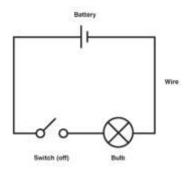
第六单元: 电和磁性		Unit 6: Electricity and Magnetism
主要观念:		Key Ideas:
6. 1	观察,形容,和研究能量在电路里转移的凭证	6.1 Observe, describe, and investigate the evidence of energy transfer in electrical circuits.
6. 2	建造和图解一个电路	6.2 Construct and diagram an electrical circuit
6. 3	辨认一个电路里的导电体和绝缘体	6.3 Identify conductors and insulators in an electrical circuit.
6. 4	比较不同物品的电和磁的特性	6.4 Compare the electrical and magnetic properties of different materials.
6. 5	研究磁铁的特性	6.5 Investigate properties of magnets.
6. 6	探索电和磁性的互动并创建一个电磁铁	6.6 Explore the interaction of electricity and magnetism to create an electromagnet.
6. 7	形容电如何帮助或伤害人类(安全性)	6.7 Describe how electricity can be helpful or harmful to people (safety).
单元大纲		Unit Overview
电可以令人兴奋和好玩。它会让你的头发竖立起来 (静电)。这种电是有趣的,但是没有用处。人类 可以控制大量的电来让它变得有用。这些电量如果 使用不当,将具有相当的危险性。		Electricity can be exciting and fun. It can make your hair stand on end (static electricity). This electricity is fun, but not useful. People can control larger amounts of electricity to make it useful. These amounts of electricity can be dangerous if not used safely.

第六单元: 电和磁性	Unit 6: Electricity and Magnetism
<b>关键问题:</b> 电和磁性的特质(属性)是什么?	Essential Question: What are the properties of electricity and magnetism?
<b>6.1 主要观念</b> 观察,形容,和研究能量在电路里转移的凭证。	<b>Key Idea 6.1:</b> Observe, describe, and investigate the evidence of energy transfer in electrical circuits.
科学用语:2. 电荷1. 电子2. 电荷3. 电流4. 密闭式电路5. 开放式电路6. 开关	Scientific Terms:  1. electron 2. electric charge 3. electric current 4. closed circuit 5. open circuit 6. switch
内容: 电子可以在实体里通顺地流动。流动的电子,或一个电荷的流动, 造成电流。人类可以控制电流 让电為人类工作。	Content: Electrons can flow smoothly through matter. Flowing electrons—or a flow of an electric charge—make electric current. People can control an electric current to make electricity work for them.
电流只有当它在一个关闭的路径称作 <b>密闭式电路</b> 里才可以流动。图片里的电路有三个部份。首 先,电池在路径里推动电子。第二部份,当电流 通过,灯泡点亮。第三,一条电线连接电池到灯 泡。另一条电线连接灯泡回到电池。	Electric current flows only when it can follow a closed path called a <b>closed circuit</b> . The circuit in the picture has three parts. First, the battery pushes electrons through the path. Second, the bulb lights up when current passes through it. Third, a wire connects the battery to the bulb. A wire also connects the bulb back to the battery.
如果你从图片中的电路里拿走其中一条电线,会发生什么?你将会把电流遵循的路径切断。你打开了电路。因为电流只可以在一个密闭式电路里流动,这个灯泡将不会亮。	What would happen if you took away one of the wires of the circuit in the picture? You would break the path that the electric current follows. You open the circuit. Because current can flow only through a closed circuit, the bulb would not light up.
一个开关是打开或关闭一个电路的装置。当你打 开一盏灯,你关闭了一个电路。你让两个导电体 碰触在一起,所以电流可以流动。电灯里的灯泡 就亮了。	A <b>switch</b> is a device that opens or closes a circuit. When you switch on a lamp, you close the circuit. You allow two conductors to touch so that the current can flow. The bulb in the lamp glows.
当你关掉一盏灯,你打开了一个电路。当电路是	When you switch off a lamp, you open the circuit. When the circuit is open, the current

开放的, 电流不能够流动, 灯泡就不会亮。

cannot flow, the bulb doesn't glow.



# 复习:

- 1. 当一个驾驶压方向盘上的喇叭,会发生什么?
- 2. 形容当一个电热器的开关打开的时候,电热器里的电流如何流动?
- 3. 开关把什么连接在一起?

# **Review:**

- 1. What happens when a driver presses on the steering wheel to honk the horn of a car?
- 2. Describe the flow of current through an electric heater when the heater is switched on.
- 3. What does a switch bring together?

第六单元: 电和磁性	Unit 6: Electricity and Magnetism
关键问题:	<b>Essential Question:</b>
电和磁性的特质(属性)是什么?	What are the properties of electricity and
	magnetism?
6.2 主要观念	Key Idea 6.2:
建造和图解一个电路	Construct and diagram an electrical circuit
科学用语:	Scientific Terms:
1. 串联式电路 2. 并联式电路 3. 路径	1. series circuit 2. parallel circuit 3. path
<b>内容</b> : 电路并不是按照一样的方式排列的。灯泡可以放置 於两种电路, <b>串联式电路</b> 和 <b>并联式电路</b> 。	Content: Electrical circuits are not all laid out in the same way. Light bulbs can be a part of two kinds of circuits—series circuits and parallel circuits.
在一个串联式电路里,灯泡是位于同一个路径。一个简易的例子有两个灯泡,一个电池,和电线。电流在路径里从电池流出,穿过第一个灯泡,再穿过第二个灯泡,然后回到电池。如果你把其中一个灯泡拿走或转松,电路就打开了电路一旦打开,电流无法到达电路其他的部位。试想如果你家所有的灯和电器品都是串联式电路的一部份,将会发生什么?除非你把所有的灯和电器都打开,不然电路是开放式的。没有任何一盏灯和电器可以运作。	In a series circuit, the bulbs are in the same <b>path</b> . A simple example has two bulbs, one battery, and wires. The current flows in a path from the battery, through the first bulb, through the second bulb, and back to the battery. If you remove or turn off either bulb, the circuit opens. Current cannot reach the other parts of the circuit. Think about what would happen if all the lights and appliances in your home were parts of a series circuit. Unless you had all the lights and appliances on, the circuit would be open. None of the lights and appliances would work.
	SERIES  Battery  Lamp  Lamp  Lamp  Lamp  Lamp  Lamp  Lamp

个并联式电路有一条以上的路径让电流流动。如

A parallel circuit has more than one path for the

果有某些东西将电荷在一条路径上挡住,它们可以 走另一条路径。

在这个并联式电路图片里,你可以看到两条电流路径。电流穿过两个灯泡,将两个灯泡点亮。如果其中一个灯泡不见了或损坏了,电流仍是可以流动到另一个灯泡。一条路径被切断并不会阻挡电流。当并联式电路的一部份不能运作,电路的另外一部份仍然继续运作。电流仍是有一条路径可以让它通行。

electric current to follow. If something stops charges from moving along one path, they can take another.

In the picture of a parallel circuit, you can see two circular paths. The current can travel through both bulbs and light them both. If one bulb is missing or damaged, however, the current can still travel through the other bulb. Breaking one path doesn't stop the current. When one part of a parallel circuit fails, the other parts of the circuit continue to work. The electric current still has a path along which it can travel.

## 复习:

- 1. 一个并联式电路和串联式电路如何不同?
- 2. 假设你想要装饰一间房间来开派对。你计 划买一些灯来装饰。哪一种电路比较好? 为什么?
- 3. 用以下的名称来画一个串联式电路。 电线,开关,灯泡,电池

#### **Review:**

- 1. How is a parallel circuit different from a series circuit?
- 2. Suppose you want to decorate a room for a party. You plan to buy strings of lights. Which type of circuit would it be better to get? Why?
- 3. Use the following terms to draw a series circuit.
  - wire, switch, bulb, battery

第六单元: 电和磁性	Unit 6: Electricity and Magnetism
关键问题:	Essential Question:
电和磁性的特质(属性)是什么?	What are the properties of electricity and
	magnetism?
6.3 主要观念	Key Idea 6.3:
辨认一个电路里的导电体和绝缘体	Identify conductors and insulators in an electrical circuit.
科学用语:	Scientific Terms:
1. 导电体 2. 绝缘体 3. 电阻	1. conductor 2. insulator 3. resistance
4. 超导体	4. superconductor
内容:	Content:
电流在一些材料里很容易的流过。这些材料是导电	Electric current passes easily through some
体。许多金属都是很好的导电体,尤其是铜。	materials. These materials are <b>conductors</b> . Many metals are good conductors, especially copper.
   电流在其他的材料里不能容易的流过。这些材料是	Electric current does not pass easily through other
<b>绝缘体</b> 。空气,橡胶,玻璃,和塑料都是绝缘体。	materials. These materials are <b>insulators</b> . Air,
之 <b>以</b> 种。工 (,	rubber, glass, and plastic are insulators.
	Take a look at an electric cord. The metal wire
仔细看一下电线。里面的金属线引导,或带领,电 流进入电器。而外面的橡胶绝缘体防止电流流到它	inside conducts—or carries—the current into an
不该去的地方。	appliance. The rubber insulator on the outside
	keeps the current from flowing where it should
	not go.
	Resistance measures how well electricity flows
电阻是测量电在一种材料里的流畅度。好的绝缘体	through a material. Good insulators have high
有高的电阻。好的导电体有低的电阻。超导体没有	resistance. Good conductors have low resistance.
任何电阻。	Superconductors have no resistance at all.
	Many everyday things do their jobs safely and
许多日用品能够安全的并完善的被使用,都是因为	well because of the way insulators and conductors
绝缘体和导电体互相运作的关系。如果你仔细看一	work together. If you look at the bottom of a light
个电灯泡的底座,你会看到一个小小的金属片将电	bulb, you will see the small metal tip that
流从插座导引到灯泡。就在金属片的上方,你会看	conducts the current from the socket into the bulb.
到一条黑边。这个黑边是一个绝缘体。它不让电流	Just above the tip, you will see a black band. This
从金属片流到上面的金属螺旋线。	band is an insulator. It does not allow the current
	to flow from the metal tip to the metal screw
复习:	threads above it.  Review:
1. 当一个电流碰到一个导电体的时候,会发	1. What happens when a current reaches a
生什么?当一个电流碰到一个绝缘体的时	conductor? What happens when it reaches an insulator?
候,又会发生什么?	an insulator?

- 2. 绝缘体和导电体有何不同? 为什么两者都很重要?
- 2. How are insulators and conductors different? Why are both important?

第六单元: 电和磁性	Unit 6: Electricity and Magnetism
<b>关键问题:</b> 电和磁性的特质(属性)是什么?? <b>6.4 主要观念</b> 比较不同物品的电和磁的特性	Essential Question: What are the properties of electricity and magnetism?  Key Idea 6.4: Compare the electrical and magnetic properties of
科学用语:         1. 特性 2. 吸引 3. 磁铁 4. 铁质         5. 铜	different materials.  Scientific Terms:  1. property 2. attract 3. magnet 4. iron 5. copper
内容: 何种材料构成一个物体决定它的特性。我们知道一个软木塞是来自一棵树,它会在浮在水面上,但是一根铁钉在水里就会下沉。铁钉的另外一个特性是它对磁铁的吸引力,但是并不是所有的金属材料都有这个磁性的特性。一个铜质的一分钱硬币和一片铝箔纸都无法吸引磁铁。含有铁质的金属物体才会对磁铁吸引。许多钢製金属物体,都有含铁在内。	Content: The materials that an object is made up of determine some of its properties. We know that a cork, which comes from a tree, will float in water, but a metal iron nail will sink. Another property of an iron nail is its attraction to a magnet, but not all metals have this magnetic property. Neither a copper penny nor a piece of aluminum foil will be attracted to a magnet. Metal objects with iron in them are attracted to a magnet. Many metal objects are made of steel, which has iron in it.
铜和铝箔都无法和磁铁相吸引,但是铜有一个特性是和铝箔不同的。铜是一个很好的导电体。 铝箔是一个很弱的导电体。 这就是为什么铜被用在电器用品的电线里和我们家庭里的电线里。好和弱的导电能力是实体的另一个特性。	Both copper and aluminum cannot be attracted to a magnet. However, copper has a property that is does not share with aluminum. Copper is a good conductor of electricity. Aluminum is a poor conductor of electricity. That is why copper is used in the wiring in electrical appliances and in the wires in your home. Good or poor conductivity is another property of matter.
<ul><li>复习:</li><li>1. 你如何测试磁力的特性?</li><li>2. 如果一个迴文针可以被一个磁铁吸引,那我们知道有什么一定要在这个迴文针里?</li><li>3. 是否所有金属的特性都一样?给一个例子。</li></ul>	<ol> <li>Review:         <ol> <li>How can you test for the property of magnetism?</li> <li>If a paper clip can be attracted to a magnet, what must be in this paper clip?</li> </ol> </li> <li>Are the properties of all metals the same?         <ol> <li>Give an example of your answer.</li> </ol> </li> </ol>

第六单元: 电和磁性	<b>Unit 6: Electricity and Magnetism</b>
关键问题:	Essential Question:
电和磁性的特质(属性)是什么?	What are the properties of electricity and magnetism?
6.5 主要观念	Key Idea 6.5:
研究磁铁的特性	Investigate properties of magnets
科学用语:	Scientific Terms:
1. 磁铁 2. 吸引 3. 障碍物	1. magnet 2. attract 3. barrier
4. 磁场 5. 排斥	4. magnetic field 5. repel
内容:	Content:
一个磁铁是一个物体能够吸引铁质和一些其他的	A magnet is an object that attracts iron and a
金属材料。磁铁能够吸引钢,因为钢含有铁质。	few (not all) other metals. Magnets attract steel
当你拿著一个铁质物体或一个钢质物体靠近一个	because it contains iron. When you bring an iron
磁铁的时候,物体会朝磁铁靠近。	object or a steel object close to a magnet, the
	object moves toward the magnet.

同。有些磁铁的形状像棒子。其他的有U型的磁 铁。有些可以吸附在电冰箱门上的磁铁,是扁薄 型的。

距离影响一个磁铁的吸引力。一个小的钢质物体 靠近磁铁, 便会往磁铁靠近。但是, 同样的物体 如果拿到远处,它便不会朝磁铁方向靠近。

其他的力可以抵消磁铁的力。磁铁吸附在冰箱的 门上,但是你可以容易的把它们拔下来。

障碍物也可以干扰一个磁铁的拉力。一个冰箱上 的磁铁也许可以吸住一张到两张纸在门上, 但是 如果你放太多张纸在磁铁下, 磁铁便会掉下来。

磁铁可以让一些其他的物体產生磁性。例如,如 果你拿著一根针在一个磁铁上同样的方向摩擦数 次,这根针将会变得带有磁性并可以把另一根针 吸起来。

磁场是围绕在磁铁的周围,可以感受到磁力的范 围。如果你洒铁屑在一块磁铁上,铁屑会排列成 alike. Some magnets are shaped like bars.

Others are U-shaped. Some magnets that stick to refrigerator doors are thin, flat shapes.

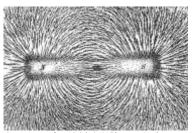
Distance affects the strength of a magnet's attraction. A small steel object that is close to a magnet moves toward it. However, it the same object is farther away, it will not move toward the magnet.

Other forces can overcome the force of a magnet. Refrigerator magnets stick well to the door, but you can easily pull them off.

**Barrier**s can interfere with a magnet's pull, too. A refrigerator magnet may hold one or two sheets of paper to the door, but if you put too many sheets under it, the magnet will fall.

Magnets can make some other objects magnetic. For example, if you rub a needle over a magnet several times in the same direction, the needle will become magnetic enough to pick up other needles.

The **magnetic field** of a magnet is the space around the magnet where its force, or magnetism, 曲线的模式。铁屑之所以产生这种模式是因为最强力的磁场是位於磁铁的两端,或两极。



如果一个磁铁掛著,让它可以自由的转动,它的一极会指向北边。那是因为地球本身是一个巨大磁铁。磁铁有两极,北极和南极。如果你把两个磁铁边靠边放,你会看到相反的两极会互相吸引,而相同的两极会互相排斥。

can be felt. If you sprinkle iron filings on a magnet, the filings line up in a pattern of curved lines. The filings make the pattern because the magnetic field is strongest near the ends, or poles, of the magnet.

If a magnet is hung so that it can move freely, one pole will point north. That is because Earth itself is a large magnet. Magnets have two poles, a north pole and a south pole. If you placed two magnets side by side, you would see that opposite poles attract, or come together, and like poles **repel**, or move apart from, each other.

# 复习:

- 1. 如果你用一个磁铁来捡钢针,你认为磁铁的那边会吸起最多的针?为什么?
- 2. 解释为什么有些金属物体不会吸引磁铁。
- 3. 距离和磁性的关系是什么?

## **Review:**

- 1. If you use a magnet to pick up steel pins, where on the magnet would you expect the most pins to stick? Why?
- 2. Explain why some metal objects are not attracted to the magnet.
- 3. What is the relationship between the distance and magnetism?

第六单元: 电和磁性	Unit 6: Electricity and Magnetism
<b>关键问题:</b> 电和磁性的特质(属性)是什么?	Essential Question: What are the properties of electricity and magnetism?
<b>6.6 主要观念</b> 探索电和磁性的互动并创建一个电磁铁	Key Idea 6.6: Explore the interaction of electricity and magnetism to create an electromagnet.
<b>科学用语:</b> 1. 电磁铁	Scientific Terms: 1. electromagnet
内容: 一个电流在电线里流动在电线周围造成磁场。如果电线是环綫的形状,磁场就更强。一个电流循著环綫流动造成一个电磁铁。如果电流关闭,这个电磁铁就不再具有磁性。这个电磁铁也被关闭。	Content: An electric current moving through a wire causes a magnetic field around the wire. If the wire is shaped into loops, the magnetic field gets stronger. An electric current running through a loop of wire makes an electromagnet. If the electric current is shut off, the electromagnet is no longer magnetic. The electromagnet is turned off.
一个电磁铁通常有一块铁在中间。当电流从电线流过,电线和铁变成有磁性。铁的磁场加上电线的磁场。电磁铁就变得更强。	An electromagnet usually has a piece of iron in its center. When current runs through the wire, the wire and the iron become magnetic. The magnetic field of the iron is added to the magnetic field of the wire. The electromagnet becomes stronger.
利用许多线圈和强力的电流,电磁铁可以非常强力。在废铁场里,这种电磁铁可以举起许多吨的废铁和钢。	With many coils of wire and a strong current, electromagnets can be made very strong. In junkyards, such electromagnets lift many tons of scrap iron and steel.
复习:	Review:
1. 如何制作一个电磁铁? 2. 为什么一个电磁铁不是一个永久性的磁铁?	<ol> <li>How can you make an electromagnet?</li> <li>Why is an electromagnet not a permanent magnet?</li> </ol>

第六单元: 电和磁性	Unit 6: Electricity and Magnetism
关键问题:	<b>Essential Question:</b>
电和磁性的特质(属性)是什么?	What are the properties of electricity and
	magnetism?
6.7 主要观念	Key Idea 6.7:
形容电如何帮助或伤害人类(安全性)	Describe how electricity can be helpful or
	harmful to people (safety).
科学用语:	Scientific Terms:
1. 传导 2. 绝缘 3. 电流	1. conduct 2. insulation 3. electric current
内容: 电是电能。电可以改变成光能和热能。如果使用 得不正确,电是危险的。它可以造成烧伤和休 克,如果电穿越过一个人的身体,它还会造成死 亡。一个很重要的安全守则我们必须要遵守的 是,当你是湿的时候,绝对不可以碰触任何有电 的东西。你皮肤上的水份可以 <b>导电</b> 。它可以引导 电进入你的身体。	Content:  Electricity is electric energy. Electricity can be changed into light energy and heat energy.  Electricity is dangerous if it is not used correctly. It can cause burns, shock, and death if it travels through a person's body. An important safety rule to follow is never touch anything electrical while you are wet. Water on your skin can conduct electricity. It can lead the electricity into your body.
不要使用电线外面的 <b>绝缘材料</b> 有磨损或断裂的电灯和电器。因为 <b>电流</b> 可以很容易的行进到你的身体。电流也会引起失火。	Do not use electric lamps and appliances that have cords with worn, cut, or broken <b>insulation</b> around the wires. The <b>electric current</b> could easily travel to your body. The current also could start a fire.
人类也必须非常小心的是不要插太多的电灯和电器在同一个插座。太多的电流从插座穿过,可能会让墙壁内的电线过热而造成失火。然而,大部份的家庭都有一种开关装置可以防止太多的电流在电路里流动。如果有太多的电流在电路里流过,这种开关,一种保险丝或断路器,会打开电路。这样,就没有任何电流可以流过电路。	People also need to be careful not to plug too many lamps and appliances into the same outlet. Too much electric current flowing through the outlet might make the wires in the wall hot enough to start a fire. However, most homes have a kind of switch that stops too much current from flowing through a circuit. This switch—a fuse or circuit breaker—opens the circuit when too much current flows through it, stopping the flow of electricity. Electric current cannot flow through the open circuit.
复习:	Review:
	1. What are two ways you are been also to
1. 哪两种方法可以防止电流进入你的身体?	1. What are two ways you can keep electric current from getting into your body?
2. 为什么将电线从地毯下穿过是不安全的?	<ul><li>2. Why is it unsafe to run electric cords under a rug?</li></ul>

## 解答

# 6.1

- 1. 按喇叭控制一个电路, 让电荷从电池穿过喇叭在回来。流动的电流穿过喇叭让喇叭 產生声音。
- 2. 当打开电热器时,电流可以沿著一个完全的电路流动,从电源穿过电热器然后再回来。
- 3. 一个开关可以把导电体连接起来。

### **6.2**

- 1. 一个并联式电路有超过一条路径让电流通过。如果一条路径打开或损坏,电可以沿著其他的路径流动。一个串联式路只有一条路径可以让电流通过。
- 2. 一个并联式电路比较好,因为如果一条路 径不能作用,其他的路径仍可以运作。一 个 串联式电路比较好因为它容易开关所 有的部份。
- 3. (范例, 开关可以放置在任何部位)

## 6.3

- 1. 一个电流从一个导电体流过。当这个电流 碰到一个好的绝缘体,它就会停下来。
- 2. 绝缘体阻挡电流的流动。它们对於安全来说是非常重要的。导电体让电流过。

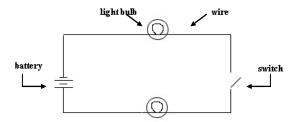
# **Answer Key**

### 6.1

- 1. Pushing on the horn control completes a circuit and lets charges flow from the battery through the horn and back again. The current flowing through the horn makes it sound.
- 2. When the heater is switched on, current can travel along a complete circuit, from the power source through the heater and back again.
- 3. A switch can bring conductors together.

## **6.2**

- 1. A parallel circuit has more than one path that the current can follow. If one path is open or damaged, electricity can flow along the other path. A series circuit has only one path that current can follow.
- 2. A parallel circuit is better, because if one path isn't working, another path will work. A series circuit is better because it is easy to switch all parts on and off.
- 3. (a sample diagram, switch can be placed anywhere)



## 6.3

- 1. An electric current flows through a conductor. When the current reaches a good insulator, it stops.
- 2. Insulators stop the flow of current. They are important for safety. Conductors let electricity flow.

#### 6.4

- 1. 用一个磁铁来测试一个物体是否可以吸引磁铁。
- 2. 这个迴文针一定含有铁质,因为铁有磁性的特性。
- 3. 不是,金属有不同的颜色,电力,和磁力,等等。例如,铁有电的能力和磁性的特性。然而,铜是一种金属,导电能力很好,但是不能被磁铁吸引。

#### 6.5

- 1. 磁铁的两端,或两极会有最多的针,因为那是磁铁最强的地方。
- 2. 这些金属物体没有含铁。
- 3. 物体的磁力跟著距离的增加而减弱。

#### 6.6

1. 你可以将电线绕成线圈的形状,让电流可以通过。如果我们将铁放进线圈内,通电后铁和线圈都会变成电磁铁。制造一个相当强壮的磁场。

2. 只有当电流通过电线的时候,电磁铁才有磁力。如果电流被关闭,电磁铁也被关闭。

### 6.7

1. 当你湿的时候,绝对不要碰触和电有关的 任何东西。不要使用有损坏的电线或电线 的绝缘体破损的任何电器。

#### 6.4

- 1. Use a magnet to see if the item is attracted to it.
- 2. The paper clip must with iron in it, because iron has magnetic property.
- 3. No, metals differ in color, electrical and magnetic ability, etc. For example, iron has electrical and magnetic ability. However, copper is a kind of metal that good in conducting electricity but will not be attracted to a magnet.

### 6.5

- 1. The most pins will be on the ends or poles of the magnet, because that is where the magnet is the strongest.
- 2. These metal objects do not have iron in them.
- 3. The force of magnetism on objects decreases as the distance increases.

#### 6.6

- 1. An electric current moving through a wire creates a magnetic field around the wire. You can make an electromagnet by shaping the wire into loops and allowing the current to flow through it. If you wrap the loops of wire around an iron core, both the iron and the loops of wire become magnetic as electricity flows through the wire, creating a much stronger electromagnet.
- 2. The electromagnet is not a permanent magnet because it has a magnetic force only when an electric current moves through the wire. If the electric current is shut off, the electromagnet is turned off.

#### 6.7

1. Never touch anything electrical while you are wet. Do not use electric any appliances that have cords with worn, cut,

- 2. 把电线从地毯下穿过是不安全的。因为我们可能不会注意到有任何的电线有破损,断裂,或电线外面的绝缘体有损坏的情形。电流会很容易的流动到你的身体。电流也很容易引起火灾。
- or broken insulation around the wires.

  2. It is unsafe to run electric cords under a
- 2. It is unsafe to run electric cords under a rug because we would not notice if there is any cords with worn, cut, or broken insulation around the wires. The electric current could easily travel to your body. The current could also start a fire.