

Lesson Plan

Lesson Title: Science—Newton’s Laws of Motion

Grade Level: 3rd Grade

Learning Central Focus

<p>Central Focus</p> <p>What is the central focus for the content in the learning segment?</p>	<ul style="list-style-type: none"> • Understanding the Newtons three laws of motion and how they occur in everyday life. • Using Inspiration 9 as a resource for the students to outline newtons three laws and their characteristics. • Allow the students to present their findings on the three laws and their outlines from Inspiration 9.
<p>Content Standard</p> <p>What standard(s) are most relevant to the learning goals?</p>	<p>3-PS2-1 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.</p> <ul style="list-style-type: none"> • PS2.A: Forces and Motion <ul style="list-style-type: none"> - Each force acts on one particular object and has both strength and a direction. • PS2.B: Types of Interactions <ul style="list-style-type: none"> - Objects in contact exert forces on each other. (3-PS2-1)
<p>Student Learning Goal(s)/ Objective(s)</p> <p>Skills/procedures What are the specific learning goal(s) for student in this lesson?</p> <p>Concepts and reasoning/problem solving/thinking/strategies¹ What are the specific learning goal(s) for students in this lesson?</p>	<ul style="list-style-type: none"> • Students will understand the three laws of motion presented by Sr. Isaac Newton. <ol style="list-style-type: none"> 1. Objects at rest stay at rest unless another force acts on it. 2. The acceleration of an object depends on the net force acting upon the object and the mass of the object. 3. For every action, there is an equal and opposite action. • Students will fill in the outline from the Inspiration 9 software that corresponds with the lesson. • Students will discuss the laws and how each law effect’s us in everyday life. • Students will conduct an experiment that proves Newtons First Law of Motion.

¹ The prompt provided here should be modified to reflect subject specific aspects of learning. Language here is mathematics related. See candidate edTPA handbooks for the “Making Good Choices” resource for subject specific components.

	<ul style="list-style-type: none">• Students will watch the teacher demonstrate the use of Newtons Cradle (the newtons cradle is a device that has steel balls equally apart and when one hits another they react) and then ask which law the students think the object would fall under.
<p>Prior Academic Knowledge and Conceptions</p> <p>What knowledge, skills, and concepts must students already know to be successful with this lesson?</p> <p>What prior knowledge and/or gaps in knowledge do these students have that are necessary to support the learning of the skills and concepts for this lesson?</p>	<ul style="list-style-type: none">• Students should show understanding of cause and effect from second grade. This knowledge will help them come to conclusions for the laws of motion.• If a student does not have this prior knowledge they may have problems understanding the why to the meanings behind each law and how they work in our everyday life.• In order to insure the students', have all the knowledge they need to conduct experiments or interact in the group discussions maybe try and teach a short refresher course before jumping into the lesson. This could go over terms that the students should already know like velocity or acceleration.
<p>Common Errors, Developmental Approximations, Misconceptions, Partial Understandings, or Misunderstandings</p> <p>What are common errors or misunderstandings of students related to the central focus of this lesson?</p> <p>How will you address them for this group of students?</p>	

Instructional Strategies and Learning Tasks

Description of what the teacher (you) will be doing and/or what the students will be doing.

<p>Launch ___8___ Minutes</p> <p>How will you start the lesson to engage and motivate students in learning?</p>	<ul style="list-style-type: none"> • The teacher should start the lesson with the demonstration of an object at rest. This can be done by using a carpenter's leveling tool and a marble. Set the level on a desk and then show the students the bubble that indicates the desk is level. The teacher may need to go into detail as to what kind of tool the level is used for. • After you explain the leveling tool you will place the marble in the center of the tool and ask the students to explain why it is not moving. The student's answers should be relevant to the reasoning that nothing has applied force to the marble to make it move. • After they answer your questions you need to tilt the level upwards so that the marble moves and rolls down the level. This is an example of 'an object at rest stays at rest until another force acts on it.' • This activity should get your students interested in the three laws of motion that Newton created.
<p>Instruction ___30___ Minutes</p> <p>What will you do to engage students in developing understanding of the lesson objective(s)?</p> <p>How will you link the new content (skills and concepts) to students' prior academic learning and their personal/cultural and community assets?</p> <p>What will you say and do? What questions will you ask?</p> <p>How will you engage students to help them understand the concepts?</p>	<ul style="list-style-type: none"> • You should start the lesson by going over each law and what they mean. • After you have discussed each law ask your students to name things that happen in everyday life that go with each law. • Make a list on your whiteboard of the everyday occurrences for the students to consider and look back on. • Ask the students why these three laws are important to understand in science and in everyday life. • If your students are engaging in your conversations take a break from lecturing and show them videos of Newtons three laws. This is a more visual way of explaining the laws and how they work. Here is a good link for you to display in your classroom, https://www.youtube.com/watch?v=yUp4W9htmuY. • Ways for you, as the teacher, to determine if your students are understanding the information you are giving to them would be to give oral quizzes, which is questions you ask them as you are teaching or after you have gone over the material. Another form of assessment would be a written test. You could also assess the students by allowing them to conduct experiments of their own and recording their results on paper, then coming together as a class and reporting what each group of students found when conducting the experiment. • Another way to allow the students to be creative would be to ask them to write or draw of a time when they saw one of newtons three laws in action in their life time. After you allow them to brainstorm and draw or write it out, you could call

<p>What will students do?</p> <p>How will you determine if students are meeting the intended learning objectives?</p>	<p>on a few students to share in front of the class before turning them in. This is a fun and interactive way to see if a student understands the topic at hand.</p>
<p>Structured Practice and Application __20__ Minutes</p> <p>How will you give students the opportunity to practice so you can provide feedback?</p> <p>How will students apply what they have learned?</p> <p>How will you determine if students are meeting the intended learning objectives?</p>	<ul style="list-style-type: none"> • In order to prove that the students have developed understanding of the three laws you will ask them to complete the template on the three laws of motion found in the inspiration 9 software. • Students will apply what they have learned when the teacher asks them specific questions. It is always important that the teacher requires the students to raise their hands when answering instead of calling out answers at random, that way it gives the teacher a chance to allow all students to try and answer to see what they know. • Students will have a chance to ask the teacher questions if there are confusions or misunderstandings, by allowing this to happen the teacher can also keep track as to what they should focus on most when explaining the lesson. • As the teacher it is important to allow your students to be creative. You could ask the students to draw out or write about a time when they saw one of newtons three laws in action within their life.
<p>Closure __2__ Minutes</p> <p>How will you end the lesson?</p>	<ul style="list-style-type: none"> • Split the class up into multiple teams and have them answer specific questions by coming to a conclusion with one another and writing the answers on a small dry erase board. Groups should be no more than four students, if you add more students there seems to be conflict when deciding on an answer. The group with the most points gets a prize!
<p>Differentiation/Planned Support</p> <p>How will you provide students access to learning based on individual and group needs?</p>	<p><i>Whole Class:</i></p> <p><i>Groups of students with similar needs:</i></p>

<p>How will you support students with gaps in the prior knowledge that is necessary to be successful in this lesson?</p>	<p><i>Individual students:</i></p> <p><i>Students with IEP's or 504 plans:</i></p> <p><i>Strategies for responding to common errors and misunderstandings, developmental approximations, misconceptions, partial understandings, and/or misunderstandings:</i></p>
<p>Student Interactions</p> <p>How will you structure opportunities for students to work with partners or in groups? What criteria will you use when forming groups?</p>	<ul style="list-style-type: none"> • Students will work with partners when we close the lesson out and have group questionnaires. This allows students to be competitive but also to show what they know. • Students will have a few times to interact as a whole group/class throughout the lesson.
<p>What Ifs</p> <p>What might not go as planned and how can you be ready to make adjustment?</p>	<ul style="list-style-type: none"> • One thing to make sure of before starting the lesson is to see if the surface you are putting the carpentry level on is completely level. If it is not, then the marble may roll off the level and it will be very difficult to explain yourself if you don't have a level surface. (if anything, use the floor!) • If the video link is no longer available for the song that explains the laws of motion, then there were multiple ones online that would be suitable for this lesson.
<p>Theoretical Principles and/or</p>	

<p>Research–Based Best Practices</p> <p>Why are the learning tasks for this lesson appropriate for your students?</p>	
<p>Materials</p> <p>What materials does the teacher need for this lesson?</p> <p>What materials do the students need for this lesson?</p>	<p>Teacher Materials Needed</p> <ul style="list-style-type: none"> • Inspiration 9 software • https://www.youtube.com/watch?v=yUp4W9htmuY • Arkansas State Standards—Science k-4. • Carpenter level • Marble • Computers for all students to use to create inspiration template <p>Students Materials Needed</p> <ul style="list-style-type: none"> • None

Academic Language Demand(s):

<p>What language function do you want students to develop in this lesson? What must students understand in order to be intellectually engaged in the lesson?</p>	
<p>What content specific terms (vocabulary) do students need to support learning of the learning objective for this lesson</p>	
<p>What specific way(s) will students need to use language (reading, writing, listening and/or speaking) to participate in learning tasks and demonstrate their learning for this lesson?</p>	
<p>What are your students' abilities with regard to the oral and written language associated with this lesson?</p>	

How will you support students so they can understand and use the language associated with the language function and other demands in meeting the learning objectives of the lesson?	
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Assessments:

Describe the tools/procedures that will be used in **this lesson** to monitor students' learning of the lesson objective(s). Attach a copy of the assessment and the evaluation criteria/rubric in the resources section at the end of the lesson plan.

Type of assessment (Informal or Formal)	Description of assessment	Modifications to the assessment so that all students could demonstrate their learning.	Evaluation Criteria - What evidence of student learning (related to the learning objectives and central focus) does the assessment provide?

Analyzing Teaching

To be completed after the lesson has been taught

What worked? What didn't? For whom?	
Adjustments What instructional changes do you need to make as you prepare for the lesson tomorrow?	
Proposed Changes.	<i>Whole class:</i>

<p>If you could teach this lesson again to this group of students what changes would you make to your instruction?</p>	<p><i>Groups of students:</i></p> <p><i>Individual students:</i></p>
<p>Justification</p> <p>Why will these changes improve student learning?</p> <p>What research/ theory supports these changes?</p>	

Resources:

- Inspiration 9 software
- , <https://www.youtube.com/watch?v=yUp4W9htmuY>
- Arkansas State Standards—Science k-4.