

Developing & Expanding Explanations

Professional Development Situation: Meeting (Virtual)

Skill Focus: Helping Learners Develop and Expand Explanations

Time Required: 30 minutes

Purpose: Afterschool staff members and volunteers will be able to identify key actions to help facilitate opportunities for youth to develop and expand explanations.

Materials and Supplies:

- Meeting Resource A - Expanding Explanation Crossword Puzzle
- Meeting Resource B - Background Information

Step 1: Contact participants by email informing them of date, time and instructions for connecting to the virtual meeting. Send attachments (Meeting Resources A and B) and the *Sharing & Explaining Findings: Helping Learners Develop & Expand Explanations* skill video web link <http://www.click2sciencepd.org/sharing-findings>. Instruct participants to complete the crossword puzzle before the meeting. Do not attach the Crossword Key.

Step 2: Introduce the meeting by emphasizing the important role staff and volunteers play in working with youth to create interest and skills in STEM areas. Go over the crossword puzzle answers. Model the use of explanations in presenting information by clarifying that the crossword puzzle words are terms related to and describing STEM areas. Focus on the five actions words that leaders can use to help learners develop and expand explanations: encourage, support, question, facilitate and model.

Step 3: Introduce the *Sharing & Explaining Findings: Helping Learners Develop & Expand Explanations* skill video as an example of a leader working with youth on an activity that requires youth to explain data, processes and outcomes. Encourage the participants to note examples of each of the action words from the puzzle. Watch the skill video as a group, under step three on the learning module page at <http://www.click2sciencepd.org/sharing-findings>. Run the clip a second time, if possible.

Step 4: After the viewing the video, lead a discussion about the ways the leader helped the youth make and expand explanations. **(Be sure to have someone record the ideas and comments during the discussion.)** Possible discussion questions include:

- What were some examples of youth making explanations?
- How did the leader help in the process of creating and expressing the explanation?
- Were the explanations reasonable? Were they based on data?
- How was the information presented and shared with team members and the larger group?
- What did you like about the leader's actions? What would you do differently?

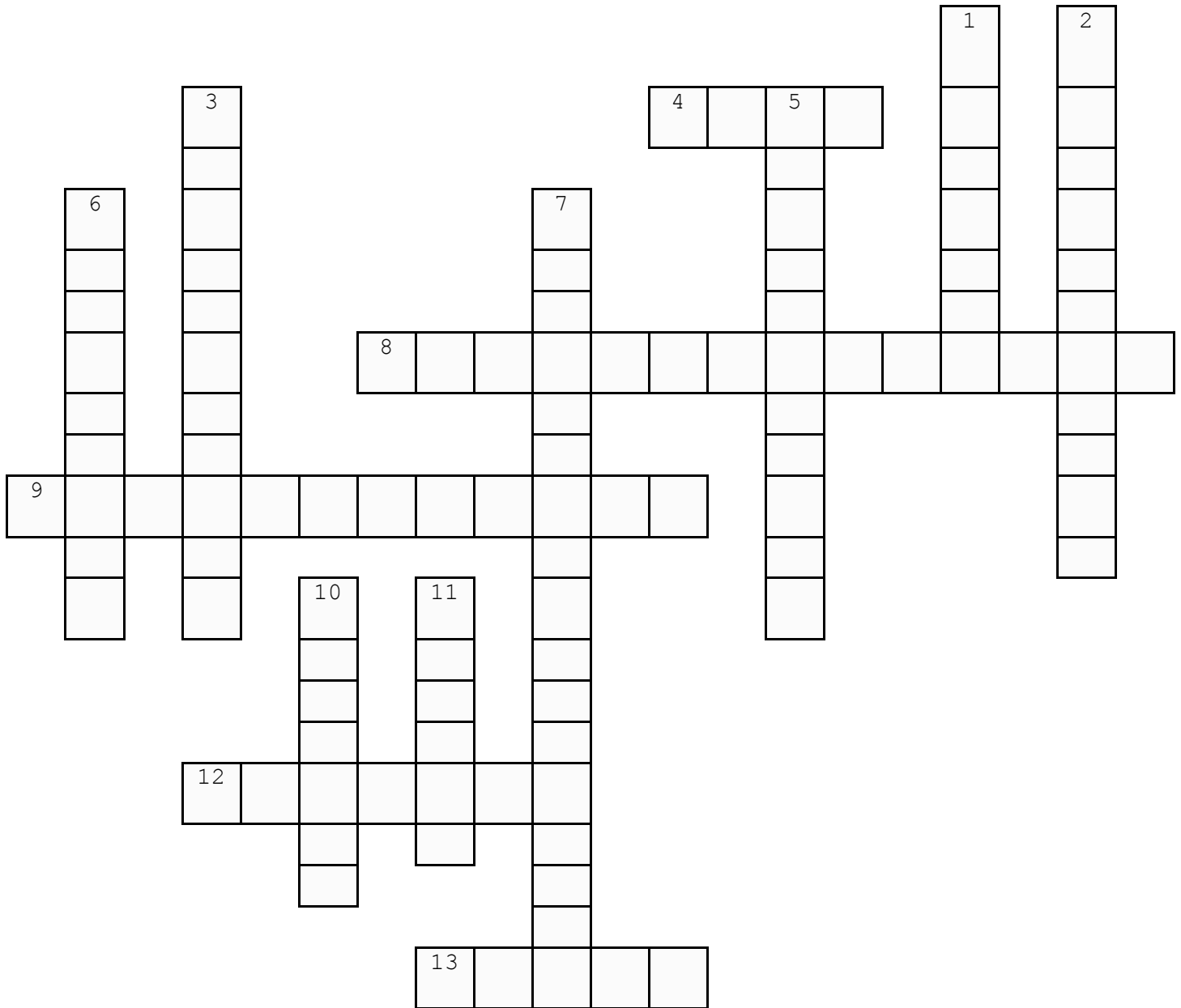
Step 5: Summarize the discussion comments, again emphasizing the importance of the explanation skill to STEM learning and the VIP role the staff and volunteers play in making that happen.

Step 6: Ask each participant to make a conscious commitment to use the actions from the meeting by writing on a 3x5 card three ways they will use the five actions to help youth develop and expand explanations. It should be displayed in a prominent place where it can be seen daily. Request that each person email you their goals so you can compile a list of ideas to share with the group as a follow-up resource.

Step 7: Follow up with an email in several days summarizing the discussion ideas from the meeting. Include any commitments from the group.

Meeting Resource A

Expanding Explanations Crossword Puzzle



© TheTeachersCorner.net Crossword Maker

Down

- 1.** A practice that promotes interest and provides a basis for learning
- 2.** Provides purposeful guidance
- 3.** A statement made to clarify and make understandable
- 5.** Designs and builds solutions
- 6.** To give support, build confidence, and offer hope
- 7.** A guide to discovery and explanation
- 10.** A search for information, truth or knowledge
- 11.** The process of increasing the extent, size, volume

Across

- 4.** Science, Technology, Engineering, Math
- 8.** Explains the meaning of something
- 9.** A way to bring about an action or process
- 12.** Explains what is
- 13.** A representation of knowledge, and process

Word Bank:

encourage

support

facilitation

model

STEM

science

engineering

questioning

interpretation

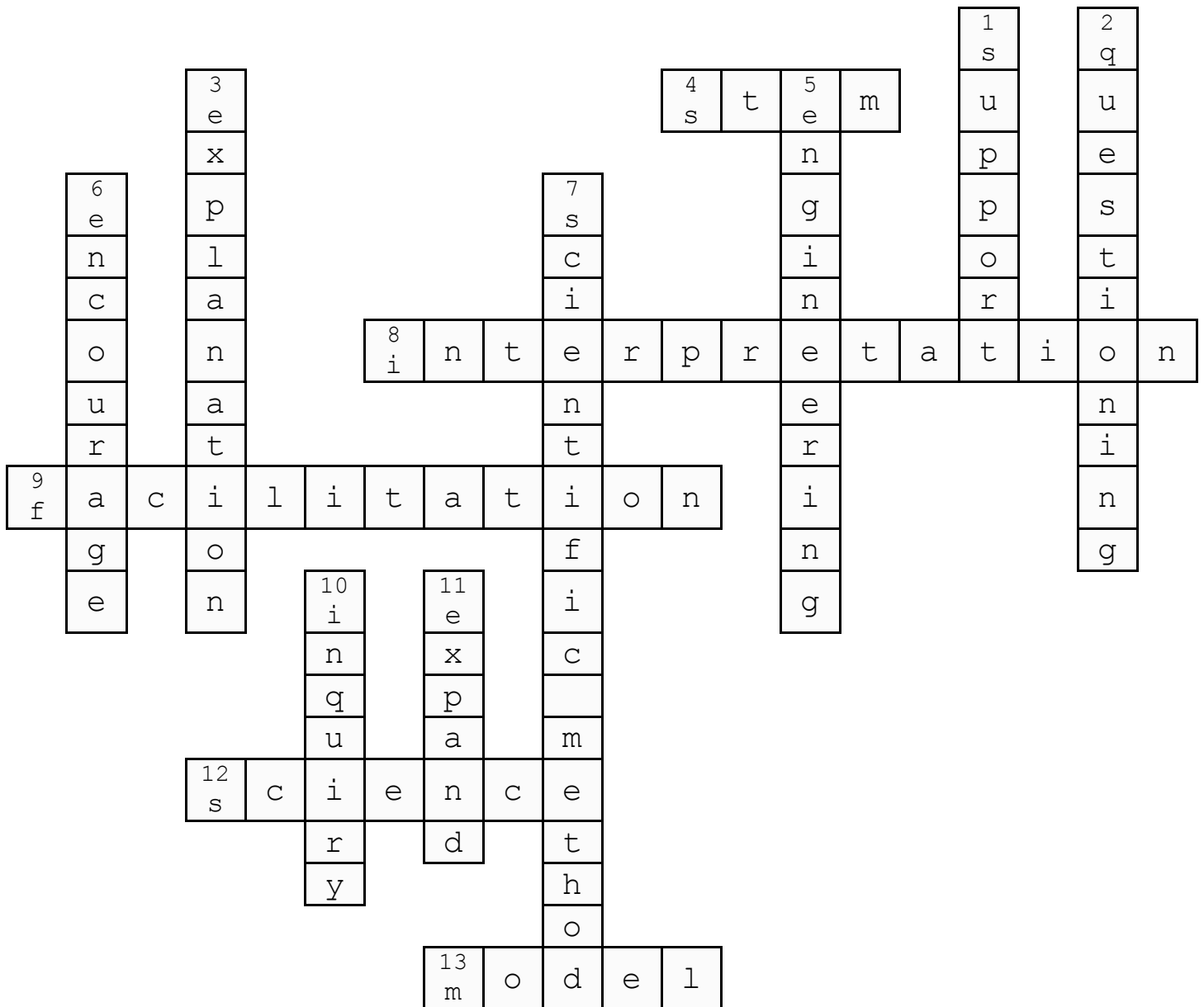
expand

explanation

inquiry

scientific method

Expanding Explanations Crossword Puzzle - Key



© TheTeachersCorner.net Crossword Maker

Meeting Resource B

Background Information - Developing & Expanding Explanations

Explanations are statements made to clarify something and make it understandable. Science uses explanations as it attempts to answer who, what, when, why, where and how questions and explores cause and effect. The scientific method outlines specific steps to collect, organize and present information for analysis and interpretation. Science requires that explanations be consistent with data collected and previous findings. Explanations must be testable and observable in laboratories, in nature, in the field or through study of past events. To prove reliability, explanations must be tested and supported by evidence over time.

Engineers design and build solutions using the explanations and interpretations developed by science. Collecting, organizing and interpreting data is equally important for engineers. Mathematics and technology are critical to processing data. Designing a solution uses a process similar to the scientific method and guides changes that will benefit a desired outcome. Engineering answers the action questions: What can be done to improve or strengthen a product or service? How can we build a “better mouse trap?” How can we change the effect or impact?

Science provides knowledge that explains what is and engineering applies the information to design solutions. Working together with support from math and technology brings deeper understanding and beneficial solutions for both our personal and worldly issues. STEM knowledge is critical to life.

STEM education requires that learners become skilled in collecting and processing data, constructing explanations and designing solutions. Understanding and practicing the scientific method and design process becomes the foundation to STEM understanding and application. Testing assumptions, requiring evidence, looking for alternatives, forming hypotheses and evaluating arguments are science and engineering practices that should be modeled by frontline staff and volunteers.

A STEM leader’s role becomes one of a facilitator, shaping activities and learning experiences with opportunities for STEM education.

The following are **key actions** for helping learners develop explanations using STEM skills. STEM leaders need to consciously think about how to use these actions in work with youth.

Encouragement means to give support, build confidence and offer hope to someone. It can be done in a variety of ways and is critical to helping inspire and stimulate youth to get excited about STEM.

Questioning provides purposeful guidance as youth use STEM knowledge to explore and explain their world.

Facilitation is a way to bring about an action or process that allows the learner to experience, discover and practice STEM skills. Providing an appropriate environment for learning is critical.

Support is a critical practice that promotes interest and provides a basis for learning. Supportive actions create and sustain interest in exploring and practicing STEM skills.

Modeling scientific and engineering processes – testing assumptions, requiring evidence, seeking alternatives, and evaluating ideas and arguments – helps youth learn by example. Youth learn best from leaders excited about STEM knowledge.

Development of progressive learning activities is critical to promote continued experience and development of STEM skills and knowledge.