



Learning to Eat

**The role of schools in addressing
ultra-processed diets**



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Executive summary

Children in Britain today face significant barriers to developing a healthy relationship with food. Growing up surrounded by ultra-processed products, their appreciation of the joy, complexity, taste and texture of whole foods is inhibited.

Ultra-processed foods (UPFs) have grown to dominate people's diets, displacing whole or minimally processed foods, freshly prepared meals, and traditional cooking.¹ They are particularly prevalent in the UK, where they make up a staggering 67% of daily energy intake for under 14-year-olds.² While ultra-processed diets are of concern for various reasons, the loss of connection and relationship to good food sits at the heart of the dietary health crisis overtaking young people.

The process of learning to eat should be an exciting and rewarding journey, but UPF-rich diets are undermining children's ability to appreciate the diversity of flavours, colours, smells and textures of whole foods. UPFs are made using industrial processes and additives that wouldn't be found in a household kitchen – they typically lack whole, minimally processed ingredients, are excessively sugary, fatty, or salty, and are depleted in dietary fibre.³ As children learn not only 'how' to eat but also what, how much, and in what context to eat, the prevalence of UPFs in their diets can hinder the development of healthy eating habits and taste preferences.⁴ This disrupted relationship to food is concerning because:

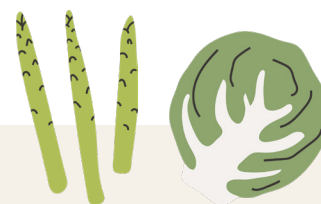
- Research shows that high UPF consumption among infants and children is linked to poor health outcomes, including risks associated with higher body weight, dental caries, and potential impacts on growth and development.⁵
- Early exposure to UPFs shapes long-term food preferences, increasing the risk of unhealthy eating habits in adulthood, and increasing the risk of developing conditions like obesity,^{6,7} type 2 diabetes,⁸ cardiovascular disease^{9,10} and cancer¹¹ later in life.

UPFs also have a significant environmental footprint. UPF production and consumption often use too much energy, land, and water, creating unnecessary waste, including single-use plastics – all with detrimental impacts on the future environment that children grow up in.^{12,13}



There are no easy solutions, but schools, nurseries and other early years settings can play a central role in supporting children to develop a healthy and beneficial relationship with food.

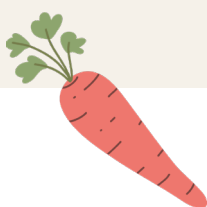
The 'whole school approach' to food embodied in the Soil Association's Food for Life Schools Award offers a template for healthy, sustainable eating in schools. It increases access to healthy, delicious meals, connecting children with where their food comes from, and helping them cultivate an appreciation for fresh, minimally processed foods from a young age. Food for Life helps shape children's taste preferences and reduce exposure to UPFs, emphasising freshly prepared meals, minimising harmful additives, and embedding food education across all aspects of school life.¹⁴



Solutions

The evidence is clear: UPF-rich diets are robbing children of the experience of learning to eat, posing serious risks to their development and health. Despite growing public concern, the UK Government has yet to implement measures to curb UPF consumption. Urgent action is needed to address children's disrupted relationship with food:

- **All schools should be supported to take a whole school approach to food,** following the example set by the Food for Life Schools Award. If every school in England was a Food for Life school, an estimated one million more children would be eating their five-a-day, benefiting their health while also nurturing their appreciation of real food.¹⁵
- **Sensory food education should be rolled out in all schools,** building on the model developed by TastEd, alongside practical cookery and food education across the curriculum, farm visits and growing.
- **Mandatory procurement standards should be implemented in schools,** requiring that caterers source more organic, seasonal and agroecological produce for freshly prepared meals.
- **The School Fruit and Vegetable Scheme (SFVS) should be revised to source more British, local and organic produce,** boosting fruit and vegetable consumption and introducing children to a range of textures and flavours.
- **A percentage reduction target for UPF in children's diets should be introduced,** achieved by boosting consumption of minimally processed fruits, vegetables and pulses.



1. The challenge: how ultra-processed diets shape children's relationship to food

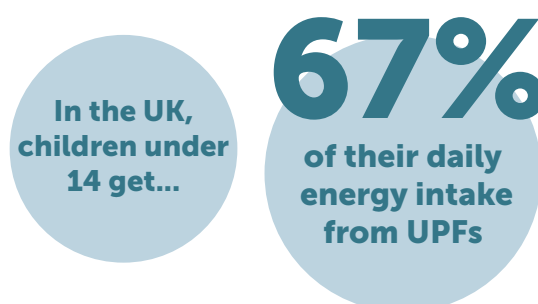
A growing body of evidence shows that excessive consumption of ultra-processed foods (UPFs) during infancy and childhood disrupts healthy eating habits and optimal taste development.¹⁶ This can lead to a 'broken' relationship with food, where children's appreciation of the complexity, taste and texture of whole foods is inhibited. Learning to eat should be an adventure, challenging and rewarding in equal measure, but increasingly children are being robbed of the experience. This disruption to taste preferences and dietary habits can, in turn, result in adverse health outcomes both in the short and long term.

Greater consumption of UPFs, even among very young children, is linked to increased body weight,¹⁷ increased risk of dental caries,¹⁸ and potential impacts on children's growth and development.¹⁹ Early exposure to UPFs can shape children's long-term food preferences, increasing the risk of developing unhealthy eating habits later in life,²⁰ and potentially leading to an increased risk of developing conditions like overweight and obesity,^{21,22} type 2 diabetes,²³ cardiovascular disease,^{24,25} and cancer.²⁶

This is concerning because the UK consumes more UPFs than anywhere else in Europe. Various governments worldwide have implemented measures to reduce their populations' consumption of UPFs. The UK Government has not taken a similar course of action, despite UPFs making up more than half of our diets – 63% of daily energy intake for people of all age groups, up from 57% in 2008.²⁷ Children's diets are of particular concern, with under 14-year-olds in the UK getting a staggering 67% of their daily energy from UPFs.²⁸

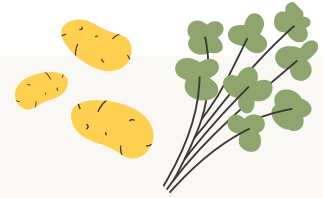
The detrimental health effects of UPFs go beyond their nutrient composition, including excess fats, sugars, and salt. Emerging evidence suggests various other mechanisms pose health risks, including those that encourage the regular consumption of snack foods, and foster a preference for sweet

flavours and soft textures.²⁹ Conversely, there is strong evidence supporting the health benefits of consuming unprocessed and minimally processed foods, including not only fresh fruit and veg but also healthy tinned and frozen options.^{30,31} As part of a healthy, balanced diet, children should be eating a greater proportion of whole and fresh foods, cultivating an appreciation of the flavours, textures, smells and diversity of real food from the youngest possible age. UPF consumption is a complex issue, and further research is needed to elaborate the mechanisms underpinning adverse health outcomes, but a large and rapidly growing body of research already shows there is robust cause for concern.



Moreover, UPFs (and the industrial food systems in which they are manufactured) typically have a significant environmental footprint. The production, processing, transport and consumption of UPFs often result in excessive use of energy, land and water and generate unnecessary waste (including single-use plastics) – all with detrimental impacts on the future environment that children grow up in.^{32,33}

There is increasing public appetite for government action on ultra-processing. According to a nationally representative survey published by the Food Farming and Countryside Commission, public concern around UPFs is high, with 74% of respondents saying they would welcome government action on ultra-processing.³⁴ Recent parliamentary debates and Prime Minister's Questions on UPFs and children's health further highlight concerns from health experts, and the need for urgent solutions to shift children's diets away from UPFs.^{35,36}



What are ultra-processed foods?

NOVA classification

Food processing, including cooking, has played a vital role in ensuring nourishment, food safety and accessibility for thousands of years. In the past half-century, new industrial processing techniques have been developed. The concept of 'ultra-processing' was introduced by Dr. Carlos Monteiro and his team at the University of São Paulo's Center for Epidemiological Research on Nutrition and Health (NUPENS) in Brazil.³⁷ Their NOVA classification, widely recognised by scientists and public health authorities around the world, categorises food products available in the market into four distinct groups:

Group 1 consists of minimally processed or unprocessed foods, including whole fruits and vegetables, fresh meats, and fish.

Group 2 includes culinary ingredients like salt, sugar, and oils.

Group 3 encompasses processed foods such as canned fruits and vegetables.

Group 4 includes ultra-processed foods, manufactured using industrial processes and additives which wouldn't be found in a home kitchen, such as sweet and savoury snacks, convenience meals, soft drinks, and other items that often contain minimal or no whole foods from group one.



2. Impacts on children's health

Substantial evidence suggests that children face a specific health risk associated with the consumption of UPFs, extending from pregnancy through childhood.^{38,39,40,41} Due to their frequent hyper-palatability, and because they are typically easily accessible, convenient, and heavily marketed, UPFs often encourage unhealthy eating habits, contradicting public health guidelines for infant and child nutrition.

A 2023 report by First Steps Nutrition Trust (FSNT), a public health nutrition charity, shows that infancy and early childhood is a crucial time for the development of a healthy, balanced relationship to food.⁴² The development of children's taste preferences

is based on a complex interplay between biological and environmental factors – children can have genetic predispositions to accept or reject foods, but eating environments and learned behaviour play a crucial part in shaping food preferences.⁴³

Exposure to the diverse flavours, colours, smells, and textures of unprocessed and minimally processed foods is therefore essential to building the healthy eating habits of a lifetime.⁴⁴ For children to learn to enjoy and accept the healthy foods that should make up most of their diets, they need to become familiar with these foods – tasting bitter greens, spicy ginger, or the nutty flavour

of beans and lentils, feeling the crunch of a fresh carrot or a tomato bursting on their tongue, or recognising the citrusy smell of an orange.

When children's diets are dominated by UPFs, on the other hand, they are mostly exposed to uniformly soft textures and excessively sweet flavours, which inhibits their appreciation of whole foods. Over time, this can lead to the development of harmful preferences and dietary habits that persist into adolescence and adulthood.^{45,46}

How UPFs disrupt healthy eating habits:

Displacing unprocessed and minimally processed alternatives

Increased UPF consumption is associated with a displacement of unprocessed and minimally processed foods, resulting in reduced intake of essential food groups such as fruits, vegetables, legumes and seeds. These whole foods are vital sources of micronutrients crucial for maintaining good health and nutrition. High consumption of UPFs thus not only disrupts taste preferences but also undermines the overall nutritional quality of the diet.⁴⁷

Encouraging unnecessary snacking

The widespread availability and consumption of ultra-processed snacks contribute to the normalisation and reinforcement of unnecessary and unhealthy snacking habits from an early age. This is particularly concerning as children are often encouraged to graze on soft, sweet, and artificially flavoured products, setting the stage for a lifetime of potentially detrimental eating behaviours oriented around UPF.⁴⁸

These harmful eating habits and taste preferences, in turn, can result in adverse health impacts, including:

Poor nutritional intake

- High consumption of UPFs is strongly linked to less nutritious diets in infants and children, contributing to widespread nutrient imbalances, both in nutrients that should be increased and those that should be limited.⁴⁹
- UPF-rich diets tend to contain higher levels of added sugars, refined grains, saturated fats, sodium, and higher energy density, coupled with lower amounts of fibre, protein, and essential micronutrients. The food ingredients used in UPFs are also often derived from intensive farming systems.^{50,51}

Increases in energy intake

- UPF consumption is strongly linked to higher calorie intake and subsequent weight gain,⁵² posing both short-term and long-term risks, as rapid weight gain in infancy and childhood heightens the risk of carrying excess weight into adolescence and adulthood.⁵³
- The convenience, ubiquity, and appealing taste of UPFs contribute to overeating, particularly in infants and young children, partly explaining the observed increases in energy intake.⁵⁴
- UPF consumption may also contribute to excess calorie intake by influencing the body's hormonal response that controls feelings of fullness. This is particularly relevant when it comes to baby food products with uniformly soft or smooth textures (including puréed fruits and vegetables), which are understood to reduce feelings of fullness.^{55,56}
- More broadly, marketing and advertising, often featuring enticing packaging with animals, cartoons, vibrant visuals, and health-related claims, play a significant role in encouraging excessive UPF consumption.^{57,58}



Consumption of harmful additives and contaminants

- UPFs often contain 'cosmetic' additives, such as colourings, sweeteners, and flavourings, along with 'functional' additives like preservatives, thickeners, and emulsifiers, the long-term impacts of which are not well understood. Emerging evidence suggests links between specific additives, including artificial sweeteners and emulsifiers, and the risk of cancer, though more research is needed.^{59,60}
- Moreover, food processing can produce harmful substances like industrial trans-fatty acids⁶¹ and acrylamide, associated with increased cardiovascular disease and cancer risks.^{62,63}
- Harmful compounds can also migrate from food packaging into the food (e.g. bisphenols) – those consuming UPF-rich diets are more exposed to these risks, as UPFs are almost always packaged.⁶⁴

Impact on gut microbiota development

- New studies are suggesting that UPFs might adversely affect gut microbiota, potentially leading to low-grade inflammation, which could contribute to long-term health issues like cancer, type 2 diabetes, and heart disease.⁶⁵ This impact is of particular concern during infancy, a critical phase for the development of the immune system.⁶⁶
- This is thought to occur because UPFs tend to replace minimally and unprocessed foods, such as whole plant-based foods, which are the cornerstone of dietary patterns known to have protective effects against inflammation.⁶⁷ While more research is needed to fully comprehend the underlying mechanisms connecting UPFs with some health outcomes, this should not hinder the need for immediate action.⁶⁸

3. The role of schools

Children spend over half of their time at school each year, making it a crucial environment for nurturing a healthy relationship with food. This should involve not only providing nourishing and delicious school meals but also incorporating food education across the curriculum and making food an integral part of the school day.

In many cases, children grow up detached from the origins of their food, never seeing where food is grown or how it is produced, never handling fresh produce, and rarely cooking or eating freshly prepared meals. This is particularly prevalent in areas where UPFs dominate local food options, and where households may face financial constraints in choosing healthier alternatives. Disparities in the food environment are evident within the UK – over 10 million people live in 'food deserts', areas where people have very limited access to affordable healthy food.⁶⁹

Schools, nurseries and other early years settings provide an opportunity to rectify this detachment, addressing inequalities in the

access and enjoyment of good food. Research demonstrates that nutritious and delicious school meals can yield multiple benefits, enhancing children's health and education while reducing inequalities.⁷⁰ As such, schools provide an environment where we can ensure that all children, regardless of their location or background, receive nutritious meals that lay the foundation for a balanced diet and a grown-up palate, including plenty of fresh fruits and vegetables.



Beyond the provision of healthy, delicious school meals, practical and sensory food education can play a crucial role in fostering a healthy relationship with food. Schools can thereby help to rectify the harms caused by UPF-rich diets, supporting children to nurture a lasting appreciation and understanding of real food. Embedding good food across all areas of school life, including minimal

exposure to UPFs within the school environment, has been shown to improve dietary patterns. The positive impacts of high-quality food education and school meals also extend beyond children in school, benefitting the broader economy, children's families, and their future lives. The Soil Association's [Food for Life](#) programme provides a framework for doing this.

4. Food for Life as a template for healthy, sustainable eating in schools

Addressing excessive UPF consumption requires that we instil a love of good food in children from a young age. Food for Life is a Soil Association initiative which began in 2003 and developed into an award-winning national programme. Working with schools across England, the [Food for Life Schools Award](#) addresses children's disrupted relationship with food by encouraging pupils to appreciate freshly prepared meals, connect with the source of their food, learn how it is cultivated and prepared, and understand the significance of responsibly sourced ingredients.

[Food for Life Served Here](#) provides a framework for caterers who are serving sustainable, higher welfare, locally sourced and healthier menus, which meets national guidelines on food and nutrition.

While the Food for Life Schools Award is most prevalent in primary schools, it is also present in secondary schools across the UK. The [Food for Life Early Years Award](#), in addition, supports nurseries and early years settings to give every child in their care the best possible start to their food journey.

Food for Life has been recognised by the [National Food Strategy](#), an independent review

for the UK Government offering a plan for the Government and other stakeholders to address the combined impacts of the food system on human health and biodiversity. The Strategy recommends adopting Food for Life Served Here as a government-mandated accreditation scheme for caterers in the public sector, including schools. Roughly one quarter of primary schools in England are enrolled with a Food for Life programme, creating huge impact and showing schools can be catalysts for systemic change.

What is the Food for Life approach and how does it impact UPF consumption and children's relationship with food?

School meals

Under Food for Life, school food entails:

- **Fresh preparation:** In schools participating in Food for Life, children primarily enjoy freshly prepared meals – at least 75% made from minimally processed ingredients.
- **No harmful additives:** Food for Life menus exclude artificial trans fats, problematic sweeteners and additives, as well as many UPFs. Guidance is available to all schools on reducing or minimising UPF consumption.
- **Agroecological and organic produce:** Children in Food for Life schools consume more organic and agroecological produce. Organic whole foods are nutrient-dense,^{71,72} and emerging evidence suggests they can offer superior taste and complexity.⁷³



1/4

of primary schools
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A whole school approach

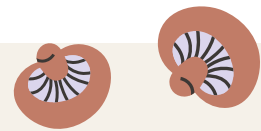
Schools can have a broader impact beyond improving school meals. The Food for Life Schools Award engages stakeholders throughout the school system, enhancing their skills, confidence, and knowledge, building networks, and promoting healthy and sustainable food as a focal point. This includes educators, school leadership, and catering professionals who are empowered and connected to transform the culture of school food.

Bringing together pupils, parents, teaching and catering staff is the basis of the 'whole school approach' to food that allows a good food culture to become an intrinsic part of life at school.

A whole school approach leads to outstanding school food through:

- **Integrating food across all subjects:** Food for Life assists teachers in embedding learning about good food across the entire curriculum, reinforcing positive messages and deepening comprehension of healthy and sustainable food.
- **Cultivating fruits and vegetables:** Supporting schools to set up growing on school grounds, inspiring pupils to handle and eat fresh, healthy food and learn how it is grown.
- **Learning about the origin of food:** Comprehensive food education is encouraged, including farm visits. Students get hands-on experience with real ingredients, reconnecting with the source of their food.
- **Learning to cook:** Organising cooking activities in schools, providing exposure to the smells and sensory qualities of fresh ingredients, and essential skills for making good food choices.
- **Recognising the value of food across the whole setting:** Making a good food culture a priority for the school leadership team and giving pupils a voice to be part of decision-making.





TastEd

A number of studies suggest that multisensory exposure to foods can increase the acceptance of unfamiliar fruits and vegetables among young children.^{74,75}

As part of a whole setting approach, sensory education can therefore play a crucial role in building healthy food preferences and fostering a strong connection with food from an early age.

TastEd is a charity delivering sensory food education in schools, nurseries and other early years settings, helping children explore the colours, textures, sounds, flavours and shapes of fresh fruits and vegetables.

By offering teachers free guidance, training and resources to deliver simple, classroom-based lessons that are tailored to the National Curriculum in England, TastEd is delivering huge impact for children growing up disconnected from real food.



"It helps you to learn what foods you will like in the future. I really enjoyed the lesson because you get to taste different foods that you've never tried before."

Ambler Primary School and
Children's Centre

"Huge impact. Children are trying more food and the fruit and veg the children bring in each morning are more diverse. We have more variety in the snack bar now as a result of TastEd."

College Green Nursery School

"We could do this again so that instead of junk food, we know some other foods to have."

Ambler Primary School and
Children's Centre

5. Shaping healthy futures: the impact of Food for Life

Independent evaluation has shown that Food for Life's whole school approach has a marked impact on children's eating behaviours and relationship to food, resulting in reduced consumption of UPFs and increased consumption of whole and minimally processed foods, especially vegetables and fruits.

Because Food for Life also involves parents, school staff and children, it has been shown to have a broad and lasting impact beyond the school gates.⁷⁶ Few public health interventions have the potential to make such a significant impact on the health and wellbeing of the whole population. The benefits of Food for Life can be seen across:

Dietary patterns

Food for Life not only incentivises reduced consumption of UPFs, but it also makes healthy, delicious food more accessible, available, and appealing:

- Currently, school food is the best available option for many schoolchildren, as only 1.6% of packed lunches meet the nutritional standards required of school meals.⁷⁷ However, there is room for improvement. Due to a range of factors including increased pressure on resources and lack of facilities, school meals in the UK often include UPFs (61% of energy intake from school meals for primary school children, compared to 81.2% for packed lunches),⁷⁸ which can contribute to unhealthy eating patterns.
- In comparison, 75% or more of dishes served in Food for Life awarded schools are freshly prepared from minimally processed ingredients (on-site or at a local hub kitchen), and no undesirable additives or artificial trans fats are used.

Children in Food for Life schools are also eating more fruits and vegetables, which is typically associated with lower UPF consumption:

- Children in Food for Life schools eat around one third more fruits and vegetables than pupils in comparison schools.⁷⁹
- They are twice as likely to eat five fruits and vegetables a day and a third less likely to eat no fruit or vegetables than pupils in comparison schools.⁸⁰
- If all primary schools in England were Food for Life schools, one million more children would eat five or more portions of fruit and vegetables per day.⁸¹
- The evidence suggests that children in Food for Life schools eat more fruit and vegetables, not because they've been taught that they should, but because they're inspired to do so – cooking, growing, and visiting farms has shifted their eating patterns and relationship with food
- These eating behaviours also track back home, with 45% of parents eating more fruits and vegetables because of their children's engagement with the programme.⁸²
- Research also shows there is a positive association between fruit and vegetable consumption and child involvement in home cooking, suggesting it may be an effective intervention to increase healthy food intake outside of school too.⁸³



Appreciation of good food and taste development

- Food for Life works with children, staff and parents to foster a positive food culture and help increase children's appreciation of good food. The benefits of this approach are clear, with children in Food for Life schools being 40% more likely to report that they 'like' or 'really like' school meals than pupils in comparison schools.⁸⁴
- Food for Life evaluation found a significant association between variables such as enjoyment of growing or attitudes towards sustainable food, and intake of fruits and vegetables – further demonstrating the impacts of a whole school approach to food.⁸⁵ This is supported by evidence showing that involvement in food growing in school projects leads to improved pupil nutrition.⁸⁶

The wider benefits of the Food for Life Programme

Food for Life's impact extends beyond children's nutrition and healthy relationship to food, bringing huge social, economic and environmental benefits:

- Evidence points towards Food for Life's potential to contribute to helping 'close the gap' for disadvantaged children in terms of their health and academic attainment.⁸⁷

- Food for Life Served Here provides a significant boost to British producers – schools and caterers are incentivised to prioritise local, seasonal supply and build connections with local businesses, spending £51.9m on UK produce annually. Evaluation shows that for every £1.00 spent on Food for Life Served Here menus £4.41 is generated for the local economy.⁸⁸
- UPFs are responsible for significant dietary environmental impacts, including 17–39% of total diet-related energy use, and 36–45% of total diet-related biodiversity loss.⁸⁹ School meals can play a vital role in tackling these climate and biodiversity impacts, including by supporting agroecology (farming that works with nature) and channelling significant spend into assurance schemes such as Marine Stewardship Council certified fish (£10.7m annually), organic (£12m annually), and LEAF (£271k annually), contributing to local economies, nature recovery and Net Zero.⁹⁰

"The children's awareness of food is everywhere across the school now, it's part of the ethos"

Birch Wood Area
Special School

"Participating in Food for Life has given me the confidence to make changes in our menus and to share this learning with the three other nurseries in our chain. I understand additives and the importance of freshly prepared food now."

Nursery Manager,
The Learning Tree

"Since Walsall Council Catering achieved the Bronze Food for Life Award, we have seen a significant improvement in the quality of meals served. Fresh, locally sourced produce is used as part of the menu options, with great care taken to ensure food is freshly prepared, cooked and served."

Head Teacher, St Giles
Primary School

Solutions

Children in the UK have a disrupted relationship with food. Their diets and surrounding food environment are saturated with UPFs, hindering their ability to fully appreciate the pleasure, intricacy, flavours, and textures of whole foods. We need urgent government action to address this. Schools provide an ideal environment in which to start – failure to act now will only yield health issues for individuals and more expenses for taxpayers in the future.^{91,92} England should be following the example of other countries, such as France, Brazil and Mexico, in developing a clear position on UPFs and taking action to address high levels of UPF consumption among infants and children.

- **All schools should be supported to take a whole school approach to food**, following the example set by the Food for Life Schools Award. If every school in England was a Food for Life school, an estimated one million more children would be eating their five-a-day, benefiting their health while also nurturing their appreciation of real food.
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