Bernadette Estrada-Brown

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Standards   Access Points   Print/Export Standards   Computer Science Standards   Coding Scheme   Content Complexity Rating
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Big Idea 1: The Practice of Science

Export   Print

Idea Information

Related Benchmarks — 4

Related Access Points — 9

Related Resources — 86
- 39 Lesson Plans
- 32 Teaching Ideas
- 9 Unit/Lesson Sequences
- 3 Original Student Tutorials
- 1 Resource Collection
- 1 Assessment
- 1 Lesson Study Resource Kit

Student Resources — 3

Parent Resources — 3

A: Scientific inquiry is a multifaceted activity; The processes of science include the formulation of scientifically investigable questions, construction of investigations into those questions, the collection of appropriate data, the evaluation of the meaning of those data, and the communication of this evaluation.

B: The processes of science frequently do not correspond to the traditional portrayal of "the scientific method."

C: Scientific argumentation is a necessary part of scientific inquiry and plays an important role in the generation and validation of scientific knowledge.

D: Scientific knowledge is based on observation and inference; it is important to recognize that these are very different things. Not only does science require creativity in its methods and processes, but also in its questions and explanations.

General Information

Number: SC.1.N.1
Type: Big Idea
Grade: 1

Title: The Practice of Science
Subject: Science
Body of Knowledge: Nature of Science

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Lesson Plan

Title: Physical vs. Chemical Changes Secret Message

Purpose: To engage 1st graders with critical thinking of scientific experiments to differentiate between a physical or chemical change.

Date(s) & Class Time: 04/3/2022 & 60 mins

Instructor: Bernadette Estrada-Brown

Timeline:

15 mins: to discuss physical and chemical changes

5 mins: for questions

5 mins: to explain the experiment

5 mins: to mix ingredients

10 mins: to discuss the different fruits the students have been exposed to and enjoy at home as well as incorporate new fruits to taste and critique

15 mins: to complete the experiment

5 mins: questions and wrap up

Mandated Course Outcomes:

SMART Learning Objectives:

1. I will be specific about what I want to accomplish: Teaching the students the differences between physical and chemical reactions.
2. I can measure this goal by the reactions of the students upon completion.
3. I know my goal will be attainable as the students will be engaged and if I see a student having trouble, I will help them through.
4. This goal is relevant as it helps students think about their environment and how everyday things can impact their lives and learning.
5. The objective will be completed in a timely matter as we will start and finish within an hour to ensure that each student will have time ask their questions for clarification and closure.

Student Information

Grade-Level: 1st grade

Classroom Composition: Diverse classroom

Diversity Groups Impacted by the Achievement Gap: ESL students

Student Needs: Bilingual instructions

Existing Student Knowledge Level: Bilingual with understanding of 70% of English site words but easily confused when language is rushed.

Existing Student Skill Level: Student is motivated but can shut down upon not understanding what instructions may follow.

Lesson Materials

Indicate which materials are needed to instruct and complete this lesson.

Student Materials:

1 oz. water

2 TBS. baking soda

White printer paper

Paper towel

2 Q-tips

Blackberry

Blueberry

Strawberry

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Guava
Mango
Mamey

Instructor Materials:
Note pad with each student's name to jot down information on student's progression through each step of the experiment.
5 questions to ask each student.

1. What do you think will come from this experiment?
2. Do you think this will be a physical change or a chemical change?
3. What supports your theory?
4. Why do you think the outcome happened the way it did?
5. What in your home or lifestyle can be examples of physical or chemical changes?

Classroom & Technology Materials:
Video on chemical and physical changes: https://www.generationgenius.com/trial-d/?type=display&utm_source=google&utm_medium=cpc&gclid=EAIaIQobChMIjPXHp9r19gIVJQplCh0Ajge OEAEYASAAEgLu8fD_BwE
Book: The Phases of Matter The Phases of Matter - Chemistry Book Grade 1 | Children's Chemistry Books eBook by Baby Professor - 9781541918405 | Rakuten Kobo Canada

ENGAGE Lesson Plan

Directions: Add detail to each part of the ENGAGE lesson plan to complete your lesson. You should be adding instructional strategies that ensure the lesson is culturally-responsive and diverse.

Energize Stage

Goal: Prepare students for learning.
Purpose: Establishes Connection & Interaction.

Energize Stage	Instructional Strategy or Teaching Method
Pre-Lesson Plan	Student Motivation Technique: Discuss how fruits are important in any home. What fruits are from different countries and how they help each person's body. Why do they help and what chemical or physical changes happen to your body when you eat a balance of different fruits?
Pre-Lesson Plan	Prior Knowledge Check: Talk Science. Why do we study science? Read book on chemical and physical change. and Changes in Matter.
Lesson Start Plan	Interaction Technique: Read: The Phases of Matter
Lesson Start Plan	Motivation Technique: Go over the ingredients list with students.

Navigate Stage

Goal: Enable higher-level student learning.
Purpose: Creates Cognitive Connections.

Navigate Stage	Instructional Strategy or Teaching Method
Teaching Plan	Active Learning & Engagement Plan: Show videos, discuss text, and engage the students with power point of how fruits take on different

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Navigate Stage	Instructional Strategy or Teaching Method
	changes.
Teaching Plan	Culturally Responsive Plan: Discuss how fruits can be used for different meals in different cultures…do those pose change?
Review Plan	Review Technique: Cut, smash, rot, and smear fruits. Do they make physical or chemical changes?

Generate Stage

Goal: Involve students in the learning process.
Purpose: Transfers knowledge into long-term memory.

Generate Stage	Instructional Strategy or Teaching Method
Retention Plan	Retention Techniques: break the class into 3 groups, each group interchanges to engage with the 3 ingredients. Touch, smell, and taste all ingredients. How can these components make change?
Relevance Plan	Learning Goal Check: These ingredients are largely used in most diverse households. Water is universal, baking soda is used for cleaning, baking and curing in Latin households, and fruits are nourishments used in all households.
Meta-Cognitive Plan	Learning Self-Reflection Techniques: How are these components used for the experiment utilized in your own home.

Apply Stage

Goal: Showcase student learning.
Purpose: Expands learning comprehension.

Apply Stage	Instructional Strategy or Teaching Method
Application Plan	Demonstration Techniques: Experiment implemented: Mix baking soda with water Dip Q-tip in baking soda and water mixture Write a message on the white paper Dab dry with paper towel Take fruit and smear it over the message
Feedback Plan	Feedback Techniques: What happens? Your message should appear if there is a chemical change. Let's talk about it.

Gauge Stage

Goal: Encourage meaningful learning.
Purpose: Deepens learning connections.

Gauge Stage	Instructional Strategy or Teaching Method
Review/Retention Plan	Knowledge Checks, Review and Retention Techniques: Have the students do a walk through around the classroom and figure out what objects can be changed physically or chemically. Soap when hands are washed…is that a physical or chemical change?

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Gauge Stage	Instructional Strategy or Teaching Method
Assessment Plan	Assessment Techniques: Construct a 5-point question homework sheet for students to go home and work with their parents.

Extend Stage
Goal: Make learning active.
Purpose: Increase active knowledge.

Extend Stage	Instructional Strategy or Teaching Method
Application Plan	Action Plan: Send home a "Let's work together sheet"!
Collaboration Plan	Support Networks: https://www.generationgenius.com/trial-d/?type=display&utm_source=google&utm_medium=cpc&gclid=EAIaIQobChMIjPXHp9r19gIVJQplCh0AjgeOEAEYASAAEgLu8fD_BwE

Take home worksheet.
Let's work together sheet.

Scientific Changes
Is it physical or chemical?

Que paso?

1. Add water to soap & shake it up…Is there a physical or chemical change? **Hypothesis**
2. I think the _____ &_____ will become _____ after shaking it.
3. What was your observation?
4. Were you correct in your hypothesis?
5. Was there a physical or chemical change?

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Technology Integration Lesson Plan Evaluation

Directions: After selecting a lesson plan, complete the following chart. Phases I & II are as if you are preparing to conduct the lesson. For Phase III, reflect on the quality of the lesson plan, which you are evaluating, and plan to implement. Type your responses in the boxes (the space will expand as you write) then save your document.

Selection of Lesson Plan

Lesson Title: Physical vs. Chemical Changes Secret Message

Source: (include URL): Self made

Standards used to search for plan (full text of standards): SMART Learning Objectives:

6. I will be specific about what I want to accomplish: Teaching the students the differences between physical and chemical reactions.

7. I can measure this goal by the reactions of the students upon completion.

8. I know my goal will be attainable as the students will be engaged and if I see a student having trouble, I will help them through.

9. This goal is relevant as it helps students think about their environment and how everyday things can impact their lives and learning.

10. The objective will be completed in a timely matter as we will start and finish within an hour to ensure that each student will have time ask their questions for clarification and closure.

Overview of the lesson: What do students do and what does the teacher do? Students engage and interact while teacher over looks and offers suggestions if asked.

If you needed to change your lesson plan to incorporate technology **before** you evaluated it, then what have you added, deleted, or changed in the original lesson plan
Describe your changes and the rationale:
My personal lesson plan had tech already added.

Phase I: Analysis of Learning and Teaching Needs
Step 1: Determine Relative Advantage

What are the goals/objectives or outcomes for the lesson? List the top 3.
To engage students
Make science fun
Teach children that physical and chemical changes are happening in everyday life

What is the relative advantage of the technology in this lesson (pg. 56-58)? Powerpoint and video offering rich visual aids

Is this relative advantage enough to persuade your principal to support you in the use of this technology?
yes

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Step 2: Assess Tech-PACK

Is my content, technological, and pedagogical knowledge sufficient to conduct this lesson (p. 58)?
Which content, technology, and pedagogy knowledge will I use that I already know? TPACK Theory
Content: I show the experiment by showing them the content
Technology: I utilize PowerPoint and video to engage the students with rich visual aids
Pedagogy: I know who I'm working with as far as the students and their educational learning levels in order to have a successful lesson

What content, technology, and pedagogy knowledge will I need to learn to be successful?
TPACK and how it works.

Phase II: Planning for Integration

Step 3: Decide on Objectives and Assessments

What outcomes do I expect of students after the instruction, and how will they show me what they have learned? (for example, students will be able to list the steps in the scientific method; students will apply the scientific method to designing an experiment.)
Establishes Connection & Interaction with Science. While incorporating language skills, team work and diverse learning/teaching.

How will I assess students' learning (for example. written test, products, presentation, etc.)? (for example, students will arrange the steps of the scientific method in order in an online quiz. A rubric will be used to assess the students' present the results of a formal experiment. I will use a rubric.)
A quiz as well as interactive discussions.

Do the assessment instruments (for example, test, rubrics) exist or will I have to develop them?
List the assessment instruments and indicate those that need to be developed: I developed one. Quiz and discussion to assess students knowledge and understanding.

Step 4: Designing integration strategies: What teaching strategies will work best?

Will the instruction be single subject or interdisciplinary (integrating more than one content area such as a history and writing assignment)? Which subject area(s) are covered? What grade level?
I have integrated 3 subjects…Science, language, and public speaking. They are 1st graders.

What are the characteristics of the learning environment? (active, collaborative, constructive, authentic, and/or goal directed; See descriptions) Include all that apply and what in the lesson makes it so.

active, collaborative, constructive, authentic, and goal directed as they will be working with their hands, with their peers, it's up to them how the fruits interact and their hypothesis will determine how they've completed the lesson.

Which thinking skills are supported and how? (remembering, understanding, applying, analyzing, evaluating, creating; See descriptions) Are most of the activities for students focused on the higher order thinking skills of applying, analyzing, evaluating, and creating?
Critical thinking.

What level of technology integration is evident? (Entry, Adoption, Adaptation, Infusion, and/or Transformation; See descriptions.). Include all that apply and what in the lesson makes it so. Infusion as I am doing text and technology.		

With which learning theories will the activities be aligned: objectivism (directed instruction led by teacher), constructivism (student-directed instruction with student chosen topics, presentation modes, and/or project tools), or a combination of these? Support your answer with your reasoning. (See Table 2.2 on page 47)
Combination as not only will they be hands on but also have the students do a walk through around the classroom and figure out what objects can be changed physically or chemically. Soap when hands are washed…is that a physical or chemical change?

Step 5: Preparing the instructional environment: Are the essential conditions in place to support technology integration?

How long will the technology resources be needed? What is the time span for using technology in this lesson?
15 mins for visual aid and powerpoint.

	YES	NO
Does the lesson require scheduled time in a lab or media center?		x
Does the lesson require the scheduling of projection devices or large-screen monitors for demonstrations? We have them in the classroom.		x
Does the lesson require other equipment, software, media and resources? *If yes, then list other equipment, etc.*:		x
Is the lesson legal according to copyright laws?	x	
Does the lesson provide for students' privacy and safety?	x	
Does the lesson provide provisions for special populations such as students with disabilities (SWD), English Language Learners (ELL), and gifted? *List the provisions:* Tables are higher for students in wheelchairs	x	
Am I familiar with troubleshooting procedures specific to the hardware or software? *List where to get help*:	x	
Does the lesson provide a backup plan if the resources cannot be used as planned? *Briefly describe it:* I am bringing print out of slides for the children.	x	

Phase III: Post-Instruction Analysis and Revisions

Step 6: Analyze Results

	YES	NO

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Is the sequence of activities adequate for completing the task? Would a substitute teacher be able to teach this lesson? Could you teach this lesson?	x	
Is the lesson plan designed to achieve the objectives? What evidence will I use to indicate success? *List your assessment methods:* Quiz, homework and discussion sessions.	x	
Now that I evaluated this lesson plan, do I see myself using it in the future?	x	

Step 7: Make Revisions

After using this lesson with your class, you would at this point make necessary revisions after completing Step 6: Analyze Results.

	YES	NO
Do I see myself using it in the future with modifications?	x	

Additional Comments: I love this lesson!!! So much fun!