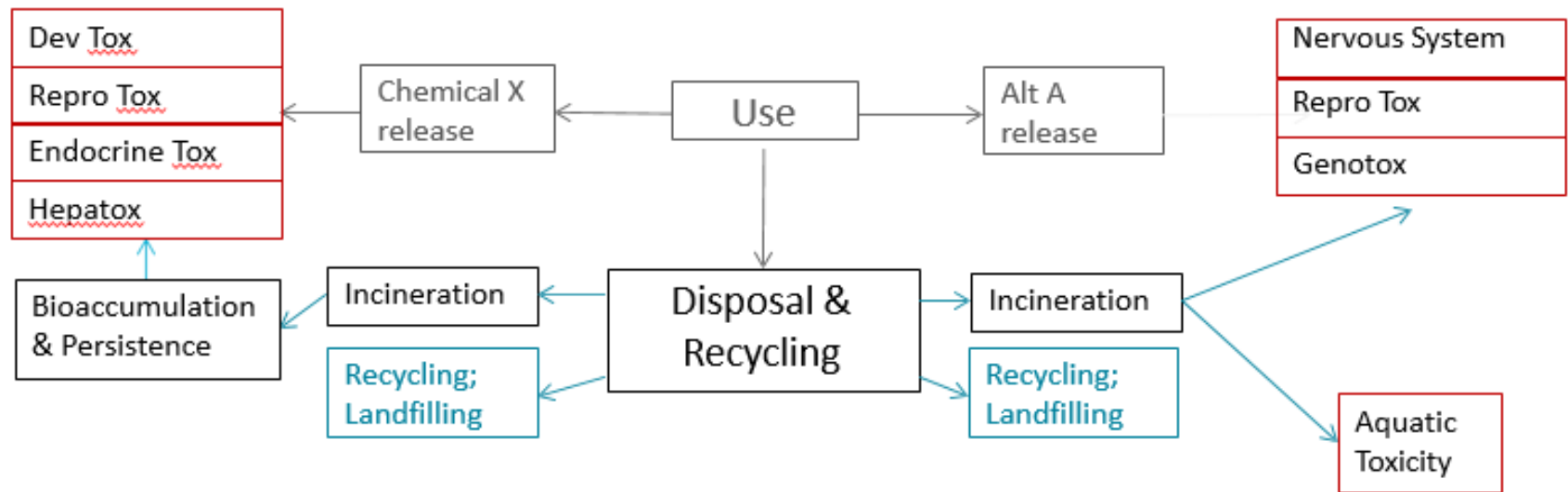
Alternative A



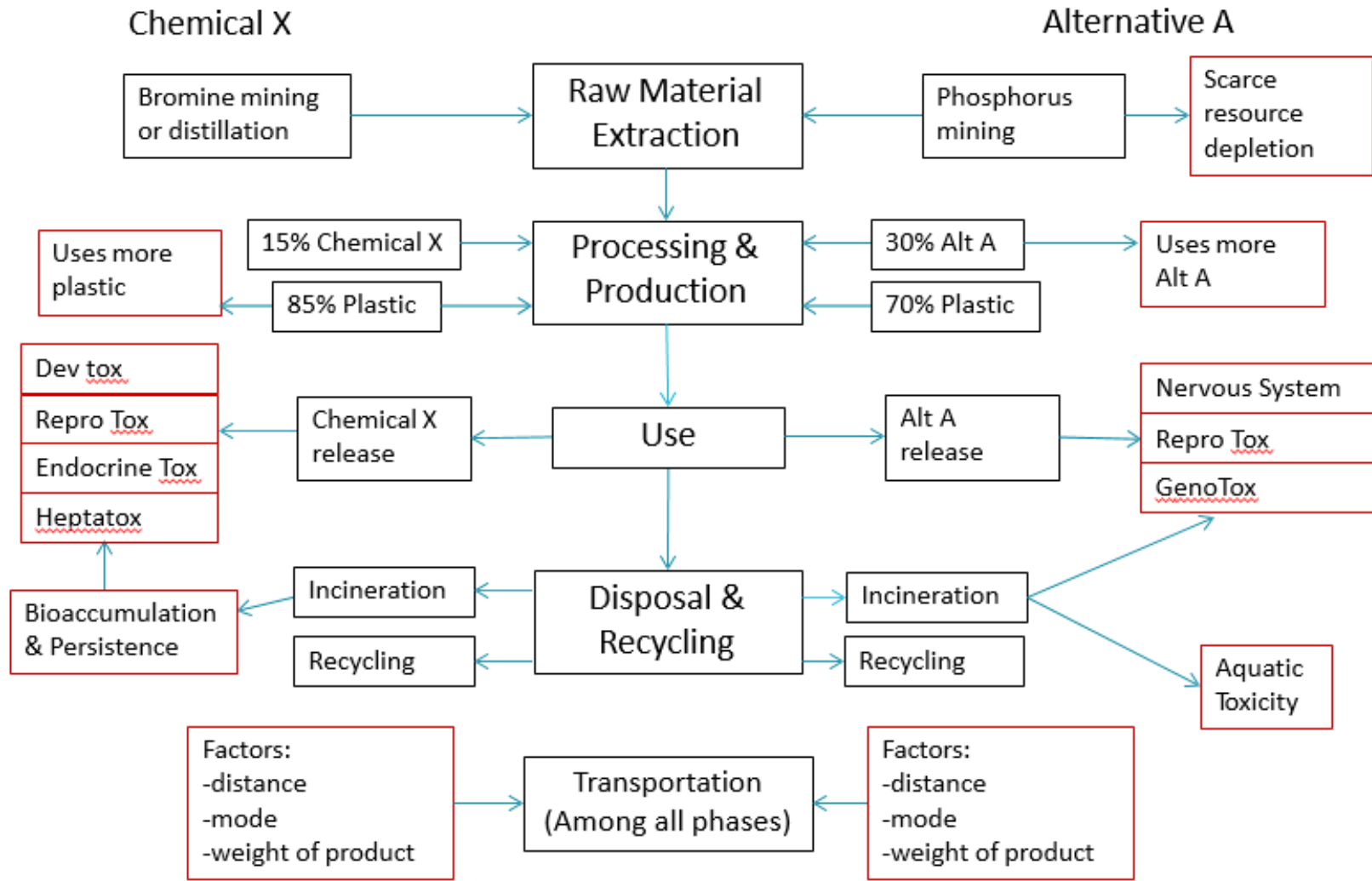
Determining Potential Relevant Factors by Life Cycle Stages

Chemical X

Alternative A



Determining Potential Relevant Factors by Life Cycle Stages



Conceptual Models Help AA

- Visualize the relationships among fate and transport of the chemicals and routes and pathways of exposure
- Clarify similarities and differences among alternatives
- Consider phases beyond the use and disposal phases



Thanks to:

- Jordan Chamberlain – UC Santa Barbara
- Relly Briones - DTSC





Questions or Suggestions?



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