

ALTERNATIVE LESSON PLANS FOR DISTANCE LEARNING

These alternative lesson plans condense what is taught and suggest ways to support students learning at home. We acknowledge that every situation is unique and strive to provide plans that can be used online or as printed packets. Focus on fewer scientific principles. Use print and audio readings. Share the videos that you can. Discuss if you can.

UNIT TITLE	PS2
DRIVING QUESTION	Why do some things stop and others keep going?

Lesson 1 (2 days)	Energy
Activity 1.1	<p>Radiometer Demonstration and Newton vs. Goldberg Video Student Activity Video or search for similar radiometer video https://iat.wistia.com/medias/cnzj3bbs55</p> <p>Video 1.1: Isaac Newton vs. Rube Goldberg from the Teacher Portal https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_1_video_1-1026.mp4,</p> <p>Share Projected Image 1. Newton vs. Goldberg Video Event</p>
Activity 1.2	<p>Observing Surprising Devices</p> <p>Student Activity Videos https://iat.wistia.com/medias/mdvuzmgb66 https://iat.wistia.com/medias/9bq3vc52kn https://iat.wistia.com/medias/y7qkebxpmb https://iat.wistia.com/medias/zittra8wo5 https://iat.wistia.com/medias/6887oaiu4z https://iat.wistia.com/medias/1iwi7h5ztg</p>
Reading 1	<i>Perpetual-Motion Machines</i>

Lesson 2 (3 days)	Kinetic Energy
Activity 2.1	<p>Objects in Motion Student activity video https://iat.wistia.com/medias/1iwi7h5ztg https://iat.wistia.com/medias/zittra8wo5</p> <p>Video 2.1 Objects in Motion from Teacher Portal https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_2_video_2-1027.mp4</p>
Activity 2.2	Investigating Kinetic Energy

	<p>Student Activity Videos https://iat.wistia.com/medias/gqintclfsv https://iat.wistia.com/medias/k4zis8hbmX</p> <p>Share Projected Image: Kinetic Energy Activity</p> <p>Share Setup Video https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_2-81.mp4</p>
Reading 1	<i>Impact Craters</i>
Activity 2.3	<p>Predicting the Amount of Kinetic Energy in Scenarios Share: https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_1_video_1-1026.mp4</p> <p>https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_2_video_2-1028.mp4</p>
Simulation 2	<p>Share: https://d16dnhlej6sizh.cloudfront.net/assets/media/sims/massspring.html</p>

Lesson 3 (3 days)	Gravitational Energy
Activity 3.1	<p>Investigating the Connection between Elevation and Energy Student Activity Video https://iat.wistia.com/medias/9bq3vc52kn https://iat.wistia.com/medias/zittra8wo5 https://iat.wistia.com/medias/jmpx0j22ws</p> <p>Video 1.1: Isaac Newton vs. Rube Goldberg from the Teacher Portal https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_1_video_1-1026.mp4</p>
Activity 3.2	<p>Gravitational Energy, Energy Conversions, and Energy Conversion Diagrams Share Projected Images: 1) Falling Object 2) Bar Charts</p> <p>Teachers may want to share the completed work and discuss the conversion graphs, rather than construct the graphs.</p>
Reading 1	<i>Gravitational and Kinetic Energy</i>
Activity 3.3	<p>Investigating How a Pendulum Works Teachers may want to share the completed work and discuss the conversion graphs, rather than construct the graphs.</p> <p>Student Activity Videos: https://iat.wistia.com/medias/9bq3vc52kn https://iat.wistia.com/medias/zittra8wo5</p> <p>Share Projected Image: Energy Conversion Diagram</p>

Simulation 3.1	Share: https://lab.concord.org/embeddable.html#interactives/inquiry-space/pendulum/1-pendulum.json
Simulation 3.2	Share: https://phet.colorado.edu/files/prototypes-2012/energy-skate-park/simulations/energy-skate-park/

Lesson 4 (3 days)	Elastic Energy
Activity 4.1	<p>What Happens to a Ball as It Bounces? Share Projected Image: Final Energy Conversion</p> <p>Share: https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_4_video_4-1023.mp4</p> <p>https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_4_video_4-1024.mp4</p> <p>https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_4_video_4-1025.mp4</p> <p>Student Activity Videos: https://iat.wistia.com/medias/jhu734vlo https://iat.wistia.com/medias/2qdkru481r</p>
Activity 4.2	<p>Investigating Elastic Energy</p> <p>Student Activity Videos: https://iat.wistia.com/medias/2o9w1q29ez https://iat.wistia.com/medias/zhu37ari5p https://iat.wistia.com/medias/pua8la0e3x https://iat.wistia.com/medias/kpsjdtfbaa https://iat.wistia.com/medias/em7qe5w3kg</p>
Activity 4.3	<p>What Determines How Much Elastic Energy an Object Can Have? Share: PI: Final Energy Conversion</p> <p>https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_1_video_1-1026.mp4</p> <p>Student Activity Videos: https://iat.wistia.com/medias/mqv03ddlza https://iat.wistia.com/medias/chmh6mjahc https://iat.wistia.com/medias/jhu734 https://iat.wistia.com/medias/j2mmerracmvlo https://iat.wistia.com/medias/j2mmerracm https://iat.wistia.com/medias/enw3xonalb</p>
Reading 1	<i>Elasticity and the Body</i>

Lesson 5 (4 days)	Energy Systems, Transfer, and Conservation
Activity 5.1	<p>Revisiting the Bouncing Ball</p> <p>Share:</p> <p>https://d16dnhlej6sizh.cloudfront.net/assets/media/PS2-Video-5-1-Bouncing-Ball.m4v</p> <p>https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_5_video_5-1029.mp4</p> <p>https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_5_video_5-1030.mp4</p> <p>Student Activity Video</p> <p>https://iat.wistia.com/medias/bee8j5ru5h</p>
Activity 5.2	<p>Demonstration: Bouncing Two Balls Together</p> <p>Student Activity Video</p> <p>https://iat.wistia.com/medias/peb0w0io2d</p>
Activity 5.3	<p>Observing Objects that Slow Down before They Stop</p> <p>Student Activity Video</p> <p>https://iat.wistia.com/medias/9bq3vc52kn</p> <p>Discuss starting and stopping points of the pendulum.</p>
Activity 5.4	Energy Transfer and Systems
Reading 1	<i>Energy Transfer</i>

Lesson 6 (3 days)	Thermal Energy
Activity 6.1	<p>Colliding Balls</p> <p>Share:</p> <p>https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_6-84.mp4</p> <p>https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/Lesson6-Simulation_6.1_CollidingBalls.gif</p>
Activity 6.2	<p>Thermal Energy: Solids</p> <p>Share:</p> <p>https://www.google.com/url?q=https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/Molecular_Motion_in_a_Hot_and_Cold_Solid_Simulation2.gif&sa=D&ust=1586439083535000&usg=AFQjCNEIstRy2TuWNttUq9xUHZ-3xXuulQ</p> <p>Teachers may want to share the completed table in TE with students and discuss.</p>

Activity 6.3	<p>Molecules in Motion: Liquids and Gases</p> <p>Share: https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_6-82.mp4</p> <p>https://www.google.com/url?q=https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/Molecular_Motion_in_a_Hot_and_Cold_Liquid_Simulation2.gif&sa=D&ust=1586439083535000&usg=AFQjCNHcBjeJzGLBuO_hN41F-9z882wK9Q</p> <p>https://www.google.com/url?q=https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/Lesson_6-Simulation_6.4_Molecular_Motion_in_a_Hot_and_Cold_Gas.gif&sa=D&ust=1586439083535000&usg=AFQjCNHIW-gnQUXqIUUIZlhizavFCY7tTw</p> <p>Student Activity Video https://iat.wistia.com/projects/f4kdyd9llg</p>
Reading 1	<i>Potential Energy</i>

Lesson 7 (1 days)	Can Sound Make Things Stop?
Activity 7.1	<p>What Is Sound Energy?</p> <p>Share Projected Image: Rolling Can</p> <p>Search for vibrating guitar strings or use this: https://youtu.be/ttgLyWFINJI</p> <p>Student Activity Video https://iat.wistia.com/medias/kpsjdtfbaa</p>
Reading 1	<i>Sound Energy</i>

Lesson 8 (4 days)	Chemical Energy
Activity 8.1	<p><i>Thermal Energy in Chemical Reactions</i></p> <p>Share: https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_8-85.mp4</p> <p>Student Activity Video https://iat.wistia.com/medias/hcowjw8m7x</p>
Activity 8.2	<p>The Paper Cup</p> <p>See TE for set up directions</p> <p>Student Activity Videos https://iat.wistia.com/medias/Of6m1zgznf https://iat.wistia.com/medias/fue1ppiqix</p>
Activity 8.3	<p>How Much Chemical Energy Is There?</p> <p>Share: https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_8-1017.mp4</p> <p>Student Activity Video https://iat.wistia.com/medias/x9gjnrrhkm</p>

Activity 8.4	Chemical Energy Transformations Share Projected Images: 1) Engine 2) Exercise 3) Watch 4) Fireworks
Reading 1	<i>Fuels</i>

Lesson 9 (3 days)	Electrical Energy
Activity 9.1	How Can I Move Energy? Share Projected Image: Electrical and Water Circuits Student Activity Video https://iat.wistia.com/medias/0yuvwjlaep
Activity 9.2	The Homemade Battery Share: https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_9-1018.mp4
Reading 1	<i>Batteries and Hydrogen Cells</i>
Activity 9.3	What Does an Electrical Generator Do? Share Projected Image: Electric Generator Share: https://d16dnhlej6sizh.cloudfront.net/assets/portal/Teacher-Portal-Resources/PS2_se_v2_0_5_video-lesson_9-1021.mp4 Look very closely for the light flashing on and off in the lower left corner of the device. Student Activity Video https://iat.wistia.com/medias/0yuvwjlaep

Lesson 10 (1 day)	Can Light Make Things Stop or Start?
Activity 10.1	How Light Makes Things Happen Share Projected Images 1. Traffic Light 2. Plant 3. Camera 4. Suntan 5. Solar Cooker Search for video of vibrating guitar strings or use this: https://youtu.be/ttgLyWFINJI Student Activity Video https://iat.wistia.com/medias/cnzj3bbs55 https://iat.wistia.com/medias/kpsjdtfbaa
Reading 1	<i>Solar-Power Plants</i>

Lesson 11 (1 day)	Concluding the Unit
Activity 11.1	Revisiting Learning Sets 1–3
Reading 1	<i>Examples of Energy Resources</i>

Appendix 1 (1 day)	Ice Cube Challenges
Reading 1	<i>Transferring Thermal Energy with Materials</i>

SUMMATIVE ASSESSMENT: There are many possible ways to wrap up this unit. Use those that fit your students and your learning goals. Possibilities include the following:

1. Ask students to provide examples of energy transformations in everyday life (walking or riding to school, eating, texting, playing a sport or instrument, engaging in a hobby or activity) and share ideas about energy transfer or transformation in their examples.
2. Have students construct a complete scientific explanation to answer the Driving Question—Why Do Some Things Stop While Others Keep Going?—using examples from class investigations as evidence for the claim they make in response.
3. Students might answer the following: If you were going to tell someone new to our school the most important things you have learned about energy, what would you tell them they need to understand?
4. Students might make individual or collaborative books, videos, comic books, or other representations of energy transfer or energy transformation, or about specific instances, such as what makes a ball bounce or a pendulum swing or playground slide.

You might choose to emphasize only a portion of this as a final assessment, given what you are able to teach and what students are actually able to do during this remotely taught unit.