



雨树榕榕

英国最具影响力的青少年科普读物之一

(英)托马斯(Thomas, I.) 著

田秋 刘爱国 译

SEARCH and RESCUE

【热能的转换】

搜救行动



哈尔滨工业大学出版社
HARBIN INSTITUTE OF TECHNOLOGY PRESS

SEARCH and RESCUE

【热能的转换】

搜救行动

哈尔滨工业大学出版社

版权专有 侵权必究

图书在版编目 (CIP) 数据

搜救行动: 英汉对照 / (英) 托马斯 (Thomas, I.) 著; 田秋, 刘爱国译. — 哈尔滨: 哈尔滨工业大学出版社, 2009. 4
(雨树溶溶. 第2辑)
ISBN 978-7-5603-2821-8

I. 搜… II. ①托…②田…③刘… III. ①英语-汉语-对照读物②科学知识-青少年读物 IV. H319.4: Z

中国版本图书馆CIP数据核字(2009)第037748号

黑版贸审字08-2009-043号

Search and Rescue by Isabel Thomas

© Harcourt Education Ltd 2008

The moral right of the proprietor has been asserted.

英汉双语版由Capstone Global Library Limited授权哈尔滨工业大学出版社在中国大陆地区独家出版发行

责任编辑 孙 杰 田 秋

美术设计 屈 佳

出版发行 哈尔滨工业大学出版社

社 址 哈尔滨市南岗区复华四道街10号 邮编 150006

传 真 0451-86414749

网 址 <http://hitpress.hit.edu.cn>

印 刷 黑龙江日报印务中心

开 本 787×1092mm 1/16 印张 24 字数 600 千字

版 次 2009年4月第1版 2009年4月第1次印刷

书 号 ISBN 978-7-5603-2821-8

印 数 1—5000

定 价 201.60 元 (共12本,含光盘)

(如因印装质量问题影响阅读,我社负责调换)

Contents 目录

"Mayday, Mayday!" “救救我！”	4
The heat is on 热浪袭人	8
Pass it on 接二连三	12
On the trail 继续追踪	20
Found! 找到了!	24
Mission debrief 行动总结	28
Glossary 词汇表	30
Want to know more? 想知道得更多吗?	31
Index 索引	32

有些单词被印刷成粗体，**就像这样**。你可以在第30页中找到它们的意思，还可以在单词第一次出现时，在相关书页下方的方框内发现它们的含义。

"Mayday, Mayday!"

“救救我！”

A soldier is lost in the jungle. He radios for help: "Mayday, Mayday!". Then the radio goes dead. A team gets ready to look for him. They are **commandos**. Commandos are specially trained soldiers. They go on search and rescue missions. A commando never leaves another soldier in danger.

The trees in the jungle grow very close together. It is difficult to see through the trees from the air. The commandos have to go in on foot. They carry everything they need on their backs.

The commandos will use **energy** on their mission. Energy makes things happen. It can make objects move. It can make objects change shape. There are many different types of energy. Energy lets the commandos see. Energy powers their tools. Energy keeps them warm.

Every minute is important. The mission is about to begin.

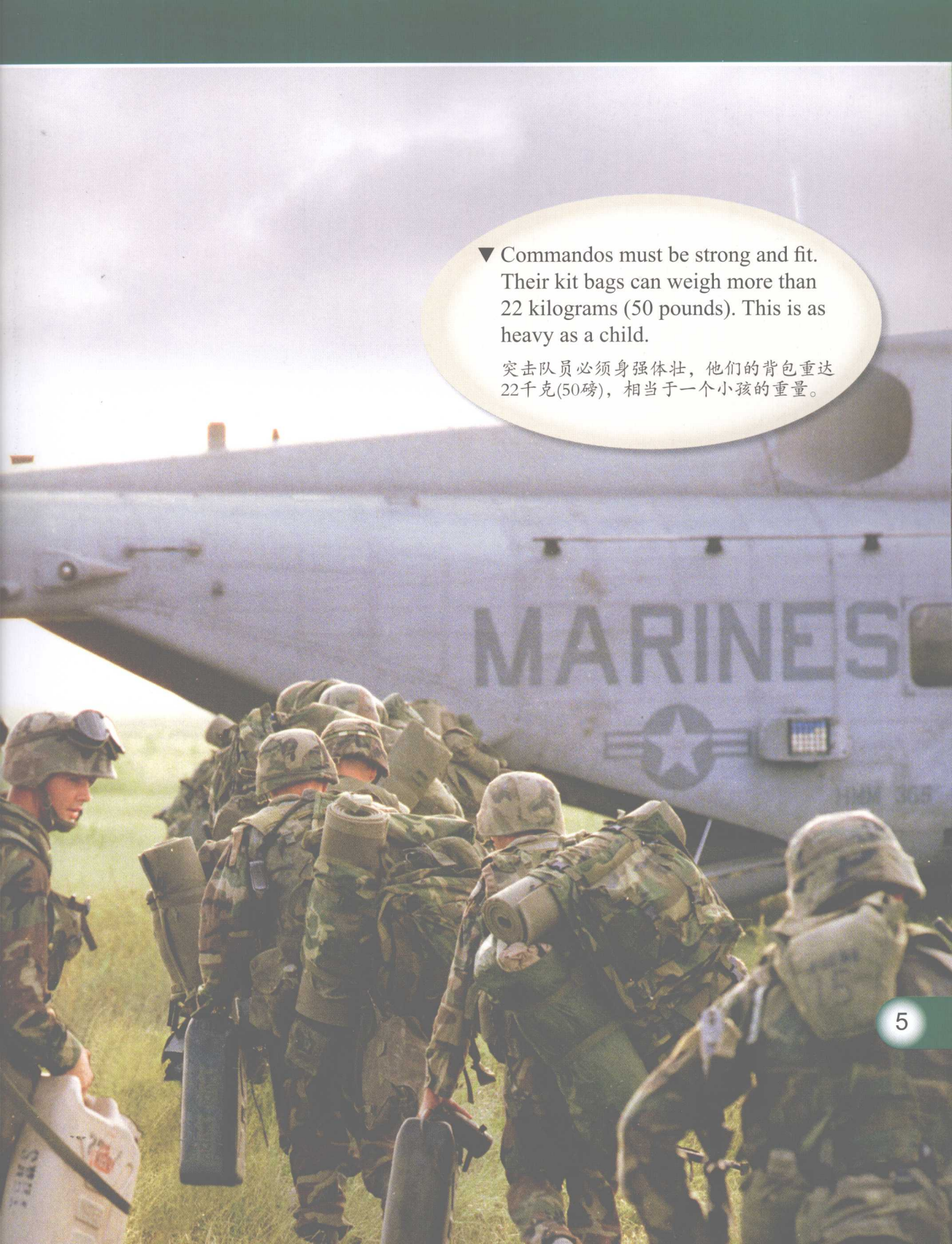
一名士兵在丛林里失踪了。他的无线电发出了最后的求救信号后，就悄无声息了。一小队人马整装待发，准备搜救。他们是**突击队员**，是受过特殊训练的士兵，专门执行搜救任务。突击队员总能帮助遇险士兵脱离险境。

丛林里枝繁叶茂，想从空中搜寻目标太困难了。突击队员必须徒步搜索，一切装备随身携带。

突击队员在执行任务时要利用**能量**。任何变化都需要能量，能量可以使物体移动，或者改变形状。能量以多种形式存在，它可以帮突击队员侦察环境，启动装备，甚至取暖自护。

分秒必争，开始行动吧！



A photograph of several Marine commandos in camouflage uniforms and helmets, heavily laden with gear, walking away from the viewer. They are carrying large backpacks and some are holding equipment like a white container. In the background, the side of a large military transport aircraft is visible, with the word "MARINES" and a star insignia painted on it. The scene is set outdoors in a grassy field under a cloudy sky.

▼ Commandos must be strong and fit. Their kit bags can weigh more than 22 kilograms (50 pounds). This is as heavy as a child.

突击队员必须身强体壮，他们的背包重达22千克(50磅)，相当于一个小孩的重量。

Jungle drop

丛林空降

The commandos fly to the jungle in a helicopter. Everything that moves has **energy**. The flying helicopter has energy. It has movement energy. Movement energy is called **kinetic energy**. Big, fast objects have a lot of kinetic energy.

Energy can be changed from one type to another. The helicopter flies up. It has kinetic energy. The commandos sitting in the helicopter have **potential energy**. Potential energy is stored energy. The commandos have energy that is waiting to be used.

The commandos parachute down to the ground. As they fall, their potential energy changes. It changes back to kinetic energy. This is because they are moving. The flowchart on page 7 shows how energy changes.


突击队员乘直升机飞往丛林。运动的物体都具有**能量**。飞行的直升机所具有的能量是由运动产生的。运动的能量称为**动能**。质量大速度快的物体具有的动能也大。

能量可以从一种形式转变成另一种形式。直升机起飞了，具有了动能。而坐在直升机里的突击队员具有**势能**。势能是一种储存起来的能量。突击队员的能量过一会儿才会释放出来。

突击队员开始跳伞。当他们降落的时候，势能发生变化，又变回动能。这是因为他们正处于运动中。第7页的流程图显示了能量的变化。

- The falling soldier is moving. He has kinetic energy.

空降中的士兵在运动着，他具有动能。



The helicopter rises. It has **kinetic** (movement) **energy**.

直升机起飞时，具有**动能**。

The commandos are sitting in the helicopter. They have **potential** (stored) **energy**.

突击队员坐在直升机里时，具有**势能**。

The falling commandos have **kinetic** (movement) **energy**.

突击队员从空中降落时，具有**动能**。

The heat is on

热浪袭人

The air feels hot and damp. The **commandos** look for tracks on the ground. They move through the trees. They have **kinetic** (movement) **energy**.

Everything is made of tiny pieces. These tiny pieces are called **particles**. The particles **vibrate**. This means they move back and forth all the time. The particles have a different type of kinetic energy. It is called **thermal energy**.

We cannot see thermal energy. But we can feel it. Thermal energy causes heat. The commandos feel the thermal energy (heat) of the hot air.

空气闷热潮湿。突击队员仍在仔细地搜寻地面上一切可疑的痕迹。他们在树林里穿行。他们具有**动能**。

一切物体都是由**微粒**组成的。这些小微粒称为粒子。粒子在不停地**振动**，也就是不停地前后运动，因此，它们具有另一种形式的动能——**热能**。

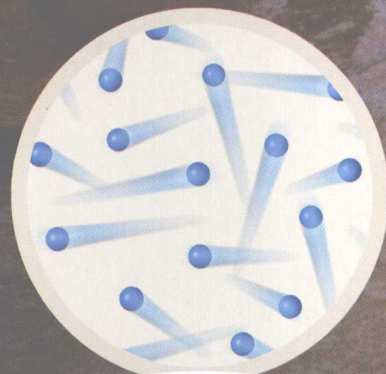
我们看不到热能，但却能感觉到它。热能会使人产生热的感觉，因此，突击队员能够感觉到闷热空气中的热能。

Hot or cold?

热还是冷?

Hot things have fast-moving particles. The commandos boil some water. The water particles move more quickly. The water gets hotter.

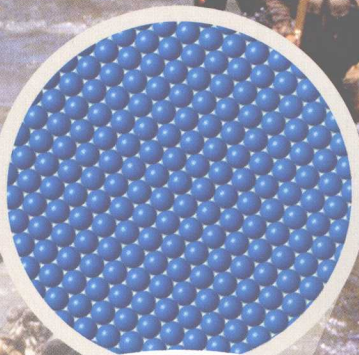
热的物体内部粒子运动得快。突击队员给水加热，水中的粒子就运动得越来越快，水也越来越热。



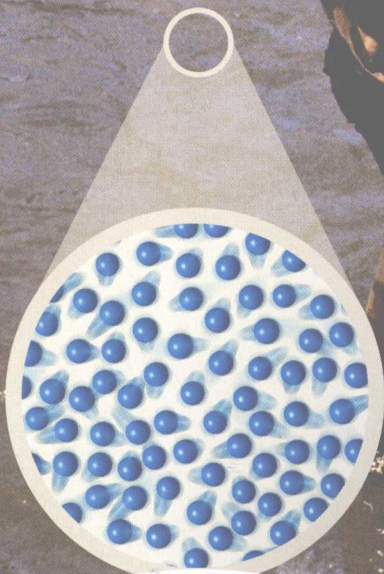
gas particles (air)
气体粒子(空气)

▼ Everything is made of tiny particles. The particles have kinetic (movement) energy.

一切物体都是由粒子组成的，粒子具有动能。



solid particles (plastic)
固体粒子 (塑料)



liquid particles (water)
液体粒子 (水)

One way only 单向流动

Thermal energy (heat) always flows from hot objects to cooler objects. It never flows the other way. Heat cannot travel from a cool pan to a hot fire.

热能总是从热的物体流向冷的物体，从不反向流动，也就是说热从来不会从冷的锅传向热的火。

▼ Heat energy from the campfire makes the soldiers warmer.

士兵在燃烧的篝火旁取暖。

Setting up camp

安营扎寨

Daylight is fading fast. The **commandos** find a clearing to camp in. They put up hammocks to sleep in. They collect wood. They build a campfire to boil water and cook food.

The campfire has lots of **thermal energy** (heat energy). We cannot see thermal energy. But we notice when it moves from one place to another. This is called **heat transfer**. Heat moves from hot substances to cooler substances. The cooler substances get warmer.

Thermal energy moves from the campfire to other places. Thermal energy is transferred to the pans. It is transferred to the air. It is transferred to the soldiers. It makes them warmer.

天色渐晚，**突击队员**找了一块空地开始宿营。他们支帐篷，捡木头，点起篝火，烧水做饭。

火具有大量的**热能**。我们看不到热能，但能感觉到它在不同物体之间的传递，这称为**热传递**。热量从热的物体传向冷的物体，冷的物体就变热了。

热能从篝火传到其他地方，传到锅里，传到空气中，也传到士兵身上，他们感到很暖和。

The campfire has
thermal energy
(heat).

篝火具有**热能**。

Thermal energy
heats the pans.

热能加热了锅。

Thermal energy
heats the soldiers.

热能使士兵感到
暖和。

Pass it on

接二连三

The **commandos** cook food in a pan. Heat is transferred (moved) from the hot fire to the pan. Heat can move in three ways. The first is called **conduction**. Heat moves through a pan by conduction.

A pan is made of metal **particles** (tiny pieces). The particles **vibrate**. They move back and forth all the time. The campfire heats the bottom of the pan. The particles at the bottom of the pan begin to vibrate more quickly. They now have **thermal energy** (heat energy).

The fast-moving particles bump into slower particles. Some of their **energy** passes to the slow-moving particles. The slower particles begin to move more quickly, too. They now have more thermal energy. They pass it on to particles next to them.

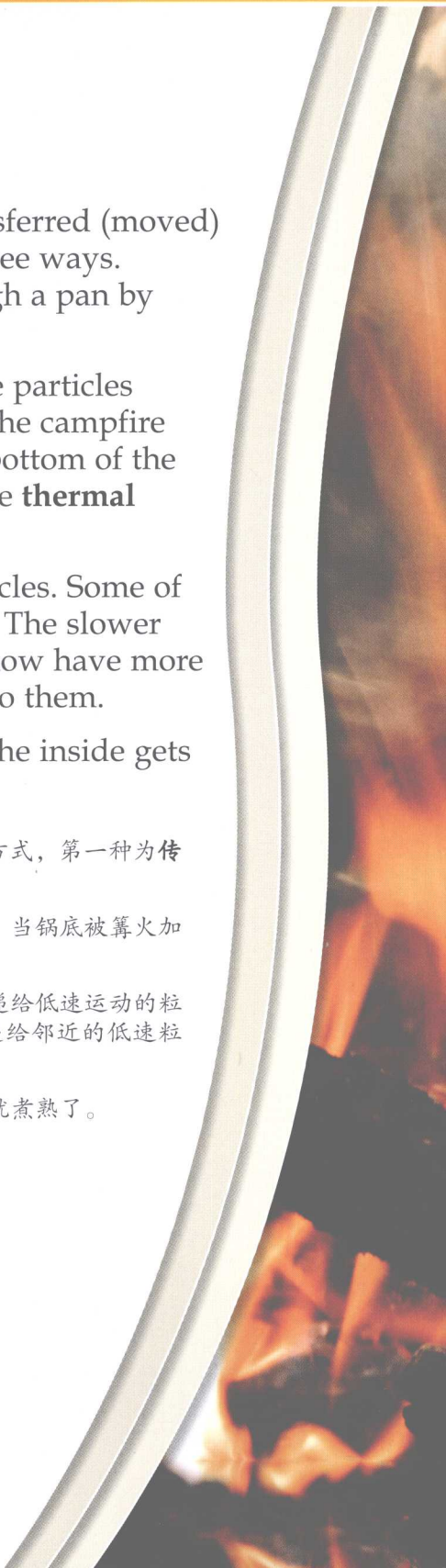
Heat is conducted all the way through the pan. The inside gets as hot as the outside. The heat cooks the food.

突击队员开始做饭。热量从炽热的火焰传到锅里。热有三种传递方式，第一种为**传导**。热就是通过传导的方式传到锅里。

锅是由金属**粒子**构成的。粒子在**振动**，也就是在不停地跑来跑去。当锅底被篝火加热，锅底的粒子就加快了振动，于是它具有了更多的**热能**。

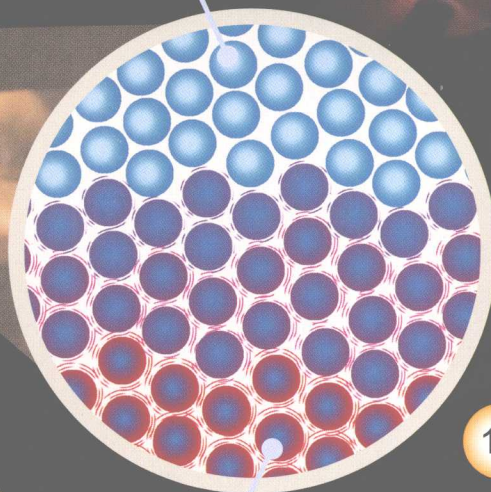
快速运动的粒子与低速运动的粒子发生碰撞后，将一部分**能量**传递给低速运动的粒子，这些粒子运动加快，具有了更多的热能。它们再把热能传递给邻近的低速粒子。如此接二连三地传递下去。

热量在锅里沿着各个方向传递，直到锅的内外温度一样高，食物就煮熟了。





cold particles
冷的粒子



hot particles
热的粒子

▲ In conduction, fast-moving particles bump into slow-moving particles. Thermal energy (heat) flows from hot parts of the pan to cooler parts of the pan.

在传导过程中，快速运动的粒子和低速运动的粒子发生碰撞，于是，热量就从锅热的部分传到凉的部分。

Too hot to handle

太热了，碰不得

The **commandos** are careful not to touch the hot metal pan. Metals are good **conductors**. They pass on heat when **particles** (tiny pieces) bump into each other. This is called **conduction**.

Metal particles are packed closely together. They bump into each other often. Heat is conducted (moves) quickly through a metal. Metal is a solid. Solids are the best conductors.

Many things do not conduct heat well. They are called **insulators**. Gases are good insulators. Air is a gas. Air is a good insulator. Some solids are good insulators, too. Plastic is a solid. The commandos use pans with plastic handles. Plastic is a good insulator. It does not conduct heat very well. It stays cool enough to touch.

突击队员小心翼翼，不去碰灼热的饭锅。金属是热的良导体，它通过粒子的碰撞传递热量。这种方式称为传导。

金属粒子相互之间挨得很近，经常发生碰撞。热在金属中传导得非常快。金属是一种固体，固体多为热的良导体。

导热不好的物体被称为绝热体。气体是良好的绝热体。空气是气体，它就是良好的绝热体。有些固体也是良好的绝热体，例如塑料。突击队员使用带有塑料把手的锅。塑料是良好的绝热体，导热性差，因此，塑料把手不太热，可以用手摸。

Good insulators

良好的绝热体

Heat is lost through a person's hands and feet. Commandos wear boots with thick rubber soles. Rubber does not conduct heat well. Rubber is a good insulator. It does not take heat away from the feet.

热量可以通过人的手脚散发掉。突击队员穿着厚橡胶底的靴子。橡胶导热性差，是良好的绝热体，可以防止热量散失。





- ▲ Metal binoculars get very hot in the Sun. Commandos use binoculars with plastic handles. Plastic is a good insulator. It does not conduct heat very well. The plastic handles stop the commandos' hands from getting too hot.

在太阳的照射下，金属望远镜会变得非常热。塑料是良好的绝热体，导热性差。突击队员用的望远镜有塑料把手，所以不会烫手。

Heat flow

热对流

The jungle gets cooler at night. The **commandos** on night watch need to stay warm. They collect water to make hot drinks. They boil it over the campfire.

Water is a liquid. It does not conduct heat as well as the metal pan. But in a few minutes all the water in the pan is hot. Heat energy has transferred (moved) through the water. This is called **convection**.

The metal pan is hot. It heats the water at the bottom of the pan. The hot water rises to the top. It carries **thermal energy** (heat) to the water in the rest of the pan. Cold water sinks. It fills the space left by the rising hot water. The cold water is heated up. It rises to the top of the pan. Water keeps moving around the pan. It keeps moving until all the water has the same **temperature**.

Convection is the second type of **heat transfer**.

夜晚，丛林凉风阵阵。站岗的**突击队员**需要保暖。他们想用篝火烧些热水来喝。

水是液体，它不能像金属锅那样传导热量。但几分钟后，整个锅里的水也都变热了，因为，热量可以在水中传递。这种方式称为**对流**。

金属锅是热的。首先，它加热锅底部的水。然后，热水不断上升，把**热能**带到四面八方。同时，冷水向下流动，填满上升的热水留下的空间。冷水又被加热，再次上升。水就这样在锅里循环流动，直到水的**温度**相同。

对流是**热传递**的第二种方式。

► The water in the pan is heated by convection.

锅里的水通过对流的方式变热。