



Biology with TI-Nspire™ and TI-Nspire™ Navigator™ – Day 2

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Materials for Workshop Instructor*

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The following technology will be needed for Days 1-6:

- TI-Nspire™ CX CAS Navigator™ 30-user system
- 30 additional TI-Nspire™ CX CAS handhelds
- 60 standard-A to mini-B USB cables
- 30 mini-A to mini-B USB cables
- A laptop for each participant with the TI-Nspire™ CX Navigator™ Teacher Software installed

In addition to the above technology, the following technology will be needed for each given day:

Day 1

Day 2

- 10 TI-Nspire™ Lab Cradles
- 20 stainless steel temperature probes
- 10 gas pressure sensors
- 10 conductivity probes
- 10 Vernier EasyLink or GoLinks

Day 3

- 10 TI-Nspire™ Lab Cradles
- 10 CO₂ gas sensors
- 10 stainless steel temperature probes

Day 4

- 10 TI-Nspire™ Lab Cradles
- 20 stainless steel temperature probes
- 10 gas pressure sensors
- 10 CO₂ gas sensors
- 10 conductivity probes

Day 5

- 10 TI-Nspire™ Lab Cradles
- 20 stainless steel temperature probes
- 10 gas pressure sensors
- 10 CO₂ gas sensors
- 10 conductivity probes

Day 6

- 10 TI-Nspire™ Lab Cradles
- 20 stainless steel temperature probes
- 10 gas pressure sensors
- 10 CO₂ gas sensors
- 10 conductivity probes

Supplies List

Day 1

-

Day 2

- Distilled Water
- .1M, .2M, .3M Salt solutions
- 400/600 mL Beakers
- 25/50 mL graduated cylinders
- Dental floss
- Funnel
- Dialysis Tubing
- Small Plastic Cups
- Isopropyl (Rubbing) Alcohol
- Room Temperature Water
- Sharpie Markers

- Paper Towels
- Hydrogen Peroxide (H₂O₂)
- 125 mL Flasks
- 10 mL graduated cylinders
- 250 mL Flasks
- Ice
- Funnel
- Cheesecloth
- Liver (Beef or Chicken or Turkey)
- Distilled Water
- Hot Plate



Day 3

- 100ml beaker
- 25 germinated pea seeds
- 25 non-germinated pea seeds
- Ice cubes

Day 4

- Small plastic cups
- Bottle of rubbing (isopropyl) alcohol
- Room temp, water
- H₂O₂
- 125ml flask
- 10ml graduated cylinder
- Enzyme suspension
- 100ml beaker
- 25 germinated pea seeds
- 25 non-germinated pea seeds
- Ice cubes
- Utility clamps
- Ring stand
- Plant cuttings
- Plastic tubing clamps
- Dropper or beral pipette
- Razor blade or scalpel
- 100 watt light source
- Metric ruler
- Masking tape
- Plastic gallon sized bag with twist tie
- Heater, small electric
- Fan with slow speed
- Spray bottle or plant mister
- Graph paper
- Dialysis tubing
- String
- Salt
- Electronic balance
- Stirring rod

Day 5

- Latex Balloons
- Tape Measures (or string and meter sticks)

- String
- Salt
- Electronic balance
- Stirring rod

Day 6

- Small plastic cups
- Bottle of rubbing (isopropyl) alcohol
- Room temp, water
- H₂O₂
- 125ml flask
- 10ml graduated cylinder
- Enzyme suspension
- 100ml beaker
- 25 germinated pea seeds
- 25 non-germinated pea seeds
- Ice cubes
- Utility clamps
- Ring stand
- Plant cuttings
- Plastic tubing clamps
- Dropper or beral pipette
- Razor blade or scalpel
- 100 watt light source
- Metric ruler
- Masking tape
- Plastic gallon sized bag with twist tie
- Heater, small electric
- Fan with slow speed
- Spray bottle or plant mister
- Graph paper
- Dialysis tubing



Day Two	Page #
1. Overview	2-7
2. TI-Nspire™ CX Navigator™ Teacher Software	
a) Getting Started with the TI-Nspire™ CX Navigator™ Teacher Software	
b) Nspire Navigator Scavenger Hunt	
3. Introduction to Data Collection Choose one or more of these simulations with a data collection component:	
a) Biodiversity and the Environment	
b) Like Moths Around a Flame	
c) Arctic Wars – Lynx vs. Snowshoe Hare	
d) Too Hot? Too Cold? Just Right!	
e) Need for Speed	
4. Data Collection with Probeware Choose one or more:	2-9
a) Exploring Diffusion Lab (Conductivity Probe)	
b) Sweating Alcohol (Temperature Probe)	
c) Enzyme Catalysts (Gas Pressure Sensor)	
5. Reflection Ticket Outta Here	

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Biology with TI-Nspire™ and TI-Nspire Navigator™ – Day 2**PD Objectives**

- Introduce the TI-Nspire Navigator System to participants.
- Make participants aware of Quick Polls, sending documents, and the Live Presenter feature.
- Make participants aware of simulation activities and the various types (Strict simulation, Data manipulation, Data collection)

Materials Needed/Set Up Requirements

- *Navigator_Introduction.tnsp*
- *Navigator_Introduction.tns*
- *Nav_Quick_Polls.tns*
- *Nav_Data_Collection.tns*
- *Nspire_Navigator_Scavenger_Hunt.tns*
- *Upload .tns files for the simulations you have chosen to use.*
 - *Be sure to pick at least one of each type*

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- If participants have not searched the TI website for a simulation (Day One homework), then start the day with participants searching for a simulation that they can use in their Biology classroom – which state objectives does it support?
- As homework, suggest that participants locate additional activities at the TI website to use in their classrooms.
- Open the PublishView™ document and use it to guide the activity.
- Send out each question in the *Nav_Quick_Polls.tns* as Quick Polls. Discuss how this could be used in their class to gather feedback.
- Ask teachers about how they get students' feedback on lessons that they have done on prior days.
- How do you assess students on a daily basis?
- Poll teachers early on about which simulations they would like to see/try
- How can you guide the class through an activity without touching the technology?
- Send the participants the *Nav_Data_Collection.tns* and make a participant the Live Presenter. Talk them through how to setup the handheld to collect the temperature data.
- Investigate the use of data simulations in the Biology classroom
- Send the participants the .tns files for the simulations you have chosen to use
- Which simulations are strictly simulations and which have data manipulation or actual data collection components? Be sure participants understand the different types of simulation activities.

Technology Tips

- Use Scavenger Hunt Activity to review/introduce features of the software.

Summary Reflection Questions

- How would you modify this activity for your students?
- How do you see yourself using the TI-Nspire Navigator System at this time?
- How could using the TI-Nspire Navigator System strengthen your teaching?
- When are simulations appropriate? For whole class viewing as demonstrations? For individual student work to introduce or wrap up a topic? For data manipulation? For data collection?

Instructor Notes

Data Collection

PD Objectives

- Data collection with different probes.
- Analyzing variables
- Making predications
- Practice in data collection

Materials Needed/Set Up Requirements

Activity	Subject	Data Collection Device and/or TI-Nspire™ document
Vernier® – Cell Respiration	Cells	Vernier® CO2 sensor, USB temperature sensor <i>14_Cell_Respiration.tns</i>
Vernier® – Transpiration	Cells	Vernier® Gas Pressure sensor <i>13_Transpiration.tns</i>
Enzyme Catalyst	Cells	Vernier® Gas Pressure sensor <i>Enzyme_Catalyts.tns</i>
Diffusion Data Collection	Cells	Vernier Conductivity Probe <i>Diffusion_Data_Collection.tns</i>
Sweating Alcohol	Ecology	Two Vernier EasyTemp USB temperature sensor <i>Sweating_Alcohol.tns</i>

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- Practice data collection.
- Focus in data analysis in this section.
- Discuss inquiry extensions for each of the activities.
- Have groups report out their findings and what they valued in the activity.

Technology Tips

- Introduce the Vernier® DataQuest™ application, and discuss different sampling techniques.
- Discuss default values (180 sec for a temperature probe).
- Show them how to get to menus to change parameters for their experiments.

Summary Reflection Questions

- How would you use this activity in your classroom?
- What would you change in this activity to better suit your class?
- What inquiry extensions can you make from this?