Week 5 - Assignment: STEM Lesson Plan

GRADE	First
SUBJECT	Science: Buzzin' Bees
CONTEXT (new)	23:1 student: teacher ratio; 3 students are currently being assessed for IEP's; 1 student has a 504 plan; 82% of students are MLL; 99% are Hispanic/Latino; all students are from low socio-economic backgrounds.
LESSON SUMMARY	This lesson introduces students to bees, their role in pollination, and how to support them. Activities include bee observations and brainstorming ideas for bringing more bees to campus.
How is Theory applied in this lesson?	This lesson centers around the progressivist theory of experiential, relevant, and reflective learning, as described by Webb and Metha (2003/2017). This approach emphasizes active learning through practical application. Moreover, Webb and Metha (2003/2017) highlight that this theory aligns with curricula employing cooperative group activities and the scientific method.

ISTE Standards for Students How will you address the ISTE Standards for Students?

Creative Communicator: 1.6: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

- *Students will share their findings and ideas using the method of their choice. This can include a video, a Google Slide deck, or other technology.*

STATE or COMMON CORE How will you address your States or the Common Core standards?

NGSS Kinder & First Grade Standards:
NGSS K-2-ETS1-1 (Engineering Design): This standard focuses on asking questions, making observations, and gathering information about a situation people want to change to define a simple problem.
NGSS K-ESS2-2 (Earth's Systems): This standard deals with observing and describing the different ways animals and plants depend on each other.
NGSS K-ESS3-1 (Earth and Human Activity): This standard relates to making observations and asking questions about the natural world.

Common Core First Grade Math: Measurement & Data
1.MD.4 - Represent and interpret data.
4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many are in each category, and how many more or less are in one category than in another.
Students will tally the number of bees they observe on the school campus.

MEASURABLE OBJECTIVE What will your students be able to do?

By the end of this lesson, students will be able to identify at least two ways that bees help plants and explain one way they can help bees in a simple sentence or drawing.

ASSESSMENT How will you know whether your students have made progress toward the objective? How and when will you assess mastery?
I will use a KWL chart (Estes & Mintz, 2016) as a formative assessment tool. This will allow students to also track their learning and develop a sense of ownership and accomplishment in their learning. Students will also be assessed summatively at the end of the lesson using a rubric to assess their cumulative projects.

DIVERSE LEARNERS (Mixed Abilities) 1. How will your instruction support the diversity of learners in your classroom? 2. List the specific strategies you will use.			
1. Students with Disabilities - Frequent checks for understanding - Peer-assisted learning - Frequent “brain breaks”; time for movement - Divide work into smaller segments (Bateman & Cline, 2016)	2. English Learners (ELD Standards) - Provide labels for all materials and tools - Sentence stems and frames - Culturally responsive teaching (Bateman & Cline, 2016)	3. Advanced Learners -Tiered activities - Peer-assisted learning (GATE grouping) (Bateman & Cline, 2016)	4. At Promise - Individualize instruction - Peer-assisted learning - Culturally responsive teaching (Bateman & Cline, 2016)

DIFFERENTIATION ● Differentiated instruction is not the same as individualized instruction. ● Differentiation allows students to show what they know in different ways.		
1. Content - Provide a variety of examples for examination - Matching bug/shape type to appropriate vocabulary	2. Process - Provide materials in digital and paper formats - Utilize technology to expand the variety of examples and immediate feedback - Encourage students to create shapes with their bodies via yoga poses - Encourage students to re-enact “bee dance”	3. Product - Offer choice in presentation method (e.g. - working with Google Slides, writing, cutting/pasting, drawing, building, etc.).

CLASSROOM MANAGEMENT	
How will you create a healthy learning environment?	I will maintain a clean and organized classroom. Students will be comfortable and independent in the classroom as supply locations and boundaries are clearly established (Wong & Wong, 2018). Throughout the school year, I will continually build positive relationships with all students to ensure their emotional comfort in this learning space, allowing them to feel safe taking risks and exploring (Wong & Wong, 2018).

How will you create and maintain a supportive and safe learning environment?	In order to establish and sustain a nurturing and secure learning atmosphere, I will employ visual aids and established routines to establish explicit guidelines for participation, as suggested by Wong (2018) and Wong & Wong (2018).
How will you establish a climate of learning?	Bateman & Cline (2016) explain it best when they advocate for classrooms marked by a “secure, predictable, and consistent environment." This is a constant aspiration for me, and an area I am consistently refining. I will establish and revisit expectations as I progress through the lesson, thereby fostering active engagement and comprehension of forthcoming steps. This approach will reassure students, giving them a sense of certainty about what lies ahead in this lesson.

OPENING (10 minutes – suggested)			
How will you communicate *what* is about to happen? How will you communicate *how* it will happen?	I will explain to students that we will be working as scientists to better understand how our world works. I will provide a brief overview of the lesson and timing so students are prepared and know what to expect.		
How will you communicate its *importance*? How will you communicate *connections* to previous & future lessons?	I will clearly state the learning objectives at the beginning of the lesson. I will explain what students will be able to do or understand by the end of the lesson. Students will work with me to create a KWL chart to help us track our knowledge and make meaningful connections.		
How will you engage students and capture their interest?	I will begin the lesson with a read-aloud of the story, *Bee Dance* by Rick Chrustowski.		
TIME 10 min	TEACHER “Ok students, this afternoon we will be scientists! We will need to use our nature eyes to help us make observations of the world around us. We will spend the next few minutes reading a story, and then we will work together making observations. Finally, we will work independently to begin designing our solutions. Let’s begin with our story, *Bee Dance* by Rick Chrustowski.” - Invite students to the carpet for reading - Read book	STUDENTS - At desk listening - Transition quickly and quietly to the carpet	MATERIALS, STRATEGIES, & TECHNOLOGIES USED -*Bee Dance* by Rick Chrustowski (Chrustowski, 2016)

INTRODUCTION OF NEW MATERIAL (10 minutes – suggested)	
How will you introduce academic language?	I will incorporate academic language by providing clear definitions whenever I use relevant terms, such as explaining that "when we refer to the POLLINATION, we are talking about how POLLEN is moved from one part of the plant to another part." These definitions will be readily available to students through presentation slides, worksheets, and our KWL chart.

What key points will you emphasize and reiterate?	I will emphasize and reiterate that we are being scientists so we must make careful observations about what is happening around us. We must also make notes or drawings about what we see so that we can share them with each other and look back at them in the future.
How will you ensure that students actively take-in information?	By engaging in a group activity, students will establish connections both with the subject matter and their peers. All students will convene on the carpet, making sure students can hear my instructions and minimizing potential distractions.
How will you vary your approach to make information accessible to all students? How will you differentiate your instruction for all your learners?	Students will be introduced to the concepts through images, a read-aloud component, and by discussing with their learning partners. Instruction will be differentiated by providing verbal opportunities to share (at the carpet) and by engaging in independent work to draw or write their ideas about bees and pollination.
Which potential misunderstandings will you anticipate?	I anticipate some confusion about the vocabulary used in this lesson. To mitigate this, I will provide students with access to definitions of key terms in the form of anchor charts with supporting visuals that will be clearly visible to all students.
Why will students be engaged and interested?	Students will be engaged and interested because they will be able to share their own experiences. This lesson is also very social and allows for constructive communication between and among students.

TIME	TEACHER	STUDENTS	MATERIALS, STRATEGIES, & TECHNOLOGIES USED
9 min total 5 min KWL Chart 4 min video	-Display KWL Chart and explain how we will fill in the K column with what we already know about bees, and the W column with questions that we have about bees or things that we want to know. At the end of the lesson, we will fill in what we have learned about bees. - Facilitate K and W column completion. - Explain that many of their questions will be answered through careful observation and collaboration with other scientists. - Let's watch a video (4 min) about bees and how we can best observe them before we go out on a bee hunt!	- Potential student responses: K Column: "I know that bees make honey!" "I know that bees can sting!" "Bees live in a hive!!!" W Column: - "I want to know why bees make honey." "Why are bees so scary?" "Why do bees make that sound when they fly?"	-Digital anchor chart on Google Slide Deck -Laptop & Projector for video -Busy Bee's video (SciShow Kids, 2016) - KWL Chart

GUIDED PRACTICE (15 minutes – suggested)	
How will you clearly state and model behavioral expectations?	I will guide students in creating expectations and rules for observing bees around school. We will discuss how the scientist in the video suggests observing bees (e.g. - give them space, don't bother them, look with your eyes). We will write these down on an anchor chart. They will also be printed on students' observation worksheets.

How will you integrate the academic language?	The academic language will be integrated throughout the teacher-led demonstration. It will be integrated into the observation worksheet as well for quick reference.
How will you ensure that all students have multiple opportunities to practice?	Students will be able to practice together in the group activity as well as on their own during independent practice. Independent observations will also take place over the course of a week.
How will you scaffold practice exercises from easy to hard?	I will use “purposeful partnering” to ensure students have learning partners that can help them co-construct and build upon prior knowledge (Kolb, 2018, p. 156).
How will you monitor and correct student performance?	I will buzz around the area to observe students and check for understanding. I will use this time to answer questions and provide any needed guidance or clarification.
Why will students be engaged and interested?	Students will be engaged and interested in this because it is hands-on and interactive. Observation of bees is also highly relevant as they are often found around our school, making it student-centered (Burden & Byrd, 2019).

TIME	TEACHER	STUDENTS	MATERIALS, STRATEGIES, & TECHNOLOGIES USED
15 min	- “OK, so we know how to observe bees. Where do you think would be the best place to observe bees at our school?” - “Absolutely - outside! There are lots of plants there for bees to buzz around. What are some things we should look for while we are observing these bees?” - Share worksheet for recording notes and observations. Demonstrate how to record information while observing. - “One question I want you to think about while we are observing is: Do we have enough bees in our school garden? If not, how could we get more bees to visit our school?”	-Potential student responses: “OUTSIDE!” “On the playground!” “By the garden!!” - ”We should look for what the bee is doing.” “We should see what plant the bee likes best.” “We should count how many bees we see!”	- bee observation worksheet - Gradual release of responsibility (I do - We do - You do) (Burden & Byrd, 2019)

INDEPENDENT PRACTICE (25 minutes – suggested)	
How will you clearly state and model behavioral expectations?	Students will have time to practice observing as a whole class. I will remind them of expectations before they head out with their partners.
How will students demonstrate an understanding of the academic language?	Students will demonstrate understanding during their interactions and conversations with the teacher and their peers. They will use the correct academic language when referring to their work.
In what ways will students attempt to demonstrate independent mastery of the objective?	Students will demonstrate mastery of the objective by identifying how bees are helpful to plants.

How will you provide opportunities for extension?	Students will be encouraged to make observations of bees and other insects in the school garden, the playground, and their homes.		
Why will students be engaged and interested?	Students will be engaged and interested in this because it is hands-on and interactive. Observation of bees is also highly relevant as they are often found around our school, making it student-centered (Burden & Byrd, 2019).		
TIME 30 min (including transition time to outside space)	TEACHER - "Let's go find some bees!" - Transition students from the carpet to the outside observation area. Ensure each student or pair has an observation worksheet, pencil, and clipboard. -Buzz around with students to monitor progress and keep them on task.	STUDENTS - Actively moving around looking for bees to observe. Engaging in conversation about bees and what they are seeing. - Record their observations	MATERIALS, STRATEGIES, & TECHNOLOGIES USED - Observation worksheets - Writing utensils - Clipboards

CLOSING (5 minutes – suggested)			
How will students summarize what they learned?	Students will add to the L column of the KWL chart to share their learning. They will share about the experience of making observations		
How will students be asked to state the significance of what they learned?	Students will be given a prompt to help them reflect on their experience and express it in writing.		
How will you provide all students with opportunities to demonstrate mastery of, or progress toward, the objective?	Students will be given two avenues to demonstrate mastery or progress toward the objective. They can complete their writing/drawing reflections and/or complete their observation worksheets. Modifications to writing can include the use of SeeSaw to record their thoughts.		
TIME 5 minutes	TEACHER - Facilitate student transition back to the carpet. - Praise students for their excellent work as scientists! - Facilitate adding two or three responses to the L column (as time allows). - Transition students back to desks to work on their reflections. *- Students will share their findings after additional observations in the method of their choice (Google Slide deck, video, writing, artwork, etc).*	STUDENTS - Return to their desks. -Students raise their hands to share their learnings and any questions.	MATERIALS, STRATEGIES, & TECHNOLOGIES USED Laptop & Projector -Digital anchor chart on Google Slide Deck - Class discussion - SeeSaw (modification) - Writing prompts

HOMEWORK (if appropriate). How will students practice what they learned?
Students will be encouraged to conduct a bee observation at their homes. We will compare data collected from school and at home.

COLLABORATION What other education professionals will you collaborate with to ensure all learner needs are met?
I will talk about this lesson with the kindergarten teachers who taught the majority of my students last year. This will help me establish a foundation of what the students already comprehend and excel at. Furthermore, I will collaborate with our education specialists who focus on supporting students with Individualized Education Programs (IEPs) to proactively identify potential areas of confusion and devise strategies to maintain their engagement and interest.

SOCIAL AND EMOTIONAL SKILLS	
Which of the following social and emotional competencies (World Economic Forum, 2016), does this lesson support? ● Critical Thinking/Problem Solving ● Creativity ● Communication ● Collaboration	Communication: According to a 2016 report from the World Economic Forum (p. 27), it is imperative to cultivate an environment rich in language to bolster students' communication capabilities. This lesson achieves this objective by fostering peer-to-peer interaction and exposing students to written and spoken language through a variety of materials and discussions. Collaboration: This lesson promotes peer communication to enhance tolerance and empathy among students, alongside facilitating collaborative activities within peer groups, aligning with the World Economic Forum's recommendations (2016, p. 27).
Which of the following social and emotional character qualities (World Economic Forum, 2016), does this lesson support? ● Social and cultural awareness ● Leadership ● Adaptability ● Persistence/Grit ● Initiative ● Curiosity	Curiosity: This lesson stimulates students' curiosity by prompting them to inquire and explore the daily lives of bees and their impact on the natural world. This approach is consistent with the objective of fostering students' curiosity, as outlined by the World Economic Forum in 2016.

World Economic Forum. (2016). New vision for education: fostering social and emotional learning through technology. Geneva, Switzerland: World Economic Forum. Retrieved from http://hdl.voced.edu.au/10707/443447.

PROFESSIONAL TEACHING STANDARDS
InTASC What InTASC standards are supported by this lesson?

1. Learner Development: The teacher understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences. 2. Learning Differences: The teacher uses an understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards. 3. Learning Environments: The teacher works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self-motivation. 7. Planning for Instruction: The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of the learners and the community context.
ISTE Standards for Teachers What ISTE standards are supported by this lesson?
Designer: 2.5.b: Design authentic learning activities that align with content area standards and use digital tools and resources to maximize active, deep learning. Facilitator: 2.6.b: Manage the use of technology and student learning strategies in digital platforms, virtual environments, hands-on makerspaces or in the field.
TPE's What TPE's are supported by this lesson?
1. Engaging and supporting all students in learning. 2. Creating and maintaining effective environments for student learning. 3. Understanding and organizing subject matter for student learning. 4. Planning instruction and designing learning experiences for all students. 5. Assessing student learning.

LESSON REFLECTION (Pre – and Post – teaching the lesson)	
Pre-Teaching Lesson - I developed this lesson as a means of allowing students to engage with their natural world. I want students to connect with nature and develop skills for close looking.	Post-Teaching Lesson (if applicable)
REFERENCES: List any research used or quoted consistent with APA style guidelines.	

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Wong, H. K., & Wong, R. T. (2018). The first days of school: how to be an effective teacher (5th ed.). Harry K. Wong Publications.

World Economic Forum. (2016). Industry Agenda New Vision for Education: Fostering Social and Emotional Learning through Technology Prepared in collaboration with The Boston Consulting Group. World Economic Forum. https://www3.weforum.org/docs/WEF_New_Vision_for_Education.pdf

PROFESSIONAL TEACHING STANDARDS REFLECTION

InTASC Of the InTASC standards identified as being supported by this lesson, rate your performance:

Does Not Met
Developing
Effective

*Note. This is an opportunity for you to identify areas of development. It is important for you to be honest in your reflection, so you know what areas you need to strengthen.

ISTE Standards for Teachers Of the ISTE standards identified as being supported by this lesson, rate your performance:

Does Not Met
Developing
Effective

*Note. This is an opportunity for you to identify areas of development. It is important for you to be honest in your reflection, so you know what areas you need to strengthen.

TPE's Of the TPE's identified as being supported by this lesson, rate your performance: Does Not Met Developing Effective *Note. This is an opportunity for you to identify areas of development. It is important for you to be honest in your reflection, so you know what areas you need to strengthen.