SCIENCE:

GRADE 2–ENERGY

Energy

Increasing and Decreasing Energy

TEKS

2 (6) Force, motion, and energy. The student knows that forces cause change and energy exists in many forms.

(A) The student is expected to investigate the effects on an object by increasing or decreasing amounts of light, heat, and sound energy such as how the color of an object appears different in dimmer light or how heat melts butter.

Content Objective

I can identify and investigate the effects of increasing and decreasing amounts of light, heat, and sound energy on an object.

Science

Science Process Skills

2 (1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures.

(A) The student is expected to identify and demonstrate safe practices as described in the Texas Safety Standards during classroom and outdoor investigations, including wearing safety goggles, washing hands, and using materials appropriately.

2 (2) Scientific investigation and reasoning. The student develops abilities necessary to do scientific inquiry in classroom and outdoor investigations.

(A) The student is expected to ask questions about organisms, objects, and events during observations and investigations.

(B) The student is expected to plan and conduct descriptive investigations such as how organisms grow.

(C) The student is expected to collect data from observations using simple equipment such as hand lenses, primary balances, thermometers, and non-standard measurement tools.

(E) The student is expected to communicate observations and justify

explanations using student-generated data from simple descriptive investigations.

2 (3) Scientific investigation and reasoning. The student knows that information and critical thinking, scientific problem solving, and the contributions of scientists are used in making decisions.

(B) The student is expected to make predictions based on observable patterns.

2 (4) Scientific investigation and reasoning. The student uses age-appropriate tools and models to investigate the natural world.

(A) The student is expected to collect, record, and compare information using tools, including computers, hand lenses, rulers, primary balances, plastic beakers, magnets, collecting nets, notebooks, and safety goggles; timing devices, including clocks and stopwatches; weather instruments such as thermometers, wind vanes, and rain gauges; and materials to support observations of habitats of organisms such as terrariums and aquariums.

Mathematics

2 (10) Measurement. The student uses standard tools to estimate and measure time and temperature (in degrees Fahrenheit).

(A) The student is expected to read a thermometer to gather data.

English Language Arts and Reading

2 (5) Reading/vocabulary development. Students understand new vocabulary and use it when reading and writing.

(B) Students are expected to use context to determine the relevant meaning of unfamiliar words or multiple-meaning words.

2 (28) Listening and speaking/listening. Students use comprehension skills to listen attentively to others in formal and informal settings. Students continue to apply earlier standards with greater complexity.

(A) Students are expected to listen attentively to speakers and ask relevant questions to clarify information.

(B) Students are expected to follow, restate, and give oral instructions that involve a short related sequence of actions.

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2 (29) Listening and speaking/speaking. Students speak clearly and to the point, using the conventions of language. Students continue to apply earlier standards with greater complexity. Students are expected to share information and ideas that focus on the topic under discussion, speaking clearly at an appropriate pace, using the conventions of language.

2 (30) Listening and speaking/teamwork. Students work productively with others in teams. Students continue to apply earlier standards with greater complexity. Students are expected to follow agreed-upon rules for discussion, including listening to others, speaking when recognized, and making appropriate contributions.

Figure 19.

Reading/comprehension skills. Students use a flexible range of metacognitive reading skills in both assigned and independent reading to understand an author's message. Students will continue to apply earlier standards with greater depth in increasingly more complex texts as they become self-directed, critical readers.

(C) The student is expected to monitor and adjust comprehension (e.g., using background knowledge, creating sensory images, re-reading a portion aloud, generating questions).

(D) The student is expected to make inferences about text using textual evidence to support understanding.

(F) The student is expected to make connections to own experiences, to ideas in other texts, and to the larger community and discuss textual evidence.

English Language Proficiency Standards

2 (I) Cross-curricular second language acquisition/listening. The student is expected to demonstrate listening comprehension of increasingly complex spoken English by following directions, retelling or summarizing spoken messages, responding to questions and requests, collaborating with peers, and taking notes commensurate with content and grade-level needs.

3 (D) Cross-curricular second language acquisition/speaking. The student is expected to speak using grade-level content area vocabulary in context to internalize new English words and build academic language proficiency.

3 (E) Cross-curricular second language acquisition/speaking. The student is expected to share information in cooperative learning interactions.

3 (G) Cross-curricular second language acquisition/speaking. The student is expected to express opinions, ideas, and feelings ranging from communicating single words and short phrases to participating in extended discussions on a variety of social and grade-appropriate academic topics.

Language Objective

I can discuss the effects of increasing and decreasing amounts of heat, light, and sound energy on an object.

Response to Intervention/Tier 1 Differentiation

All science lessons support students in receiving quality Tier 1 instruction. Using the 5E model, knowledge is taught in a variety of contexts, integrating math, science, and ELA content, thus supporting the active engagement of students with the content. Lesson-specific differentiation strategies for addressing diverse student needs can be found throughout each lesson in sections titled “Differentiation Strategy.”

Differentiation should

- focus on skills students did not understand and extend the lesson for advanced students;
- be conducted in small groups or embedded in whole-group instruction; and
- provide students with a variety of strategies to process the information, such as
  - allowing for additional opportunities for verbal brainstorming of words associated with a topic (with teacher taking dictation);

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- making clear connections of new and more complex concepts to foundational aspects and prior knowledge;
- participating in more tangible experiences, such as experiments, investigations, and active exploration;
- sorting academic vocabulary words into categories by common attributes—process words or science content vocabulary;
- organizing brainstorming into semantic maps or creating graphic organizers;
- discussing the meaning of a graphic organizer with a partner; and
- creating a visual representation to demonstrate understanding.

See the handout in the Content Resources section that addresses instructional strategies.

College and Career Readiness Standards

I.C1 Collaborative and safe working practices. Collaborate on joint projects.

I.E1 Effective communication of scientific information. Use several modes of expression to describe or characterize natural patterns and phenomena. These modes of expression include narrative, numerical, graphical, pictorial, symbolic, and kinesthetic.

Vocabulary Focus

decreasing
energy
heat
increasing
light
sound
thermometer

Energy

Prerequisite Science Knowledge

K (6)(A) Force, motion, and energy. The student knows that energy, force, and motion are related and are a part of their everyday life. The student is expected to use the five senses to explore different forms of energy such as light, heat, and sound.

K (6)(C) The student is expected to observe and describe the location of an object in relation to another such as above, below, behind, in front of, and beside.

1 (6)(A) Force, motion, and energy. The student knows that force, motion, and energy are related and are a part of everyday life. The student is expected to identify and discuss how different forms of energy such as light, heat, and sound are important to everyday life.

5E Lesson Summary

Engage
Students identify heat, light, and sound energy in different equations.

Explore
Students investigate the effects of increasing and decreasing heat, light, and sound energy on objects.

Explain
Students explain heat, light, and sound energy.

Elaborate
Students identify the effects of increasing and decreasing heat, light, and sound energy.

Evaluate
Students describe the effects of increasing and decreasing heat, light, and sound energy.

Energy

Engage

Materials

For teacher

- chart paper
- markers

For student groups

- RM 1
- resealable plastic bags

Teacher Note

The abbreviation RM stands for reproducible master. RMs include activity cards with instructions for students to follow or pages on which they can record observations and data.

Advance Preparation

Cut apart a set of *RM 1: Energy Equation Cards* for each group of students and place them in resealable plastic bags.

Teacher Instruction

- Model how to create an energy equation using the cards shown in the example below.

Download Grade2_Engage_Energy from Drop Boxes in your Science Academies for Grades K–4 Project Share group to use on a SMART™ or Mimio® interactive whiteboard.

- Pass a set of *RM 1* to each group.
- Instruct students to create at least five equations using the cards.
- Allow adequate time for students to complete the activity.
- Lead a discussion about each equation using sentence stems such as:
  - If I can hear something, it has _____ energy.
  - Something that gives off light has _____ energy.
  - Something that gets warmer or cooler has _____ energy.
  - If I (cut or saw) the (wood), it makes (sound energy).
  - When a (lit match) is (placed on wood), it creates (fire), which has (heat) energy.
  - I can use (my hands) on a (piano or drum) to create (sound energy).
- Record the discussion on chart paper.

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Facilitation Questions

- What other light, heat, and/or sound energy equations can you make? Create three other energy equations: one for light energy, sound energy, and heat energy. *Accept all reasonable answers.*
- How do you know that something has light energy? Sound energy? Heat energy? *If something has light or gives off light, I can see that it has light energy. If something makes noise, I can hear that it has sound energy. If something gets warmer or cooler, I can feel that it has heat energy.*

RM 1 Answer Key

Note: Several equations may equal more than one form of energy.

- *wood + match = heat energy*
- *candle + match = light energy*
- *lamp + electrical outlet (electricity) = light energy*
- *Sun = light energy*
- *flashlight + battery = light energy*
- *Sun = heat energy*
- *heater + electrical outlet (electricity) = heat energy*
- *tea kettle + stove = sound energy*
- *hair dryer + electrical outlet (electricity) = sound energy*
- *piano + hands = sound energy*

Energy

Explore

Activity 1

Materials

For each student

- science notebook
- pencil

For student groups

- 20 toothpicks
- 9” x 13” aluminum pan (optional)
- tape (optional)

Content Builder

Students should come to understand that sound is made when something moves or vibrates. During the Explore activity, monitor student conversations but refrain from telling them about sound and sound waves.

Teacher Note

Students can work in small groups at several tables. Any small material, such as centimeter cubes or paper clips, can be substituted for the toothpicks. If you have heavy, sturdy tables in your lab or classroom, it may be difficult to observe the effects of tapping on the tables. As an option, you can place a 9” x 13” aluminum pan upside down on each table. Tape each pan in place and put the toothpicks on top of them.

Teacher Instruction

- Place 20 toothpicks in the middle of each table.
- Ask the following: What do you observe? What do you hear? What do you see?
- Instruct students to draw a picture of the setup and record their observations in their science notebooks. Remind students to include illustrations and labels.
- Instruct students to lightly tap the edge of their table with their fingertips.
- Ask the following: What do you observe? What do you hear? What do you see?
- Instruct students to tap the edge of their table with their hands. Students should begin softly and gradually to increase intensity.
- Ask the following: What do you observe? What do you hear? What do you see?
- Instruct students to record in their science notebooks their observations.

Facilitation Questions

- What happened when you lightly tapped the table with your fingertips? *My fingertips hit the table and made a soft sound.*
- What happened when you tapped the edge of the table with your hands and increased intensity? *The sound was louder than when I used my fingertips, and the table vibrated, which caused the toothpicks to move. The harder I tapped the table, the louder the sound and the more the toothpicks moved.*
- What happened when you stopped tapping the table? *The toothpicks stopped moving and the sound stopped.*
- How does the motion of the toothpicks compare to the amount of sound? *The more sound we created, the more the toothpicks moved.*

Activity 2

Teacher Note

You will need a variety of light sources ranging in intensity to illustrate the concept of this activity. Tap lights can be purchased from home improvement stores. The materials listed will provide the variety but are suggested items only.

Because students will be using different light sources, you may want to remind students of appropriate ways to use the materials. Students should be advised to refrain from shining any of the lights into each other's eyes.

Advance Preparation

- Gather three dark-colored file folders and packaging tape to create one file folder tent.
- Open two file folders and lay them side by side so that two sides overlap. The distance between the fold of each file folder should be slightly wider than the width of a file folder. Tape the folders together, as shown in Figure 1.

Materials

For teacher

- Materials for file folder tents:
  - 3 dark-colored, letter-size file folders
  - packaging tape
  - 1 sheet of white paper

For each student

- science notebook
- pencil

For student groups

- flashlight, focused source suggested
- glow stick
- tap light
- pen light
- file folder tent
- small object, such as a plastic animal figure

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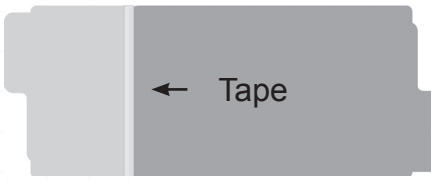
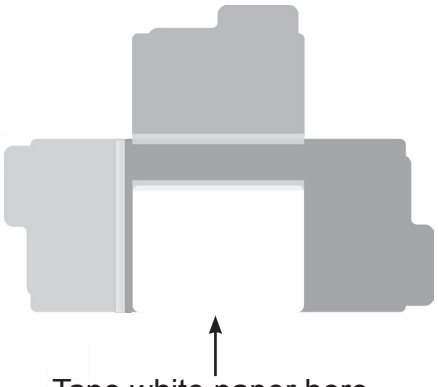
Figure 1.



Width of a file folder

- Open the third folder and lay it vertically across the two taped-together folders. Center the taped folders over the bottom half of the third folder, as shown in Figure 2.
- Tape the folders in place (front and back), making sure that when they stand, the top flap allows no light to filter into the work space, as shown in Figure 3. Tape a sheet of white paper on the area where the two folders overlap, as shown in Figure 2.

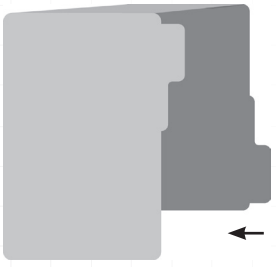
Figure 2.



Tape white paper here.

- To use the tent, stand the folder up so that it makes a U-shape, with the third folder providing a cover over the work space, as shown in Figure 3.

Figure 3.



Work area

Energy

Teacher Instruction

- Place the light sources on each table.
- Leave the lights on, and instruct students to explore each light source.
- Instruct students to point each light source at several objects in the classroom and share observations with their group.
- Ask the following: Which light source is brighter? Which light source helped you see the objects around the room more clearly? Did any of the objects appear to change when the light shined on them?
- Allow time for student discussion.
- Instruct students to turn on their flashlights.
- Turn the classroom lights off, and instruct students to explore each light source.
- Instruct students to point each light source at several objects in the classroom and share observations with their group.
- Ask the following: Which light source is brighter? Which light source helped you see the objects around the room more clearly? Did any of the objects appear to change when the light was shined on them?
- Allow time for student discussion.

Facilitation Questions

- How are the light sources different? *Some of the light sources are bright and some are dim. Some shine more brightly than others.*
- How did the amount of light in the room affect how you used each light source? *It was difficult to observe the light from each light source when the light was on in the room. When the light in the room decreased, it was easier to observe the light from each light source.*
- Which light source is the brightest? *Answers will vary depending on the light sources used.*

Energy

Teacher Instruction

- Pass a file folder tent and an object to each group of students.
- Instruct students to place the object inside the file folder tent and to make observations as they shine each light source on the object one at a time.
- Instruct students to sequence the light sources from brightest to dimmest and record the sequence in their science notebooks.

Facilitation Questions

- How does the object appear when the amount of light changes? *The object appears to change color depending on the amount of light.*
- Which light source helped you see the most details? *The brightest light helped me see more details than the dimmer lights.*
- Which light source is the brightest? Which light source is the dimmest? *Answers will vary depending on the brightness of each light source used.*
- How did the position of the light and object affect how well you could see? *Accept all reasonable answers.*
- What happened to the shadow when you moved the light closer? Farther? *The size of the shadow changes as the light is moved.*
- Which light creates the best shadow? Why? *Answers will vary depending on the brightness of each light source used. A brighter light creates a darker shadow.*
- What are other sources of light energy? *Answers may include the Sun, a lamp, an overhead light, and a night-light.*
- How is light energy important in your life? *Answers will vary but should include the following: I need light energy to help me see in the dark, to see things more clearly, and to be safe, such as knowing when to stop at an intersection.*
- Do you need to have electricity to have light energy? *No, the Sun does not have electricity and neither does a glow stick or a candle.*
- What would your life be like without light energy? *Accept all reasonable answers.*

Activity 3

Advance Preparation

Prepare the stations by placing each type of food item in a resealable plastic bag. Locate work space with multiple electrical outlets for this activity. Remove the cloth heating pad covers.

Teacher Note

For this activity you will need six groups of students. All groups will investigate the effects of low and high temperature settings on different materials over 2 days.

If you do not have the materials to allow all students to be involved in the activity at the same time, set up two stations and have small groups of students work to complete the activities over 2–3 days. Allow time for the temperature of the heating pad to return to normal between investigations.

Students will be required to read a thermometer and record temperature during this activity. If your students are unfamiliar with using a thermometer, take time to teach proper use and how to read a thermometer prior to this activity. Reviewing how to read a thermometer and checking for understanding can help you identify students who may struggle with this activity.

Although scientists use the metric measure of temperature, °C, students will be asked to record the temperature in °C and °F to help them see how the two are related. Students should understand that both measure temperature. Zero °C feels the same as 32 °F. Thirty-eight °C feels the same as 100 °F.

Differentiation Strategy

Pair struggling students with an experienced classmate or work with them in a small group to give more guided instruction to better assess misconceptions or struggles.

Materials

For each student

- RM 2
- science notebook
- pencil

For student groups

- 6 heating pads
- 12 chocolate chips
- 12 mini chocolate chips
- 12 white chocolate chips
- 36 small resealable plastic bags or small jewelry bags
- 6 stopwatches
- tape
- 6 thermometers

Energy

Day 1

Teacher Instruction

- Divide the class into six groups of students.
- Instruct each group to determine who will take the role of Timer, Recorder, Materials Manager, and Temperature Tracker. The Materials Manager will gather materials and lead the setup and management of the materials. The Timer will operate and monitor the stopwatch. The Recorder will be responsible for recording the group's observations and data. The Temperature Tracker will monitor, record, and report the temperature throughout the investigation. If needed, add the role of Reporter. The Reporter will be responsible for sharing the group's data and observations with the class.
- Pass a set of prepared materials and page 1 of *RM 2: Heat Energy Investigation* to each group as you assign work spaces.
- Instruct students to place the thermometers and the resealable plastic bags with a chocolate chip, a white chocolate chip, and a mini chocolate chip on the heating pad.
- Instruct students to draw their setups and record their observations of each material in their science notebooks or on the back of page 1 of *RM 2*.
- Instruct students to follow the first three steps on page 1 of *RM 2*, measuring starting temperature and predicting the effects of low heat on each item.
- Use the questions below to facilitate student responses on *RM 2*.

Facilitation Questions

- How does each material feel? Look? Smell? *Answers will vary and may include the following: The mini chocolate chip is smaller than the others. The chocolate chips are hard; I cannot squish them. The chocolate chips smell sweet, like chocolate.*
- Which material do you predict will change first? *Accept all reasonable answers. Instruct students to record their answers on RM 2.*

- How do you predict each material will change? *Accept all reasonable answers. Instruct students to record their answers on* RM 2*.*
- How will heat affect each material? *Accept all reasonable answers.*
- Will all the materials change at the same temperature? *Accept all reasonable answers.*

Teacher Instruction

- Instruct student groups to turn the heating pad to low and to start the stopwatches.
- Instruct the Recorders to record the temperature at which each object begins to change.
- Instruct the Timers to inform their groups when the stopwatch reaches 5 minutes. After 5 minutes, instruct the groups to stop observing, record their observations, and share their data.
- Allow adequate time for each group to complete the investigation using the low setting and to discuss and record their data and observations on *RM 2*.

Facilitation Questions

- Were your predictions correct? *Answers will vary. Instruct students to record their answers on* RM 2*.*
- At what temperature did each material change and how did it change? *Accept all reasonable answers. Instruct students to record their answers on* RM 2*.*
- Which item changed first? *Answers will vary by group.*
- Which item changed the most? *Answers will vary by group.*
- Did all of the items change at the same time? *Answers will vary.*
- What forms of energy did you observe? *I observed heat energy and sound energy.*
- How did heat affect each material? *Accept all reasonable answers.*

Energy

Day 2

Teacher Instruction

- Pass a set of prepared materials and page 2 of *RM 2* to each group as you assign work spaces.
- Instruct students to place the thermometers and the resealable plastic bags with a chocolate chip, a white chocolate chip, and a mini chocolate chip on the heating pad.
- Instruct students to draw their setups and record their observations of each material in their science notebooks or on the back of page 2 of *RM 2*.
- Instruct students to follow the first three steps on page 2 of *RM 2*, measuring starting temperature and predicting the effects of high heat on each item.
- Use the questions below to facilitate student responses on *RM 2*.

Facilitation Questions

- How does each material feel? Look? *Answers will vary and may include the following: The mini chocolate chip is smaller than the others. The chocolate chips are hard; I cannot squish them.*
- Which material do you predict will change first? *Accept all reasonable answers. Instruct students to record their answers on* RM 2.
- How do you predict each material will change? *Accept all reasonable answers. Instruct students to record their answers on* RM 2.
- How will high heat affect each material? *Accept all reasonable answers.*
- Will all the materials change at the same temperature? *Accept all reasonable answers.*

Teacher Instruction

- Instruct all groups to turn the heating pad to high and to start the stopwatches.

- Instruct the Recorders to record the temperature at which each object begins to change.
- Instruct the Timers to inform their groups when the stopwatch reaches 5 minutes. After 5 minutes, instruct the groups to stop observing, record their observations, and share their data.
- Allow adequate time for each group to complete the investigation using the low setting and to discuss and record their data and observations on *RM 2*.
- Lead a whole-class discussion about how increasing the amount of heat energy affected the materials.

Facilitation Questions

- Were your predictions correct? *Answers will vary. Instruct students to record their answers on* RM 2*.*
- At what temperature did each material change and how did it change? *Accept all reasonable answers. Instruct students to record their answers on RM 2.*
- Which item changed first? *Answers will vary by group.*
- Which item changed the most? *Answers will vary by group.*
- Did all of the items change at the same time? *Answers will vary.*
- What forms of energy did you observe? *I observed heat energy and sound energy.*
- How did heat affect each material? *Accept all reasonable answers.*
- How did the increase in temperature affect each material? *Accept all reasonable answers.*
- What effect did the lower or higher heat have on each item? *Accept all reasonable answers.*

Energy

Explain

Materials

For teacher

- *Energy Effects: My Experiences with Heat, Light, and Sound* book

Teacher Instruction

- Read and discuss *Energy Effects: My Experiences with Heat, Light, and Sound*.

Facilitation Questions

- What caused the water in the birdbath to freeze? Melt? *A decrease in heat energy overnight caused the water to freeze. An increase in heat energy from the Sun caused the water to melt.*
- What caused the temperature to increase in the house? *The heat energy from the fire caused the temperature in the house to increase.*
- Why did the light need to be on to sort the socks? *It was hard to differentiate the colors of the socks in the dark room.*
- Why was it easier to match the socks when the light increased? *As the amount of light increased, it became easier to differentiate colors.*
- Why did the sound of the fire truck seem to change? *The sound of the fire truck seemed to increase as it got closer to the house and decreased as it moved away from the house.*
- What caused the picture on the wall to vibrate? *The sounds of the truck and the siren caused the picture to vibrate.*
- What are the effects of increasing amounts of heat energy? Decreasing amounts of heat energy? *Increasing heat energy will cause things to heat up and will melt/change certain items. Decreasing heat energy will cause things to cool or possibly freeze.*
- What are the effects of increasing light energy? Decreasing light energy? *Increasing light energy will cause things to be brighter and make it easier to see in the dark. Decreasing light energy will cause things to be darker and make it difficult to see in the dark.*
- What are the effects of increasing sound energy? Decreasing sound energy? *Increasing sound energy will cause the volume of the sound to increase and may cause pain in the ears of those who are*

near. Decreasing sound energy will cause the volume of the sound to decrease and may cause the sound to completely stop.

- How have you been affected by increased or decreased heat energy? Light energy? Sound energy? *Accept all reasonable answers.*

Energy

Elaborate

Materials

For teacher

- RM 3

For each student

- RM 3
- materials for presentations
- posters
- glue
- scissors

Teacher Note

Students will be asked to complete an assignment similar to the assignment they read about during Explain. Work through *RM 3* as a class or in small groups, as needed.

Teacher Instruction

- Use *RM 3* to lead a discussion about increasing and decreasing amounts of heat, light, and sound energy.
- Instruct students to complete the *RM 3* activity.
- Use thumbs up to show increasing energy and thumbs down to show decreasing energy when asking the facilitation questions.

Facilitation Questions

- What form of energy does it take to make toast? Does the energy increase or decrease? *It takes an increase in heat energy to toast bread.*
- What form of energy is experienced when listening to the radio? Does the energy increase or decrease in this sequence? *There was an increase in sound energy when someone turned the radio up.*
- What form of energy helps dry our clothes? Our hair? Does the energy increase or decrease? *It takes an increase in heat energy to dry hair and clothes.*
- What form of energy can be observed when a candle is lit? Does the energy increase or decrease? *An increase in light and heat energy can be observed when a candle is lit.*
- What form of energy caused the snowman to melt? Did the energy increase or decrease? *An increase in heat energy from the Sun caused the snowman to melt.*
- What form of energy is exhibited by an alarm clock? *An alarm clock exhibits sound energy. An alarm clock may also use light energy.*
- When night turns to day, what form of energy can be observed? *Light energy can be observed as the Sun rises and shines throughout the day.*

Visit http://edu.glogster.com to use Glogster EDU for student presentations.

- What form of energy does it take to pop popcorn? Does the energy increase or decrease? *It takes an increase in heat energy to pop popcorn.*
- What form of energy helps you see when it is dark? Does the energy increase or decrease? *An increase in light energy helps me see when it is dark.*
- When soup is too hot to eat or drink, do you need to increase or decrease the heat energy in the soup? *I need to decrease the heat energy so I can eat the soup.*
- If you want to make ice, do you need to increase or decrease heat energy? *To make ice, the heat energy would need to decrease to at least 0 °C/32 °F.*
- What form of energy is used to warn people that a train is coming? *Sound and light energy are used at most railroad crossings to warn people that a train is coming.*

Teacher Instruction

- Instruct students to find examples of increasing and decreasing amounts of heat, light, or sound energy and their effects on their everyday life.
- Instruct students to prepare a presentation of their examples to share with the class.
  - Student presentations may include but are not to be limited to a poster with illustrations, a video, or photographs with labels detailing the increase or decrease of heat, light, or sound energy.
- Allow adequate time for students to complete the assignment.
- Allow each student to present their assignment to the class.

Differentiation Strategies

Differentiate this activity by allowing students who may need assistance to use *RM 3: What Happened Here?* to help them find an example.

G/T: Students may create their own scenarios without the help of *RM 3*.

ELL: Pair an ELL with a student who has strong English language skills.

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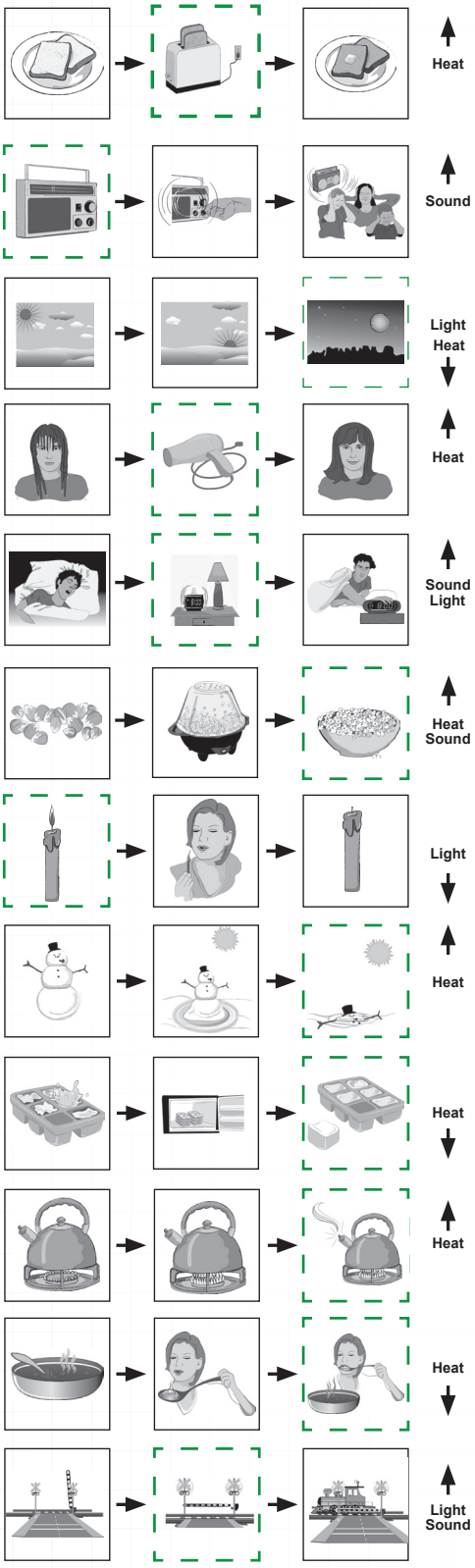
RM 3 Answer Key



Evaluate

Differentiation Strategies

G/T: Ask students to create their own scenarios.

ELL and Struggling Students: Support students by offering sentence starters like the following:

- Our picture shows _____. We saw evidence of _____ energy because _____.
- We can see that (increased/decreased) _____ energy played a part in _____. We know this because _____.
- We know that it takes _____ energy to _____.
- This just in: _____ energy has _____ again.

Materials

For student groups

- 1 page of RM 4
- science notebook

Teacher Instruction

- Pass one picture from *RM 4: Give Us the Story* to each group of students.
- Instruct students to observe the picture and identify the evidence of increased or decreased heat, light, and/or sound energy.
- Instruct students to use their observations and supporting evidence to write a story or news report detailing what happened.
- Allow adequate time for student groups to complete the evaluation.
- Allow each group to share their story or news report.

Use Project Share wiki tool to create a story. Refer to the "Wiki" video in your Science Academies for Grades K–4 Project Share group.

Facilitation Questions

- What do you think happened before this picture was taken?
  Answers will vary and could include students' descriptions of evidence of increased or decreased light, heat, and/or sound energy.
- What evidence of heat, light, or sound energy do you observe?
  Accept all reasonable answers.

Energy

Energy

Energy

RM 4 Answer Key

Possible descriptions for each picture may include:

1. Popped popcorn—increased heat energy
   Popped popcorn and turned television on—increased sound energy
   Turned television on—increased light energy

2. Ordered pizza—increased sound energy
   Pizza was made—increased heat energy
   Sun went down—decreased light energy
   Turned porch lights on—increased light energy
   Door bell ringing—increased sound energy

3. Snowy weather—decreased heat energy
   People talking—increased sound energy

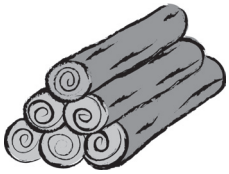
4. Fire alarm rings—increased sound energy
   Students walking in line—decreased sound energy
   Walking outside—increased light energy from the Sun

Grade 2

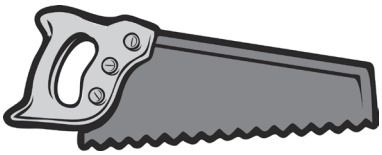
RM 1: Energy Equation Cards

Match

Wood

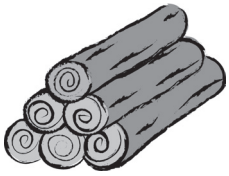


Saw



Match

Wood



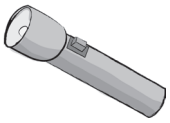
Candle

Outlet

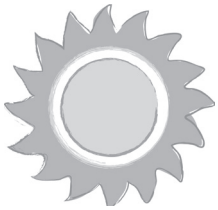
Outlet

Battery

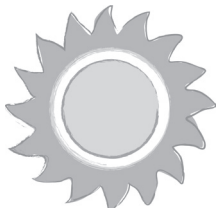
Flashlight



Sun



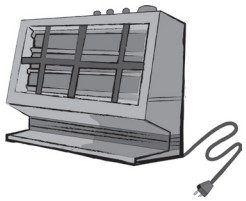
Sun



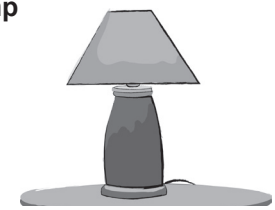
Stove

Hair dryer

Space heater



Lamp



Outlet

Tea kettle

Grade 2

RM 1: Energy Equation Cards continued

Piano

Hand

+ + + + +

+ + + + +

= = = = =

= = = = =

Grade 2

RM 1: Energy Equation Cards continued

Heat Energy	**Light Energy**	**Sound Energy**
Heat Energy	**Light Energy**	**Sound Energy**
Heat Energy	**Light Energy**	**Sound Energy**
Heat Energy	**Light Energy**	**Sound Energy**
Heat Energy	**Light Energy**	**Sound Energy**

RM Title

RM #

Grade 2

RM 2: Heat Energy Investigation

Low Heat

1. In the first column, draw and label each item.
2. Record your predictions about how each item will change, and circle the item you predict will change first.
3. Record the starting temperature of each item in ˚C and ˚F.
4. Begin your investigation.
5. Record the temperature when each item begins to change.

Item	**How do you predict it will change?** (Will the item melt, freeze, get warmer, or get colder?)	Starting temperature		Time when change occurs	Temperature when change occurs	
		˚C	˚F		˚C	˚F

RM Title

RM #

Grade 2

RM 2: Heat Energy Investigation continued

High Heat

1. In the first column, draw and label each item.
2. Record your predictions about how each item will change, and circle the item you predict will change first.
3. Record the starting temperature of each item in ˚C and ˚F.
4. Begin your investigation.
5. Record the temperature when each item begins to change.

Item	**How do you predict it will change?** (Will the item melt, freeze, get warmer, or get colder?)	Starting temperature		Time when change occurs	Temperature when change occurs	
		˚C	˚F		˚C	˚F

6. Compare the results of both investigations. What effect did the lower or higher temperature have on each item?

_____

_____

_____

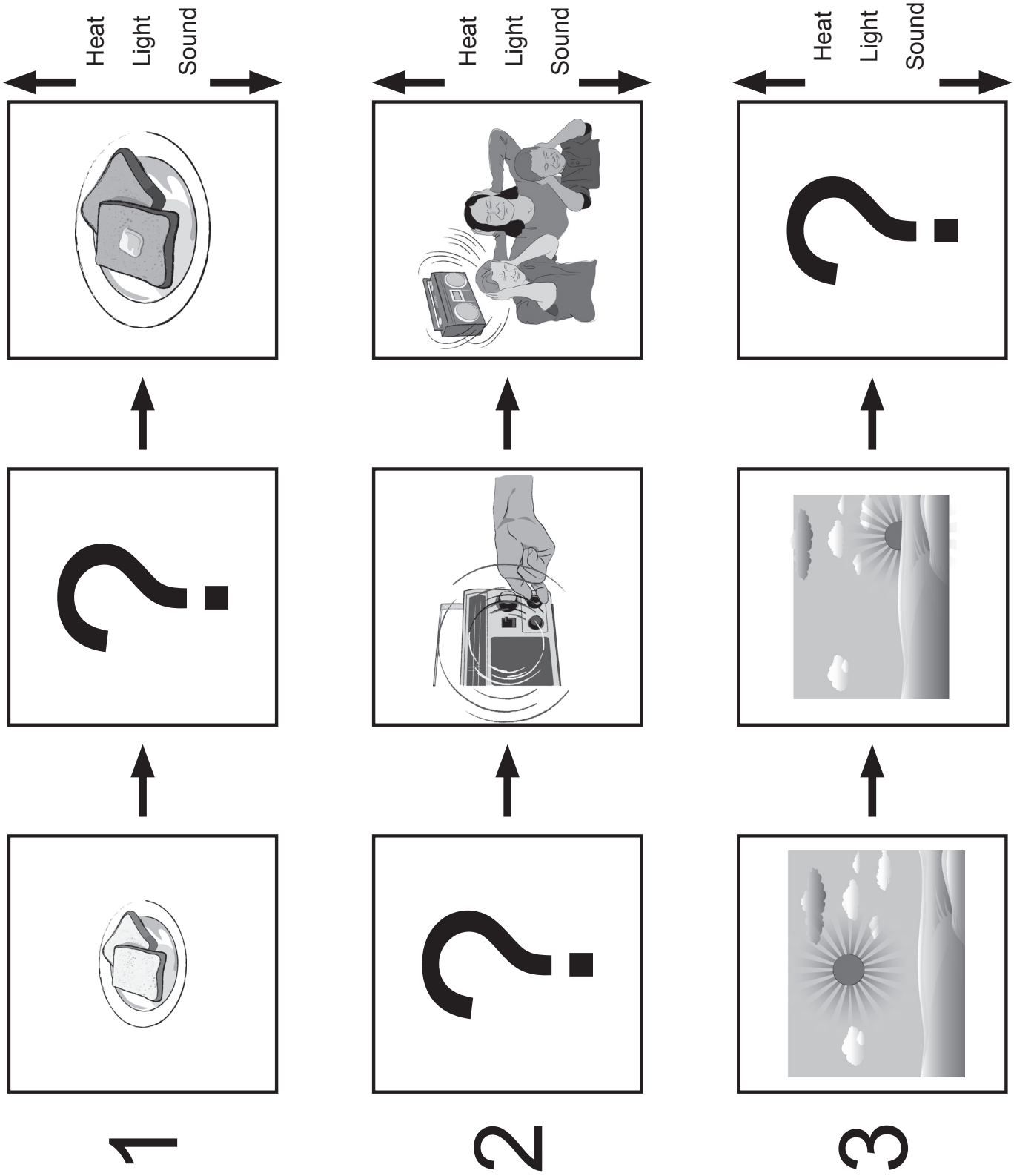
RM Title

RM #

Grade 2

RM 3: What Happened Here?

Complete each sequence. Circle the form of energy that is shown.



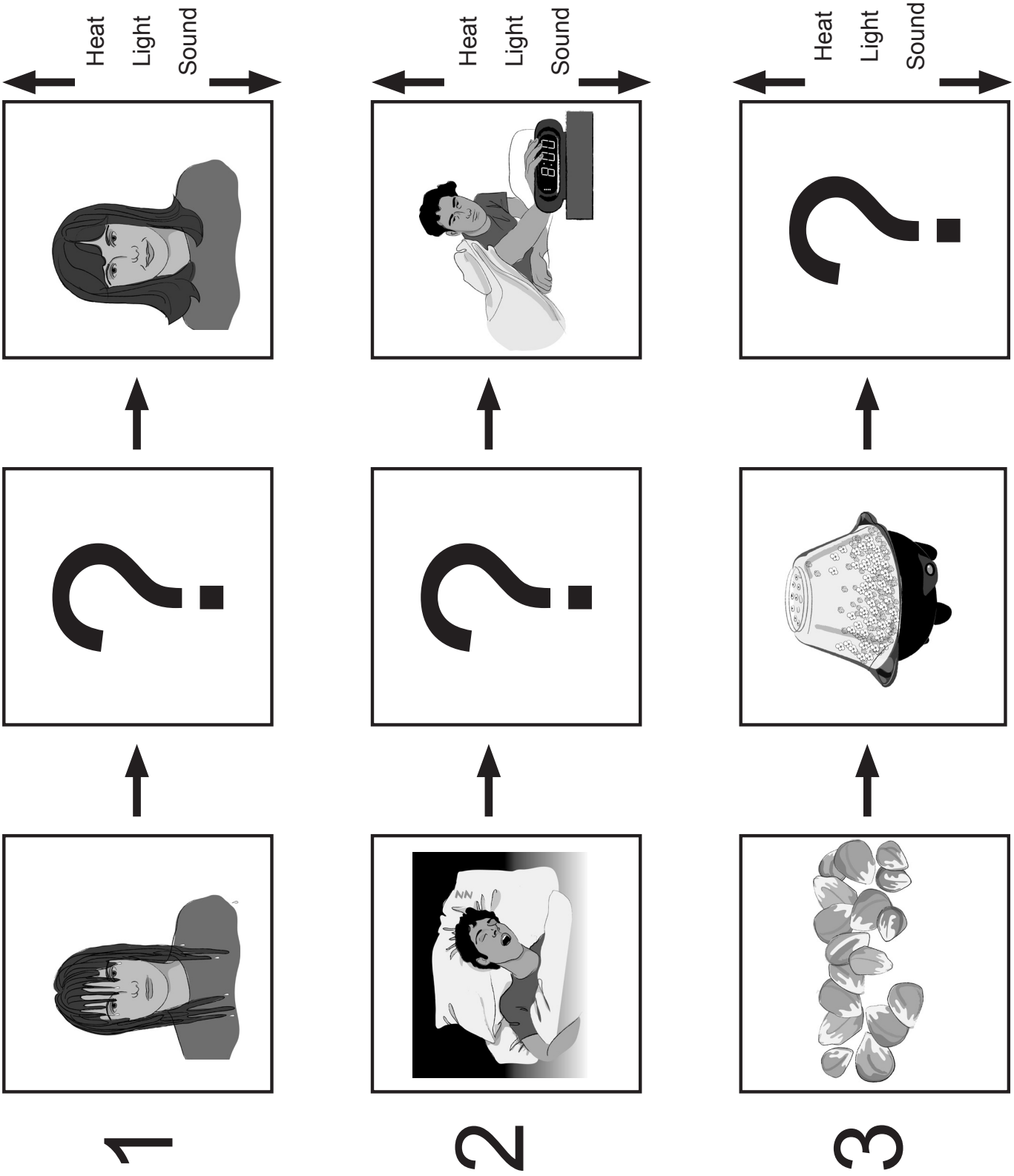
RM Title

RM #

Grade 2

RM 3: What Happened Here? continued

Complete each sequence. Circle the form of energy that is shown.



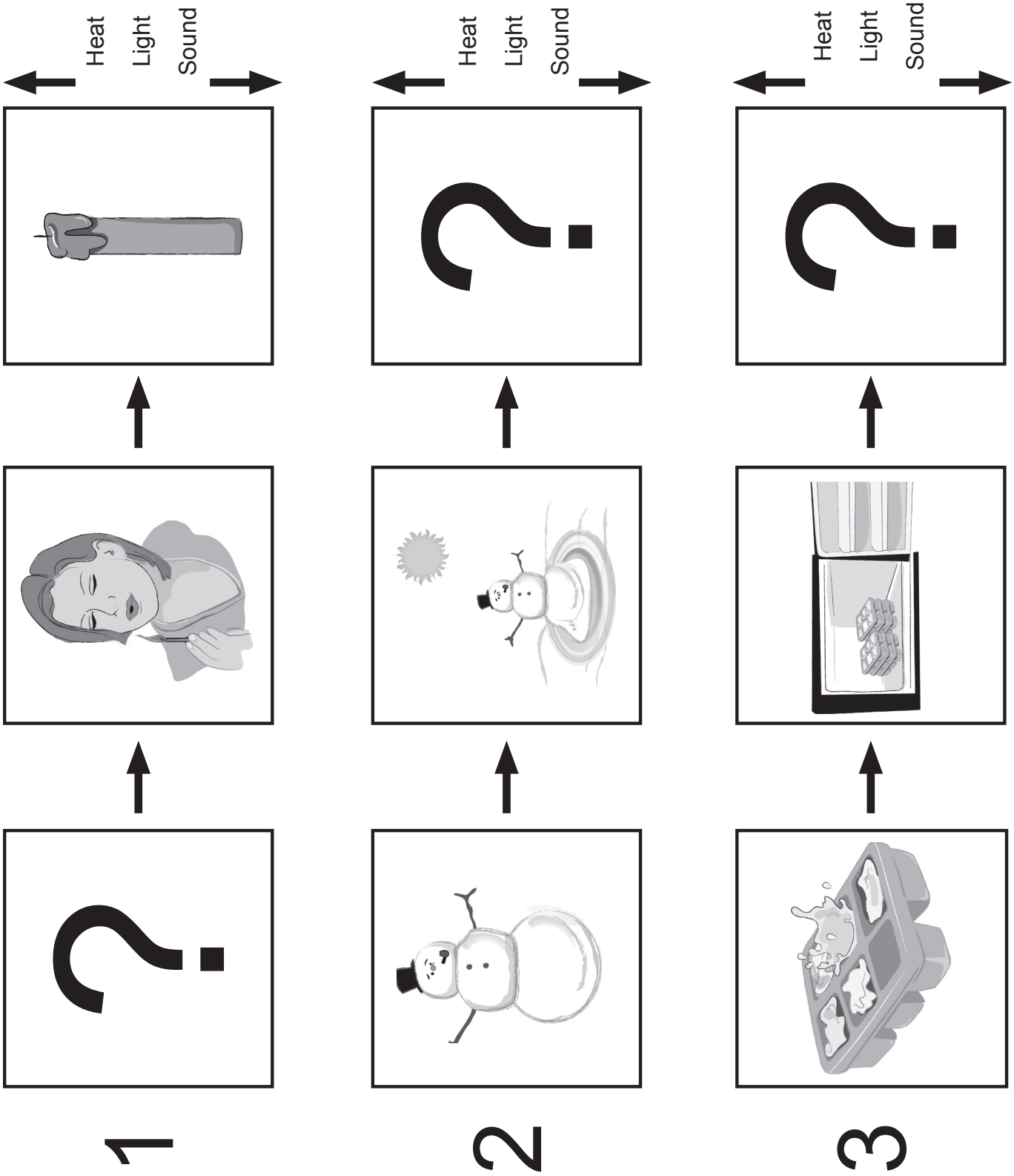
RM Title

RM #

Grade 2

RM 3: What Happened Here? continued

Complete each sequence. Circle the form of energy that is shown.



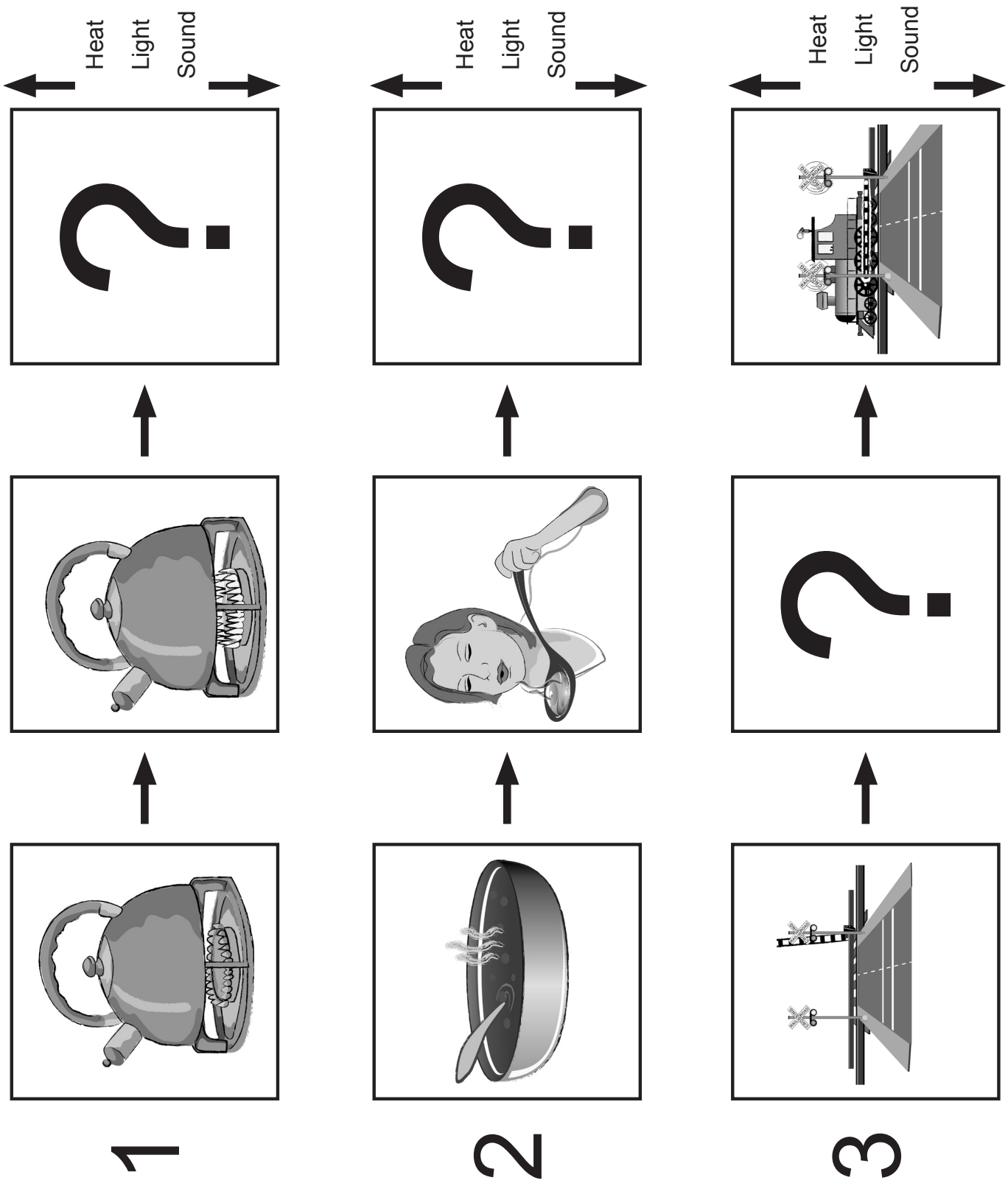
RM Title

RM #

Grade 2

RM 3: What Happened Here? continued

Complete each sequence. Circle the form of energy that is shown.

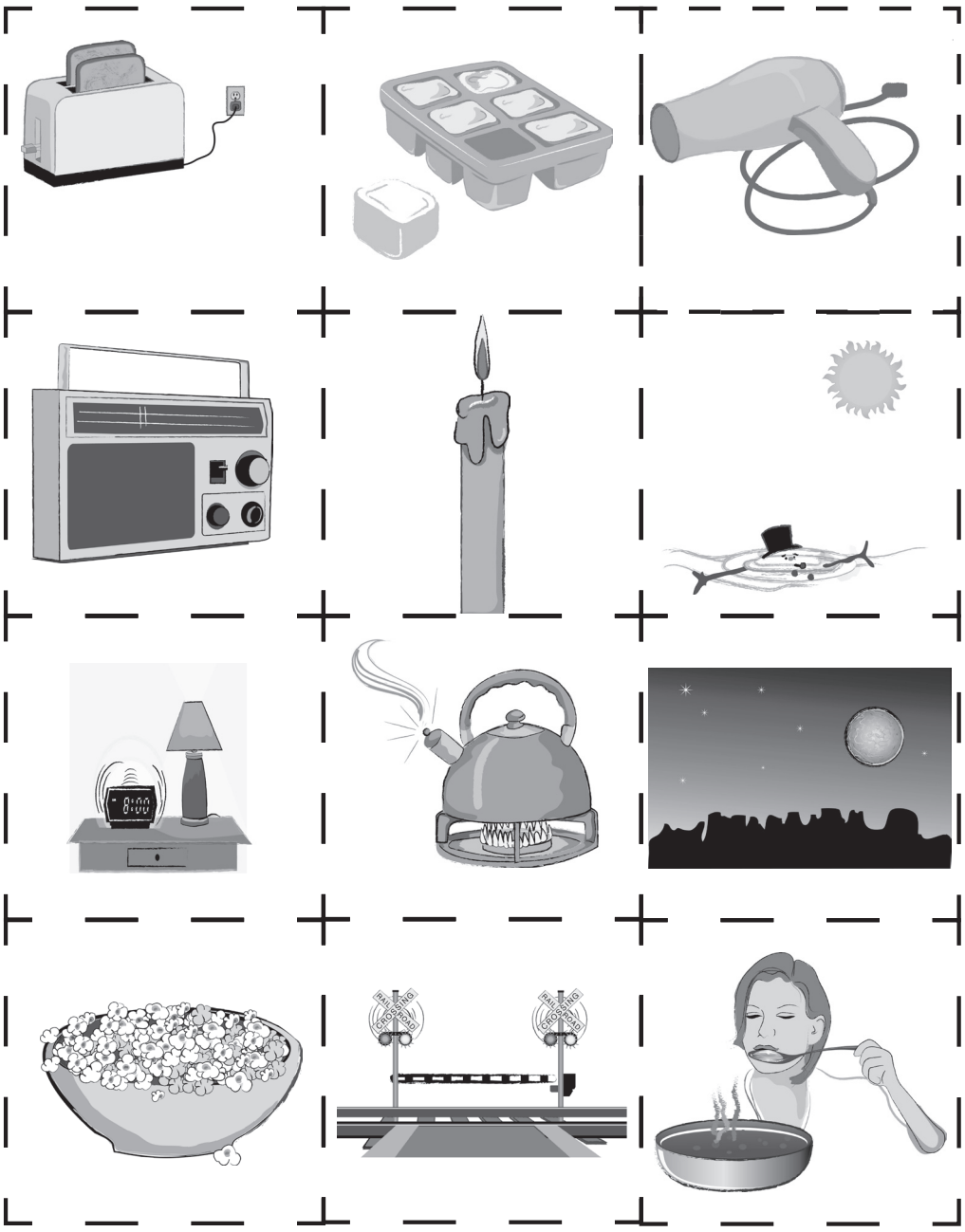


RM Title

RM #

Grade 2

RM 3: What Happened Here? continued



RM Title

RM #

Grade 2

RM 4: Give Us the Story

1.

2.

RM Title

RM #

Grade 2

RM 4: Give Us the Story continued

3.

Grade 2

RM 4: Give Us the Story continued

4.

NOTES

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