Purpose: The aim of this lesson is to make Solve the Final Layer: Make a Yellow Cross accessible to all elementary students through the use of a song.

Background: Students should have spent time solving the top and middle layers of the cube and should be comfortable solving those two layers.

Opening: Now we are going to solve the yellow cross. This algorithm can seem tricky at first, so we are going to learn a song to go with it. Is everyone familiar with this tune? (Hum the tune to The Mexican Hat Dance). We call this the ‘Fur-urf’ move and we will be putting the moves to this stage to that fun tune!

Lesson: Before we begin to solve the yellow cross, let’s take a look at the patterns in this algorithm.

Suggested Questions to Ask:
What do you notice about the first and last moves? (A: They are both front face moves; the first is a right and the second is a left!)
What about other patterns within the first algorithm? (A: The second and third moves are mirror image moves of the fourth and fifth moves; the second and fourth moves are top moves, whereas the third and fifth moves are right moves).

Two more notable patterns within this sequence are:
1) There are only two lefts within the algorithm. They happen at the 2nd and 6th moves.
2) There are three ‘moves’ and then three ‘undo’, or opposite moves. (The first three moves are clockwise, the second three moves are counter-clockwise.)
Great work finding patterns! Now let’s put the algorithm to music:

**F.U.R.U.R.F. Move (To the Mexican Hat Dance Tune)**

- Front Right
- Top Left
- Right Up (clap, clap)
- Top Right
- Right Down
- Front Left (clap, clap)

*repeat if needed*

**Practice:** Give students the opportunity to practice the move until they’ve solved the yellow cross. Have extra cubes on-hand that are solved through the middle layer to provide ample practice time for students.

**Independent Practice:** Have students practice the moves through the yellow cross five times daily for one week. Provide lyrics for students to take home to practice, and make sure students have access to the training video. Once students have mastered the steps through the yellow cross in 3 minutes, they will be ready to go onto the next stage.

**Video for this lesson:**
https://vimeo.com/439084756