



<b>Lesson Title</b>	Vector Resolution
<b>Length of Lesson</b>	2 days
<b>Created By</b>	Kimberley Leggett
<b>Subject</b>	Science
<b>Grade Level</b>	11 <sup>th</sup> , 12 <sup>th</sup> (Physics)
<b>State Standards</b>	Physics: 2 a
<b>DOK Level</b>	DOK 3
<b>DOK Application</b>	Use concepts to solve non-routine problems; construct; formulate
<b>National Standards</b>	9-12: B: Physical Science; A: Science as Inquiry
<b>Graduate Research Element</b>	Vectors and vector techniques are used daily in my research while using FEA (Finite Element Analysis) software.

**Student Learning Goal:**

Physical Science: 2. Develop an understanding of concepts related to forces and motion:  
(a) Use inquiry to investigate and develop an understanding of the kinematics and dynamics of physical bodies.

- Vector and scalar quantities
- Vector problems (solved mathematically and graphically)

National Science Education Standards of Content 9-12

A: Science as Inquiry: Abilities necessary to do Scientific Inquiry

- Identify questions and concepts that guide scientific investigation
- Use technology and mathematics to improve investigations and communications

**B: Motions and Forces**

- **Objects change their motion only when a net force is applied. Laws of motion are used to calculate precisely the effects of forces on the motion of objects. The magnitude of the change in motion can be calculated using the relationship  $F=ma$ , which is independent of the nature of the force. Whenever one object exerts force on another, a force equal in magnitude and opposite in direction is exerted on the first object.**

**Materials Needed (supplies, hand-outs, resources):**

Book, calculator, protractor, pencil, paper, hot wheels car, yard stick, stop watch, and ruler

**Lesson Performance Task/Assessment:**

There will be homework problems assigned and graded



**Lesson Relevance to Performance Task and Students:**

The relevance is to be able to resolve vectors into components

**Anticipatory Set/Capture Interest:**

I am going to set up a ramp using some books and the yard stick. This is so the car can roll down the yard stick. We will time the car, measure the height and length the car traveled, and use the protractor to measure the angle. This information will be used to calculate the vectors.

**Guided Practice:**

To work sample problems on the board with the help of the students so they can see how they can solve for the unknowns with the information given

**Independent Practice:**

Homework problems similar to the one's worked in class

**Remediation and/or Enrichment:**

R: Individual IEP; partner help throughout the lesson, fewer known's in the problem  
E: More intense calculations containing more known and unknown information

**Check(s) for Understanding:**

Homework will be collected and graded

**Closure:**

Vectors must be completely understood before moving to the next topic since future learning is dependent on this knowledge

**Possible Alternate Subject Integrations:**

Math – Geometry or Trigonometry

**Teacher Notes:**

The hot wheel activity could be done in groups.

There is also a handout (INSPIRE\_LP\_KimLeggett\_9\_1\_10\_Handout.doc) with sample problems to work on vector resolution.

Below are links to a few other sites for more information on vector resolution:

<http://www.physicsclassroom.com/class/vectors/u3l1e.cfm>

<http://www.sasked.gov.sk.ca/docs/physics/u1b3phy.html>