Osmos

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Standards/Performance Indicators/Skills

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

Science:

Oklahoma Academic Standards for Science 2nd Grade

Matter and Its Interactions (PS1)		
2.PS1.3 Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.		
Clarification Statement: Examples of pieces could include building blocks, or other assorted small objects. Provide students with the same number of pieces to create a different object. **Assessment Boundary:** Do not introduce terminology associated with the Law of Conservation of Matter just concepts. Chemical change is outside of this performance expectation.		
Science and Engineering Practice	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Constructing Explanations: • Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.	• A great variety of objects can be built up from a small set of pieces. • Different properties are suited to different purposes.	**Energy and Matter:** • Objects may break into smaller pieces and be put together into larger pieces, or change shapes.

https://sde.ok.gov/sites/ok.gov.sde/files/Oklahoma%20Academic%20Standards%20for%20Science.pdf

Math: 2.N.3.2 Construct equal-sized portions through fair sharing (length, set, and area models for halves, thirds, and fourths).

Math: 2.N.3.1 Identify the parts of a set and area that represent fractions for halves, thirds, and fourths.

Math: 2.GM.1.3 Compose and decompose two-dimensional shapes using triangles, squares, hexagons, trapezoids, and rhombi.

2nd Grade

Learning Objectives/Goals

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

By the end of the lesson, students will be able to investigate how shapes can piece together in different ways to further their creative thinking by using Osmos.

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

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

The students will get to learn how to code hands-on with the Tangram Coding activity.

The class will work in small groups to complete the Tangram missions.

The students will fill out a worksheet color the osmo shape, cut it out and name the shape of the osmo.

Pretest questions:

1. Which of the following is a triangle?
2. Which of the following is a parallelogram?
3. What makes a triangle a triangle?
4. What is the difference between a parallelogram and a triangle?
5. What two shapes can you use to create a square?
6. How is a square related to a parallelogram?
7. Can you make a distinction between a triangle and a square?
8. What different shapes could you create with 4 triangles, 1 square and a parallelogram?
9. What would you need to do to change a triangle to a square?
10. Evaluate the different ways multiple triangles can make different shapes.

Information taken from only one source and/or information not accurate.	Accurate information taken from a couple of sources but not systematically.	Accurate information taken from a couple of sources in a systematic manner.	Accurate information taken from several sources in a systematic manner.

Inappropriate materials were selected and contributed to a product that performed poorly.	Appropriate materials were selected.	Appropriate materials were selected and there was an attempt at creative modification to make them even better.	Appropriate materials were selected and creatively modified in ways that made them even better.
Plan does not show measurements clearly or is otherwise inadequately labeled.	Plan provides clear measurements and labeling for most components.	Plan is neat with clear measurements and labeling for most components.	Plan is neat with clear measurements and labeling for all components.
Fatal flaws in function with complete failure under typical stresses.	Structure functions pretty well, but deteriorates under typical stresses.	Structure functions well, holding up under typical stresses.	Structure functions extraordinarily well, holding up under atypical stresses.

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).

Engagement (Before): At the beginning of the lesson, anticipatory questions will be asked about how the class can put different shapes together to make a more complex, new shape. Questions like “What are shapes? What are the different shape names?” “What if we put a square and a triangle together?” “How about if we add a rectangle to our shape?” “ what shapes can be put together to make a rectangle?” will be asked to jumpstart their thought process into the current lesson.

Explore (During): This activity will help students learn about **composing new shapes from other shapes** and the possibilities that this provides us. Grouping the students

into groups of two to three, they will use an iPad and Osmos to manipulate given shapes into more complex shapes. During this time, monitor and add questions like “How can we get this shape with these leftover shapes?”, “What is the difference between these two shapes?”, and “Is there another way to make this shape?” will increase student involvement and deepen their learning.

Explain (During): After the array decomposition paper, students will have an open discussion with their table mates over how they broke their array into two pieces and how they got the same answer as the large array. The teacher will ask prompting questions to help further discussion and learning in the classroom. Students will engage in conversation about whether they find array decomposition to be beneficial, why we do it, and when it would be useful for students to decompose instead of complete an array outright. A picture of the example arrays will be present on the board to assist students with their problems on their papers and discussion.

Elaboration (During/After): During this lesson, the teacher will talk to each student and ask questions to further comprehension. The teacher will ask students if they can create new arrays and solve them outright and then use decomposition. Students can draw, practice, or talk about these questions. Students will pick one option from each column on the choice board to further their practice.

Evaluation (After): Students will be divided into groups of 3, color names are given to represent their group, and each group is assigned a shape to make. When the group name is called they will come up to the front of the class and make the shape they are assigned to do. After analyzing the pre and post-test, the instructor will build a choice board for the students to choose from the next day. Once students determine which choice board activity to complete, the instructor will answer further questions and assist when needed.

Instructional Strategies

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

To help students learn how to solve code patterns utilizing problem-solving abilities, the teacher will offer guided practice with instructional strategies. Giving students demonstrations of how to accomplish code patterns while applying their problem-solving abilities will improve their learning during teacher-led guided practice. Students are informed of the anticipated outcomes of the activity's modeling. Students will be actively involved in learning about coding through interactive instruction from the teacher. Similar to what the students would see in the code, the teacher will use shapes

and sizes. With the use of teacher-student contact and behavior modeling, this instructional technique improves student learning.

Learning Activities

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

With the Tangram Coding activity, the kids will get to practice their coding skills.

The Tangram missions or activities will be finished by the class in small groups. (Explains the game and the process in more detail.)

Resources and Materials

List the materials used to plan and deliver the lesson.

- Ipad
- Tangram Code
- Pencils
- Worksheets
- Books
- Chromebooks

Technology

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

- Coding Tangram
- Coding duo
- Coding Awbie
- Coding Jam

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.

Focus Student No. 1 does not get special education services, despite having a pre-test grade that was close to the bottom. Their self-assurance in this area is low.

To support Focus Student No. 1, praising their mistakes and accomplishments should be supported (Wierman, 2021). Let them know that mistakes are a good part of the learning process and good because it shows that they are trying. Just because it is okay to fail, let them know not to stop there, and hitting a bump in the road should not stop their learning momentum.

Perhaps start this student with the easier puzzles to build their confidence, then once they begin feeling safer, help the student branch out to harder puzzles.

Two learning activities:

1. While completing the Osmo tangrams have the students keep a sticky note(s) with them. Whenever they feel hopeless, angry at themselves, or frustrated, have the students write down why or how they feel. After they've completed the puzzle they were working on, the student will meet with the teacher and explain what happened and how they felt. Then once they've released their anxiety and noticed their accomplishment, they can crumple up their bad thoughts and throw it away before moving on to a new puzzle.

2. At the beginning of the week, the teacher will secretly assign students to observe throughout the week. Once the end of the week approaches, have the students report what that student has accomplished or done well so the teacher can fill out a certificate to fill out for each student and hand shout-outs for their accomplishments.

Focus Student No. 2 is learning English as a Second Language. It would be preferable for this student to engage in tasks that don't require a lot of English. Visuals rather than verbal are used in this activity. They could be taught by a teacher who is not fluent in their language by using visual aids or cueing systems.

To support Focus Student No. 2, help them realize that they are intelligent. One common roadblock for ELLs is that the language barrier tends to make them feel dumb (when in fact they are exceptionally intelligent to be learning a whole other language). ELL students have a hard time comparing themselves to English-speaking students because of their ease in English whereas they are struggling; this is a huge impact on their learning that needs to be addressed and differentiated (Wierman, 2021). Focus on the one-on-one relationship to help the students grow in awareness of their individuality.

Two learning activities:

1. Achievements collages are pictorial assessments that allow students to show off their current accomplishments with drawings, printed pictures, and cut-outs. This gives ELLs a way to express their feelings and accomplishments in a universally understandable way.
2. At the beginning of the week, the teacher will secretly assign students to observe throughout the week. Once the end of the week approaches, have the students report what that student has accomplished or done well so the teacher can fill out a certificate to fill out for each student and hand shout-outs for their accomplishments.

References: Wierman, M. K. (2021, August 3). *5 strategies to help boost your students' self-esteem and confidence in the classroom*. Edmentum Blog. Retrieved November 17, 2022, from https://blog.edmentum.com/5-strategies-help-boost-your-students-self-esteem-and-confidence-classroom

ADD STUDENT GROUPINGS

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.

Portion not required

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.

Extensions: Early finishers can participate in other Osmos coding kits like Numbers, Monsters, Awbie, and so forth. Students can experiment to learn about functions and code. Additionally, planning ahead and cognitive skills will be able to develop in them.

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.)

Portion not required

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.

1. This lesson is structured to cross technology which can be used to in math and fractions.The Students can use Osmo tangram shapes to have better visual unserstanding of learning math and fractions.
2. It is added to the top of the lesson plan standard.
3. The student will be given blocks of different shapes (triangle, parallelogram, and square). Students will be divided into groups of 4 and will work on the given shape (there will be a poster on the board with shapes) with tangram blocks and complete the missions on it by leveling up the difficult each level.