

Hiring Request for Main Break Repair Team

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Subject/Grade: 7th Grade Math



Lesson Summary (1-2 sentences) How are you going to share “Water and Wastewater” connections with your students? How will this fit into your regular scope and sequence?

I plan to share water and wastewater connections with my students by having them engage in a model-eliciting activity (MEA) in the context of human resources and main breaks. This would fit in a grade 7 unit for real number systems.

Industry Focus Areas: (e.g. watershed protection: **reducing water pollutants, conserving water resources, environmental justice** and/or **inspiring watershed stewardship**)

Conserving water resources

Learning Goals:

Solve real-world problems involving the four operations with rational numbers.

Driving Question that Students Will Explore

How can we use operations with rational numbers to solve real-world problems and make everyday decisions?

Instructional Outline (examples for science week): This should be the bulk of your writing. Bullets of what the students will do throughout the lesson to reach the learning goals.

Hook/Intro...Opening Email ([Appendix A](#))

During...Occupation Description Handout ([Appendix B](#)) and Candidate Pool Handout ([Appendix C](#))

Reflection...Response Email ([Appendix D](#))

Recommended Timing: Block Period (90 minutes) or Two Classes (two 45 minute periods)

Suggested Pre Reading Topics: [Water Conservation and water loss](#) (article), [Main Breaks](#) (video)

1. Hook/Intro: Divide students into pairs or groups of threes. Send the email ([Appendix A](#)) or provide a physical copy of the email for students to read.
2. During: Allow students to brainstorm quietly and respond to the following readiness/comprehension questions. Then have students discuss within their groups. If time allows, teachers can have students share in a whole class discussion.
 - a. How many total candidates will you have to hire?
 - b. What is your annual budget?
 - c. What will you need to report out to the company?
 - d. When assigning salary, will you value education, experience, or skills? Why?
 - e. When assigning a salary, do you plan to minimize or maximize the amount of

- money you pay an individual? Why?
- f. What other information do you need to make better decisions? Where can you find that information?

3. Provide students with Occupation Description Handout ([Appendix B](#)) and Candidate Pool Handout ([Appendix C](#)). Remind students they need to select candidates, assign a salary, calculate annual, monthly, and hourly salaries, and rationale for who they hired and their assigned salary.
4. Reflection: Provide students with a response email ([Appendix D](#)) to provide who they hired, offered salary, monthly rate, and hourly rate, as well as rationale for who they choose and their offered salary.

Materials/Resources:

Computer (optional)
Scientific Calculator (optional)
[Appendix A: Opening Email](#)
[Appendix B: Occupation Description Handout](#)
[Appendix C: Candidate Pool Handout](#)
[Appendix D: Response Email](#)

Standards: Common Core, NGSS, CTE, GoalBook or another state or national list.

7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.

Industry-related careers or [skill](#)

Careers: Human Resources
Skills: Leadership, Character, Collaboration, Communication, Critical Thinking

Assessment: How will you check your students' understanding? [Creative assessment](#) ideas

Students will submit a response email ([Appendix D](#)) that includes annual, monthly, and hourly costs. Check students' work.

Rubric

	4 - Mastery	3 - Approaching	2 - Developing	1 - Beginning
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7.NS.3	Clear and accurate (90% or above) use of four operations with rational numbers to solve real-world and mathematical problems.	Usually correct (75% or above) use of four operations with rational numbers to solve real-world and mathematical problems.	Partially correct (Between 60% to 75%) use of four operations with rational numbers to solve real-world and mathematical problems.	Incorrect (below 60%) or incomplete use of four operations with rational numbers to solve real-world and mathematical problems.
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Appendix A

Opening Email

Subject: Hiring Request for Main Break Repair Team

Dear [HR Manager's Name], ← Student Names

I hope this message finds you well. I am writing to inform you of a need to hire a specialized team based on the indicated requirements below to address main breaks in our water distribution system. For context, in San Jose, there are approximately 2,400 miles. Annually, we can expect anywhere from 10 to 30 main breaks per 100 miles of pipe. This situation requires preemptive attention to minimize service disruption and ensure the continued safety and reliability of our water supply.

The roles we need to fill immediately are as follows:

1. **Utility Workers/Technicians:**
 - Responsibilities: Perform hands-on repair and replacement of broken mains, including excavation, removal of damaged pipes, and installation of new ones.
 - Requirements: High school diploma or GED, relevant on-the-job training or technical school program.
 - Need: 4
2. **Engineers:**
 - Responsibilities: Design repair plans, ensure compliance with technical standards and regulations, oversee the technical aspects of the replacement process.
 - Requirements: Bachelor's degree in civil/environmental engineering, PE license preferred.
 - Need: 2
3. **Project Manager:**
 - Responsibilities: Coordinate the project, manage timelines and resources, ensure efficient and cost-effective completion.
 - Requirements: Bachelor's degree in project management, construction management, or civil engineering, PMP certification preferred.
 - Need: 1
4. **Safety Officer:**
 - Responsibilities: Ensure all safety protocols are followed to protect workers and the public.
 - Requirements: Bachelor's degree in occupational health and safety or related field, CSP certification preferred.
 - Need: 1
5. **Traffic Control Personnel:**
 - Responsibilities: Manage traffic around the work site to ensure safety and minimize disruption.
 - Requirements: High school diploma or GED, certification in traffic control management.
 - Need: 2
6. **Inspector:**
 - Responsibilities: Check the quality of the repair work and ensure compliance with standards.
 - Requirements: High school diploma or GED, certification in inspection or quality control preferred.
 - Need: 1
7. **Administrative Support:**
 - Responsibilities: Handle permits, documentation, and communication with stakeholders.
 - Requirements: High school diploma or GED; associate's or bachelor's degree in business administration preferred.
 - Need: 1
8. **Customer Service Representatives:**
 - Responsibilities: Provide information and assistance to affected residents and businesses.
 - Requirements: High school diploma or GED, excellent communication skills.
 - Need: 2

Please prioritize the recruitment process for these positions as the timely resolution of the main break is critical. We have a firm budget of \$1,000,000 to cover associated labor costs. Please inform us of their annual, monthly, and hourly wages so we can pay them appropriately. Also, please provide a rationale for hiring the person and the salary you offered. Should you need any further details or have questions, feel free to reach out to me directly.

Thank you for your immediate attention to this matter.

Best regards,

[teacher name]

Project Owner

[teacher email]

[teacher company]

Appendix B

Occupation Description Handout

Utility Workers/Technicians: They are the hands-on workers who physically replace the broken mains, dig up the ground, remove the damaged pipes, and install new ones.

Education: High school diploma or GED.

Training: On-the-job training, apprenticeships, or technical school programs in water technology or plumbing.

Salary: \$40,000 - \$60,000 per year

Engineers: Civil or environmental engineers design the repair plans, ensure compliance with regulations, and oversee the technical aspects of the replacement process.

Education: Bachelor's degree in civil engineering, environmental engineering, or a related field.

Certification: Professional Engineer (PE) license, which requires passing exams and gaining work experience.

Salary: \$65,000 - \$100,000 per year

Project Managers: They coordinate the overall project, manage timelines, resources, and ensure that the work is completed efficiently and within budget.

Education: Bachelor's degree in project management, construction management, civil engineering, or a related field.

Certification: Project Management Professional (PMP) certification or equivalent can be beneficial.

Salary: \$70,000 - \$110,000 per year

Safety Officers: They ensure that all safety protocols are followed to protect the workers and the public.

Education: Bachelor's degree in occupational health and safety, environmental health, or a related field.

Certification: Certified Safety Professional (CSP) or other relevant safety certifications.

Salary: \$50,000 - \$80,000 per year

Traffic Control Personnel: If the main break is in a road or street, these workers manage traffic to ensure safety and minimize disruption.

Education: High school diploma or GED.

Training: Certification in traffic control management, often through short courses or on-the-job training.

Salary: \$30,000 - \$50,000 per year

Inspectors: After the work is completed, inspectors check the quality of the repairs to ensure everything is up to standard.

Education: High school diploma or GED, though a college degree can be beneficial.

Certification: Certification in inspection or quality control, which may include specialized training in water systems or construction.

Salary: \$45,000 - \$70,000 per year

Administrative Support: They handle permits, documentation, and communication with the public and other stakeholders.

Education: High school diploma or GED; an associate's or bachelor's degree in business administration or a related field can be advantageous.

Training: Proficiency in office software and administrative procedures, often gained through experience or vocational training.

Salary: \$30,000 - \$45,000 per year

Customer Service Representatives: They provide information and assistance to affected residents and businesses during the repair process.

Education: High school diploma or GED.

Training: On-the-job training in customer service practices and communication skills.

Salary: \$30,000 - \$45,000 per year

Appendix C

Candidate Pool Handout

This diverse candidate pool showcases varying levels of education and qualifications, providing a broad range of skills and experiences for each position.

Utility Workers/Technicians

1. **John Ramirez**
 - Education: High school diploma
 - Qualifications: 8 years of experience in utility maintenance, certified plumber, proficient in excavation and pipe replacement.
2. **Maria Chen**
 - Education: Vocational training in water technology
 - Qualifications: 5 years of experience as a utility technician, skilled in troubleshooting and repair of water mains.
3. **Ahmed Khan**
 - Education: GED
 - Qualifications: 3 years of experience as a utility worker, completed apprenticeship program, strong mechanical skills.
4. **Sophie Nguyen**
 - Education: High school diploma
 - Qualifications: Entry-level position with 1 year of experience in utility operations, eager to learn and contribute.

Engineers

1. **Dr. Alicia Patel**
 - Education: Ph.D. in Civil Engineering
 - Qualifications: 15 years of experience in water infrastructure projects, licensed Professional Engineer (PE), expert in hydraulic modeling.
2. **Mark Thompson**
 - Education: Bachelor's degree in Environmental Engineering
 - Qualifications: 7 years of experience in water system design and analysis, EIT certification in progress.
3. **Rachel Johnson**
 - Education: Master's degree in Civil Engineering
 - Qualifications: 5 years of experience in utility management, PE license, specializes in rehabilitation projects.
4. **Alexandre Dubois**
 - Education: Bachelor's degree in Mechanical Engineering
 - Qualifications: 3 years of experience in utility systems, adept at technical problem-solving and project coordination.

Project Managers

1. **Emily Foster**
 - Education: Bachelor's degree in Construction Management
 - Qualifications: Certified Project Management Professional (PMP), 10 years of experience managing infrastructure projects, strong leadership skills.
2. **Carlos Martinez**
 - Education: Master's degree in Business Administration
 - Qualifications: 8 years of experience in project management, PMP certification, bilingual proficiency in English and Spanish.
3. **Anna Johnson**
 - Education: Bachelor's degree in Civil Engineering
 - Qualifications: 6 years of experience in utility project management, PMP certification in progress, skilled in budgeting and resource allocation.
4. **Mohammed Ali**
 - Education: Bachelor's degree in Construction Engineering
 - Qualifications: 4 years of experience in construction project management, proficient in scheduling and risk management.

Safety Officers

1. **Sarah Thompson**
 - Education: Bachelor's degree in Occupational Health and Safety
 - Qualifications: Certified Safety Professional (CSP), 10 years of experience in construction safety management, extensive knowledge of OSHA regulations.
2. **Juan Ramirez**
 - Education: High school diploma
 - Qualifications: 6 years of experience as a safety officer, certified in First Aid and CPR, specializes in site inspections and hazard analysis.
3. **Lily Chang**
 - Education: Associate's degree in Environmental Health
 - Qualifications: 4 years of experience in safety compliance, adept at developing safety programs and conducting training sessions.
4. **Michael Smith**
 - Education: High school diploma
 - Qualifications: Entry-level safety officer with 1 year of experience, enthusiastic about promoting workplace safety and reducing incidents.

Traffic Control Personnel

1. **Robert Taylor**
 - Education: High school diploma
 - Qualifications: 6 years of experience in traffic management, certification in traffic control management, proven ability to handle high-traffic areas safely.
2. **Jessica Anderson**
 - Education: GED
 - Qualifications: 3 years of experience as a flagger, completed a traffic control certification course, strong communication skills.

Inspector

1. **William Harris**
 - Education: Bachelor's degree in Quality Control Management
 - Qualifications: 8 years of experience inspecting water systems, certified in inspection techniques, thorough understanding of industry standards.
2. **Nancy Young**
 - Education: High school diploma
 - Qualifications: 5 years of experience in construction inspection, certification in water system inspection, attention to detail and compliance.

Administrative Support

1. **Sophia Martinez**
 - Education: Associate's degree in Business Administration
 - Qualifications: 4 years of experience in administrative roles, proficient in office software, excellent organizational skills.
2. **Brian Wilson**
 - Education: High school diploma
 - Qualifications: 3 years of experience handling permits and documentation, strong communication and clerical skills.

Customer Service Representatives

1. **Elizabeth King**
 - Education: Bachelor's degree in Communications
 - Qualifications: 5 years of experience in customer service, excellent problem-solving skills, proven ability to handle difficult situations.
2. **Thomas Robinson**
 - Education: High school diploma
 - Qualifications: 2 years of experience in a customer service role, strong interpersonal skills, adept at providing clear and helpful information.

Appendix D
Response Email (Assessment)

Dear [Your Name], ←Teacher Name

Thank you for your prompt request to hire a team for the main break repair. We understand the urgency and importance of this task and have proceeded accordingly. Below, I have provided the rationale behind our hiring decisions for each role required for this project:

1. **Utility Workers/Technicians:**
 - **Hired:** [Names]
 - **Offered Salary**
 - i. **Annual:**
 - ii. **Monthly:**
 - iii. **Hourly:**
 - **Rationale:**
2. **Engineers:**
 - **Hired:** [Names]
 - **Offered Salary**
 - i. **Annual:**
 - ii. **Monthly:**
 - iii. **Hourly:**
 - **Rationale:**
3. **Project Manager:**
 - **Hired:** [Name]
 - **Offered Salary**
 - i. **Annual:**
 - ii. **Monthly:**
 - iii. **Hourly:**
 - **Rationale:**
4. **Safety Officer:**
 - **Hired:** [Name]
 - **Offered Salary**
 - i. **Annual:**
 - ii. **Monthly:**
 - iii. **Hourly:**
 - **Rationale:**
5. **Traffic Control Personnel:**
 - **Hired:** [Names]
 - **Offered Salary**
 - i. **Annual:**
 - ii. **Monthly:**
 - iii. **Hourly:**
 - **Rationale:**
6. **Inspector:**
 - **Hired:** [Name]
 - **Offered Salary**
 - i. **Annual:**
 - ii. **Monthly:**
 - iii. **Hourly:**
 - **Rationale:**
7. **Administrative Support:**
 - **Hired:** [Name]
 - **Offered Salary**
 - i. **Annual:**
 - ii. **Monthly:**
 - iii. **Hourly:**
 - **Rationale:**
8. **Customer Service Representatives:**
 - **Hired:** [Names]
 - **Offered Salary**
 - i. **Annual:**
 - ii. **Monthly:**
 - iii. **Hourly:**
 - **Rationale:**

The total labor costs are:

- i. **Annual:**
- ii. **Monthly:**
- iii. **Hourly:**

We believe this team is well-equipped to handle the main break repair efficiently and effectively. Should you have any further questions or require additional information, please do not hesitate to reach out.

Thank you for your collaboration.

Best regards,

[HR Manager's Name]
[HR Manager's Position]
[Contact Information]
[Company Name]