



TULIP

TEST
GARDENS

Tracking changes in seasons and climate around the world

JOURNEY NORTH 

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Tulip Test Gardens **Teacher Packet**



Spring arrives at different times in different places around the globe. When does spring reach your hometown? In this hands-on learning experiment, students use technology to ask and answer questions about climate in our changing world.



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Tulip Test Gardens **Instruction Packet for Teachers**

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Welcome to The Tulip Test Garden!

This fall, plant a Journey North Tulip Garden so you can proclaim the official arrival of Spring in your community. By sharing observations over the Internet, students across North America will follow the wave of spring as it moves northward and measure its pace from distant places.

A Study of Plants and Climate

These gardens are the focus of an annual international science project in which students investigate the relationship between geography, climate, and the arrival of spring. Plants reveal the effects of climatic factors as they develop and grow. Over time, data showing changes in the timing of plant growth can be used as an indicator of climate change. Through this study, now in its 17th year, students can explore real-time maps and climate data and compare their results with others in a long-term database.

Join The Fun!

Classrooms of all grade levels can participate and teachers can enjoy learning with their students. How will this spring compare to earlier years?

Let's find out!

Tulip Test Gardens Calendar *Steps to Getting Started*

<p>Any time</p>	<p><u>Get Ready</u> for Tulip Garden Project http://www.learner.org/jnorth/tm/tulips/AboutFall.html</p>
<p>September</p> 	<ul style="list-style-type: none"> • <u>Order</u> your Red Emperor Tulip Bulbs http://www.learner.org/jnorth/tm/tulips/BulbsOrder.html • <u>Register</u> for Journey North http://www.learner.org/jnorth/reg/
<p>October to December</p> 	<ul style="list-style-type: none"> • <u>Decide</u> where to plant your tulip test garden http://www.learner.org/jnorth/tm/tulips/PlantingRubric.html • <u>Plant</u> your garden http://www.learner.org/jnorth/tm/tulips/Planting.html • <u>Report</u> your planting date http://www.learner.org/cgi-bin/jnorth/jn-sightings
<p>November 21, 2011</p>	<p><i>*Warm regions*</i> Deadline to start 6-wk bulb refrigerating.</p>
<p>First Week of January 2012</p>	<p style="text-align: center;">Planting Deadline</p>
<p>Spring 2012</p>	<p>Observe, record, study the map, track weather. When your tulips emerge and bloom report in to proclaim spring's arrival in your schoolyard!</p>

How to Participate

Read steps 1-6 below carefully so you'll have a successful Journey North garden:

1) Purchase **RED EMPEROR Tulips ONLY**

<http://www.learner.org/jnorth/tm/tulips/BulbsOrder.html>

Any other variety would compromise the value of this scientific experiment! This year, U.S. schools can order Red Emperor in bulk from **Netherland Bulb Company** (1-888-508-3763), Canadian schools can order from **Botanus** (1-800-672-3413) and European schools from **Fleurtiek Amsterdam B.V.** (31-20-659-2101). Be sure to say you're planting a Journey North garden!

2) [Register](#) for Journey North

<http://www.learner.org/jnorth/reg/>

Registration is free, but only registered schools may report news from their gardens. (You must be REGISTERED for the full Journey North project before you can REPORT. But if you registered last year, you do NOT need to register again!)

3) Try These Related [Fall Lessons](#):

<http://www.learner.org/jnorth/tm/tulips/Resources.html>

- How Do You Define Spring? (Take-Home Survey)
- Tulips as Weather Tools (Dissection & Observations)
- Deciding Where to Plant the Garden (Planting Rubric)
- Predicting the Arrival of Spring
- A Matter of Degrees (Understanding Microclimates)
- Phenology Data Exchange (Find Your Partner Using Nature's Clues)
- Replicating the Experiment (Take-Home Tulip Garden)

4) Plant your tulips **EXACTLY** according to the instructions below.

5) After planting your garden, [REPORT](#) back to Journey North.

<http://www.learner.org/cgi-bin/jnorth/jn-sightings>

If you are interested in an exchange with a partner school, you can email them through individual planting reports on the tulip garden map.

6) Next spring, you'll REPORT back to Journey North two times-- 1st when your tulips EMERGE and again when they BLOOM. Together we'll chart spring's progress across the Northern Hemisphere!

Planting Instructions for Journey North Gardens

NOTICE: If you live in California or one of the Gulf States (Zones 8-11) you may need to refrigerate your tulip bulbs to force dormancy.

The instructions below should be followed carefully so that all Journey North gardens are planted in the same way. Remember, your tulips are intended to indicate the arrival of spring in your community. Therefore, every effort should be made to plant them in an area that **best represents** the general climate of your region.

Plant "Red Emperor" Tulips

All Journey North gardens will be planted with the same variety of tulips, the RED EMPEROR variety. Different tulip varieties bloom at different times in the spring, and are categorized as "early", "mid-season", and "late" blooming varieties. The Red Emperor variety falls into the "early" blooming category. This variety was selected because Journey North classrooms will record the first tulips to bloom in the spring.

When to Plant

Planting must take place before deep frost hardens the ground. Remember, if you live in a warm region (Zones 8-11) contact Journey North for special planting instructions!

Where to Plant

Exposure: For consistency, Journey North tulip gardens **MUST NOT** be planted near the foundation of a building, in an enclosed area, in heavy shade, or on ground that slopes to the north or south. This is because sheltered areas near buildings warm up much more quickly than surrounding areas, stimulating bulbs to bloom earlier. Similarly, north or south-facing areas will cause an advance or delay in blooming. Spring bulbs can be planted in partial shade or in full sun. Tulips should not be planted in heavily-shaded areas.

Drainage: Avoid planting bulbs where water stands after a rain. Bulbs will rot if they sit in moisture. Therefore, plant them in well-drained soil and/or on sloped ground. A good loam soil is best. If the soil is heavy clay, add organic matter such as compost or peat moss to loosen it.

How to Plant

For simplicity, tulip bulbs can be planted in a bed rather than individually. The entire bed should be planted at the proper depth, as specified below. It is a good idea to fertilize bulbs by adding bone meal and mixing it well with

the soil. If you choose to plant bulbs individually, either a garden trowel or a bulb-plating tool can be used.

Depth: Bulbs in all Journey North gardens should be buried so that the base of each bulb is exactly 7 inches underground. (Blooming time can vary by a week or two if bulbs are not planted at the same depth. In fact, gardeners who want to prolong blooming time will intentionally plant their bulbs at varying depths.) Bulbs should be spaced 4 inches apart.

Placement of Bulb: Set bulbs firmly in place with the POINTED END UP. The hole should be flat on the bottom so that the FLAT BASE of the bulb is in contact with the ground. Cover with soil and water thoroughly. Moisture is necessary for the bulbs to take root before winter. If dry weather persists after planting, water thoroughly and deeply. Do not keep soil soggy or the bulbs could rot. After the ground freezes, apply about a six inch deep mulch of clean straw or leaves.

Predator Control: Squirrels are the most common tulip bulb predators in urban and suburban areas. They are attracted to the smell of fresh bulbs and are most likely to destroy gardens within the first weeks after planting. For inexpensive and effective protection, cover your newly planted bulbs immediately with chicken wire. To secure the edges, cut wire hangers and form them into a U shape. Drive them into the ground around the edges of the chicken wire. Alternatively, bulbs can be covered with a board or with the saucer of a flower pot.

SPRING CARE

Remove the winter mulch as soon as the shoots are 1-2 inches high. Otherwise, the stems and leaves may be weak. After your tulips bloom and are faded, cut the stems in order to conserve energy for next year's flowers. DO NOT cut the leaves until they turn yellow and wither. These leaves are needed to produce the nutrition for next year's tulips. Bulbs may be fertilized after the blooms fade. This is the critical time in which they make the most use of the fertilizer. Liquid applications of a 10-10-10 fertilizer can be applied as long as the leaves appear green and vigorous.

May We Use This Year's Bulbs Again Next Year?

Unfortunately, no. New bulbs must be planted each year for the Journey North study. This is because too many variables affect tulip growth in the second year for the experiment to be dependable. However, you can save your bulbs for experimental purposes! Remember, however, for the Journey North experiment you may only report on the growth and blooming of the new, "official" bulbs.

Inquiry and Experiments

After planting the Journey North tulip garden exactly according to the experimental protocol, invite students to explore their own questions and design investigations to find answers.

- [Video](http://www.learner.org/jnorth/tm/tulips/Nutshell_inquiryVideo.html): Tulips as tool for investigation
http://www.learner.org/jnorth/tm/tulips/Nutshell_inquiryVideo.html
- [How to](http://www.learner.org/jnorth/tm/inquiry/planb.html) frame a testable question?
<http://www.learner.org/jnorth/tm/inquiry/planb.html>
- Experimental plot [support journal](http://www.learner.org/jnorth/tm/tulips/K3_Plan_Exper_Page.doc)
http://www.learner.org/jnorth/tm/tulips/K3_Plan_Exper_Page.doc

Connect with Journey North: September - May

- [Updates](http://www.learner.org/jnorth/tulip/News.html):
<http://www.learner.org/jnorth/tulip/News.html>

Maps, lessons, activities and discussions. Email and Web Updates published on Thursdays.

Once a Month: September – January (see Fall [Calendar](#))

Once a Week: Thursdays, February – May, 2012

Students collect and reflect on Update news and maps using their Fall and Spring [Journal](#) pages.

<http://www.learner.org/jnorth/tm/tulips/JournalFall.html>

<http://www.learner.org/jnorth/tm/tulips/JournalSpring.html>

- [Global Garden Partners](http://www.learner.org/jnorth/tm/tulips/GlobalComparison.html):
<http://www.learner.org/jnorth/tm/tulips/GlobalComparison.html>

Share and compare garden news, weather, climate and geography with a partner.

Important Links

- 1) Family Take-home [Letter](http://www.learner.org/jnorth/tm/tulips/jr/Intro_Letter.html)
http://www.learner.org/jnorth/tm/tulips/jr/Intro_Letter.html
- 2) [Overview](http://www.learner.org/jnorth/tm/tulips/AboutFall.html) of the Tulip Garden Project
<http://www.learner.org/jnorth/tm/tulips/AboutFall.html>
- 3) Introductory [Slide Show](http://www.learner.org/jnorth/tm/tulips/jr/Intro1.html): When Does Spring Reach Your Hometown?
<http://www.learner.org/jnorth/tm/tulips/jr/Intro1.html>
- 4) Frequently Asked [Questions](http://www.learner.org/jnorth/tm/tulips/FAQTulips.html)
<http://www.learner.org/jnorth/tm/tulips/FAQTulips.html>
- 5) [Advice](http://www.learner.org/jnorth/tm/tips/index.html#tulip) from Teachers – Organizing and Planning
<http://www.learner.org/jnorth/tm/tips/index.html#tulip>
- 6) [Mapping Ideas](http://www.learner.org/jnorth/tm/tulips/MappingFallData.html) – Analyzing, Variables to Explore, and Basics
<http://www.learner.org/jnorth/tm/tulips/MappingFallData.html>
<http://www.learner.org/jnorth/tm/tulips/MappingSpringData.html>
- 7) [Standards](http://www.learner.org/jnorth/tm/Standards.html) – Correlations to National Science and Math Standards
<http://www.learner.org/jnorth/tm/Standards.html>
- 8) Journey North for [Kids](http://www.learner.org/jnorth/tm/tulips/jr/JnKidsOverview.html): A simple, student-directed entry point to Journey North studies.
<http://www.learner.org/jnorth/tm/tulips/jr/JnKidsOverview.html>