第二单元：能量	**Unit 2: Energy**
主要观念: 2.1 观察，辨认，和形容不同形式的能量：声音，机械，热力，电，和化学。 2.2 辨认能量转变的凭证和人类如何利用这些能量的转变：热到光，化学到电，电到声音，等等。 2.3 观察并形容热力如何被传导，并可以从一个地方传递到另一个地方。 2.4 观察并形容热力可以被释放出来的不同方法：燃烧，摩擦，或把一种物质和另外一种物质混合。 2.5 物质和能量的互动，例如，电让灯泡发亮，深色吸收光能，等等。 2.6 声能：高低音（频率），震动，音量，声音如何穿越固体，液体，气体，和噪音污染。	**Key Ideas:** 2.1 Observe, identify, and describe a variety of forms of energy: sound, mechanical, heat, electrical, and chemical 2.2 Identify the evidence for energy transformations and how humans use these energy transformations: heat to light, chemical to electrical, electrical to sound, etc. 2.3 Observe and describe how heat is conducted and can be transferred from one place to another. 2.4 Observe and describe different ways in which heat can be released: burning, rubbing (friction), or combining one substance with another. 2.5 Interactions of matter and energy (e.g., electricity lighting a bulb, dark colors absorbing light, etc.) 2.6 Sound energy: pitch (frequency), vibrations, volume, how sound travels through solids, liquids, gases, and noise pollution.
单元大纲	**Unit Overview**
我们无法经常的看到能量，但是我们知道它就在那里。一锅水在炉头上滚沸。在锅子里煎蛋。烹饪需要很多的能量。四处移动也是需要很多的能量。例如飞机利用能量在城市中穿梭。小鸟需要能量在空中飞翔。 任何时候东西变暖，变冷，或移动，能量即是从一种形态转变到另一种形态。经常的我们可以看到或感觉到能量释放造成的效果。例如，我们由食物中得到能量。这个能量让我们存活并提供我们做所有事情的力量。储存在食物里的能量在我	We can't always see energy, but we know it's there. A pot of water boils on the stove. An egg fries in a pan. Cooking takes a lot of energy. So does moving around. Jet airplanes speeding between cities use energy. So do birds soaring through the sky. Anytime something gets warmer, gets cooler, or moves, energy is being changed from one form to another. Often we can see or feel the effects of released energy. For example, our bodies get energy from food. This energy keeps us alive and provides power for all we do. The energy

们体内释放出来。汽车用的汽油也是有储存的能量。 燃烧汽油释放出能量，这个能量让汽车移动。	stored in the food is released in our bodies. The gasoline used in a car also has stored energy. Burning the fuel releases the energy and the energy makes car move.

第二单元：能量	**Unit 2: Energy**
关键问题: 有哪些方法能量可以从一种形态转变到另一种形态？	**Essential Question:** What are some ways that energy can be changed from one form to another?
2.1 主要观念 观察，辨认，和形容不同形式的能量：声音，机械，热力，电，和化学。	**Key Idea 2.1:** Observe, identify, and describe a variety of forms of energy: sound, mechanical, heat, electrical, and chemical
科学用语： 1. 功 2. 能量 3. 实质，实体 4. 热 5. 化学 6. 物质 7. 震动 8. 电路	**Scientific Terms:** 1. work 2. energy 3. matter 4. heat 5. chemical 6. substance 7. vibrate 8. circuit
内容: 如果你没有能量，你无法移动。以科学角度来看，**能量**是一种做功的能力，这个功是当一些物体移动时发生的。相对而言，如果你在读一本书，你没有做任何的功。如果你在跑步，你在做功。能量也会移动。热能从热的东西移动到冷的东西。 当你握著一杯热可可，热能从杯子移动到你的手。所以，当能量移动，功就完成。	**Content:** If you do not have energy, you would not be able to move. In science, **energy** is the ability to do **work** and work only happens when something moves. In other words, if you were reading a book, you would not be doing any work. If you were running, you would be doing work. Energy moves too. Heat energy moves from hot things to cold things. When you hold a cup of hot cocoa, the heat moves from the cup to your hands. So, when energy moves, work is being done too.
能量存在於不同的形态里。热能是提高实体温度的能量。化学能是储存在物质里的能量，例如食物，汽油，木头，或一根火柴的头。 光能是从物体释放出来的能量，例如太阳或一个灯泡。声能是因物体震动，造成空气的移动而產生的能量。	Energy exists in several forms. **Heat** is the energy that raises the temperature of **matter**. **Chemical** energy is the energy stored in **substance**s such as food, gasoline, wood, or the tip of a match. Light energy moves out from objects such as the Sun or a light bulb. Sound is energy created when objects **vibrate**, causing movement in the air.
机械能和实体的移动有关。如果一粒弹珠打到另一粒弹珠，机械能让第二粒弹珠移动。	Mechanical energy is involved with moving matter. If a rolling marble strikes another, mechanical energy makes the second marble move.
电能让家电用品运作，例如收音机或灯泡。电能在一个密闭式电路里流动。电能如果从一个电源离开，例如一个变电所， 它完成工作以后必须回到它的电源。例如，如果它从一个电源出来到达一个灯泡，点亮灯泡之后，它必须回到它的电源。不然，它无法点亮灯泡。	Electric energy powers appliances such as a radio or light bulb. It travels in a closed **circuit**. Electric energy that leaves a source, such as an electric plant, must come back to its source after doing work. For example, if it comes from a source and goes to a light bulb, it must go back

	to that source after it lights the bulb. Otherwise, it cannot light the bulb.
复习： 1. 能量和功如何相关？ 2. 当科学家使用“功”这个名词时，是指什么意思？ 3. 当你在推一面墙壁的时候，你有在做功吗？ 4. 当一个物体震动的时候会產生什么形态的能量？ 5. 哪一种能量从太阳到地球？	**Review:** 1. How are energy and work related? 2. What do scientists mean when they use the term work? 3. Are you working when you push a wall? 4. What form of energy does an object create when it vibrates? 5. What is one type of energy that reaches Earth from the Sun?

第二单元：能量	**Unit 2: Energy**
关键问题: 有哪些方法能量可以从一种形态转变到另一种形态？	**Essential Question:** What are some ways that energy can be changed from one form to another?
2.2 主要观念 辨认能量转变的凭证和人类如何利用这些能量的转变：热到光，化学到电，电到声音，等等。	**Key Idea 2.2:** Identify the evidence for energy transformations and how humans use these energy transformations: heat to light, chemical to electrical, electrical to sound, etc.
科学用语： 1. 有机体　　2. 转变	**Scientific Terms:** 1. living organism　2. transformation
内容: 第一个利用来自太阳的光能的有机体是植物。植物将来自太阳的光能转变成食物，其中储存著化学能。当动物和人类吃了植物以后，他们将储存的化学能转变为热能让自己保持温暖，和机械能可以让自己移动。当植物的部位为木头或乾的树叶，燃烧以后，它们储存的化学能便转变为热能。 当煤炭燃烧，它储存的化学能转变为热能。然后热能也许转变为机械能，转动机器并產生电能。电能可以转变成光，声音，热，或者机械能。它可以让一盞灯，一个门铃，一个电热板，或一个搅拌器运作。机械能也可以转变為声音。例如，你敲击一个钢琴键，便会聽到一个乐音。 其他能量的**转变**和人类如何利用能量转变的例子有：当我们点亮一根火柴，储存在火柴棒的化学能燃烧并转变為光能和热能。当我们使用一个搅拌器，电能转移成机械能。当太阳照射到我们，能量从光能转变為热能。	**Content:** The first living organisms to use light energy from the Sun were plants. Plants change light energy from the Sun to food, which is stored chemical energy. When animals and people eat a plant, they change its stored chemical energy to heat to stay warm and to mechanical energy to move. When plant parts such as wood or dry leaves are burned, their stored chemical energy is changed to heat energy. When coal is burned, its stored chemical energy is changed to heat energy. Then the heat energy may be changed to mechanical energy to turn a machine that makes electrical energy. Electrical energy can be changed into light, sound, heat, or mechanical energy. It may power a lamp, a doorbell, a hot plate, or a blender. Mechanical energy can be changed to sound. You push a piano key and hear a musical note. Other evidence for energy **transformations** and how humans use these energy transformations are: When we light a match, the chemical energy stored in the match burns and is transformed into light energy and heat energy. When we use a blender, the electrical energy is transformed into mechanical energy. When the Sun shines on us, the energy changes from light to heat.
复习： 1. 当煤炭燃烧时，会发生什么样的能量改变？ 2. 当你吃过东西以后，你出去骑单车。食物最可	**Review:** 1. What energy change takes place when coal is burned?

能转变成什么形态的能量？ 3. 当太阳的光能到达地球，它如何改变？ 4. 形容当我们使用烤麵包机时的能量如何转变。	2. After you eat, you go out and ride your bike. Into which forms of energy was the food most likely transformed? 3. How does the Sun's light energy change when it reaches Earth? 4. Describe the change of energy when we use a toaster.

第二单元：能量	**Unit 2: Energy**
关键问题: 有哪些方法能量可以从一种形态转变到另一种形态？	**Essential Question:** What are some ways that energy can be changed from one form to another?
2.3 主要观念 观察并形容热力如何被传导，并可以从一个地方传递到另一个地方。	**Key Idea 2.3:** Observe and describe how heat is conducted and can be transferred from one place to another.
科学用语： 1. 摩擦 2. 转移 3. 固体 4. 液体 5. 气体	**Scientific Terms:** 1. friction 2. transfer 3. solid 4. liquid 5. gas
内容: 机械能可以產生热。运作当中的机器零件摩擦產生热。摩擦是物品互相摩擦造成。当你摩擦你的双手，摩擦让你的手感到温热。当你用砂纸摩擦一根木头，这个木头会变的温热，因为木头和砂纸之间的摩擦產生热。 能量通常从一个物体转移或移动到另一个物体。当你要烤麵包，你将热从烤麵包机传到麵包。当瓦斯炉上锅子里的水滚了，能量从瓦斯炉转到锅子再到水。当你喝热可可， 热能移动到你的细胞，牛奶里的化学能也转变為机械能，让你可以活动，热能让你温暖。 有些材料转移能量比其他的材料好。例如，金属传热非常的好。因此，如果你想要一个马铃薯烤得更好，你可以插一根铁钉在马铃薯的中间。这个铁钉将热从烤箱传到马铃薯的中央。有些时候，你不希望能量转移，因此你可能要利用一些转移能量不良的材料，例如，木头或塑料。这因此说明为什么炉子和锅子是用金属製成。如果一个金属锅子有金属把手，这个把手在炉子上会变得非常烫。因此，有些锅子把手是使用木头或塑料製成的。	**Content:** Mechanical energy can release heat. The friction between moving machine parts releases heat. **Friction** is caused by materials rubbing together. When you rub your hands together, friction makes your hands feel warm. A piece of wood gets warm when you sand it with sandpaper because the friction between the wood and sandpaper releases heat. Energy is often **transferred** or moved from one object to another. When you make toast, you transfer heat from the toaster into the bread. When water is boiled in a pan on a stove, energy is transferred from the stove to the pan to the water. As you drink hot cocoa, the heat energy moves into your cells. Chemical energy in milk either turns into mechanical energy to help you move or heat energy to keep you warm. Some materials transfer energy better than others. For example, metals transfer heat very well. Therefore, if you want a potato to bake better, you can push a metal nail through its center. The metal nail transfers heat from the oven to the center of the potato. Sometimes you do not want energy to transfer, so you might want to use material that does not transfer energy well, for example, wood or plastic. That is why stoves and pots are made of metal. If a metal pot has a metal handle, the handle becomes very hot on the stove. Therefore, some pot handles are made out of wood or plastic.

固体转移热量比液体好。而液体转移热量比气体好。例如，水转移热量比空气好。如果室温下，放一个冰块在水里，它会比在同样温度下，曝露在空气中，融化的快。你可以将你的手伸进一个350度的烤箱里，但是你不可以碰触到烤盘或是蛋糕。因为烤盘和蛋糕是固体，而固体传热比空气好。	Solids transfer heat better than liquids. Liquids transfer heat better than gas. For example, water transfers energy better than air. If you put an ice cube into water that is at room temperature, it will melt faster than if you leave it exposed to air at the same temperature. You can put your bare hand in a 350 degree oven but you can't touch the cake pan or the cake. This happens because the cake pan and cake are solid, and solids transfer heat energy better than air.
复习： 1. 为什么燃烧煤炭会比燃烧纸张產生更多的热能？ 2. 为什么煮马铃薯会比烤马铃薯来得快熟？ 3. 你的身体如何让游泳池里的水变得比较温热	**Review:** 1. Why does burning coal produce more heat energy than burning paper? 2. Why do potatoes cook faster when you boil them than when you bake them? 3. How does your body cause the water in a swimming pool to get warmer?

第二单元：能量	**Unit 2: Energy**
关键问题: 有哪些方法能量可以从一种形态转变到另一种形态？	**Essential Question:** What are some ways that energy can be changed from one form to another?
2.4 主要观念 观察并形容热力可以被释放出来的不同方法：燃烧，摩擦，或把一种物质和另外一种物质混合。	**Key Idea 2.4:** Observe and describe different ways in which heat can be released: burning, rubbing (friction), or combining one substance with another.
科学用语: 1. 释放　2. 摩擦　3. 混合 4. 物质　5. 转变	**Scientific Terms:** 1. release　2. friction　3. combine 4. substance　5. transform
内容: 第一个使用来自太阳的光能的有机体是植物。植物将来自太阳的光能转变成食物，即是储存的化学能。当动物和人类吃植物，他们便将植物里储存的化学能改变成热来保持温暖和机械能来活动。当植物的部位，例如木头或乾叶子，燃烧起来，它们储存的化学能改变為热能。 机械能也可以释放出热。在两个活动的机器零件之间摩擦產生热。当你摩擦你的双手，摩擦力让你的手觉得温暖。 有时候当我们混合两种物质（液体的醋和固体的苏打粉在玻璃管里混合），得到一种新的物质（气体）。如果我们触摸玻璃管，会感觉到温热。 我们已经将能量从化学能变换到热能。	**Content:** The first living organisms to use light energy from the Sun were plants. Plants change light energy from the Sun to food, which is stored as chemical energy. When animals and people eat a plant, they change its stored chemical energy to heat to stay warm and to mechanical energy to move. When plant parts such as wood or dry leaves are burned, their stored chemical energy is changed to heat energy. Mechanical energy can also **release** heat. The **friction** between moving machine parts releases heat. When you rub your hands together, friction makes your hands feel warm. Sometimes when we **combine** two **substance**s (a liquid vinegar and solid baking powder) to make a new substance (a gas), we **transform** the energy from chemical to heat.
复习： 1. 车子开了以后，为什么轮胎会热热的？ 2. 当煤炭燃烧，发生什么能量改变？ 3. 当一根蜡烛燃烧，发生什么能量改变？ 4. 是否我们每一次混合物质得到一个新的物质时，都会有热能释放出来？为什么是或不是？	**Review:** 1. After a car is driven, why are its tires warm? 2. What energy changes takes place when coal is burned? 3. When a candle burns, what energy change is taking place? 4. Will heat energy be released every time we combine substances to get a new substance? Why or why not?

第二单元：能量	**Unit 2: Energy**
关键问题: 有哪些方法能量可以从一种形态转变到另一种形态？	**Essential Question:** What are some ways that energy can be changed from one form to another?
2.5 主要观念 物质和能量的互动，例如，电让灯泡发亮，深色吸收光能，等等。	**Key Idea 2.5:** Interactions of matter and energy (e.g., electricity lighting a bulb, dark colors absorbing light, etc.)
科学用语： 1. 互动的　2. 蒸发　3. 吸收 4. 反射　5. 来自太阳的	**Scientific Terms:** 1. interact　2. evaporate　3. absorb 4. reflect　5. solar
内容: 能量和实体是**互动**的。能量在实体里產生改变。例如，阳光提高水的温度造成水的**蒸发**。实体也被利用於能量形态改变的过程中。例如，当你用机械能来玩一个乐器，这个乐器的实体会製造出声音；或者你拍手会產生声音（手是一个实体）。 实体里细小的不同有时会造成能量互动的差异。例如，深色会**吸收**比较多的光线，而浅色会**反射**比较多的光线。因此，你也许注意到在夏天人们通常穿著浅色的衣服。有些人将游泳池底漆成很深的颜色。深色的底部吸收热能并转移到水里面。 人类利用实体和能量之间的互动。电能会造成灯泡发亮或烤麵包机发热，电还可以让门铃响。电能有时会储存在实体里。例如，有些计算机，收音机，和手表是利用电池里储存的能量而运作。有些**太阳能**电池储存来自太阳的能量。	**Content:** Energy and matter **interact**. Energy produces changes in matter. For example, sunlight raises the temperature of water and causes it to **evaporate**. Matter is also used in processes that change the form of energy. When you use mechanical energy to play a musical instrument, the matter in the instrument produces sound; The same thing happens when you clap your hands to make sound (hands are matter). Small differences in matter may cause different interactions with energy. For example, dark colors may **absorb** more light, while light colors may **reflect** more light. You may have noticed that people often wear lighter colors in the summer. Some people paint the bottom of a swimming pool very dark. The dark bottom absorbs heat energy and transfers it to the water. Humans utilize interactions between matter and energy. Electrical energy may cause a bulb to light up or a toaster to heat up. Electrical energy can also make the doorbell buzz. Electrical energy is sometimes stored in matter. For example, some calculators, radios, and watches run on the energy stored in batteries. Some **solar** batteries store energy from the Sun.
复习： 1. 当我们开车的时候，能量如何和实体互动？ 2. 当电视开的时候，能量如何和实体互	**Review:** 1. How is energy interacting with matter when we drive a car? 2. How is energy interacting with matter when the TV is on?

动？ 3. 解释在一个炎热的天气里，用一支黑色的太阳伞比较好还是一支白色的太阳伞比较好？ 4. 什么样的能量和成长中的植物互动？ 1. 5. 列出三个人类利用能量和实体之间互动的方法。	3. Explain whether a black or a white sun umbrella would be better to use on a hot day. 4. What kind of energy interacts with growing plants? 5. List three ways in which humans use the interactions between matter and energy.

第二单元：能量	**Unit 2: Energy**
关键问题: 有哪些方法能量可以从一种形态转变到另一种形态？	**Essential Question:** What are some ways that energy can be changed from one form to another?
2.6 主要观念 声能：高低音（频率），震动，音量，声音如何穿越固体，液体，气体，和噪音污染。	**Key Idea 2.6:** Sound energy: pitch (frequency), vibrations, volume, how sound travels through solids, liquids, gases, and noise pollution.
科学用语： 1. 音调 2. 震动 3. 音波 4. 音量 5. 分子 6. 回音 7. 污染 8. 噪音 9. 丧失听力	**Scientific Terms:** 1. pitch 2. vibration 3. sound waves 4. volume 5. particle 6. echo 7. pollution 8. noise 9. hearing loss
内容: 声音的**音调**是指声音有多高或多低。如果你学小猫叫，你也许要发出高音调的声音。然而，你如果想要学狮吼，你也许要发出低音调的声音。震动造成声音音调的不同。如果一个物体**震动**的慢，它就会產生低音。**声波**相隔的比较远。如果一个物体震动的快，它就会產生高音。声波相隔的比较近。	**Content:** The **pitch** of a sound is how high or how low the sound is. If you were pretending to meow like the kitten, you might make a sound with a high pitch. However, if you were trying to sound like a roaring lion, you might make a sound with a low pitch. **Vibration** makes the pitch of sounds different. If an object vibrates slowly, it will make a low sound. The **sound waves** are farther apart. If an object vibrates quickly, it will make a high sound. The sound waves are closer together.
一些声音会比其它的声音大声，是源於一个物体的**音量**撞击到另一个物体的力量大小。例如，如果我们轻轻的敲击桌面，我们製造出轻的声音。如果我们敲击桌面重一点，我们便会製造出大一点的声音。我们必须用多一点的能量来敲击桌面重一点，我们製造出来的音波便有多一点的能量，因此声音便会更大声。	What makes the **volume** of some sounds louder than others is how hard an object hits another object. For example, if we tap our desk lightly, the sound we make is a soft sound. If we tap the desk harder, the sound we make is louder. It takes more energy for us to tap the desk hard, so the sound waves we make have more energy, and the sound is louder.
水里的**分子**比木头里的分子彼此距离更远，因此它们可以自由的移动。空气中的分子彼此距离最远。实体里的分子震动產生音波穿越实体。当一个分子开始震动，它会撞到另一个分子。然后，这个分子再撞到另一个分子，如此继续下去。分子之间越靠近，它们彼此撞击的就越快。当分子撞击到另一个分子的时候，音波的能量从这个分子移动到另一个分子。所以分子越靠近，实体里的音波移动的越快。声音在液体里移动的比在固体里慢。声音在空气里移动的慢因为空气里的分子彼此距离得很远。	The **particles** in water are farther apart and move more freely than the particles in wood. The particles in air are the farthest apart of all. Sound waves travel through matter by causing the particles in matter to vibrate. When a particle begins to vibrate, it bumps into another particle. Then that particle bumps into another — and so on. The closer together the particles are, the faster they bump into one another. The energy of the sound waves moves from one particle to another as the particles bump into

	one another. So sound waves travel fastest in matter in which the particles are closest together. Sound travels slower in a liquid than in a solid because the particles of the liquid are farther apart. Sound travels slowly through air because the particles of air are so far apart.
回音是一种从一个物体反弹回来的声音。我们也许可以在一个四面环绕山丘的地方聽到回音。动物利用回音来寻找食物。当一隻海豚在水里游泳的时候，它发出声音。然后音波撞击到一个物体，例如一条鱼，声音再反弹回来到海豚。这样，海豚便会知道鱼在哪里。	An **echo** is a sound bouncing back from an object. We might hear an echo in a place surrounded by hills or cliffs. Animals find their food by using echoes. As a dolphin swims through the water, it makes sound. When the sound waves hit an object, such as a fish, they bounce back to the dolphin. Then the dolphin knows where the fish is.
当一些东西让水，土地，或空气骯脏的情况下，我们会想到**污染**。噪音也可能是一种污染。**噪音**是音量太大，或太高，或持续太久而对我们造成伤害。它们可以让我们变得烦躁并影响我们的睡眠。它们甚至可以造成**听力丧失**。我们无法控制所有围绕在我们身边的噪音。我们无法让救护车的警笛不要响。但是，有一些噪音是我们可以控制的。例如，我们可以把电视机，收音机，或音乐的音量降低。我们可以降低耳机的音量来保护我们的耳朵。	We probably think of **pollution** as something that makes the water, land, or air dirty. **Noise** can be pollution, too. Noises that are too loud or high pitched, or go on too long, can harm us. They can make us cranky and disturb our sleep. They can even cause **hearing loss**. We can't control all the noises we hear around us. We can't make an ambulance not sound its siren. However, there are noises that we do have control over. For example, we can turn the sound down on TVs, radios, or music players. We can lower the volume of earphone to protect our ears.
复习： 1. 声音如何產生的? 2. 你如何让一个物体发出大的声音? 3. 为什么一个小鐘会比一个大鐘发出比较高的音调? 4. 为什么声音在木头里移动的比在空气里快? 5. 我们可以怎么做来降低噪音污染**?**	**Review:** 1. How is sound made? 2. How can you cause an object to make a loud sound? 3. Why does a small bell make a higher pitched sound than a large bell makes? 4. Why does sound travel faster through wood than through air? 5. What can we do to reduce noise pollution?

解答

2. 1

1. 没有能量，功无法完成。
2. 当一个力让某样东西移动，能量转移时，功便完成。
3. 没有，我没有在做功因为墙壁没有移动。
4. 当一个物体震动时，它產生声能和热能。
5. 来自太阳的光能传到地球。

2. 2

1. 当煤炭燃烧，它的化学能转变為热能。

2. 食物最有可能转变成热能和机械能。

3. 太阳的光能改变成热能。

4. 当我们使用一个烤麵包机时，电能转变為热能。

2. 3

1. 燃烧的煤炭比燃烧的纸张製造出更多的热能，因为煤炭储存比较多的化学能。因此，煤炭会释放出比较多的热能。

2. 马铃薯在水里会比在烤箱里煮熟的快一点，因为液体比气体传热更好。

3. 游泳（机械能）產生摩擦，而摩擦產生热，并传递到水里。

2. 4

1. 轮胎和路面摩擦，產生摩擦力，而摩擦力造成热。
2. 它储存的化学能转换成热能。
3. 他的化学能转变成热和光。

Answer Key

2.1

1. Without energy work cannot be done.
2. Work is done when a force makes something move and energy is transferred.
3. No, I am not working because the wall doesn't move.
4. When an object vibrates, it creates sound energy and heat energy.
5. Light energy from the Sun reaches Earth.

2.2

1. When coal is burned, its chemical energy changes to heat energy.
2. The food most likely changes into heat energy and mechanical energy.
3. The Sun's light energy changes to heat energy when it reaches Earth.
4. When we use a toaster, the electrical energy changes to heat energy.

2.3

1. Burning coal produces more heat energy than burning paper because there is more chemical energy stored in the coal. Therefore, the coal can release more heat energy.
2. Potatoes cook faster in water than in the oven because liquids transfer heat better than gases.
3. Swimming (mechanical energy) creates friction and friction causes heat, which gets transferred into the water.

2.4

1. The tires rub on the road, creating friction, and friction causes heat.
2. Coal's stored chemical energy is converted to heat energy.
3. The candle's chemical energy changes to

4. 并不是每一次混合两种物质得到一个新的物质的时候都会释放热。每一个物质都一定要有化学能。例如，如果我们混合水和苏打粉，就不会有反应。	heat and light. 4. Heat energy is not released heat every time two substances are combined to make a new substance. There has to be energy in each of the chemicals for heat energy to be released. For example, if we combine water and baking soda, there would be no reaction.
2.5	**2.5**
1. 从汽油来的化学能让车子移动。 2. 电能让电视运作。 3. 在热天用白色的阳伞比较好，因为浅色会反射阳光，而黑色反而会吸收阳光。 4. 光能和正在成长的植物互动，让植物成长。 5. （可能的答案）人类利用太阳光将衣物晒乾；利用烤麵包机烤麵包；利用电池来使用手电筒。	1. The chemical energy from the gasoline makes car move. 2. The electrical energy makes televisions work. 3. A white sun umbrella would be better to use on a hot day because light color will reflect the sunlight, whereas the black one would absorb it. 4. Light energy interacts with growing plants to make them grow. 5. Possible answers: Humans use sunlight to dry clothes on a line; using a toaster to toast bread; and, using batteries to run a flashlight.
2.6	**2.6**
1. 所有的声音都是由一些东西让实体震动而產生。 2. 敲击物体更重会產生更大的声音。 3. 一个小鐘传出来的音波彼此比较靠近，震动的更快。如果一个物体震动的快速，它就会產生一个高音调的声音。 4. 声音在木头里比在空气里移动的更快，因为木头里的分子比在空气里的分子更彼此靠近。在木头里，当一个分子撞击到另一个分子时，声波的能量从一个分子移动到另一个分子会更快。 5. 我们可以把收音机，电视机，和耳机的音量调低来降低噪音污染。	1. All sounds are made by something that causes matter to vibrate. 2. Hitting the object harder will make a louder sound. 3. The sound waves moving out from a small bell are closer together and vibrate quickly. If an object vibrates quickly, it will make a high-pitched sound. 4. Sound travels faster through wood than through air because the particles in wood are closer than the particles in air. In wood, the rate at which the energy of sound waves moves from one particle to another as the particles bump into one another will be faster. 5. We can reduce noise pollution by turning down the volume of radios, TVs, and earphones.