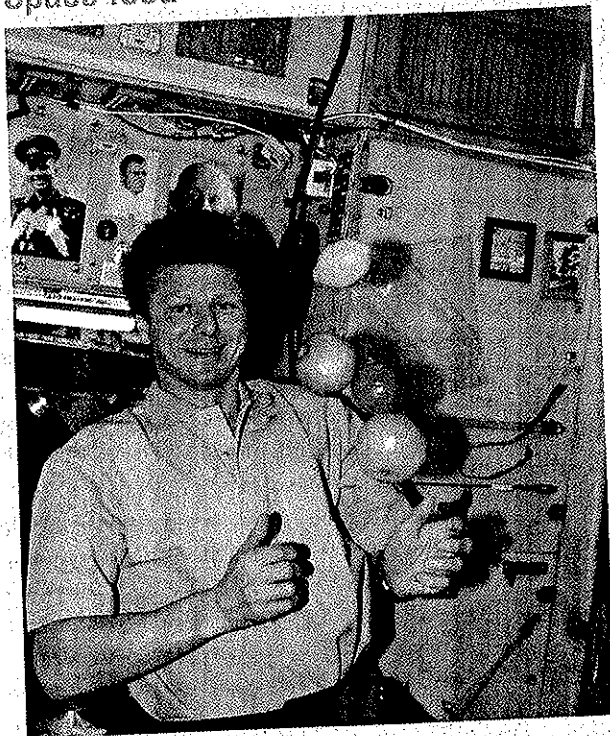


## CASE STUDY

### Space food



Astronauts do not have to eat specially formulated and packaged rations all the time.

Imagine going camping for over a week with several of your close friends. You would make sure you have plenty of food and the gear to cook and eat it with. The food would have to be stored properly and be non-perishable to avoid spoilage. After finishing your meal, or at the end of your camping trip, you would then stow all your gear and dispose of your trash properly just before the ride home.

Astronauts basically do the same thing when they go into space. Preparation varies with the food type. Some foods can be eaten in their natural form, such as

brownies and fruit. Other foods require adding water, such as macaroni and cheese or spaghetti. Of course, an oven is provided in the space shuttle and the space station to heat foods to the proper temperature. There are no refrigerators in space, so space food must be stored and prepared properly to avoid spoilage, especially on longer missions.

Condiments are provided such as ketchup, mustard and mayonnaise. Salt and pepper are available but only in a liquid form. This is because astronauts can't sprinkle salt and pepper on their food in space. The salt and pepper would simply float away. There is a danger they could clog air vents, contaminate equipment or get stuck in an astronaut's eyes, mouth or nose.

Astronauts eat three meals a day — breakfast, lunch and dinner. Nutritionists ensure the food they eat provides them with a balanced supply of vitamins and minerals. Calorie requirements differ for astronauts. For instance, a small woman would require only about 1900 calories a day, while a large man would require about 3200 calories. There are also many types of foods an astronaut can choose from such as fruit, nuts, peanut butter, chicken, beef, seafood, candy, brownies, and so on. Drinks range from coffee, tea, orange juice, fruit punches and lemonade.

As on Earth, space food comes in packages that must be disposed of. Astronauts must throw their packages away in a trash compactor inside the space shuttle when they are done eating. Some packaging actually prevents food from flying away. The food packaging is designed to be flexible, easier to use, as well as maximize space when stowing or disposing of food containers.

Source: Human Space Flight,  
National Aeronautics and Space Administration.

### CASE STUDY QUESTIONS

Carefully consider the article above. Remember that this is not just a comprehension task; use the stimulus material along with your knowledge of *food for space missions* to complete the tasks ahead.

1. List the range of foods that may be available for consumption by astronauts during space missions.
2. List and briefly describe the foods that may be specially manufactured and packaged for consumption during space missions.
3. Discuss the main problems that astronauts would encounter regarding the disposal of food waste and food packaging.

4. A NASA-related research organisation has been asked to develop foods for consumption by astronauts going on space missions of three months' duration. There will be no refrigeration but temperatures and relative humidity are expected to be low during the mission. Remember, there will be low to zero gravity during this mission and, hence, when eating the rations.
  - a) What food items would you include for the space mission?
  - b) List the special characteristics of each item in the ration pack.
  - c) What packaging forms would work best for this specialised application?



**TABLE 14.3 Australian market segment needs and expectations, and foods developed by manufacturers to meet these needs**

SPECIAL NEED	MARKET SEGMENT	FOOD SOLUTION
Weight reduction	Obese people	Low-fat food, low-energy food, 'lite' foods
Diabetic food	Diabetics	Sugar substitutes
Lactose-free food	Lactose-sensitive people	Lactose-reduced milk
Milk substitutes	People with allergic reactions to milk	Soy milk
Food that minimises heart attack risk	People with high cholesterol	Low-cholesterol food, low-salt food, food low in saturated fat, high-fibre foods
Food for people with gluten sensitivity	People with coeliac disease	Gluten-free food
Food in keeping with religious values	Moslems	Animals killed according to Islamic law
'Clean' food	Jews, Moslems	Pork-free food
Kosher foods	Orthodox Jews	Food prepared according to Jewish law
Meat-free meals	Vegetarians	Meat analogues
Ethnic foods	Ethnic groups	Indian food, Italian food, Chinese food, Thai food
Conservation of forests	Professional people who lead busy lives	Recyclable packaging
Safety of baby food	Mothers	Tamper-evident seals
Microwave food	Professional people who lead busy lives	Precooked frozen dinners
Economy food lines	Budget consumers	Generic foods, house brands, promotional deals
Party food	Socialisers, home entertainers	Multishot packs, party packs
Caffeine-free diet	Health-aware people	Decaffeinated coffee, coffee substitutes, caffeine-free drinks

