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.

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.

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

Descent Hand Chinese Martine in Br part See Breader Demonte, and to wan the Raven and at THERE WELL BEAC offire Di Maria The start in Kine Settings and Ret The motion Constituted. Carlingan home the - This Coston interiors - for 5. Dubit Countries stream wheelt suchs other we been to The fortune iten ited Ders of othe ine Guet of the Porest first States as theme are to 1/3 Shere). LAR DE ERTOR, MAR COMPLEMENT; Henricologic the work with THE PLACE TO SE MAN BL & Limitale B. Such 1963, Ther wanter Parises A LOT GUT THE THE FRONT & LEADER OFFICES TO DE Constitu And A Search To Risk ad Salts And TO 8 It's Completion TO IN 11.5" we ZO" Sint of Ourshall 15. Omeningers work be well 7-12 essin litter PROPRIETARY INFORMATION ATC 2-7-12 Homas Smith