



## OVERVIEW

### What Is Journey North?

Journey North is a free, web-based science program that provides sets of investigations that encourage students to explore the concept of seasonal change. Students become involved in a global study of wildlife migration and the changing seasons. Using the Internet, students track the coming of spring through the migration patterns of butterflies, birds, and mammals; the budding of plants; the changing of daylight; and other clues in their local environment. The interdisciplinary activities are tied to science, math, social studies, and language arts. By sharing field observations with students across the continent through Journey North, students come to see their own backyards as part of a global ecological system.

### About the Workshop

This workshop introduces the three sets of Journey North investigations—Seasonal Migrations (Monarch Butterflies), Plants and the Seasons (Tulip Gardens), and Sunlight and the Seasons (Mystery Class). The workshop involves participants in an exploration of spring's arrival through activities from Journey North. The introductory video gives a brief glimpse of the program and encourages participants to learn more. Participants also explore inquiry-based teaching and learning and share information about their experiences with Journey North.

### Objectives/Outcomes

After completing this workshop, participants will be able to:

- describe the three sets of Journey North investigations,
- explain how to use the Internet with the Journey North program,
- examine how Journey North can be integrated into their science curriculum, and
- discuss the basic concepts of inquiry-based teaching and learning.

### Materials You May Need

*For the facilitator:*

- VCR and television monitor
- overhead projector, blank transparencies, and markers
- flip chart or large sheets of paper and markers
- computer with Internet connection (optional)

*For the participants (handouts are provided as blackline masters within this guide):*

- How Do You Define Spring? handout (p. 10)
- Results of the Spring Survey handout (p. 11)
- A Description of Inquiry handout (p. 12)
- Journey North Tour handout (p. 13)

Have the participants bring a spiral notebook and pencil or pen to each workshop.

### Key Concepts for the Facilitator

**The Journey North program is free to teachers who wish to use it.** It is comprised of three sets of investigations, each containing a variety of topics, lessons, and activities. The investigations are Seasonal Migrations, Plants and the Seasons, and Sunlight and the Seasons.

**Seasonal Migrations—Journey North is a global study of wildlife migration and seasonal change.** The migration investigations include a dozen different species, such as monarch butterflies, eagles, hummingbirds, robins, orioles, manatees, and whales. Each engages students as active participants, observing the grand rhythms and delicate balances of nature. Students can contribute observations from their own backyards and receive observations from career scientists studying migration. The classroom receives weekly migration updates with current news, authentic data, challenges for students, lessons, activities, and interdisciplinary content centered in real-world issues.

**Plants and the Seasons—In Journey North's investigation of plants and the seasons, students track the greening of spring across the Northern Hemisphere as they watch plants in their own gardens respond to the changing season.** In the fall, tulip bulbs are carefully planted according to scientific protocol, so that geographic location is the variable being studied in gardens across the Hemisphere. The following spring, as the tulips grow and bloom at each location, students proclaim the arrival of spring in their communities. In addition, students can conduct their own investigations by designing and planting a second "Experimental" Garden. Here they alter the planting protocol and design their own experiments to answer questions they have generated themselves, i.e., "What would happen if..."

**Sunlight and the Seasons—The Mystery Class investigation is an 11-week hunt in which students try to find 10 secret "mystery classes" hiding around the globe.** Changing sunlight at each site is the central clue. Students first determine if the latitudes of the locations are above or below the equator, and later calculate the longitude of each location. Finally, interdisciplinary clues require students to use problem-solving and research skills to pinpoint each location. Students take an inspiring journey from knowing only the sunrise and sunset times (photoperiods), to discovering the exact locations of the 10 Mystery Classes. This investigation demonstrates that, as spring sweeps across the Northern Hemisphere, day length changes everywhere on earth. Students see that these dramatic seasonal changes in sunlight affect the entire web of life.

**Journey North employs "Challenge Questions" throughout all its investigations.** The Challenge Questions are posed at appropriate points in each of the investigations and model the types of questions that scientists ask themselves. The questions help students understand the importance of continually questioning one's assumptions and data.

**The teacher's job in Journey North and in inquiry-based instruction is to facilitate.** Teachers probe student thinking, ask for explanations, encourage new trains of thought, provide guidance, and demonstrate process skills.

**The Internet provides a unique opportunity for students and teachers to interact with other classrooms around the world who are involved in Journey North investigations.** The Internet becomes a valuable extension of classroom activities by providing comparative information from classes in different climates and different cultures. However, it is not necessary for a teacher to have Internet access at school in order to participate in Journey North.



## INTRODUCTION TO *Journey North*



BLACKLINE MASTERS FOR  
THESE HANDOUTS CAN BE  
FOUND ON PAGES 10 AND 11.

### Accepting All Answers



In an inquiry activity, as with brainstorming, it is important to accept all answers, correct or not. In an inquiry-based setting, students will explore their answers and eventually determine on their own if an answer is correct or not. Often “wrong” answers lead to interesting questions to investigate.

## BEFORE WATCHING THE VIDEO

### ***ACTIVITY A – How Do You Know When It’s Spring?***

Separate participants into small groups and provide them with copies of the How Do You Define Spring? survey (p. 10). Ask participants to brainstorm the answers to the questions and come up with as many responses as possible.

When groups have had sufficient time to complete the task, bring them back together again and begin listing their responses on an overhead or flip chart. After you’ve listed the responses, pass out the Results of the Spring Survey handout (p. 11). Point out that all of their responses can be divided into three categories—animal signs (including human activities), plant signs, and astronomical/meteorological signs. Go through the list and put responses into categories.

Ask “Suppose someone in Texas were filling out the survey or someone from Alaska or Canada. How would their responses be different? Would they give the same date for a certain phenomenon?”

To know how the signs of spring move across the continent, you would have to have data from hundreds of different sites in different locations. This is exactly what Journey North does, using the Internet. The project gives students the opportunity to share their own observations and access data from classmates across the continent through three sets of investigations—Seasonal Migrations, Plants and the Seasons, and Sunlight and the Seasons.

Explain that participants are going to watch a video that introduces the Journey North investigations. Following the video, they will discuss some of the instructional strategies that can be used with the program, strategies that involve important science process skills and inquiry-based instruction that are part of a standards-based science curriculum.

### ***OPTIONAL ACTIVITY – Reviewing the Standards***

Provide participants with a list of your state, provincial, or district science curriculum standards. Briefly review key points of the standards. Explain that participants can refer to this list as they move through the workshops. When participants find a Journey North activity that applies to one or more of the standards, they can make a note of it on the list. After completing all the workshops, participants will have a working correlation between their own curriculum standards and the Journey North program.

## WATCHING THE VIDEO

### What You'll Be Watching

Video Module One—Introduction to Journey North (running time approx. 11 min.)

The video shows eight Journey North teachers from around the United States who share their insights and experiences with Journey North. Elizabeth Howard, the founder of Journey North, discusses how the program engages students and teachers alike in authentic science learning. Science education experts Hubert Dyasi, a professor at City University of New York's School of Education, and Lee Schmitt, from the Science Museum of Minnesota, provide insight into the process and power of inquiry-based learning. Lee Schmitt believes that Journey North is “an excellent medium for that process.”

The video provides a glimpse of each of the three sets of Journey North investigations—Seasonal Migrations (Monarch Butterflies), Plants and the Seasons (Tulip Gardens), and Sunlight and the Seasons (Mystery Class). Excited students explore their environments and use the Internet to share observations and examine data from other classrooms in other states, provinces, and countries. Students learn that their portion of the world is part of a larger ecological system and that science is interconnected in ways that they have never imagined.

Journey North is rich and complex and can sometimes be overwhelming to a newcomer. Experienced teachers suggest how to start small, pick and choose activities, and then expand use of the program over time. Journey North teachers tell how the program has transformed the way they teach. Like their students, the teachers have become excited partners in learning.

### Suggestions for Watching the Video

Before showing the video, you may want to suggest things for the participants to look for as they watch. This will focus their viewing and help generate discussion afterward. For instance:

- Watch for examples of self-directed students engaged in learning.
- Watch for examples of teachers functioning as facilitators for student learning.
- Watch for interdisciplinary aspects of the Journey North program.
- Make notes about things in Journey North or the video that you would like more information about.

After participants have watched the video, you can discuss some of the things that participants watched for, and you may want to use some of the following questions to generate additional discussion. You will want to pick and choose questions based on your particular audience.

- Which of the Journey North investigations—Seasonal Migrations (Monarch Butterflies), Plants and the Seasons (Tulip Gardens), and Sunlight and the Seasons (Mystery Class)—do you find most interesting? Why?



### History of Journey North

Journey North was founded in 1994 by Elizabeth Howard. Inspired by the early Internet-based projects in which school children tracked human expeditions (e.g., across the Arctic by dogsled or Africa by bicycle), she saw a clear and exciting parallel between these expeditions and the wildlife migrations that cross the globe with the seasons. Both were the ultimate survival stories. The same challenges encountered on a remote expedition—changing weather, lack of food, insufficient time—have always faced migratory species as they travel across the globe or pass through our own backyards.

With a background in environmental education and natural history, she saw migration as a compelling vehicle to engage students in a study of nature and science. She realized the Internet would make it possible to collect first-hand observations from people who were spread across the continent. Elizabeth Howard and associate director Julie Brophy have developed Journey North over the years into the premier Internet-based, “citizen science” project that it is today, providing an authentic and powerful science education experience for children. “What’s most rewarding,” says Julie Brophy, “is to hear that children are actually outside, looking closely at the natural world. So often they tell us they’re looking for the first time.”



# INTRODUCTION TO *Journey North*



## About Hubert Dyasi

Dr. Hubert Dyasi is a professor at City University of New York's School of Education. He has researched and written extensively in the area of inquiry-based science education. In the video, Dr. Dyasi says, "Inquiry is the way science has always been, and it's the way science is. And if we are going to present science to children, or learning opportunities about science to children, the most authentic way to do that is to engage them in science inquiry."

## Available on the Web



Journey North has a lesson for students on using KWL. You may find it useful background information when doing this activity.

### Go to:



the "How to Use Journey North" icon on any page



select the "Classroom Lessons" icon

select "What Do You Know? Encouraging Inquiry-Based Research"

- Journey North uses actual data and activities based on phenomena that are occurring around the students. What place does a science textbook have in the Journey North activities? Explain. (This question is meant to generate discussion. Some teachers use textbooks as reference tools; others use them to teach concepts that students may need to know in order to more fully appreciate the science behind supplemental activities. Journey North complements textbook-based science instruction.)
- What are some examples of programs or activities that you have done that have energized your teaching? How did this affect your students?
- To the more-experienced Journey North teachers in the group: If you could begin again from day one, what would you do differently in implementing the program?
- How do you view Hubert Dyasi's comments about inquiry-based teaching and learning in connection to Journey North?
- How do you address the U.S. National Science Education Standards in your classroom? Your state or provincial standards? Your district standards?
- How do you teach the "interconnectedness" of science? How do you see Journey North as a tool for teaching this concept?
- What is one of your personal goals for your science students? How do you think Journey North could be used to reach those goals?
- What would you like to get out of this series of workshops?

## AFTER WATCHING THE VIDEO

### ACTIVITY B – Using KWL

Ask participants if they are familiar with KWL. If not, explain that KWL can be a kind of graphic organizer that can be used with an inquiry-based activity. *K* stands for the information that you already *know*. *W* stands for what you *want to know* written in the form of a question. *L* stands for what you've *learned*. Display an example of a blank KWL chart.

K	W	L
<i>Know</i>	<i>Want To Know</i>	<i>Learned</i>
What do you know or think you know about a topic?	What questions do you have?	What have you learned?

Explain that you are going to start a set of KWL charts that are going to be used throughout the series of Journey North workshops. Using a flip chart or large sheets of paper, make four KWL charts. Head the four charts “Seasonal Migrations,” “Plants and the Seasons,” “Sunlight and the Seasons,” and “Characteristics of Inquiry-Based Science.” Attach these charts to the walls around the room, provide markers, and have participants fill in the K and W columns. Encourage participants to fill in questions in the W column and to start adding information to the L column as the workshops progress. Participants may have other KWL charts that they might recommend such as KWHL, where *H* stands for *how* could we find the answer to this question. Add additional charts as needed.

### **ACTIVITY C – Journaling and Using Journey North Challenge Questions**

Ask the participants to share their experiences of having students keep science journals. What are some of the advantages they have discovered? Participants may suggest that science journaling is a way for students and teachers to communicate, that journaling helps students “think through” science concepts, that science journals can be used to assess student progress, etc.

Explain that throughout these Journey North workshops, you would like participants to keep their own journals. Suggest that they use a spiral notebook and divide it into three sections. One section can be used for taking notes, another for Journey North Challenge Questions, and a third section for a Learning Log, where they can keep a journal about what they’ve learned.

Explain that Journey North provides a series of “Challenge Questions” for each of the investigations. Challenge Questions are based on authentic data and are posed at key points throughout each of the investigations. They model good science and the thinking/questioning process that scientists use in their work. Because of this, the questions are very relevant to the students’ work. Explain that the participants will be answering Challenge Questions in the workshop so that they can better understand how the questions are used with the students.

Challenge Questions are often open-ended and provide students with examples of the types of questions they should be asking themselves. The questions are excellent models of questions students ask in an inquiry setting. As students move through each of the investigations, they build knowledge of the changing seasons and how sunlight affects the entire web of life.



#### **Workshop Tip**



The KWL activity can be useful in helping you, the facilitator, to determine what activities to choose and what information to emphasize as you progress through the other workshops. You can plan your workshops, in part, based on the questions and responses participants list on the KWL charts. As you move through the workshops, you will also be able to track participants’ progress.

#### **Learning From Mistakes**



It is important to allow students the freedom to make mistakes. Some of the greatest scientific discoveries were the result of experiments that “failed.” When students give answers, it is important to let the students discover if their answers are “right” or “wrong.” This is a part of the learning process. Teachers can challenge students to prove or disprove their answers or hypotheses. The teacher should provide activities that help students explore the concepts that lead to appropriate conclusions and answers.



## INTRODUCTION TO *Journey North*



### Holly Cerrulo

*Holly Cerrulo, a teacher at Joyce Middle School in Woburn, Massachusetts, has this to say about Challenge Questions:*

“A single Challenge Question will get your students thinking in ways they rarely do during the entire school year. If you did just one Challenge Question—and nothing else—you’d experience what I mean. Our entire class enjoyed the question about why owls nest in February, when it’s so cold outside. As a class, we all shared our ideas for possible reasons. Now remember, I didn’t know the answer even though I’m ‘the teacher.’ But this is what I love, this is where *Journey North* comes through. The discussion of the question comes the next week, so you don’t have to know the answer—you learn right along with the students. And what’s so great is that we could see that each of us had part of the answer in our thinking. As a class, we’d put our minds together and come up with ideas none of us—including the teacher—could have alone. Throughout the year, the students’ understanding of nature grows. So does the thinking they exhibit in answering questions. They’re making connections.”

Students are encouraged to keep a Challenge Question Journal, in which they write about the questions from *Journey North*. Many teachers use these journals as a tool for ongoing assessment of student progress. Explain that throughout the workshops, participants will be presented with Challenge Questions to answer in their journals. And their first one is:

#### CHALLENGE QUESTION:

“Why do you think hummingbirds commonly migrate at mid-day, rather than during the morning, later afternoon, or evening?”

Allow participants time to explore the question in their journals before discussing their answers. Point out that there are many ways to use the Challenge Questions, and that journaling is a way for students to begin the process. Challenge Questions provide an excellent opportunity for teachers to function as coaches or facilitators of student learning.

#### ANSWER:

*Hummingbirds are so tiny and have such a fast metabolism that they lose a lot of heat and body weight during the night when they can’t eat. Therefore, when they wake up in the morning, they must spend a lot of time feeding to replenish the energy they burned during the previous night. In the late afternoon and evening, they must rest and feed to store up enough energy to be able to survive the coming night. Thus mid-day is the best window of time to expend the energy migration requires.*

### **OPTIONAL ACTIVITY – Dealing With Wrong Answers**

Ask participants how they address student answers or responses that are way off-base. In addition, how do participants deal with student misconceptions? Have participants work in pairs or small groups and share the strategies they use when they encounter these situations.

Bring the group back together to share successful techniques they have for addressing “wrong” answers—for example, rewording or clarifying the question, asking the student to explain the process he/she used to find the answer, having the student provide data that supports the answer, etc.

## OPTIONAL ACTIVITY – What Is Inquiry?

Review the comments about inquiry that were given by Hubert Dyasi and Lee Schmitt in the video. What do participants think?

Discuss elements of inquiry that were shown or discussed in the video. Read Lee Schmitt's comments (right) and discuss participants' reactions.

Pass out copies of the handout called A Description of Inquiry (p. 12). Allow participants to read through the article and then discuss their reactions. Explain that this is the "definition" of inquiry-based science that will be used throughout the series of workshops.



A BLACKLINE MASTER OF THIS HANDOUT, A DESCRIPTION OF INQUIRY, CAN BE FOUND ON PAGE 12.

Ask participants to share their own experiences with using inquiry. Prompt them with questions like:

- How did you get started?
- Did you just jump in full-blown or did you gradually add more and more inquiry to your teaching?
- What has been the most interesting thing that's happened since you began using an inquiry approach?
- How have your students reacted?
- What differences do you see in your students?
- What positives and negatives have you experienced?
- What role does prediction play in your inquiry process?

Encourage participants to share specific strategies and techniques that they have found to be especially helpful or effective.

## Different Kinds of Inquiry



Two levels of inquiry are described in the National Science Education Content Standards: "In a full inquiry, students begin with a question, design an investigation, gather evidence, formulate an answer to the original question, and communicate the investigative process and results. In partial inquiries, they develop abilities and understanding of selected aspects of the inquiry process."



## About Lee Schmitt

Lee Schmitt is the director of teacher education for the Minnesota Science Museum. He is considered an expert in inquiry-based teaching strategies and has presented numerous workshops on the topic.

In the early part of the video, he says, "The biggest surprise, I think, that teachers have is that they can learn so much and internalize and retain so much information through the inquiry process."

Later Mr. Schmitt says, "Inquiry takes time. It is not intended to be a substitute for the content that needs to be presented in the curriculum. But for the deep understanding of science concepts, there is no better process that allows a student to internalize it, to understand it, and to apply it than by using inquiry methods in the classroom."



# INTRODUCTION TO *Journey North*



A BLACKLINE MASTER OF THE JOURNEY NORTH TOUR HANDOUT CAN BE FOUND ON PAGE 13.

## ***OPTIONAL ACTIVITY – Tour of Journey North Web Site***

For this activity, it is ideal to have a computer lab with Internet access where individuals or small groups can go to the Journey North Web site themselves.

The ability to access the Internet is a key element in Journey North. Participants should become familiar with navigating the Web site and some of its features. In this activity, you will be giving participants a list of items that they are to find on the Journey North Web site.

Provide each group with a copy of the Journey North Tour handout (p. 13).

Allow participants time to complete their tour, then bring participants back together to discuss what they've discovered. If there are experienced Journey North teachers among the group, elicit tips or ideas they might have about effectively using the Journey North Web site.

## **Report Your Sightings**



You may want to have participants practice reporting a sighting. Click on the owl icon on any page of the Journey North Web site and follow the directions.



## **Accessing the Internet**



It is not necessary for teachers to have Internet access in their classrooms or schools to be part of Journey North. Many Journey North teachers successfully use the program without Internet access in their schools. Teachers can access the Journey North Web site from any computer connected to the Internet. For example, teacher Holly Cerullo, who appears on the video, does not have access to the Internet from her school. She downloads and prints the information on her home computer and brings it to school to share with her students.

## WRAPPING UP

### Learning Log

Provide participants some time to write in the Learning Log section of their notebook. Have them write about something they've learned about science teaching in the workshop and something about Journey North that they'd like to explore in greater detail.

### Looking Back/Looking Ahead

Remind participants of Journey North's three sets of investigations—Seasonal Migrations, Plants and the Seasons, and Sunlight and the Seasons. Each investigation has a specific focus, but all explore changes in natural systems. All of the investigations are interrelated. Each of the investigations provides opportunities for inquiry-based instruction and learning.

Explain that the three remaining workshops will focus on each of the three main Journey North investigations. They will also provide opportunities to further explore the use of inquiry-based instruction and other instructional strategies.





# RESULTS OF THE SPRING SURVEY



**Signs of Spring**

**Date (*estimated*)**

Animal Signs (*including human activities*)

Plant Signs

Meteorological and Astronomical Signs

# A DESCRIPTION OF INQUIRY



At the Exploratorium Institute for Inquiry, our work in science education is deeply rooted in the belief that human beings are natural inquirers and that inquiry is at the heart of all learning. The work that we do with educators is designed to give them an opportunity to personally experience the process of learning science through inquiry. Our hope is that this experience will stimulate their thinking about how to create classrooms that are supportive environments for children's inquiry.

Inquiry is an approach to learning that involves a process of exploring the natural or material world, that leads to asking questions and making discoveries in the search for new understandings. Inquiry, as it relates to science education, should mirror as closely as possible the enterprise of doing real science.

The inquiry process is driven by one's own curiosity, wonder, interest, or passion to understand an observation or solve a problem.

The process begins by the learner noticing something that intrigues, surprises, or stimulates a question. What is observed often does not make sense in relationship to the learner's previous experience or current understanding.

Action is then taken through continued observing, raising questions, making predictions, testing hypotheses, and creating theories and conceptual models. The learner must find their own idiosyncratic pathway through this process; it is hardly ever a linear progression, but rather more of a back and forth or cyclical series of events.

As the process unfolds, more observations and questions emerge, giving occasion for deeper interaction and relationship with the phenomena—and greater potential for further development of understanding.

Along the way, the inquirer is collecting and recording data, making representations of results and explanations, drawing upon other resources such as books, videos, and colleagues.

Making meaning from the experience requires intermittent reflection, conversations and comparison of findings with others, interpretation of data and observations, and applying new conceptions to other contexts as one attempts to construct new mental frameworks of the world.

Teaching science using the inquiry process requires a fundamental re-examination of the relationship between the teacher and the learner, whereby the teacher becomes a facilitator or guide for the learner's own process of discovery and creating understanding of the world.

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*For additional information, contact:*  
Exploratorium  
3601 Lyon Street  
San Francisco, CA 94123  
[www.exploratorium.edu/IFI/index.html](http://www.exploratorium.edu/IFI/index.html)

# JOURNEY NORTH TOUR



Take a tour of the Journey North Web site at [www.learner.org/jnorth](http://www.learner.org/jnorth)

## *Today's News*



Here you'll find quick links to the latest news and information. This is the best page to bookmark and visit each day during the season. The Today's News page also includes links to the Journey North Archives, where you can access content from all past seasons.

## *What's Happening This Season?*

Depending on the season you tour the Web site, you will find either:

### *Spring's Journey North*

In the **spring**, this button takes you to the "hub" of the Journey North spring season. Here you'll find links to all of the migrations (or spring events) featured. The spring activities begin in February and last until June, but direct access to the spring section is available from January through July.



### *Fall's Journey South*

In the **fall**, this button changes directions and it links to the fall migrations and studies. The fall activities begin in September and last until December, but direct access to the fall section is available from August through December.



In both spring and fall, each of the featured species (or spring/fall events) has its own "home page." There you'll find a calendar showing when Journey North News will be posted, as well as links to background information, Challenge Questions, Ask the Expert, and Related Lessons and Resources.

## *Report Your Sightings*



This button links to the Field Report form that observers use to report sightings. Try submitting a Practice Report so you can see how the system works. Afterward, follow the instructions to access the database and see the sightings you and others have recently reported. (For quality control purposes, Journey North only accepts observations that are sent from registered email addresses. Registration is free.)

## *How To Use Journey North*



This branch of the Web site is designed specifically for teachers. It links to all online Classroom Lessons, an Orientation, a Teacher Discussion, and Teacher Tips.

## *Search Journey North*



This button takes you to the search engine. Use it to search the site for all information posted since 1995. To simplify student research, many links are also available and organized by species and topics.

