

Engineering Inventions - HSSP 2018

Logistics

- When: Saturdays, 6/30 to 8/11, 2:05 pm to 3:25 pm
- Where: Room 14-0637
- Teacher: Rebecca McCabe, S12286-teachers@esp.mit.edu
- Students: Entering grades 7, 8, and 9

Expectations

- Regular classroom rules (no phones, respect, hands to self, etc)
- 1-3 hours per week working on your invention outside of class
- Keep engineering notebook safe and not lost

Curriculum

Ever wanted to invent something? Now's your chance! I'll guide you through the invention process to brainstorm and design your own product. Learn about patents, 3D printing, and mechanical engineering. On the last day, you'll present your invention to the class.

Date	Title	Description	Progress Toward your Invention
6/30	Inventions	Engineering notebooks; brainstorming; SCAMPER	Leave class with 10+ invention ideas.
7/7	Technology and Manufacturing	Disciplines of engineering; grand problems; learning resources; types of machines	Come to class with 20+ invention ideas. Leave class narrowed down to 5 ideas.
7/14	Iteration and Prior Art	Patents; refining your idea; online patent search	Come to class narrowed down to 2 well-formed ideas. Leave class started on prior art search.
7/21	Reverse Engineering	Taking stuff apart!!! (Plus receive individual feedback on your invention.)	Come to class with a completed prior art search. Leave class with a final decision on the details of your invention.
7/28	CAD	OnShape; vector graphics	Come to class with a detailed drawing and description of your invention. Leave class started on CAD.
8/4	Prepare for Presentations	Markets; work on your poster or slideshow	Come to class with finished CAD. Leave class started on presentation.
8/11	Presentations	Demonstrate your invention; families welcome	Come to class with a finished presentation.

SCAMPER

S - Substitute - _____
Change parts, people, processes, rules, materials, shape, color, texture, name, attitude.

C - Combine - _____
Merge parts, processes, products, materials.

A - Adapt - _____
Think of existing solutions to other problems. Copy ideas, parts, processes.

M - Magnify - _____
Make it bigger, heavier, stronger, louder; more frequent, important, prominent. Duplicate parts.

P - Put to New Use - _____
Consider use in the past or future, in space, on tv; by the young, old, disabled, rich, poor.

E - Eliminate - _____
Eliminate parts, people, processes, rules. Make smaller, split apart, simplify.

R - Rearrange - _____
Change location of parts, order of operation, cause and effect, organization, purpose, timeline.

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Engineering Notebook Guidelines

Writing an entry

- Use pen
- Cross out mistakes with a single line
- Don't remove pages - must be bound
- Number each page and don't leave blank pages
- Only you can write
- Consistent organization / headings
- Extra papers should be glued in

When you finish an entry

- Draw an X through unused space
- Sign and date each page (date of writing, not of doing)
- Witness: "Disclosed to and Understood by"
- Update table of contents
- Don't add to a page after it's been signed

