

**Physics**  
**PISD Curriculum: Year at a Glance**

| Bundle | <i>Title</i><br>Big Ideas/Enduring Understandings   | Guiding Questions   |
|--------|---|---|
| 1      | <p><b><i>Kinematics in 1 Dimension</i></b></p> <ul style="list-style-type: none"> <li>▪ The motion of objects can be described qualitatively as well as quantitatively through the use of graphs and mathematical equations.</li> </ul>   | <ul style="list-style-type: none"> <li>▪ How can we describe the motion of an object?</li> </ul>                                      |
| 2      | <p><b><i>Kinematics in 2 Dimensions</i></b></p> <ul style="list-style-type: none"> <li>▪ The motion of objects in two dimensions can be analyzed through separate perpendicular components.</li> <li>▪ Certain physical quantities are comprised of both a magnitude and direction.</li> </ul>  | <ul style="list-style-type: none"> <li>▪ How do motions in different directions produce the resulting motion of an object?</li> </ul> |
| 3      | <p><b><i>Forces</i></b></p> <ul style="list-style-type: none"> <li>▪ Unbalanced forces acting on an object result in changes in the motion of the object.</li> </ul>  | <ul style="list-style-type: none"> <li>▪ How do forces affect the motion of an object?</li> </ul>                                     |
| 4      | <p><b><i>Force Applications</i></b></p> <ul style="list-style-type: none"> <li>▪ The change in motion of an object is dependent on the mass of the object and the amount of force applied.</li> </ul>   | <ul style="list-style-type: none"> <li>▪ How are unbalanced forces and the acceleration of an object related?</li> </ul>              |
| 5      | <p><b><i>Work &amp; Energy</i></b></p> <ul style="list-style-type: none"> <li>▪ The energy of a system is changed when work is done on or by the system.</li> <li>▪ Energy can take many forms but the total energy in a system is constant.</li> </ul>   | <ul style="list-style-type: none"> <li>▪ How is the energy in a system conserved?</li> </ul>  |
| 6      | <p><b><i>Momentum</i></b></p> <ul style="list-style-type: none"> <li>▪ Momentum is conserved in interactions between objects.</li> </ul>  | <ul style="list-style-type: none"> <li>▪ How can we predict the results when moving bodies interact?</li> </ul>                       |
| 7      | <p><b><i>Thermodynamics &amp; Waves</i></b></p> <ul style="list-style-type: none"> <li>▪ Energy can take many forms but the total energy in a system is constant.</li> <li>▪ Energy spontaneously tends to flow only from being concentrated in one place to becoming diffused and spread out.</li> <li>▪ Energy can be transferred from one place to another in the form of waves, which have characteristic behaviors.</li> </ul> | <ul style="list-style-type: none"> <li>▪ How is thermal energy transferred?</li> <li>▪ What is the nature of waves?</li> </ul>        |
| 8      | <p><b><i>Sound &amp; Light</i></b></p> <ul style="list-style-type: none"> <li>▪ Sound energy is carried by compression waves traveling through a medium.</li> <li>▪ Light energy can be modeled as an electromagnetic wave.</li> </ul>  | <ul style="list-style-type: none"> <li>▪ How do sound waves propagate?</li> <li>▪ What is the electromagnetic spectrum?</li> </ul>    |

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| 9             | <p><b><i>Optics</i></b></p> <ul style="list-style-type: none"> <li>▪ Light waves traveling from one medium into another refract, or change their direction of travel.</li> <li>▪ Interference is a result of the wave nature of light.</li> </ul>   | <ul style="list-style-type: none"> <li>▪ How do light waves interact with different media?</li> </ul>  |
| 10            | <p><b><i>Electrostatics</i></b></p> <ul style="list-style-type: none"> <li>▪ Objects can become electrostatically charged by the processes of conduction and induction.</li> <li>▪ Electrostatic charges produce electric fields &amp; forces.</li> </ul>   | <ul style="list-style-type: none"> <li>▪ How do electrostatic charges interact?</li> </ul>   |
| 11            | <p><b><i>Circuits</i></b></p> <ul style="list-style-type: none"> <li>▪ The configuration of conductive paths in an electric circuit determines its behavior.</li> <li>▪ The behavior of an electric circuit can be characterized through the use of measurable quantities such as current, resistance, and potential difference.</li> </ul> | <ul style="list-style-type: none"> <li>▪ What affects the flow of charge through a circuit?</li> </ul>   |
| 12            | <ul style="list-style-type: none"> <li>▪ <b><i>Magnetism &amp; Modern Physics</i></b> Electricity and magnetism are related phenomena.</li> <li>▪ Light energy can be converted to electrical and mechanical energy via the photoelectric effect.</li> </ul>  | <ul style="list-style-type: none"> <li>▪ How do magnetic fields affect charges and current?</li> <li>▪ How does the modern model of the atom explain the photoelectric effect and atomic spectra?</li> </ul> |