Professional Development Situation: Meeting

Skill Focus: Supporting Documentation of STEM Learning

Time Required: 20 minutes

A PERFECT RECORD

Participants will review strategies for having youth document their learning in order to use more STEM writing strategies.

Agenda

Self-Reflection—10 minutes

- Supporting Documentation of STEM: Self-Reflection
- Move-Pair-Share

Conclusion—10 minutes

- Types of Documentation to Use with Youth
- Supporting Documentation of STEM: Active Graphing

Materials

- Writing utensils
- One copy of Supporting Documentation of STEM: Self-Reflection for each participant
- One copy of Types of Documentation to Use with Youth for each participant
- One copy of Supporting Documentation of STEM: Active Graphing for each participant

Before the Session

- **Read this meeting guide** to become familiar with the content and allow time to personalize the activities to best suit your presentation style. Watch all videos and read informational materials.
    - *Italics indicate text that can be read aloud or emailed to participants.*
- Send reminder email about the meeting. Determine if any participants require accommodations (sight; hearing; etc.).

- *Our coaching session is scheduled for DATE at TIME. We will focus on "Supporting Documentation of STEM Learning". Please feel free to contact me with your questions or concerns at CONTACT INFORMATION.*

- Gather all materials needed for the session.
- Develop a list of possible questions participants might have during the meeting. Create potential responses to be explored through informal conversation. Review any key terms or ideas that may be unclear.

During the Session

Self-Reflection (10 min)

- Ask participants to reflect on their practice by filling out Supporting Documentation of STEM: Self-Reflection. Have them identify one area that they want to improve on as they work.
- Do a Move-Pair-Share. Have participants move around the room and when you shout, "Pair" have them give a high five to someone near them. That person is now their partner.
- With this partner, ask that they share their goal, and ask for advice.
    - *Each partner will share their goal with each other. What would your partner do to try to achieve this goal?*
- Once both partners have shared, ask participants to move again, find a new partner, and get more advice. Do this three times total so that partners get three pieces of advice.

Conclusion (10 min)

- Pass out the two resources the Active Graphing Resource and the Types of Documentation to Use with Youth. Ask participants to read them and discuss them with a tablemate.
    - *We are now going to discuss and look over some more strategies for documenting STEM learning experiences. Look over these resources and discuss them with a table mate. Consider these questions:*
    - *How might these resources help you achieve your goal or improve your STEM facilitation?*
    - *Which documentation strategies would be best for upcoming lessons and activities?*
    - *Have you incorporated these strategies before? Did any of the advice you received during the Move-Pair-Share activity match these activities?*
    - *Which one of these strategies would you most like to incorporate into your technique?*

- Have participants discuss with partners and then share with the whole group. Record these strategies so you can send them out to all participants after the session.

After the Session

- Email the participants:
  - *Thank you for your participation in the recent Click2Science session on "Supporting Documentation of STEM Learning". I hope you found it useful and applicable to your practice. Please let me know if you have any questions. You can reach me at CONTACT INFO.*
  - *Include a few strategies from the session.*

Want to Earn Credit? Click2Science has teamed up with Better Kid Care to provide continuing education units. Check it out at: http://www.click2sciencepd.org/web-lessons/about

Supporting Documentation of STEM: Self-Reflection

Circle the number that best describes your practice. There are no right or wrong responses.

1= not at all true 3=somewhat true 5= very true

1 2 3 4 5 I encourage children to communicate in written or spoken form

1 2 3 4 5 I encourage children to describe their observations precisely

1 2 3 4 5 I encourage children to clarify their thinking and to justify their arguments

1 2 3 4 5 Notebooks are used in the setting to model the importance of the scientific process and as an essential tool in engineering

1 2 3 4 5 Youth are asked to use diagrams, maps, and other models as tools to help them elaborate their ideas and present them to others

1 2 3 4 5 I support youth in conveying STEM concepts through symbols, models, or other non-verbal language.

1 2 3 4 5 I support and facilitate youth in recording data or observations about events, actions, and objects

1 2 3 4 5 Each child in the setting has a vertical file to archive charts and observations (A collection of resource materials, such as pamphlets, clippings from periodicals, and mounted photographs, arranged for ready reference, as in a library or an archive.)

1 2 3 4 5 Journals with visual depictions are present in the setting

1 2 3 4 5 I encourage children to journal or use other means of documenting data and observations to model the importance of the scientific processes

1 2 3 4 5 I encourage youth to create diagrams and to represent data and observations with plots and tables, as well as with written text, in journals

1 2 3 4 5 I support youth in recording data or observations about events, actions, and object.

Supporting Documentation of STEM: Active Graphing

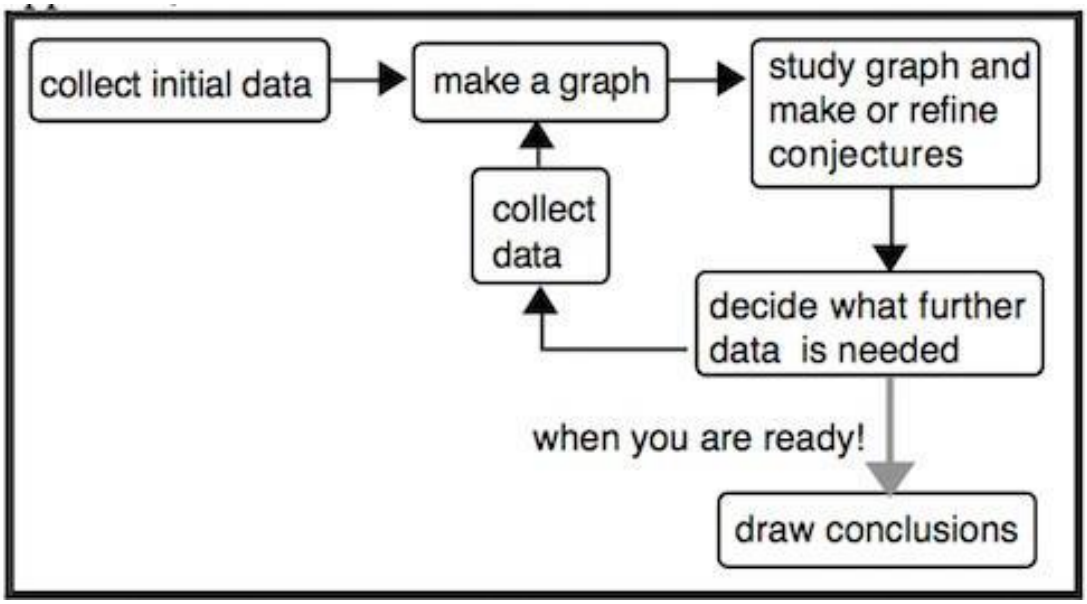
This chart was created by Dave Pratt to show a flow chart of how to utilize charts and graphs to make considerations about the recorded data.

The chart shown here is published in:

Pratt, D. (1995). Young children's active and passive graphing. *Journal of Computer Assisted Learning*, *11* (3), pp. 157-269.

A pdf version of the entire article is available for free online.

Active Graphing, Table 2.



Reflection Questions to Consider:

1. Is a similar model used in the setting to help organize data and to make decisions?
2. If not, what type of model could be incorporated in the setting to help make decisions about what to do next with the data or because of the information the data reveals?

Types of Documentation to Use with Youth

The way information is recorded and shared should be determined based on what type of documentation will best express the experience.

The 'raw data' can be recorded using tally marks, bulleted points, or just writing down notes. The raw data can then be put into a format (chart, graph, and diagram) to reflect and analyze the information. Through reflecting and analyzing information, conclusions about the experiment/experience can be made and shared with others.

Type	Uses
Venn Diagram	To compare the characteristics of two things. To show the similarities and differences between two things. To show the logical relationship between two things.
Scatter Plot	To compare two variables and their effect on a phenomenon. Example: how speed is affected by weight when testing a model car.
Line Graph	To show changes over time (or experiments).
Bar Graph	To show differences between two or more variables.
Pie Chart	To show proportion (how much of something takes up the whole of it).
Tallies	To record a unit of information (how many times something happens).

As you plan to have youth document their learning, think about:

- What things should be recorded/documented about the experiment/experience?
- How should the information be recorded/documented?
- What tools are needed to record/document the experiment/experience?
- Should the information be shared with others? If so, who and how?

Resources: Supporting Documentation of STEM

Ashbrook, P. (2010). Documenting learning. *Science & Children*, *48* (3), p. 24.

Kroeger, J. (2006). Documentation: A hard place to reach. *Early Childhood Education Journal*, *33* (6), pp. 389-398.

Bers, M. U. & Portsmore, M. (2005). Teaching partnerships: Early childhood and Engineering students teaching Math and Science through robotics. *Journal of Science Education and Technology, 14* (1), pp. 59-73.

Benenson, G. (2001). The unrealized potential of everyday technology as a context for learning. *Journal of Research in Science Teaching*, *38* (7), pp. 730-735.

McGinn, M. K., & Roth, Wolff-Michael, R. (1999). Preparing students for competent scientific practice: Implications of recent research in Science and Technology. *Educational Researcher*, *28* (3), pp. 14-24.

Forman, George. (1986) Observations of young children solving problems with computers and robots. *Journal of Research in Childhood Education*, *1* (2) pp. 60-74.

Websites:

http://www.citytechnology.org/kids
Use Educator's link for simple experiments.

http://www.sciencekids.co.nz
Wide variety of Science related experiments, lessons, images, and videos.