CS1

Application of Biomechanical and Motor Learning Principles
Video Analysis of a Sport Skill

INSTRUCTIONS
Working in pairs, you will present a short presentation describing the biomechanical principles and joint mechanics involved in a sport skill.

Select a sport skill for analysis. It should be an isolated skill performed by one individual. (ie: backhand in tennis)

PART ONE – EXPERT & SKILL ANLAYSIS:
- 1 - Acquire a film/video of an expert/professional athlete performing the skill (video taping an expert, internet, "how-to" videos, etc) or one partner if they are very proficient.
- 4 - Complete a pre-observation stage including:
  - Identify a purpose of the skill
  - Break the skill into phases-preliminary movements, backswing, force producing movements, critical instant and follow through/recovery
  - Identify the key elements in each phase
  - Develop an observation plan.(how many observations are needed to see all key elements in each phase?)
- POST - Identify the basic concepts of physics (Newton's laws, levers)
- POST - Identify the biomechanical principles that apply (stability, maximum force-production; including safety, efficiency, effectiveness, etc)
- POST - Relate these principles to the phases and the elements in each phase

PART TWO – ROOKIE & DEVELOPMENT OF SKILL:
- 2 - Show the rookie the expert video/demonstrate the skill
- 3 - Film a rookie performing a skill
  - (Be certain the rookie can complete the skill)
- 5 - Identify elements of the skill that the rookie could improve.
- 6 - Suggest one coaching cue for immediate improvement.
- 7 - Re-film the rookie performing the skill.

PART THREE – COMPARISON & IMPROVEMENT
- POST - Compare the observed skill of the rookie to the desired skill of the expert.
- POST - Identify any concerns with this movement either in *mobility, strength or coordination* and make suggestions for improvement
- POST - Develop three drills that could be used to isolate these problems and work on them separately (shaping)
- LAST - If you have time, you can begin experimenting with these drills.

The Presentation should include:
1. Video of the expert
2. Identify the purpose of the skill
3. Identify the phases of the skill and important elements in each phase.
4. Identify the basic Physics and Biomechanics principles that apply to the skill.
5. What is the observation plan for observing an athlete attempt this skill?
6. Video of the rookie
7. Outline rookie errors and correct elements
8. Suggestions for improvement and drills

ALTERNATE DEMO VIDEO:

Create a video that shows how a skill can be broken into segments and how these segments can be "chained" together as each is mastered! Note, your video WILL be shared with other students.

Rubric Available

RESOURCES

5 steps of Motor Learning

1. Readying
    a. Preparatory(equipment and warm up)
    b. Work to attain mental and emotional state
2. **Imaging - 3 stages - preparation, execution, follow through**
    a. Develop "picture" in mind of correct skill execution
    b. Receive guidance and instruction from expert
3. **Focusing**
    a. "zero" in on skill - learning components
    b. Chunking and chaining strategies
    c. Drills to improve elements evaluated as lacking
4. **Executing/Adapting**
    a. Learner attempts skill after completing first 3 stages
5. Evaluating
    a. Assess which aspects of skill were successful and which need improvement

5 steps to improve a skill (KIN 299)

I. Observe,
II. Analyze each phase,
III. use mechanics knowledge,
IV. select errors to correct,
V. determine appropriate corrections