**Form 4.2 Research Lesson Template**

**Team Name:** Three G’s and a Bee

**Research Title:** Flips, Slides, and Turns and Congruent Figures

**Grades:** Kindergarten, 2nd, and 4th

**Subject Area:** Mathematics-Geometry

**Action Inquiry Theme: Student Engagement and Success**

We will advance meaningful learning for diverse students in this lesson.

We want to see all students engaged in each of the math lessons, activities, and learning opportunities.

Once the main activity is provided the students will gain knowledge in mathematical congruency, “flips,” “slides,” and “turns.”

During the lesson, our students will have fun using tangrams and will manipulate squares, triangles, and polygons to create new shapes.

Furthermore, our students will have the opportunity to engage in measurement and geometry concepts in the California Content Standards for each individual grade level.

**Standards Addressed in the Lesson:**

**Measurement and Geometry**

Kindergarten

1.0 Students understand the concept of time and units to measure it; they understand that objects have properties, such as length, weight, and capacity, and that comparisons may be made by referring to those properties:

2.1 Identify and describe common geometric objects (e.g., circle, triangle, square, rectangle, cube, sphere, and cone).

2.2 Compare familiar plane and solid objects by common attributes (e.g., position, shape, size, roundness, number of corners).

Second Grade

2.0 Students identify and describe the attributes of common figures in the plane and of common objects in space:

2.1 Describe and classify plane and solid geometric shapes (e.g., circle, triangle, square, rectangle, sphere, pyramid, cube, rectangular prism) according to the number and shape of faces, edges, and vertices.

2.2 Put shapes together and take them apart to form other shapes (e.g., two congruent right triangles can be arranged to form a rectangle).

Fourth Grade

3.0 Students demonstrate an understanding of plane and solid geometric objects and use this knowledge to show relationships and solve problems:

3.3 Identify congruent figures.

3.4 Identify figures that have bilateral and rotational symmetry.

**Sequence of the Unit: (Unit Map): Second grade, Scott Foresman**

Chapter 9: Geometry

In this unit, students will learn to identify plane and solid geometric shapes. First, students will learn about faces, vertices and edges of solid shapes. **Next, students will learn to identify the movement of a shape as a slide, flip, and turn. Students will also learn about congruent figures.** (This is the focus of our lesson study) Then, students will put together shapes to make a new shape. Finally, students will learn to find the perimeter of different shapes

**Background Information:**

Why did we choose this topic for lesson study?

We choose congruent figures and flips, slides, and turns for our Lesson Design Study because it is a constant standard among grade levels. The concepts are taught at multiple grade levels with the ideas building on earlier learning. We also thought it would be an excellent engaged learning experience that would lend itself to teacher pedagogical content knowledge through collaborativ design and observation of a mathematics lesson.

Why is it important to have the lesson at this particular time in students’ learning?

It is important to have the lesson at this particular time in student’s learning because students need to master the concept before fourth-quarter mathematics assessment.   
As we mentioned before, the measurement and geometry standards are listed from kindergarten through fourth grade. It is very important for students to build strong mathematic foundation so that when the standard is revisited next grade level, students will be ready to learn the concept in depth.

Why did we choose the main activities?

The main activities give the students the opportunity to use Total Physical Response to show initial understanding of the concepts of congruency, flips, slides, and turns. Also, the use of tangrams will allow the instructors to observe students during guided and independent practice, and to check for understanding.

What are the key instructional strategies that are needed for this lesson?

Key instructional strategies include: direct explicit instruction, preloading vocabulary, Total Physical Response, independent and guided practice, and checking for understanding.

**Lesson Process: Esther’s Second Grade Geometry Lesson**

|  |  |  |  |
| --- | --- | --- | --- |
| **Learning Activities**  **And Teacher**  **Questions** | **Expected**  **Student**  **Reactions** | **Teacher Support** | **Points of Evaluation** |
| **Opening hands on activity**  Slide- put your right hand in. Slide it to the right. Slide to the left. We are sliding our right hand.  Repeat the process with flip and turn.  **Direct Instruction**  Place two congruent right triangles on the board. Tell students that when two figures have the same shapes and sizes, it is congruent. Place more figures on the board, ask students to choose the shapes that are congruent.  Slide- slide a rectangle left to right. Revisit the definition of the slide and have a volunteer slide the shape.  Repeat the same procedure for flip and turn.  **Guided Practice**  Students will each receive a tangram.  With teacher guiding them, have students find 2 congruent figures.  Have students choose a shape and slide it, flip it and turn it.  Repeat 3~4 times with different shapes.  **Independent Practice**  Students will each get a set of tangram. Students will each get a book that has a candle stick, a chair, baby buggy and a house.  Students will flip, slide and turn the tangram to fit all the shapes into the picture.  **Informal assessment**  Ask students what should we do to try do fit all the shapes to the picture.  Ask followings:    Should you slide?  If that didn’t work what else can we do?  Did you try to flip the triangle?  Did you flip the parallelogram? | Students are following the teacher by sliding their right hands.  Students will follow the teacher and learn the key vocabulary.  Students will watch the teacher. One volunteer will come up and choose 2 congruent figures  Students will watch the teacher. One volunteer will come up and slide the figure left to right and then right to left.  Students will find 2 congruent figures.  Students will choose a shape. Students will listen to the teacher and follow directions to flip, slide, and turn the shape.  Students will continue to listen to teacher’s directions and flip, slide and turn the shape.  Students will flip, slide and turn the tangram to fit all the shapes into the picture.  Students will continue to work independently to fit all the tangram in the picture provided.  Yes, but it didn’t work.  I don’t know.  Oh yeah. Let me try. But it doesn’t fit.  Yes. Now it fits! | Make sure to repeat the vocabulary word “slide”.  Give students repeated exposure of the vocabulary and gesture.  Repeat the word congruent. For EL students, break the words in syllables so that they can pronounce the word easier.  If a student is having a difficulty sliding, show the student how to slide the shape. After that, have him slide again and teach the vocabulary.  Assist EL students by modeling and repeating the vocabulary. Provide multiple exposure of the concept.  Make sure everyone has correct 7 shapes of tangram.  When students are working independently, encourage students to slide, flip, and turn shapes to fit the shapes in the picture.  Repeat the vocabulary words so that students can master the concept and the vocabulary | Observe students’ reactions. Make sure everyone is sliding a right hand.  Continue to observe students’ hand motions and give immediate corrective feedback.  Choose 2 shapes and ask students if two shapes are congruent. Ask why or why not.  Observe students hand motions and give immediate corrective feedback.  Teacher will walk around and observe students and give immediate corrective feedback.  Check for understanding.  Observe students while they try to figure out how to fit all the shapes in the picture.  Check for understanding |

**Evaluation of Lesson Success:**

Students were engaged in independent activity. They were flipping, turning and sliding to figure out how to fit all the shape in the picture. Also, some students were helping one another by telling each other to slide, turn and flip. It was great to hear students using academic vocabulary. I monitored students’ progress. All students were able to identify and describe the attributes of common figures in the plane and of common objects in space. Also, students were able to describe and classify plane and solid geometric shapes and students were able to put shapes together and take them apart to form other shapes by flipping, turning and sliding. Thus, the lesson was successful.

**Lesson Design: Flips, Turns, and Slides by Esder Ko**

Second Grade Mathematics Content Standards

Measurement and Geometry

2.2 Put shapes together and take them apart to form other shapes (e.g., two congruent right triangles can be arranged to form a rectangle).

Key Vocabulary

congruent – having the same size and shape

slide – a movement of a figure to a new location without turning or flipping

flip– a movement involving flipping a figure over a line

turn – a movement that involves rotating a figure

1. Lesson Objective: Students will put shapes together and take them apart to form other shapes by flipping, turning and sliding.
2. Opening activity
   * Ask students to put their right hand in like the song “Hokey Pokey”. Now slide your hand. What are we doing? “sliding”
   * Ask students to put their right hand in and this time, flip. Which way is the palm facing? Flip it again. Which way is it facing? Flip again. What are we doing?
   * Ask students to put their right hand out. Now, turn to the right. Back to the center. Turn to the left. Back to the center. What are we doing?
3. Direct Instruction
   * Congruent- place two congruent right triangles on the board. Tell students that when two figures have the same shapes and sizes, it is congruent. Place more figures on the board, ask students to choose the shapes that are congruent.
   * Slide- slide a rectangle left to right. Revisit the definition of the slide and have a volunteer slide the shape.
   * Repeat the same procedure for flip and turn.
4. Guided Practice
   * Students will each receive a tangram.
   * With teacher guiding them, have students find 2 congruent figures.
   * Have students choose a shape and slide it, flip it and turn it.
   * Repeat 3~4 times with different shapes.
5. Independent practice

* Students will each get a set of tangram. Students will each get a book that has a candle stick, a chair, and a house.
* Students will flip, slide and turn the tangram to fit all the shapes into the picture

1. Informal assessment- when students are working independently, encourage students to slide, flip, and turn shapes to make a new shape. Ask students what should we do to try do fit all the shapes to the picture. Should you slide? Try to flip the triangle, Etc. Check for understanding. Repeat the vocabulary words that students need to master for repeated exposure.

1. Homework - Students will receive 2 sets of tangram. Students will put shapes together and take them apart to form other shapes. Using those shapes, they will create a house. They may include trees, flowers and animals.

 