

INQUIRY PROCESS: RECYCLING

Class: Science & Geography
Topic: Recycling Thematic Project

Grade: 3 or 4 (cycle 2)
Time Frame: One Term

Purpose: This set of lessons is intended to spark students' interest in recycling, present the project, and support students as they conduct the IS-21 steps as their project unfolds. These lessons should be used in conjunction with the IS-21 software and the additional classroom activity plans for each step (see the *Inquiry Process Lesson Plans* in the [Teacher Resource webpage](#)). This thematic project will indicate when it would be useful to follow the activities outlined in those lessons.

Note: These lessons were created with the Flexible Mode of the IS-21 tool in mind.

Lesson: Setting Up an Inquiry Need

Stage of Inquiry Process: IS-21's START, DEFINE & BRAINSTORM step.

Teacher Tip

Use the Flexible Mode with the younger students. This will allow you to focus on the steps and/or features that the younger students are ready to take on.

Purpose of lesson: To introduce the recycling project to the students and set up groups. It will also introduce them to the IS-21 software. This lesson provides students with a research topic (i.e. a Big Question) and researchable questions (i.e. Little Questions) that will guide their inquiry. They will learn about the 'arm' analogy to help explain the differences between Big and Little Questions.

Start this lesson with the proposed hook activity, outlined below. Then refer to the activities outlined in the *Inquiry Process Lesson Plans* located on the Teacher Resource webpage.

Materials

- Reference or non-fiction books on recycling different materials (glass, paper, metals, etc.).
- Computers and Internet access.
- Worksheets of the assignment entitled *Task Description* (see the Teacher Resource webpage).
- *Optional: Computer stations with access to YouTube.*

RECYCLING STATIONS

Prior to this activity, you will have to gather a variety of resources about different materials that can be recycled. If you have a computer in your classroom, you can also have a YouTube station for students to watch videos about different products.

1) *Generate* a class definition for “Recycle”.
It could be something like: Take unwanted materials and turn it into something new.

2) *Create* a list of common items that can be recycled.

3) Show a video about the recycling process.

For Example:

Reading Rainbow: How Trash is Recycled with LeVar Burton

<http://www.youtube.com/watch?v=w1I8HXa3HLk>

Recycling for Kids with Waste Management's Mr. Cool Can

<http://www.youtube.com/watch?v=629clJ5VZFc>

4) *Set up* stations in your classroom. Each recyclable material should have its own designated station.

Here are some online resources to help you get started:

Aluminum

Ollie Recycles: <http://www.oilierecycles.com/uk/html/alumin.html>

Recycling Guide: <http://www.recycling-guide.org.uk/science-aluminium.html>

Recycle Works Kids: http://www.recycleworks.org/pdf/kids_aluminum.pdf

Compost

Recycling Guide: <http://www.recycling-guide.org.uk/materials/composting.html>

Vermi the Worm Game: <http://www.calrecycle.ca.gov/Vermi/Game/menu.html>

E-Waste

Recycling Guide – Computers: <http://www.recycling-guide.org.uk/materials/computers.html>

Recycling Guide – Electrical Equipment: <http://www.recycling-guide.org.uk/materials/electricalerequipment.html>

Recycling Guide – Mobiles: <http://www.recycling-guide.org.uk/materials/mobiles.html>

Glass

Ollie Recycles: <http://www.oilierecycles.com/uk/html/glass.html>

Recycling Guide: <http://www.recycling-guide.org.uk/materials/glass.html>

Recycle Works Kids: http://www.recycleworks.org/pdf/kids_glass.pdf

Paper

Ollie Recycles- Paper: <http://www.oilierecycles.com/uk/html/paper.html>

Ollie Recycles- Cardboard: http://www.oilierecycles.com/uk/html/card_what.html

Recycling Guide: <http://www.recycling-guide.org.uk/materials/paper.html>

Recycle Works Kids: http://www.recycleworks.org/pdf/kids_newspaper.pdf



Plastic

Benefits of Recycling: <http://www.benefits-of-recycling.com/recycleplastics/>

Ollie Recycles: <http://www.ollierecycles.com/uk/html/plastic.html>

Recycle Works Kids: http://www.recycleworks.org/pdf/kids_plastics.pdf

General (one or more of the materials)

EPA's Recycle City: <http://www.epa.gov/recyclecity/index.htm>

EPA's Recycling Basics: <http://www2.epa.gov/recycle/recycling-basics>

EPA's Trash and Climate Change activity book: <http://www.epa.gov/wastes/education/pdfs/k00-001.pdf>

Kids' Recycling Zone: <http://www.kidsrecyclingzone.com/index.html>

NASA's Recycle This! Game: <http://climatekids.nasa.gov/review/recycle-this/>

Recycling Guide: <http://www.recycling-guide.org.uk/facts.html>

Ville de Montreal:

http://ville.montreal.qc.ca/pls/portal/docs/PAGE/ENVIRO_FR/MEDIA/DOCUMENTS/DEPLIANT_PEL_EMELE_ANG.PDF

- 5) *Pass out* the 'Task Description'.
This document is on the Teacher Resource Webpage.

Teacher Tip

This assignment asks students to create a Public Service Announcement. The final format of this product can be done in many ways. For example, students can do a skit, a video, present to another class or even at a school assembly.

- 6) *Introduce* the upcoming project.
Explain that before students can select a recyclable material that interests them, they will have to learn about all four of the recyclable materials.
- 7) *Direct* students to visit each station.
Give students about 10 minutes to visit each station. Have students jot down questions of interest as they move through the different stations.

ASSIGNING THE TASK

- 1) *Refer* to the activity 'Assign the Task' in the START lesson plan.
It can be found in the *Inquiry Process Lesson Plans*, which are on the Teacher Resource webpage.
- 2) *Pass out* the 'Phase One' worksheet.
This document is on the Teacher Resource webpage.
- 3) Grade 3 & 4 students are likely not fully prepared to take on the whole inquiry process. Because of this, we have provided them with a Big Question and four Little Questions. However, we recommend that you still spend time explaining the differences between a Big Question and Little Questions.



Teacher Tip

Grade 4 students may be able to handle more of the process than grade 3 students. Consider asking the grade 4 students to answer two Little Questions each. If you think the students are ready, have them create the second Little Question. Follow the activities described in the DEFINE & BRAINSTORM lesson plan. It is part of the *Inquiry Process Lesson Plans* found on the Teacher Resource webpage.

Lesson: Identifying Keywords & Creating Search Strings

Stage of Inquiry Process: IS-21's KEYWORDS & SEARCH STRINGS step.

Purpose of lesson: This lesson allows students to pull out the key concepts that form the basis of their inquiry. Thinking of synonyms for the keywords they highlight will aid them in considering alternative ways that the information is stored and classified. They will also learn how to use the Boolean operators "AND" and "OR" in online searching to either narrow or expand their results. These Boolean operators establish a relationship between the keywords/concepts in a search, and thus have a significant impact on the relevancy of their search results.

Follow the activities outlined in the KEYWORDS lesson plan and the SEARCH STRINGS lesson plan. They are part of the *Inquiry Process Lesson Plans* found on the Teacher Resource webpage.

Here is a list of the search strings students may come up with for each of their Little Questions:

- 1) What is the definition of the environment?
(define or definition) AND environment
- 2) How do humans affect the environment?
(humans OR people) AND (influence OR impact) AND environment
- 3) How does the material that your group chose get recycled?
plastic AND (recycle OR "recycling process") AND "recycling facility"
Note: replace plastic with whatever material a group chooses.
- 4) What can be made from the recycled material your group chose?
plastic AND product AND (recycled OR reused)

Lesson: Determining Best Resources

Stage of Inquiry Process: IS-21's RESOURCES step.



Skip: Younger students have trouble grasping this step. As they are not ready to take on the full inquiry process, it might be best to skip over this step. Given you will be providing them with sources, they will not need to consider where the best location might be.

Lesson: Exploring Resources

Stage of Inquiry Process: IS-21's EXPLORE step.

Skip: Younger students have trouble grasping this step. As they are not ready to take on the full inquiry process, it might be best to skip over this step. Given you will be providing them with sources, they do not need to explore the various locations where they can find potentially useful sources.

Teacher Tip

Grade 4 students may be able to handle more of the process than grade 3 students. Consider asking them to find a source on their own (in addition to one the that you'll provide). If you think your students are ready to do this, follow the activities described in the EXPLORE lesson plan. It is part of the *Inquiry Process Lesson Plans* found on the Teacher Resource webpage.

Lesson: Selecting Sources & Reviewing Sources

Stage of Inquiry Process: IS-21's SELECT & REVIEW step.

Purpose of lesson: Students will learn how to identify the best hits/results from an Internet search by reading the title, description, and web address on a Results page. Students will determine if the sources they selected are credible and relevant. They will also make a quick judgment about the source's *quality*. Based on this evaluation, they will then determine if they would like to use the source.

Pass out the 'Phase Two' worksheet found on the Teacher Resource webpage. It provides a review of their task and lists what they can expect during the second phase.

FOCUS ON USING ONE DIRECTORY AND ONE SEARCH ENGINE

- 1) *Guide* students to a directory.
Select a directory from our suggested list of search engines and directories. Fact Monster may be a good option.
- 2) *Ask* students to find information about the environment.
Encourage student to see if they can find any information to help answer the Little Question "What is the definition of the environment?"

In Fact Monster it can be found following this path: Science > Environment, Energy & Nature > Environment > What is the Environment?



<http://www.factmonster.com/ipka/A0775267.html>

- 3) *Suggest* that students mark that source.
As a group, students should practice marking sources.
- 4) *Guide* students to a search engine.
Select a search engine from our suggested list of search engines and directories.
Duck Duck Go may be a good option.
- 5) *Ask* students to find information about one of their other Little Questions.
They should start exploring by using the search string they created in the KEYWORDS & SEARCH STRINGS step.
- 6) *Read* the title, description, and URL of a few of the results.
You can also point out how many hits they got and ask them to modify their search string if they don't think they received any good results.
- 7) *Discuss* the differences in using directories versus search engines.
- 8) *Suggest* that students mark those sources that answered a Little Question.

RELEVANT SOURCES

- 1) *Provide* students with sources that answers each of their Little Questions.
Grade 3 students are likely to have trouble finding sources that answer their Little Questions. Grade 4 students may have better luck finding additional sources to help with their task.

Here are some online resources to help you get started (you can also use the ones listed in the recycling stations activity):

Definition of environment

<http://www.factmonster.com/ipka/A0775267.html>

<http://dictionary.reference.com/browse/environment>

<http://www.yourdictionary.com/environment>

The impact humans have on the environment

<http://www.factmonster.com/ipka/A0775891.html>

<http://www.factmonster.com/ipka/A0193169.html>

<http://www.edf.org/climate/human-activity-is-causing-global-warming>

<https://www.dosomething.org/tipsandtools/recycling-basics-get-you-going>

<http://www.all-recycling-facts.com/what-to-recycle.html> (what to recycle)

<http://www.mnn.com/lifestyle/recycling/stories/bottle-recycling> (bottles)

http://www.environment-green.com/Paper_Recycling.html (paper)

<http://www.youtube.com/watch?v=jODI07akVHM> (paper)

http://environment.about.com/od/mobilephones/a/why_recycle_cell_phones.htm (cell)



phones)

The recycling process

<http://www.factmonster.com/ipka/A0934633.html> (glass, plastic, aluminum, paper)
<http://www.youtube.com/watch?v=7nZXyjrBraY> (paper, steel, glass, aluminum, plastic)
<http://www.youtube.com/watch?v=jODI07akVHM> (paper)
http://www.youtube.com/watch?v=TL_qH1ra7J0 (plastic bottles)
<http://www.youtube.com/watch?v=PJHD9teTfo0> (rubber)
<http://www.discovery.com/tv-shows/other-shows/videos/howstuffworks-recycling-aluminum.htm> (aluminum)
http://www.youtube.com/watch?v=sCU4o_Ce9PM (cellphones)

Products made from recycled material

<http://www.youtube.com/watch?v=7nZXyjrBraY>
http://wwf.panda.org/about_our_earth/teacher_resources/project_ideas/recycling_glass/ (glass)
<http://www.epa.gov/solidwaste/consERVE/materials/paper/basics/index.htm> (paper)
<http://www.kidsrecyclingzone.com/magic-makeover.html> (plastic)
<http://www.youtube.com/watch?v=PJHD9teTfo0> (rubber)
<http://www.epa.gov/epawaste/consERVE/materials/eycling/faq.htm> (e-waste)
http://environment.about.com/od/mobilephones/a/why_recycle_cell_phones.htm (cellphones)

- 2) *Have* students mark these sources by selecting the 'Webpage' form in IS-21.
- 3) *Explain* the CRACR acronym but focus on Credibility and Relevancy. The younger students may have difficulty evaluating all five criteria. Focus on these two and then have them determine if they want to *Select* the source.

Lesson 9: Note Taking

Stage of Inquiry Process: IS-21's NOTE TAKING step.

Purpose of lesson: Students will take notes on the selected sources. This involves comprehending the main points in the source, highlighting any relevant information to answer a Little Question, and determining if they will paraphrase or quote the content of each source.

The younger students may have difficulty doing this step. If you are teaching grade 3, you may want to focus on either paraphrasing or quoting rather than both. We recommend that you start with quoting.

Here are a couple of examples:

According to Fact Monster, the environment is "everything that makes up our surroundings and affects our ability to live on the earth". In this case, we are "referring to the overall condition of our planet, or how healthy it is".



The first thing in the process is to separate the types of items that come in. At the MRF, “in order to get the best results, a combination of hand-sorting and machine-sorting is used.” (Saving Little Pieces of our Earth).

If you think your students are ready, you can follow the activities outlined in the NOTE TAKING lesson plan. It is part of the *Inquiry Process Lesson Plans* found on the Teacher Resource webpage.

Provide students with the ‘Phase Three’ worksheet entitled. It reminds students of their task and provides an outline of what they will do in Phase 3 of the inquiry process.

Lesson: Synthesize

Stage of Inquiry Process: IS-21’s SYNTHESIZE step.

Purpose of lesson: Students will reorganize and distill the information they found to make sense of it all. They will also determine if they have found enough information to answer their Big Question.

Younger students are likely to have trouble with this step. Rather than have them reorganize their information, ask them to consider which order each group member would like to present in. Ask the group to determine if they can answer their Big Question.

Provide students with the ‘Considerations’ worksheet. It reminds them of their task and provides details of what they are expected to do for their end product.

There is also a suggested rubric specific to the recycling thematic project. Combine this rubric with the inquiry process rubric found on the Teacher Resources webpage.

Lesson: Citing Sources & Creating Something New

Stage of Inquiry Process: IS-21’s ACKNOWLEDGE & PRODUCE step.

Purpose of lesson: This lesson is designed to teach students that they must cite the sources that will be used to answer their Big Question. They will learn a specific citation style (MLA). Students will learn how to communicate what they have learned in an effective format with a specific audience in mind. They will use different media and develop their presentation skills.

Follow the activities outlined in the ACKNOWLEDGE lesson plan and the PRODUCE lesson plan. It is part of the *Inquiry Process Lesson Plans* found on the Teacher Resources webpage. When you get to the ‘Producing Something New’ activity, provide students with the ‘Final Preparations’ handout.



Before students present their final product, it would be a good idea to again provide students with the 'Considerations' worksheet and Rubric handout.

Be sure to have students refer to the checklist in the tool. Each group should review the appropriate checklist before they're ready to present their final product.

Our thanks to cycle 3 teacher Nadia Bruzzese from Clearpoint Elementary, and cycle 2 teacher Melissa D'Ambrosio from Twin Oaks for allowing this adaptation of their recycling unit.

