Microbial fuel cells give CV sophomore a charge

By ROBYN MEADOWS
New Era Staff Writer

Abbie Groff hungers to know more about the world around her.

“I’ve always been one of those people to ask ‘Why?’ relentlessly,” she said.

Her love of science bears the fruit of that.

The 16-year-old sophomore from Conestoga Valley High School was named the grand champion at the 52nd annual Lancaster Newspapers/Pioneer Science and Engineering Fair Tuesday night at Franklin & Marshall College.

“I was totally shocked,” Abbie said with tears brimming in her eyes.

Winning means that she will display her exhibit at the 35th Intel International Science & Engineering Fair in Phoenix, Ariz. May 8-14.

Her winning project is “Identification of Benthic Microbe Utilizing Bioremediation and MF/C’s.”

Microbial fuel cells (MF/C’s) create electricity while they clean wastewater, according to research by Penn State environmental engineers.

For her project, Abbie thought she would give it a try herself.

She used small acrylic containers (purchased at Wal-Mart for a little more than a buck) to create positive and negative atmospheres. Bacteria from mud resting in one, called the “anode,” deposits into the other container, the “cathode,” through copper-wire terminals. The flow of electrons is electricity.

In doing so, she created an alternative fuel source. But the project’s purpose was to identify which microbe makes the electricity work (She said, it’s from the family of geobacteraceae).

And once she did that, she was able to work inside the atmospheres of the containers to make it all work more efficiently, and thus clean wastewater better and generate more electricity.

The project was the culmination of two years of effort. She competed last year with a similar project and won a few auxiliary awards.

Last year, she took her microbial fuel cells into the outdoors.

She took two copper electrodes. One served as the anode in the creek sludge, and another, which she placed in the overlying water, served as the cathode.

“So, all I had to do was to connect the terminals with a volt meter to determine the voltage between the two terminals,” she said.

But, my, how a year changes everything.

“Looking back on last year from this year, it’s kind of like, ‘Wow! I understood so little,’” she said.

Her project this year has taken her so much further.

“I think it’s the extra time,” she said. “Last year, I was completely new to it.”

She was able to use what she learned last year to build a solid foundation for this year’s project.

And next year, it’s going to turn out even better, she said.

No doubt that her parents,
Abbie Groff, 16, a sophomore at Conestoga Valley High School, with her trophy and project on microbial fuel cells.
Groff

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Herb and Deb Groff of Lancaster, have been supportive.

In fact, her dad, a dock worker at Yellow Freight, inspired her.

She overhead a chat between her father and her uncle, Richard Groff. Her uncle is doing his post doctorate work in electrical engineering at Berkeley in California.

They were bantering about how microbial fuel cells work.

That's how her family is, she said. They sift through science magazines for fun.

Some character traits she inherited more specifically.

"I get my tinkering from my dad," she said.

She said growing up, her dad exhibited an insatiable curiosity.

"He's the type of person who would see something on the news and expand upon it, "What if you added some of this?"

Her dad said Abbie's success comes from Abbie. She has always been focused.

"She makes hurdles for herself to go over," dad said.

Abbie said she isn't sure what she plans to do with her life, yet. For now, she stays active with school. She's participated in a History Fair and other science events. She volunteers at the Hans Herr House during the summer.

For the record, she dismisses anyone who says that she is "brilliant.”

"I wouldn't call me brilliant," she said. "I'd call me motivated."