Lesson Plan Format

(an optional resource)

In the context of the *PPAT*[®] Assessment, this lesson plan format is a template provided for teacher candidates to use as they develop well-planned and structured lessons. This resource also can help a teacher candidate better understand and design meaningful daily lessons that will positively enhance instructional practice and student learning. It is intended for use in conjunction with Tasks 2, 3, and 4. You have the option of using your own lesson plan format.

Standards/Performance Indicators/Skills

Identify the state and national standards, performance indicators, and skills addressed by the lesson.

2.AP.C.01 With guidance, independently and collaboratively create programs to accomplish tasks using a programming language, robot device, or unplugged activity that includes sequencing and repetition.

Learning Objectives/Goals

Describe the lesson's objectives and the learning outcomes that are appropriate for meeting curricular/classroom needs.

Apply engineering design skills to solve a problem

Practice helping a story character

Describe key ideas or details from a text

Assessment (the type[s] of assessment used throughout the lesson)

Identify the assessment that occurred before, during, and after the lesson.

Before the lesson, the teacher will conduct a formative assessment by conducting a class discussion about modifications and jotting down notes as students answer.

During the lesson, the teacher will perform an informal formative assessment by walking around the room and taking notes as the students create their builds. The teacher will also ask questions to engage the students in deeper thinking.

Afterward, the teacher will conduct a formative discussion reflecting on their modifications and how they made the builds work smoothly. The teacher will take notes from the students to ensure their understanding is on target.

Pre-test questions

- 1. Select the problem presented with the Lego Spike
- 2. Infer which should be the first step in solving the problem
- 3. What modifications need to be made to make the ferris wheel stop?
- 4. Distinguish what sign means speed in the coding process
- 5. Identify which sign means to start the coding process
- 6. Reconstruct a new order for the ferris wheel.
- 7. Justify which coding order/sequence works best, the original or your new sequence?
- 8. How could you determine the amount of rotations of the ferris wheel?
- 9. How would you evaluate the different speeds of the code?
- 10. Would it be better if the ferris wheel went counterclockwise or clockwise?

Category	3	2	1
Characters	The main characters are named and clearly described in the text as well as pictures. Most readers could	The main characters are named and described. Most readers would have some idea of what the	It is hard to tell who the main characters are.

	describe the characters accurately.	characters looked like	
Scientific Knowledge	Explanations by all group members indicate a clear and accurate understanding of scientific principles underlying the construction and modifications.	Explanations by all group members indicate a relatively accurate understanding of scientific principles underlying the construction and modifications.	Explanations by several group members do not illustrate much understanding of the scientific principles underlying the construction and modifications.
Modification/ Testing	Clear evidence of troubleshooting, testing, and refinements based on data or scientific principles.	Clear evidence of troubleshooting, testing and refinements.	Little evidence of troubleshooting, testing or refinement.

Lesson Structure and Procedures

Describe the sequence of events of the lesson elements, including the before, during, and after of the lesson (i.e., the engagement/opening, the procedures used, the activities for guided practice, and the conclusion).

Engage: The teacher will begin with a class discussion about adjusting a solution to make it work smoothly. The teacher will walk through a conversation about what happens when something does not work properly. The teacher will ask, "If the roller coaster is moving slowly and doesn't have the energy to climb its steep inclines, what could you do to improve and fix it?" "What would you have to think about to make improvements?" The teacher will then introduce the lego spike Ferris wheel story, the main characters, and the first problem: the children who are on the Ferris wheel cannot get off because the Ferris wheel is in constant motion. The teacher will then hand out a lego spike set to small groups of two. The teacher will model how lego spikes work and how they should be treated. Students will write down directions and any important notes they think they will need for later in their science journals.

Explore: The teacher will have each small group get onto the app and walk them through the first challenge. With guided instruction, the students will create a Ferris wheel with the lego spike and test their creations to see if they followed the steps correctly. Once students have solved the first problem, the teacher will instruct students to improve their Ferris wheels however they would like. Students will record their data in science journals.

Explain: The teacher will gather all students to construct a class discussion reflecting on their lego spike builds. The teacher will then ask, "How did you make the Ferris Wheel stop after a quarter turn to ensure the team could get on and off?" "How did you upgrade the Ferris Wheel?"

Elaborate: The teacher will then lead students to discuss and reflect on how they can modify problems to fix them. The teacher will then ask, "What do you think about when you're trying to make modifications to fix a solution?" "How can you tell if your idea will work?" The teacher will then instruct teachers to clean up their stations.

Evaluate: The teacher will ask guiding questions to inspire students to think aloud, explaining their thought process and reasoning during the lego spike build to write on the whiteboard.

Teaching the lego spikes is a project-based activity where students work together to create different projects that relate to science and can also overlap other subjects. This lesson could fit into a large project through cross-curricular learning. Incorporating language arts through assigning a narrative including plot, character building, and setting. The project has the capability to extend even further into visual arts by assigning students to create a visual scene that goes along with the narrative they write. The assessment for this project could be in presentation form in which the students present their narrative and picture to the class. The teacher would be able to use a rubric or checklist in order to assess student learning. Another assessment could be a KWL chart, to assess what students know, want to know, and learned. The teacher would also ask the students to draw out pictures of what they liked most about the activity, and new keywords that students learned from the activity.

Instructional Strategies

Describe the teacher's approach to achieving the learning objectives and meeting the students' needs.

The teacher will begin the class by discussing the upcoming lesson. The teacher will ask the students about how adjusting a solution could change the outcome to make things work smoothly. The teacher will walk through a conversation about what happens when something does not work properly. The teacher will ask, "If the roller coaster is moving slowly and doesn't have the energy to climb its steep inclines, what could you do to improve and fix it?" "What would you have to think about to make improvements?" The teacher will then introduce the lego spike Ferris wheel story, the main characters, and the first problem: the children on the Ferris wheel cannot get off because the Ferris wheel is in constant motion. The teacher will then hand out a lego spike set to small groups of two. The teacher will have each small group get onto the app and walk them through the first challenge. With guided instruction, the students will create a Ferris wheel with the lego spike and test their creations to see if they followed the steps correctly. As the students complete their builds, the teacher will take quick notes to ensure students follow the instructions. Once students have solved the first problem, the teacher will instruct students to improve their Ferris wheels however they would like. The teacher will then gather all students to construct a class discussion reflecting on their lego spike builds. The teacher will then ask, "How did you make the Ferris Wheel stop after a quarter turn to ensure the team could get on and off?" "How did you upgrade the Ferris Wheel?" The teacher will then lead students to discuss and reflect on how they can modify problems to fix them. The teacher will then ask, "What do you think about when trying to modify a solution?" "How can you tell if your idea will work?" The teacher will then instruct students to clean up their stations. The teacher will ask guiding guestions to inspire students to think aloud, explaining their thought process and reasoning during the lego spike build to write on the whiteboard. The teacher will use a rubric to let students observe what is expected of them for the completion of the project.

Learning Activities

Describe the opportunities provided for the students to develop the skills of the objective.

Small groups will build a Ferris wheel on Lego Spike through coding. The students are challenged to solve how to get the Ferris wheel to stop for children to get off. Once groups have figured out the first challenge, they will move on to the next challenge. The students will have to improve the Ferris wheel how they would like. The students will participate in a class discussion explaining their thoughts and reasonings behind their modifications. To conclude the lesson, the students will answer guiding questions to record on the whiteboard.

Resources and Materials

List the materials used to plan and deliver the lesson.

Lego spikes

Computer

Whiteboard

Journal

Pencil

Technology

Describe the instructional and/or assistive technology that was incorporated into the lesson to enhance instruction and student learning.

The lego spikes will assist students in understanding how to modify a solution in order to achieve different outcomes. The students will also learn what they need to do differently when the build does not work correctly. The lego spike activity also teaches students how to code and is cross-curricular in mathematics.

Differentiation/Accommodations/Modifications/Increases in Rigor

Describe the modifications made to meet the needs of all learners and to accommodate differences in students' learning, culture, language, etc.

LL: The teacher can shorten the lesson to one challenge instead of multiple challenges. If more assistance is required, the teacher could assign a more-knowing other to assist the struggling student with the construction. Applies for Focus Student #1. Teacher can help focus student code and then student can build spike further while more knowing other students can finish the coding.

OL: The teacher can provide a manipulator, such as an image, for students to look at when improving their models. Applies for Focus Student #2

HL: Students will investigate new and different coding blocks. Students can program the light as a countdown before the Ferris wheel starts. Students can journal ways in which they believe the build could be improved.

Classroom Management

Identify the strategies used that are consistent with the learning objectives of the lesson and that also met student behavior needs to help keep the students on task and actively engaged.

The instruction strategy used in this lesson is guided instruction/practice. This begins when students open the instructions before building their lego spikes. The teacher will use guided instruction to help get the students started on the project in their small groups. In their groups, the students will work until their first Ferris wheel build is complete. Once the Ferris Wheel has been tested and the teacher has observed that it was constructed properly, the teacher will ask the students to modify the Ferris wheel to a level speed set of their choice. This can also be considered discovery learning in the process of seeing the results students get based on the choices the group made for the ferris wheel to work.

Extensions

Describe the activities for early finishers that extended the students' understanding of and thinking about the learning objectives/goals by having them apply their new knowledge in a different way. In order to extend the lesson into Language Arts, after the lesson, the students will be asked to create a journal incorporating the Ferris Wheel activity. The students will create a narrative about the Ferris Wheel in an amusement park incorporating characters, plot, and a basic setting. The lesson can be further extended into Visual Art by having the students draw a picture to accompany the narrative.

2.3.W.1 Students will write narratives incorporating characters, plot (i.e., beginning, middle, end), and a basic setting (i.e., time, place).

Follow-Up Activity to the Lesson

Describe a quick activity for review or for building on the lesson that will deepen student understanding and interconnect concepts. (The activity may be incorporated in class the next day or throughout the unit.)

Option 1: For a follow up activity that can be used in this lesson is the reading of this article. This would be an in-class activity that the teacher would read with the whole class. The article would serve as a purpose to help students get a deeper and more understanding about the project they had just constructed in small groups. It's an article about the person who built the big ferris wheel in London. The activity can give inspiration and provide more background knowledge for students about ferris wheels.

https://www.nytimes.com/2013/04/07/magazine/who-made-that-ferris-wheel.html

Option 2: Students will be handed a worksheet that has a picture of a ferris wheel on it, with a set of words to choose beside it. The teacher will ask students to choose which words they think describes the ferris wheel. Then students will write a few sentences describing the ferris wheel with the words in the sentences they have chosen. The activity will be a small-group activity. This will provide the teacher after the activity is completed, what students learned, and did not learn.

Additional Information

Identify any area or lesson component that was not covered by this lesson plan format but that you feel is vital to include in a description of the lesson. Discovery learning, which is the process of students discovering their learning as it's happening through group projects, or in-class activities. When the teacher asks students to improve the ferris wheel of their choice. This is discovery learning where students are setting the different speeds of the ferris wheel to see what worked and did not. Students seeing the results of the project gives them new ideas of what the group could change to make the ferris wheel work worse, or better.