Lesson 1-5: Uniform Circular Motion	
Curriculum Expectations	• A1.2 • A1.4 • A1.5 • A1.6 • A1.8 • A1.10 • A1.12 • A1.13 • B2.1 • B2.2 • B2.6 • B2.7 • B3.3
Learning Goals	The goals of the lesson are to: • Understand the characteristics of uniform circular motion • Understand how to apply the concepts of uniform circular motion to solve problems.
Success Criteria	I know I have achieved the goals of this lesson when I can describe the properties of uniform circular motion and solve problems relating to it.
Teacher Prep	• Ball and string to demonstrate circular motion.

Minds On

1. <u>Centripetal Acceleration Discussion</u>

- Watch the video at the top of activity 1-5A together as a class.
- Ask students if any have ever been on a similar ride. If so, have students describe the experience, what they felt, how they behaved, how their body moved.
- Ask students why they think that people on this ride don't go flying out of it and why they stick to the wall.
- Ask students to describe the forces in action in this type of problem – describing the types of forces and their predicted directions.

Action

****Refer to the Differentiation Resources link for additional practice worksheets, and to enrich your classroom teaching using different tools throughout the lesson. ****

1. **1-5A: Centripetal Acceleration**

    - If possible, bring in a string and ball and demonstrate uniform circular motion.
    - Students should take notes from this activity and add the formulas to their formula sheets.
    - Have students read through the top of section B.
    - Ask if they can come up with any other examples of uniform circular motion in the real world.
    - Watch the simulation together as a class.
    - Ask individual students to describe what they observed in the simulation, including discussion of forces and motion.
    - Review the equation for uniform circular acceleration.
    - Have students attempt the embedded question on their own.
    - Circulate through the class as students are working on this, assisting with any misconceptions or questions.

1. Take up the answer together as a class. You can have a student present their solution.
2. Repeat the same procedure for the section on period and frequency section.
3. Ask if they have encountered period and frequency in other physics topics (hint: sound waves).
4. Make sure that students record definitions for period & frequency in their notes.

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2. **1-5C: Centripetal Force**
    - If possible, bring in a string and ball and demonstrate uniform circular motion.
    - Have students take notes from this section.
5. Have students read through sections A & B of the activity and then have a student summarize the content.
    - Have students solve the sample problems individually.
    - Circulate through the class as students are working on this, assisting with any technology or content issues.
6. Ask individual students to demonstrate their answers, explaining their logic.
7. Clear up any questions or misconceptions.

3. **1-5D: Careers in Physics**
8. Students are required to perform research on careers related to physics.
9. They must record a response on the Voicethread based on their research.

10. Have students present their chosen career to the whole class, describing the job itself, the education required to obtain the job and their reasons for picking this career.

4. The Physics of Rollercoasters Group Activity

- Working in groups of 2-3, read the article on the physics of roller coasters. Afterwards, work together to answer the questions provided.
- Have groups present their responses to the whole class.

5. Dynamics in Sports Jigsaw

- Organize students into groups of 4.
- Each group gets a number from 1-4 indicating which expert group they are.
- Each group will be assigned a particular sport by clicking on one of the icons #1-4.
- Groups will download their sport information by clicking on the icon corresponding to their group.
- Expert groups will then break up into sharing groups with one person from each expert group.
- In your sharing group, share what you learned in your expert groups with your new group members allowing everyone to become expert in each topic.

Consolidation

1. 1-5C: Circular Motion Review

- Click on the link and allow students to read through the content to review their knowledge.
- Circulate through the class as students are working on this, assisting with any questions or misconceptions.
- Have students attempt the questions on their own.
- Have individual students present their answers to the class, explaining their logic.
- Clear up any misconceptions.

2. 1-5D: Circular Motion Problem Set

- Have students complete worksheets individually or in groups either at home or in class.
- If in class, circulate throughout the class as students are progressing, allowing opportunities for questions and clarifications.
- Take up questions together as a class once all questions have been answered.
- Have students demonstrate their answers and explain their thought process to the class.

3. **1-5E: Uniform Circular Motion Quiz**
    - To be completed individually either at home or in class.
    - Answers should be taken up together as a class, identify any issues or areas of weakness and review this material.
    - Call on individual students to share their answers and explanations to each question.
    - Address any misconceptions or questions by reviewing material from the lesson

4. **1-5: Circular Motion Lab**
    - To be completed **individually.**
    - Review the assignment beforehand, emphasizing where marks are allocated and proper submission formats.
    - Students must answer questions using the GRASS method.
    - Students must record their own observations.
    - Emphasize that students must show and submit all their work and answer using full sentences.

5. **Unit 1 Learning Log**
    - This must be completed by each student before permission to write the unit test.

****Refer to Differentiation Resources for additional practice worksheets, and to enrich your classroom teaching using different tools. ****