

LESSON PLAN by _____ Jenny Stiffler _____

Lesson: _____ Indianapolis 500 Unit-Science_(Guided Discovery)_____ **Length** ____60 minutes__

Age or Grade Intended ____Fourth Grade__

Academic Standard(s): Science-4.1.6 Explain that even a good design may fail even though steps are taken ahead of time to reduce the likelihood of failure.

4.6.1 Demonstrate that in an object consisting of many parts, the parts usually influence or interact with one another.

4.6.2 Show that something may not work as well or at all, if a part of it is missing, broken, worn out, mismatched or incorrectly connected.

Social Studies- 4.1.13 Identify and describe important events and movements that changed the life in Indiana from the mid-twentieth century to the present.

Performance Objectives: After investigating simple machines, the students will construct knowledge of different parts, their purpose, and how they work together to form a simple machine by correctly completing the attached worksheet with 90% accuracy.

Assessment: The teacher will collect the students' drawings and worksheet to assess their understanding. The drawing will be worth 5 points and the worksheet will be worth 20 points.

Advanced Preparation by Teacher: The teacher will need to run enough copies of the worksheet so that everyone may have one to complete for a grade. The teacher will also need to find a simple machine for the students to look at and use to complete the worksheet. The teacher will also need to a workspace for each group of students.

Procedure:

Introduction/Motivation: Now that the students have raced their cars, some did not go as planned. Have the student picture their racecar they created in their heads. Explain to students that they have just transformed into scientist who plan on studying these cars as well as other simple machines. Ask the students to think of reasons why the cars failed or did not run as they had planned? Then ask the students to predict why these things could happen in the actual Indianapolis 500 based on what they observed with their own racecars.

Step-by-Step Plan: 1. Have the students group into groups of 4 to 5 people. Have the students then sit together and give them a simple machine. Also, randomly chose a student made racecar and sit it on their desk. Have each group member get a blank worksheet to complete. (Bloom's Knowledge, Gardener's Intrapersonal, Tactical, Visual.)

2. Define profit, entrepreneur, and costs. Have the students discuss in their groups why these things would be important to a race team racing at the Indianapolis 500. Ask the students to also

discuss why each part of the racecar would be important to the driver and race owner. (Bloom's Knowledge, Application, Synthesis, Gardner's Intrapersonal, Visual, Naturalist)

3. Have the students complete the worksheet based on investigating the two machines they have in front of them. Tell the students to use classroom resources for the worksheet if they need to and to use the group members' ideas. (Bloom's Comprehension.)

Closure: The teacher will then take a simple machine and use it to guide thinking in the right direction. The teacher will ask and answer guided questions through his or her personal investigation. The teacher will demonstrate with a car which piece was not working properly and why this affected the performance of the car. Allow the students to rethink their answers after the discussion and change an answer if they feel they can now think of a better answer. Collect the worksheets from the students.

Adaptations/Enrichment: The gifted students could look at a more complicated machine or even a video of a Indy car. The students could be asked to construct a simple machine out of random parts and explain the worksheet with their machine. The teacher could also create worksheets depending on the students' ability level whether gifted or limited. The struggling students could work with a partner to complete the worksheet. If the students struggle with complicated answers, the teacher could ask the student to verbally explain their thoughts.

Self-Reflection: After the lesson has been taught, evaluate the effectiveness of your teaching and planning. Was it successful? What would you do differently next time to improve the lesson? Include any comments that you received by an observing adult or the students you taught. Were the machines effective in the lesson? By using the investigation method, did the students come to the correct conclusion about machines? Would there be any new questions to add to the worksheet for the next time this lesson is taught? Would it be better if the students would draw a picture of the way their car rolls?

4. Draw a picture of the racecar on your desk. What would happen if you removed one part of the machine? What would happen if this part was broken or worn out? What would happen if you put the wrong parts together? Make sure to explain your answers!!

5. Race team owners need to make a profit to support the team, pay the bills, buy new parts, and support a family. Why is it important for the race team to make a profit? Why would the race team want to use the best parts rather than the cheap parts? If you were a race team owner, would you use the best parts for your cars? Why or why not?

