



$$\left(\frac{n}{e}\right)^n \cdot \sqrt{2\pi n}$$

$$A_n^k = \frac{n!}{(n-k)!}$$

$$P_n = \frac{n!}{(n-n)!} = \frac{n!}{0!}$$

$$A_n^k = n \cdot (n-1) \cdot (n-2) \cdot \dots \cdot (n-k+1)$$

$$\tilde{A}_n^k = \underbrace{n \cdot n \cdot \dots \cdot n}_k = n^k$$

$$(n_1 + n_2 + \dots + n_k)!$$

$$C_n^k = \frac{n!}{k!(n-k)!}$$

$$\tilde{C}_n^m = \frac{(n+m-1)!}{m!(n-1)!}$$

$$C_n^0 a^n$$

$$\sum_{k=0}^n \binom{n}{k} = 2^n$$

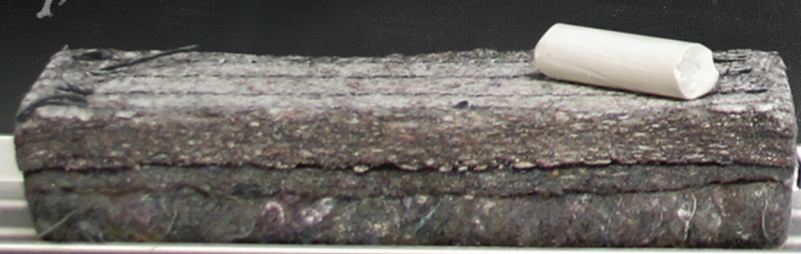
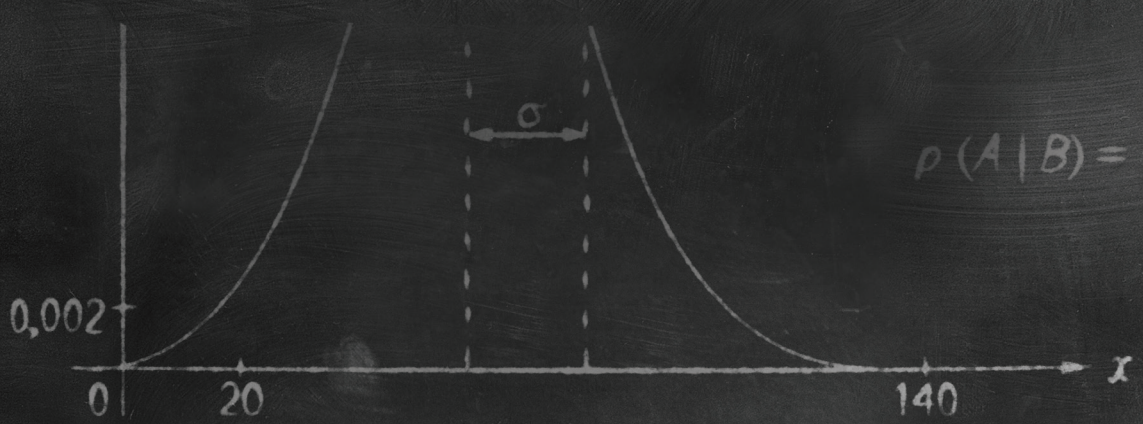
$$\int (x) \varphi(x) dx$$

$$F = G \frac{m_1 m_2}{R^2}$$

$$\frac{(x_k - \bar{x}_n)^2}{n}$$

$$p(A|B) = \frac{p(AB)}{p(B)}$$

$$2 - (M_x)^2$$



Part Public Service, Part Recruitment Strategy, a Minnesota Clean Water Utility Goes All-in On “Teacher Externships” to Help Tackle Workforce Challenges

By Bobbie Chong

Like most utilities across the country, the Metropolitan Council Environmental Services (MCES) is facing a potentially significant labor shortage. And up until recently, its employee recruitment method had simply been word of mouth. This left a blank slate for the MCES Outreach team of Jennifer Zuchowski, Andrea Mac Arthur, and Suidi Hashi.

“We really had to think about our changing workforce demographics,” said team lead Jennifer Zuchowski about the team’s experience when beginning to address the problem. “And what the agency’s needs will be soon.”

The core team got creative and resourceful: They recruited almost 25 outreach champions—internal



volunteers who donate time and talent. The champions advocate the importance of water-related careers at job fairs like the University of Minnesota’s Environmental Career Fair. Champions also give public education presentations about MCES’s work and job opportunities.

The Outreach Team also considered opportunities outside of the norm. One of those was a partnership with the TwinWest Chamber of Commerce, an organization whose mission is “to champion growth and prosperity through catalytic leadership and dynamic partnerships.” When TwinWest contacted Andrea Mac Arthur this year and pitched its idea, the Outreach Team jumped at the chance.

The MCES-TwinWest partnership, or “Teacher Externship,” was developed by TwinWest as part of a larger K-12-focused effort to combine or pool resources for the Twin Cities community, which includes employers focused on science, technology, engineering, and/or math (STEM). The externship paired MCES with educators to encourage relationship-building and collaboration on curriculum that supports skills needed by the near-future labor force.

STOKING INTEREST, FANNING FLAMES

The purpose of teaming up on student courses was to inspire an early interest in the exploration of and education in STEM. The externship/partnership also introduces the idea of pursuing a STEM job to students who might not have considered such jobs previously. These students often hail from underrepresented communities that have historically faced limited job options and opportunities. “Developing an early interest in STEM is critical in meeting



our future workforce demands,” commented Andrea Mac Arthur.

After many joint planning sessions, MCES hosted its first Teacher Externship this past August at the Metropolitan Plant in Saint Paul. The seven externship attendees were selected by TwinWest through a competitive application process that included candidates selecting one of four career tracks: Agribusiness, IT, Healthcare, or Engineering/Manufacturing. MCES falls into the fourth category.

Teachers attended two half-day sessions, at which staff introduced them to the wastewater treatment process, which included engineers and scientists. Staff spoke about what their real-world work is like and some of the soft skills needed. For some, it was the first time they had engaged in public speaking.

The group later received presentations from MCES subject-matter experts. They also toured the



treatment plant (on foot) to see the process and progression up close and to ask questions. The following day, participants met on location at an MCES sewer improvement project to see how urban landscape features shape construction projects.

When TwinWest solicited feedback from the externship attendees, MCES received the highest reviews across all four career tracks. Several teachers have requested to work with MCES again and have personally invited MCES staff into the classroom to give career-related presentations. It was a positive experience for MCES staff, too.

“The event was simply amazing,” said Mac Arthur. “As an employer, we were able to communicate directly with educators what our needs are for future employees. At the same time, educators told us about their students’ realities.

This allowed us all to explore their respective roles in economic development.”

TOOTING THE HORN, RINGING THE BELL

Support for the externship was critical to its success, both externally and internally. TwinWest was a neutral and knowledgeable navigator, connector, and translator in the partnership. Internal backing came from across MCES, not just from the employees directly involved. It was also important to approach the partnership humbly and respectfully, seeking to learn from and share instead of “taking over and directing or using our power to meet our own ends,” said Mac Arthur.

Reflecting on the experience, Zuchowski pointed out that staying flexible and open is important and that MCES staff should not shy away from

telling their stories. “Our industry often prefers not to be in the spotlight,” she continued. “However, to build relationships, provide educational content, and create interest in wastewater careers, we really do have to toot our own horn.”

Mac Arthur agreed: “Wastewater treatment is an incredible industry, and those of us who work in it often forget how fascinating it really is.”

Outreach Team members are as reflective about the teacher externship outreach as they are proud of having gotten involved and exultant

about the many layers of benefits that are accruing on all sides.

“[Our long-term plan is to maintain] an ongoing partnership,” says Mac Arthur of the externship. “The teachers [who participate]

will be hungry for more. [We plan to] be prepared for requests for facility tours, speaker requests, and more; designate a point person or team to field all requests; assign a priority system for those requests; and bring subject matter experts into the planning process as soon as possible.” This, she says, will allow them more time to understand the program and its goals as well as to develop content and case studies.

MCES will participate in the teacher externship again in August 2019 and plans to make it an annual event thereafter. 💧

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