NO PREP

Environmental Science and the Holidays

Christmas Trees and Sustainability

Includes: Student reading, case study, differentiated questions, teacher key

Name: Period: Date:

Environmental Science and the Holidays: Christmas Trees and Sustainability

The holiday season is a time for traditions, decorations, and celebrations, with Christmas trees standing as one of the most iconic symbols of the season. But have you ever considered the environmental impact of your tree choice? From the cutting of natural trees to the production of artificial ones, every tree has an ecological footprint. Understanding these impacts can help us make more sustainable holiday choices.

The Journey of Real Christmas Trees

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The Journey of Real Christmas Trees

Real Christmas trees are grown on farms, similar to crops like corn or wheat. Farmers cultivate millions of these trees every year, often planting a new tree for every one harvested. These farms support local economies, provide jobs, and help preserve open spaces. While growing, trees absorb carbon dioxide (CO_2) from the atmosphere, improving air quality and contributing to carbon sequestration. However, real Christmas trees are not without environmental costs. Harvesting trees requires heavy machinery, fuel, and transportation, which contribute to greenhouse gas emissions. Additionally, discarded trees often end up in landfills, where they produce methane, a potent greenhouse gas. Composting or recycling programs can reduce this impact, but access to such programs varies by location.

Artificial Trees: A Convenient Alternative?

Artificial trees offer a reusable option, often appealing to those who prefer convenience or have allergies to natural trees. These trees are typically made from polyvinyl chloride (PVC), a type of plastic derived from petroleum. They are produced in factories, often overseas, and shipped worldwide, contributing to carbon emissions from manufacturing and transportation. The lifespan of an artificial tree is a critical

factor in determining its sustainability. Studies suggest that an artificial tree must be used for at least 7-10 years to offset its environmental impact compared to using a real tree each year. However, most artificial trees are discarded after only a few years, often ending up in landfills where they take centuries to decompose.

Which Is More Sustainable?

Determining the more sustainable choice depends on several factors, including personal habits and access to disposal programs. For individuals with access to recycling or composting, real trees may be a better option due to their lower overall carbon footprint. However, for those who use an artificial tree for many years, this option could prove more sustainable over time. Understanding these trade-offs can help families make informed decisions that align with their environmental values.

Eco-Friendly Holiday Practices

If you want to reduce your environmental footprint during the holidays, here are a few tips: Recycle or Compost Real Trees: Check for local tree recycling programs that turn trees into mulch or compost. Choose a Potted Tree: Use a live tree that can be replanted after the holiday season. Extend the Life of Artificial Trees: If you already own an artificial tree, use it for as many years as possible. Support Sustainable Farming: Purchase real trees from certified sustainable farms that follow eco-friendly practices. Decorate Sustainably: Use LED lights and natural or reusable decorations to reduce energy use and waste.

Key Information: Table: Comparison of Real vs. Artificial Christmas Trees

Factor	Real Trees	Artificial Trees
Material	Organic (wood, needles)	Synthetic (PVC plastic, metal)
Carbon Footprint	Lower if composted/recycled	Higher due to production/shipping
Reusability	Single use (unless replanted)	Multi-year use
Disposal	Biodegradable if composted	Non-biodegradable; landfill waste

Factor	Real Trees	Artificial Trees
Support for Local Economy	Yes (tree farms, local businesses)	No (usually imported)

Case Study: The Impact of Tree Choices

In a small town in Oregon, a local Christmas tree farm has operated for decades, planting over 50,000 trees annually. The farm employs seasonal workers and sells trees locally, reducing transportation emissions. However, one year, a big-box retailer introduced artificial trees at discounted prices. Many residents opted for artificial trees, citing convenience and cost. Over time, the tree farm faced financial difficulties due to declining sales, and the land was sold for commercial development. This case illustrates the complex factors in choosing between real and artificial trees, including economic, environmental, and societal impacts.

1. How did the introduction of artificial trees impact the local Christmas tree farm economically and environmentally?

_____

_____

2. What role did consumer behavior play in the outcome described in the case study?

_____

_____

Multiple Choice

1. What material is primarily used to make artificial Christmas trees?
    a) Polyvinyl chloride (PVC)
    b) Cotton
    c) Wood
    d) Aluminum and steel wire

2. What happens to real Christmas trees in landfills?

a) They release oxygen

b) They produce methane gas

c) They decompose without issue

d) They are reused as mulch

3. How many years must an artificial tree be used to offset its environmental impact?

a) 1-2 years

b) 3-5 years

c) 7-10 years

d) 15+ years

Matching

Write the letter of the correct definition on the line next to each term.

Term	Definition
1. ___ Made from petroleum-based plastic	A) Methane emissions
2. ___ Lower carbon footprint if recycled	B) Tree farms
3. ___ Supports local farmers	C) Real trees
4. ___ Contributes to greenhouse gases	D) Real trees
5. ___ Decomposes in compost	E) Artificial trees

Fill-in-the-Blank

1. Real Christmas trees produce _____ if they end up in landfills.

2. Artificial trees are primarily made from _____ plastic.

3. Using a potted tree allows it to be _____ after the holiday season.

Short Answer

Answer each question in 2-4 complete sentences.

1. What are the key environmental benefits of composting a real Christmas tree?

2. How does the lifespan of an artificial tree affect its overall sustainability?

3. Why might supporting local Christmas tree farms be important for communities?