Spectrum 2019 Lab Books Rules and Guidelines

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What Are The Lab Books?

The lab books are fun and informative activity books for children. There are two different lab books, an introductory one for children grades ages K-6 and an advanced one for kids grade 7-12. The children can work on these books between displays and once they have completed the various pages they receive a stamp/sticker from the related display (the Stamps/Sticker will be supplied by Spectrum Committee).

Members of the Spectrum Production Team will be available to consult through email or by coming to the Spectrum office in 1A88.2 during listed hours to weigh in on possible submissions for lab books (and displays of course).

Rules

1. Each group must submit one page for both the introductory lab book and the advanced lab book.
2. Pages must be submitted by December 15th, those who fail to submit a page will not be eligible for any of the prizes for their displays.
3. Submissions must fit on a 5.5 inch wide by 8.5 inch tall page and still be easily legible
4. No more than one crossword puzzle and one word find will be accepted for either book

Guidelines

General

1. The submissions should be related to your display if possible
2. If the activity only requires a small portion of the page add a factoid or related image

Introductory Lab Book Pages (K - 6)

1. Limit math problems to single digit addition/subtraction
2. Keep instructions simple and concise
3. Pictures are encouraged
4. Ensure logic puzzles are relative simple and can be explained in simple language
5. If a difficult or technical term cannot be explained with simple language, pictures, or an example it is best not to use it

Advanced Lab Book Pages (7 - 12)

1. Limit math problems to simple algebra
2. Ensure that word problems are straight forward. If you gave the problem to a first year student are they able to easily understand what it is asking?

Examples From 2016

Example 1: Chemical Eng


Spot the difference in the chemical lab

Critique:
   While this is a simple fun page for the basic lab book, it lacks any educational benefit. A submission like this will be rejected.

Suggestions:
   A WHMIS matching puzzle would be more appropriate.
   The submission could have more to do with the actual display put on by the Chem Eng students.

Example 2: Civil Eng

1. Draw how water will flow around the circle

direction of flow
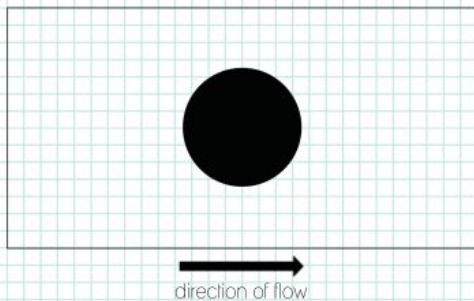
2. Find the civil engineering words in the word search

WEIR	FLUID	SAFETY
ARCH	SOIL	ENGINEER
KEYSTONE	FORCE	ROAD
FLOW	CIVIL	BRIDGE
		BUILDING

Critique:
   This submission ties into the display that was put on and the addition of a word search gave children something to do until they could see the turbulence demonstration.
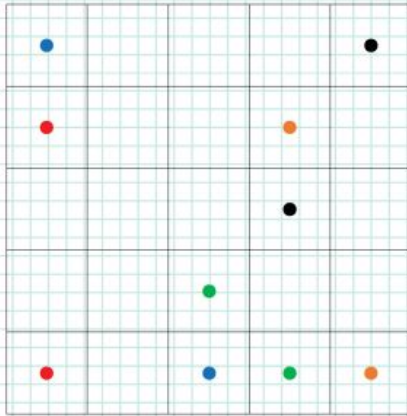   Multiple pages of the lab book will not be permitted to use word searches or similar puzzles.
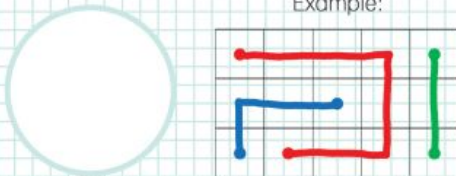
Example 3: Computer Eng

An important part of being a Computer Engineering is planning ahead so your circuits are nice and neat. Can you connect the colours wires on the grid without crossing any other wires?
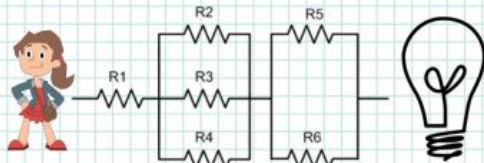
Example:

Critique:
This is a simple puzzle which can be done at most grade levels. It has a clear explanation as to why it is done and is easily scaled for difficulty. Pages like this are more than welcome in the lab books.

Example 4: Electrical Eng

What is the total resistance that Veronica Volt must get through to reach the lightbulb?
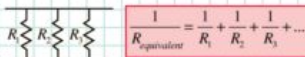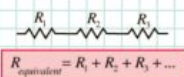
R2   R5

R1   R3

R4   R6

$R1 = 10\Omega$ $R2 = 20\Omega$ $R3 = 12\Omega$
$R4 = 15\Omega$ $R5 = 6\Omega$ $R6 = 3\Omega$

Answer: _____

Hint:

Parallel Circuits:

$$\frac{1}{R_{equivalent}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + ...$$

Series Circuits:

R_1 R_2 R_3

$$R_{equivalent} = R_1 + R_2 + R_3 + ...$$

Critique:
This is a difficult problem requiring at least grade 10 math skills and a basic understanding of equivalent circuits. This submission would be rejected.

Suggestions:
A similar problem of a simpler design would be better, for the advanced lab some simple algebra is fine, but for the intro lab book single digit whole number add/sub only.

Example 5: Eng Physics

1. Lazer Maze: Start from the laser source and trace out the path the beam will take! The laser only makes it to one of the yellow detectors – which one?

LASER

Rules of Optics:
Reflecting   Absorbing

Beam Splitting

Critique:
   This is a fun puzzle that can easily be scaled for difficulty. Something like this is an acceptable submission.

## Example 6: Geological Eng

Can you label the layers of the Earth?

Words:
Inner core   Mantle
Crust   Outer Core

Did you know: the centre of the earth is 6370 km below the earth's surface! That's about as far as it is to walk from St. John's, Newfoundland to Vancouver, BC!

Critique:
   This page could have related more closely to the demonstration put on by the Geo Eng group. The inclusion of an interesting factoid is encouraged if there is a large amount of space left on the page.
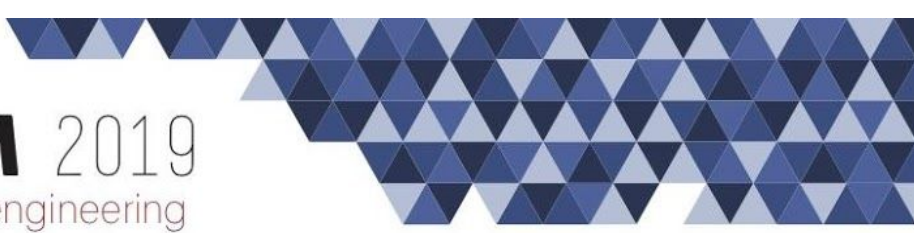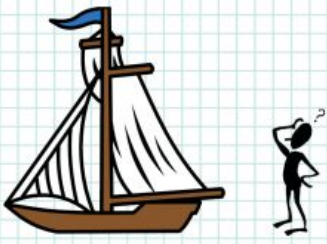
Example 7: Mechanical Eng

It is the year 287 BC, and Archimedes has just invented the pulley. He decides to show off his new invention by lifting a heavy ship, all by himself.

Archimedes knows that the ship weighs 400 pounds. From his trips to the gym, he also knows that he can only lift 100 pounds. Finally, from his experiments, Archimedes has figured out that for every pulley he uses, the ship will feel half as heavy as it actually is.

Can you figure out the minimum amount of pulleys Archimedes will need to attach to the ship in order to lift it?

Answer: _____

Critique:
   This one is word heavy for the younger children and they would not likely be able to extract the important information from the problem.

Suggestions:
   Keep problems concise, extra information is confusing.
   It wouldn't hurt to have an actual hand drawn system showing the how the pulley works.

Example 8: Husky Motorsports

Have you always wanted to get behind the wheel of a real Formula Racecar? Or find out what it's like to be on a pit-crew? Come on down to the Hardy Lab and find out what it's like to be on Huskie Formula Racing!

Complete one of the following for your sticker:

1. Race to change a 15lb racing tire on one of our formula cars (4 kids max per round).

2. Drive the race car (simulator)driving simulator on one of the Huskie race cars (1 kid per round).

Have fun and stay safe!

Critique:
   While these are fun activities, there should be an actual activity for the kids to do in the book itself.

Contacts

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