How to teach a maneuver – Putting it all together:

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Collaborative assessment is critical to determine learners' understanding of the maneuver so the CFI can provide effective further instruction. Typically, for psychomotor skills (egg take off and landings or other procedure), the instructor will either take the controls or have a full stop landing so the student has the time and opportunity to self-evaluate without distractions. Students cannot "multi-task" they attention switch. Additionally, if flying, the student may have *fear which narrows the perceptual field* and does not allow them to self-evaluate nor receive any meaningful feedback. This is why full stop landings (Deliberate practice) are more efficient than touch and go's (Block practice) in most training situations.

1. **CFI prepares a lesson plan** (see sample below) using at a minimum:
    a. Airplane flying handbook – how to do the maneuver
    b. POH- recommend procedures, limitations
    c. Airman Certification Standards- objective & outcome measures.
    d. Pilot Handbook of Aeronautic knowledge- technical information.
2. create "Play card" to perform to ACS standards.
3. **Provide student reading assignment** (see above) and homework questions (see Develop Effective Study Questions above). Then the ground lesson covers the maneuvers for the day.
4. "Demonstration and Performance" method starts- with the detailed explanation phase and reviews "play card" of how the maneuver will be performed on the ground and then succinctly in the air.
5. **The instructor should "Chair fly" with the student** the steps and control inputs to achieve the desired outcomes. This limits the amount of explanation required in the air where the student will not have the "bandwidth" to assimilate information or process feedback (as discussed above).
6. After the Ground lesson and flight brief, the CFI and Learner head to the practice area or the pattern as required.
7. **Demonstration and performance** method
    a. CFI briefly describes key control inputs *BEFORE* the maneuver. (play card)
    b. CFI performs while calling out the control inputs required to complete the maneuver
    c. Student Explains (briefs the "play card")
    d. Positive exchange of controls, then student performs.
8. **Collaborative Assessment**: After each maneuver or landing:
    a. CFI takes controls (or full stop taxi back) so student has opportunity to Replay, Reconstruct, Reflect, Redirect then take feedback.
    b. CFI may ask
        i. "How did that go?"
        ii. "What did you like and what could you do better?,"
        iii. "Why do you think that happened and how can you correct it next time."
    c. CFI provides Feedback- positives and what could be better. This becomes the standard for comparison.

NOTE: during a CFI check ride, the applicant is required to demonstrate several maneuvers. This is to reproduce, in part, the demonstration performance method of instruction.
A recommended technique is brief the maneuvers on the ground to an instructional level. Then, when in the air, the "Explanation phase" can be more succinct.

While demonstrating the maneuver, it is most effective to **describe the control inputs** that will achieve the desired outcome (completions standard). CFI applicants frequently call out check lists believing this is instruction. It is not. Here are some examples:

Demonstrating slowing to maneuvering speed:

Don't say: "Slow to maneuvering speed"
Do Say: "Reduce power to 2100 RPM, hold altitude and heading, trim off pressure, verify airspeed below maneuvering speed"

Demonstrating final approach:

Don't say: " slow down and add flaps"
Do Say: "Add 30 degrees of flaps, pitch up for Vref of 65 kts, trim off pressure, adjust power for descent rate"

Demonstrating how to initiate a level turn (clear for traffic already complete)

Don't Say: "turn yoke to right and add rudder to stay coordinated"
Do say "Turn yoke and rudder at the same time to keep nose moving into the turn, verify coordination with ball, once bank is established both bank and rudder return to neutral" (note steep turns are more complicated)

Demonstrating the start of a steep turn (clearing turns etc. have already been done)

Don't say: "Bank 45 degrees, add some power and add up trim"
Do say: "Using outside references, Pitch up 1-2 degrees to maintain altitude, simultaneously roll into a 45 Degree bank and add 200 rpm to maintain airspeed" (this also assumes pilot has learned coordination)

The CFI applicant will invariably make common errors during maneuvers. This is an excellent opportunity to clearly identify and correct the error and call it out as one of the common errors. This is how real demonstrations occur with students and how we should handle them on check rides.

It is then common for the DPE to then perform a maneuver and have the CFI applicant evaluate the common errors. Brief with the DPE how to handle the feedback ahead of time. The DPE maybe expecting the CFI to intervene during the maneuver if a simulated unsafe condition is developing or possibly a quick debrief at the end of the maneuver about what common errors occurred. Sometimes, such as during an instrument approach, they may expect the CFI applicant to make small interventions or corrections (coaching) such as "it appears you are omitting the attitude indicator, pitch down to 5 degrees to recapture the glide slope"

How to Prepare for a Maneuver Lesson

1: Prep work, reference <u>at least</u> the 4 main references

- POH
- Airplane Flying Handbook
- ACS
- PHAK

2: Play card: make "Flash Card" for key elements of maneuver to use in the air

- 1500 AGL
- P: 2100 rpm A: Level pitch C: clean
- Clear area
- Pick outside reference (road)
- Power, Pitch up 2 degrees, Bank 50
- Back pressure
- Bank for altitude
- Roll out on entry heading

3: Reading Assignment from 4 sources and Effective Questions for student to read with a purpose

Example Questions

How does the Airplane Flying Handbook define a steep turn? (the what)

What are the ACS requirements for a steep turn?

Does the POH for your plane have any limitations such as speed or aircraft configuration for steep turns?

4: Demonstration Performance method starts on the ground. Chair fly the maneuver with student. If they cant fly it in the chair, they cant fly it in the air.

5: Brief on ground Prior to flight using *Risk Assessment / Mitigation using PAVE*

6: Flight - Demonstration Performance Method and collaborative assessment. See above.

Example Maneuver Lesson Plan

Steep Turns

Description: Steep turns are an outside visual reference high performance maneuver consisting of multiple high bank angle, level turns, starting in either direction.

Purpose: Student learns aerodynamics and essential skills for this high-performance maneuver, increasing overall safety and mastery of aircraft handling. This maneuver enhances the student's ability to manage increased load factors, maintain altitude, and air speed during sharp turns.

Objective: The student is able to complete steep turns to a minimum of ACS standards, with proficiency and safety. Developing skills such as flight control smoothness, coordination at high bank angle, outside orientation with the horizon and traffic scanning.

POH: Va = 105 KIAS, steep turn entry = 95 KIAS

Elements:

- -select reference heading
- -clearing turns
- -**PAC**, Power: 2100 rpm = ≤Va or as recommended by POH (95)
    - Attitude: level, ≥1500 AGL
    - Configuration: clean
- Select an outside reference for entry and rollout heading.
- **Rolling into 50 deg bank +/- 5 deg**
    - **Add 100-200 rpm** (audible bump) to maintain +/- 10 kts
    - **pitch / back pressure to hold altitude** (+/- 100ft), **increase ROT**
    - **rudder as needed**
- **As bank is established:**
    - **Slight opposite aileron (offset overbanking)**
    - **Light inside rudder**
- **Integrated scan**
    - Outside reference for bank, altitude, and traffic
    - Verify altitude speed and coordination with instruments

- If losing altitude: Reduce bank pitch up and return to 50-degree bank
- If gaining altitude: increase bank and release back pressure
- Rollout on half the bank angle before reference heading (25 deg)
- Rollout heading must be +/- 10 degrees of starting heading
- While rolling wings level apply some forward pressure to prevent altitude gain
- Roll into next turn opposite direction
- Complete the second turn and while rolling out from the maneuver reduce pitch and power to prevent altitude gain.

Instructor Actions: Deliver the ground lesson including bank angle, load factor, overbanking tendency, and adverse yaw. Provides in flight demonstration and coaching through maneuver till student proficient.

Student Actions:

- Complete pre lesson readings and assigned questions
- Discuss steep turn lesson
- Ask any questions
- Review references of material covered

Common errors related to steep turns: (from AFH)

- No clearing turns
- Incorrect power use / air speed not stable
- Incorrect trim
- Uncoordinated
- Insufficient back pressure / altitude loss and reduced ROT
- Not looking outside, the aircraft (fixation)
- Inappropriate altitude correction procedures (power instead of bank angle)
- Incorrect rollout
- Inappropriate bank angle

Completion Standards: (See ACS)

Ground: Student can explain the purpose of steep turns, and how to fly them.
Flight: Student can perform the maneuver within ACS standards +/- 100 ft, +/- 5 bank, +/- 10 degrees on roll out. Coordinated, looks for traffic, corrects errors.

Risk Eval / Mitigation:

- PAVE checklist
- Clearing turns
- Sterile cockpit
- Checklist usage and flows
- Scanning for traffic during maneuver
- Outside references for situational awareness
- Coordination and stall awareness