

Using questions in the engineering design process

Engineer design process* / Thinking skills	Questions
Identify the need or problem <ul style="list-style-type: none"> • Compare / Contrast • Decision process • Drawing Conclusions • Analysis 	What are we looking to do? How would we judge success? What do we have to design to solve this issue? What is the purpose of this design? What would the goals and objectives be? Can we break the problem/design into parts?
Research the need or problem <ul style="list-style-type: none"> • Classification • Sequencing • Critical Thinking • Compare / Contrast • Root Cause • Synthesis 	What do we know? Any similar circumstance from the past that we can build on? Who are the stakeholders and their needs? What outside factors will affect this problem/need/design? What questions do we need to ask? How do we know the facts are true? What evidence do we have?
Develop possible solution (s) <ul style="list-style-type: none"> • Brainstorm • Critical Thinking • Root Cause • Evaluation 	What concepts, definitions, principles do we need to utilize? Have we taking all assumptions, thoughts into consideration? What facts, data, observations and experiences are available? Can we combine elements into a novel design?
Select the best possible solution(s) <ul style="list-style-type: none"> • Compare / Contract • Classification • Drawing Conclusions • Problem Solving 	What interpretation and inferences can we make? How can we select the best solutions? How would we test the solution so we can provide information about the design?
Construct a prototype <ul style="list-style-type: none"> • Classification • Drawing Conclusions • Problem Solving 	Do we need to build it or can we simulate it? What materials, skills & tools do we need? What plans are necessary to document the design? Can we break of the construction into modules?
Test and evaluate the solution(s) <ul style="list-style-type: none"> • Compare / Contract • Classification • Drawing Conclusions • Problem Solving 	What test plan do we need to evaluate the design? What tools do we need to test it?
Communicate the solution(s) <ul style="list-style-type: none"> • Compare / Contract • Classification • Drawing Conclusions 	Who are our audience and what are they expecting to hear? Have we testing all our conclusions and facts? Have we presented it in a way people can understand it?
Redesign <ul style="list-style-type: none"> • Brainstorm • Compare / Contract • Classification • Drawing Conclusions 	What have we learned & what would we do differently? What was our thought process?

* Massachusetts Curriculum Frameworks, Science and Technology/Engineering October, 2006