

Lesson Title	Types of Forces Investigation
Standards (TEKS)	4D
Objective(s):	<ul style="list-style-type: none"> • Draw and analyze free-body diagrams to describe the forces acting on an object. • Define different types of forces through a hands-on investigation.

AGENDA	KEY POINTS
<ol style="list-style-type: none"> 1. Forces Investigation 2. Exit Ticket 	<p>Forces are represented by vectors.</p> <p>Forces have a magnitude (strength of the force) and direction.</p> <p>When forces are applied to an object, it will move unless all forces add up to zero.</p> <p>If all forces add up to zero, the object is in equilibrium.</p>

Teacher note – the PhET Sim is one component of the stations activity for the types of forces investigation.

Time	Learning Activity	Materials
40	<p>Students complete three lab stations.</p> <ol style="list-style-type: none"> 1. Station 1: Tension Forces. <i>Students investigate how a spring scale records mass and force. They draw a free body diagram for an object attached to a spring scale.</i> 2. Station 2: Normal Forces. <i>Students investigate normal forces by reading a scale. They draw free body diagrams for: an object sitting on the scale, an object sitting on the scale with the student pushing down, an object being slid across the scale.</i> 3. Station 3: Friction Force. <i>Students utilize a computer simulation to explore free body diagrams. They move a crate back and forth across the screen to investigate how the friction force changes as an object moves.</i> 	<p>Station 1 –</p> <ul style="list-style-type: none"> 2 spring scales 2 rubber bands 1 weight <p>Station 2 –</p> <ul style="list-style-type: none"> 1 electronic scale 1 wooden block <p>Station 3 –</p> <ul style="list-style-type: none"> Computer with Forces and Motion PhET loaded
10	Exit Ticket – Students will take an exit ticket on forces.	