Science Field Day and Parent Night

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Time Frame 90-120 minutes

Essential Question(s)

- What is the format for helping students develop a game/station aligned to the standards?
- What is needed to host a Science Field Day and Parent Night?
- What are the benefits to hosting a Science Field Day and Parent Night?

Summary

This professional learning session focuses on guiding teachers on the creation of a science field day and parent night. Participants will experience an authentic model lesson where they will have to problem solve, rely on prior knowledge, and collaborate with their peers to develop a game/activity associated with the Oklahoma Academic Science Standards.

Learning Goals

- Experience a modified version of station-making from state standards.
- Discuss challenges of implementing a Science Field Day and Parent Night.
- Develop a plan for implementing a Science Field Day and Parent Night at your own location.

Attachments

- Authenticity Vetting—Science Field Day and Parent Night.docx
- Authenticity Vetting—Science Field Day and Parent Night.pdf
- Crack the Code Answer Key—Science Field Day and Parent Night.docx
- Crack the Code Answer Key—Science Field Day and Parent Night.pdf
- Crack the Code Instructions—Science Field Day and Parent Night.docx
- Crack the Code Instructions—Science Field Day and Parent Night.pdf
- Event Set-Up Packet - Science Field Day and Parent Night.pdf
- Exemplars, Science Standard Activity Template—Science Field Day and Parent Night.docx
- Exemplars, Science Standard Activity Template—Science Field Day and Parent Night.pdf
- Presenter Slides—Science Field Day and Parent Night.pptx
- Protein Synthesis Team Cards and Answer Key— Science Field Day and Parent Night.pdf
- Science Standard Activity Template—Science Field Day and Parent Night.docx
- Science Standard Activity Template—Science Field Day and Parent Night.pdf

Materials

- Presenter Slides (attached)
- Science Standard Activity Template (attached, one per participant)
- Authenticity Vetting (attached, one per participant)
- Event Set-up Packet (attached, one per participant)
- Crack the Code Instructions (attached, one per participant)
- Crack the Code Answer Key (attached)
- Exemplars, Science Standard Activity Template (attached, one per participant)
- Protein Synthesis Team Cards and Answer Key (attached, one per participant)
- Mr. Potato Head toy (one per group)

15 minutes

Engage

Presenter's Note: Session Preparation

Prepare a folder with the following handouts prior to the session:

- **Crack the Code Instructions handout**
- **Crack the Code Answer Key handout**
- **Protein Synthesis Team Cards and Answer Key handout**

One folder is needed for each participant group.

Welcome participants, and briefly introduce yourself and the professional development session using the attached **Presenter Slides**. Display **slide 3** and place participants into groups of three. Tell participants they are going to play a game called Crack the Code. The goal of the game is to correctly transcribe DNA to RNA, translate RNA to an amino acid, and discover the trait based on the protein based on the amino acid chain in order to assemble a Mr. Potato Head.

Assign one player to be the Smarty Pants. Explain that the role of Smarty Pants is to ask questions to the other players on their team. When a player answers the question correctly, they will receive a DNA codon to transcribe to RNA and ultimately translate into a protein using the attached **Protein Synthesis Team Cards**. The type of protein should tell the player what appendage to place on the Mr. Potato Head. The group that assembles Mr. Potato Head the quickest is the winner. The designated Smarty Pants uses the answer key to inform participants if they are translating the proteins correctly.

Have the designated Smarty Pants retrieve the prepared folder and pass out the handout to their group members. The Smarty Pants keeps the answer keys to assist the other group members while they play the game.

Presenter's Note: Purpose of the Game

Although we know that some traits are more complex and can be developed by multiple genes/alleles, the main point is to get students to understand that DNA is the ultimate decider for the characteristics that living organisms portray and that there are multiple steps that occur to achieve this final product.

Transition to **slide 4** and ask participants to summarize the activity using the What Are You Doing and Why strategy. They should think about the questions on the slide:

- What is the purpose of the game Crack the Code?
- What do you expect students to learn from playing this?

Possible Participant Responses

Question 1: What is the purpose of the game: Crack the Code?

- To provide a concrete example of the how the structure of DNA ultimately determines the structure of a protein.
- To have students work together to correctly transcribe and translate the central dogma (DNA->RNA->Protein).

Question 2: What do you expect students to learn from playing this?

- To learn the concepts in a concrete way.
- To fill in the gaps of what they didn't know.

Display **slide 5** and inform participants that the game was created to showcase the Oklahoma Academic Standards (OAS) Biology standard listed on the slide. Have a short discussion about how the game relates to the Biology standard. Transition through **slides 6-7** and review the essential questions and learning objectives of this professional learning session.

20 minutes

Explore

Presenter's Note: Subject Standards

Make copies of the standards that will be used to create station activities for participants to refer to.

Place participants into groups based on the science course they currently teach such as biology, chemistry, and physics. Similar courses such as Earth science and astronomy can be grouped together. Pass out the standards according to the course taught and the attached **Science Standard Activity Template** handout. If some participants do not have standards for their course, advise them to use their unit goals as a guide.

Move to **slide 8** and tell participants to work in their course groups to develop exemplar games for each standard in their course. After providing time for games to be created, discuss how to create games with students throughout the school year. After each unit completed, teachers should pass out a blank Science Standard Activity Template handout to each student who can work individually or in groups to create an activity or game that represents that standard.

Transition to **slide 9** and explain the Two Stars and a Wish strategy to participants. Tell participants to list two benefits for allowing students to create their own activity/game and one obstacle that students will encounter when creating their activity. Have participants share their thoughts.

Pass out the attached **Exemplars: Science Standard Activity Template** handout to review some examples of activities that other schools have created.

15 minutes

Explain

Move to **slide 10** and pass out the attached **Authenticity Vetting** handout. As a group, tell participants to highlight the components of authenticity that will be experienced by students when they create games that reflect their course standards. Tell participants to write evidence in the second column from the prior activities that reflect the parts of authenticity included in creating games. Ask participants to share their thoughts and then have participants think about why science lessons need to be authentic. Have several participants share their thoughts and have a discussion about the importance of authenticity in science courses.

15 minutes

Extend

Pass out the attached **Event Set-up Packet** handout to participants and display **slide 11**. Tell participants to review the packet and consider the items that are needed to have a successful Science Field Day and Parent Night. Provide time for participants to review the items in the packet and discuss the ways in which they can procure the needed items.

10 minutes

Evaluate

Move to **slide 12**. Tell participants to reflect on the Crack the Code game that was played at the beginning of the session as well as the games that have been created during the session. Ask participants to think about how games can be used to support a showcasing event that includes science majors and career awareness at a Parent Night to advance college readiness. Provide some time for participants to share their ideas.

Research Rationale

Providing students with engaging, concrete laboratory activities where they are given choice in framing these activities increase science engagement, awareness, and academic outcomes. Studies show that field trips or outdoor activities that include engaging, hands-on, real-world activities result in higher STEM engagement, positive classroom behavior, and higher recall (Nadelson & Jordan, 2012). Science activities, such as labs, have the highest engagement in students if they focus on student choice and connection to real-world problems (Schmidt, Rosenberg, & Beymer, 2018; Peacock, et. al., 2021). Educators should have the support in guiding students in creating and facilitating real-world laboratory activities/stations that reflect academic science standards and then supporting at a Parent Night where they showcase these student-made activities (Lakin, et. al., 2021).

Resources

- K20 Center. (n.d.). Two Stars and a Wish. Strategies. https://learn.k20center.ou.edu/strategy/83
- K20 Center. (n.d.). What are You Doing and Why? Strategies. https://learn.k20center.ou.edu/strategy/1872
- Lakin, J. M., Ewald, M. L., Hardy, E. E., Cobine, P. A., Marino, J. G., Landers, A. L., & Davis, V. A. (2021). Getting Everyone to the Fair: Supporting Teachers in Broadening Participation in Science and Engineering Fairs. *Journal of Science Education & Technology*, *30*(5), 658–677. https://doi.org/10.1007/s10956-021-09910-7
- Nadelson, L. S., & Jordan, J. R. (2012). Student Attitudes Toward and Recall of Outside Day: An Environmental Science Field Trip. *The Journal of Educational Research*, *105*(3), 220–231. https://www.jstor.org/stable/26586931
- Peacock, J., Bowling, A., Finn, K., & McInnis, K. (2021). Use of Outdoor Education to Increase Physical Activity and Science Learning among Low-Income Children from Urban Schools. *American Journal of Health Education, 52*(2), 92-100.
- Schmidt, J., Rosenberg, J., & Beymer, P. (2018). A person-in-context approach to student engagement in science: Examining learning activities and choice. *Journal of Research in Science Teaching, 55*(1), 19-43.