

Science or SS Lesson Plan

Borlaug Day

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Subject/ Grade Level: Science. 5th Grade

Materials:

- Signs for each base/position
- Anchor chart for the scientific method
- Poster of scientific method baseball/softball field
- 5 Notecards with a specific job/positions/ role in the wheat game (View at the bottom of the document)
 - The pickle
 - First Base
 - Shortstop/Second base
 - Fans/Supporters
 - Trophy
- Plastic Bat
- Soft ball

Environment:

- This lesson should be taught in an open area in which the students are able to play a game of baseball/softball. We would suggest the following:
 - Large Gym
 - Large turf room
 - Large field
 - Large Blacktop
 - Baseball field
 - Softball field

Time:

- 25-30 minutes

Standards:

- 3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- 3-5-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time or cost.
- 3-5-ETS1-3: Plan and carry out fair test in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

- SL.5.1: Engage effectively in a range of collaborative discussions (one–on–one, in groups, and teacher–led) with diverse partners on grade 5 topics and texts, building on others’ ideas and expressing their own clearly.
- SS.5.6. Identify challenges and opportunities when taking action to address problems, including predicting possible results.

Lesson Objectives:

- TLW use the baseball/softball diamond as a way to help them remember and understand the different parts of the scientific method.
- TLW apply their knowledge of baseball/softball, the Scientific method, and Norman Borlaug to make connections between the three to solve the baseball/softball diamond questions.
- TLW apply their knowledge of the Scientific method and baseball/softball to determine if a given hypothesis should be kept the same or reevaluated and tested.

Differentiation strategies to meet diverse learners needs:

- *ADHD*
 - This lesson is centered around a sport and has movement built in throughout the entire lesson allowing these students to be up and moving around without being a distraction for the rest of the class.
- *ELL*
 - We will be playing on a baseball/softball field that will allow us to model and walk through with students. It does not necessarily require speaking. Additionally our activities can be adapted to allow for a para or translator to participate with the student. The reading is also not supposed to be extremely difficult throughout the lesson because we want to emphasize content not trick the students.
- *Autism*
 - This activity does not require students to work in groups or pairs and can be adapted for different cases/severity levels surrounding group interactions or stimulation.
- *What are you going to do if there is a disruption?*
 - At the bottom of our lesson we have prepared two brain breaks to use if we need to help students regain control of their body and energy.
- *Students who are not going to be attentive due to the change in environment*
 - We will use proximity control as well as frequent check-ins. Additionally students often off task respond to responsibility so we may ask them to do something or give them a special job like help us set up or hand things out of collect things.

Engagement:

- *Describe how the teacher will capture student’s interests.*
 - The teachers will prompt the students with questions about how much they know about the scientific method, and if they have used it in their classes.

- The teachers will prompt the students with questions about if they have played baseball/softball, or understand the sport of baseball/softball.
- *What kind of questions should the students ask themselves after the engagement?*
 - The students should be asking themselves questions about how the scientific method relates to the game of baseball/softball.
 - How does the scientific method relate to baseball/softball?
 - How can we incorporate science into baseball/softball?

Explanation:

- *Describe what hands-on/ minds-on activities students will be doing.*
 - The students will be listening to one teacher go through a poster that has the Scientific Method on it. The teacher will go through the Scientific Method and explain how it works with experiments and go step by step. Next the second teacher will transition into how a baseball/softball field and game relates to the Scientific Method. The teacher will explain how the Scientific Method phases relates to each of the bases and positions in baseball/softball. The teachers will both incorporate how Norman Borlaug and his discovery of rust resistant wheat relates to the Scientific Method, than how it relates to a game of baseball/softball.
 - After this demonstration and teaching the students will gather around the baseball/softball poster and the 5 cards with positions and relations to Borlaug will be read to the students. The students will think about the cards and determine where they belong on the map. They will think about the Scientific Method and baseball/softball to determine where the card belongs, while engaging in discussion about their reasoning behind the placement they chose.
- *List “big idea” conceptual questions the teacher will use to encourage and/or focus students’ exploration.*
 - How is the game of baseball/softball similar to the scientific method?
 - How does Borlaug’s creation of rust resistant wheat relate to the scientific method?
 - Does every scientific discovery relate to the scientific method? How or how not?
 - How do you think Borlaug incorporated the scientific method as he was creating his rust resistant wheat?

Explanation:

- *Student explanations should precede introduction of terms or explanations by the teacher. What questions or techniques will the teacher use to help students connect their exploration to the concept under examination?*
 - How do you think the anchor chart on the scientific method and the poster relating the scientific method and baseball/softball will help you understand Norman Borlaug’s creation of rust resistant wheat?
 - How can the relationship between baseball/softball and the Scientific Method help you remember how the scientific method works?
- *List higher order thinking questions which teachers will use to solicit student*

explanations and help them to justify their explanations.

- How does the scientific method impact scientific discoveries?
- How could the scientific method hinder a scientists work and creation?
- In what ways have you used the scientific method in your education?

Elaboration:

- *Describe how students will develop a more sophisticated understanding of the concept.*
 - The students will be playing their own baseball/softball game based around the hypothesis that the teachers create. The hypothesis is that if the students bat with their non-dominant hand, they will not be able to hit the ball as hard or as far. The students will be split into teams and take turns hitting and fielding the ball. The students will be thinking about how the game of baseball/softball connects to the hypothesis they are trying to prove and to the scientific method, as they play the game. The teachers will wrap up the game by having the students discuss if they believe the hypothesis of not being able to hit the ball as hard or as far with their dominant hand was true or if they need to reevaluate and start over.
- *What vocabulary will be introduced and how will it connect to student's observations?*
 - **Question:** The scientific method starts when you ask a question about something that you observe: How, What, When, Who, Which, Why, or Where?
 - **Research:** Rather than starting from scratch in putting together a plan for answering your question, you want to be a savvy scientist using library and Internet research to help you find the best way to do things and insure that you don't repeat mistakes from the past.
 - **Hypothesis:** A hypothesis is an educated guess about how things work. It is an attempt to answer your question with an explanation that can be tested. A good hypothesis allows you to then make a prediction:
 - "If _____[I do this] _____, then _____[this]_____ will happen."
 - **Experiment:** Your experiment tests whether your prediction is accurate and thus your hypothesis is supported or not. It is important for your experiment to be a fair test. You conduct a fair test by making sure that you change only one factor at a time while keeping all other conditions the same.
 - **Conclusion:** Once your experiment is complete, you collect your measurements and analyze them to see if they support your hypothesis or not.
 - **Results:** To complete your science fair project you will communicate your results to others in a final report and/or a display board. Professional scientists do almost exactly the same thing by publishing their final report in a scientific journal or by presenting their results on a poster or during a talk at a scientific meeting. In a science fair, judges are interested in your findings regardless of whether or not they support your original hypothesis.
 - **Scientific Method:** a method of procedure that has characterized natural science since the 17th century, consisting in systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses.

<p>Evaluation:</p> <ul style="list-style-type: none"> - <i>How will students demonstrate that they have achieved the lesson objective?</i> <ul style="list-style-type: none"> - Students will learn and apply the information from the lesson throughout the different activities we have planned. they will also participate in the game which requires them to apply their knowledge from the day. - <i>This should be embedded throughout the lesson as well as at the end of the lesson.</i>
<p>Assessment:</p> <ul style="list-style-type: none"> - <i>How will the students demonstrate that they have learned the objectives of the lesson?</i> <ul style="list-style-type: none"> - Students will have a discussion about whether or not the hypothesis of the baseball/softball game should be keep the same of if it should be reevaluated and tested again, in a different way.
<p>Resources:</p> <ul style="list-style-type: none"> - <i>Freedom From Famine. Norman Borlaug Documentary</i> <ul style="list-style-type: none"> - http://www.pbs.org/video/iptv-documentaries-freedom-famine-norman-borlaug-story/

Cards for the Lesson

- 1st Base: I am the phase where the background research is conducted. Where Borlaug did his research about the types of rust that were causing wheat plants not to grow in third world countries.
- Shortstop: I am the questioning area in which Borlaug experimented if his process of cross breeding wheat was going to work in different third world countries.
- A pickle: I am the batter who is running back and forth to see if the idea is not working and having to go back to second base to do more testing or to move towards third base to analyze the data and draw conclusions. I run to third base to draw conclusions on how to implement rust resistant wheat in third world countries.
- Trophy: I am the Nobel Peace Prize. I was awarded to Norman Borlaug after his implementation of rust resistant wheat into Third World countries, helping stop famine and hunger.
- Fans/Supporters: We are the people of Ghana, India and other countries in which Borlaug helped end hunger with his rust resistant wheat. We support all the work Borlaug does with helping end hunger.

Posters



