

actionbioscience.org lesson

To accompany the article from the Council for Responsible Genetics (CRG)

“DNA Patents Create Monopolies on Living Organisms” (Apr. 2000)

<http://www.actionbioscience.org/genomic/crg.html>

To Own or Not to Own DNA (Mar. 2002)

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Grades & Levels:

- **Handout 1:** high school (general)
- **Handout 2:** high school (advanced/AP) – undergraduate (year 1)

Time Recommendations:

- **Handout 1:** 2-3 classes of 50 minutes each
- **Handout 2:** 1-3 weeks for research and presentation

NSES (USA) Content Standards, 9-12:

- NSES 6.1. Science & Technology: abilities of technological design
- NSES 7.3. Science in Personal/Social Perspectives: natural resources
- NSES 7.6. Science in Personal/Social Perspectives: sci. & tech. in local/national/global challenges

Note: View the NSES content standards on this site to choose other curricular applications for additional activities at:

<http://www.actionbioscience.org/educators/correlationcharts.html>

Learning Objectives: Students will ...

- be introduced to certain applications of biotechnology
- know some of the history of patenting life forms
- become aware of the link between natural resources and culture
- understand the debate for and against DNA patents
- evaluate the global consequences of life form patents

Key Words Include:

biopiracy, bioprospecting, biotechnology, commodity, DNA, ethical/moral, genes, indigenous, modification, monopoly, patent, pesticide, pharmaceutical, organism, royalty (monetary), species, sustainability

Preparation:

Article Discussion:

- Distribute or have students print out the article, Article Discussion, and appropriate Student Handout at <http://www.actionbioscience.org/genomic/crg.html>. Assign the article as reading homework and ask students to research definitions for key words for the next class period. The article discussion suggestions on page 3 include questions for a group discussion and a class discussion, as well as key words for students to define. *Optional Activity:* After discussion, have students write a letter to the author, the CRG, expressing their reaction to the article.

Student Handout 1: high school (general)

- Handout 1 involves role-play in the form of a town hall meeting conducted to discuss whether or not a patent, initiated by a group of scientists, should be allowed on a potatoe gene.
- After the discussion of the article, review the “Town Hall Meeting Instructions” (page 4) with the class, making sure students know how much time they have to complete the activity and due date.

Student Handout 2: high school (advanced/AP) – undergraduate (year 1-2)

- Handout 2 focuses on in-depth research projects about patenting life forms, followed by oral and/or visual presentation in class. Ask students to form groups and to choose one of the activities from the handout.
- Indicate how long the students have to conduct their research and to prepare their presentation (e.g., 1 or 2 weeks). Set a date for each presentation (there are 5 in all).
- Determine materials that may be needed for the presentations, such as poster board or recording equipment.
- Allow enough time after each presentation for student questions and answers.

For Educators: Article Discussion

Questions about the article from the Council for Responsible Genetics (CRG):
“DNA Patents Create Monopolies on Living Organisms”

<http://www.actionbioscience.org/genomic/crg.html>

Key Words:

biopiracy, bioprospecting, biotechnology, commodity, DNA, ethical/moral, genes, indigenous, modification, monopoly, patent, pesticide, pharmaceutical, organism, royalty (monetary), species, sustainability

Part 1. Group Discussion:

1. Divide the class into four discussion groups. Each group should have students who act as Recorder (to write), Facilitator (to keep the group on track), and Reporter (to report the group’s findings).

2. Refer to the hard-copy article. Break it up into four sections and assign one section to each group.

Suggested sections for discussion groups:

- “Genes for sale” up to (not including) “Patents on life”
- “Patents on life” up to (not including) “Searching the world over”
- “Searching the world over” up to (not including) “The CRG opposes ... patenting life”
- “The CRG opposes ... patenting life” to end of article

3. Instruct students to read their section aloud with their group and discuss its meaning. Remind them they are not to debate it at this time, but are simply to determine the message of the author by summarizing their section into key points.

4. Have each group’s Reporter read the section key points to the class. You may want the class to take notes of these key points.

Part 2. Class Discussion:

Conduct a whole group discussion. Point out the bias in the article and discuss the author/source (the article is a position paper). Explain the mandate of the CRG (at end of article) and open the discussion to reaction/opinion and other possible viewpoints not represented in the article. Prompt discussion through statements such as:

- Don’t scientists deserve to profit from their work?
- Shouldn’t all science be noble work for the greater good?
- Is it wrong to limit competition?
- Is it fair to profit from another scientist’s work?
- Is there a difference between the patent for modified bacteria and the patent for the compound found in the Gandhi tree?
- Why is the CRG concerned about the patent granted for a mouse?
- If at all, who should own the rights to plants created through years of traditional breeding?
- Are gene banks about preservation, ownership or both?

For Educators: Town Hall Meeting Instructions (Student Handout 1)

Preparation:

1. Distribute Student Handout 1. Prepare students for a “town hall meeting” that will take place by reading the hypothetical case from the handout.
2. Assign the four roles (as student groups) for the meeting: *Residents*, *Scientists*, *CRG Representatives*, and *Patent Experts*. (You may keep roles general or have students create names and backgrounds.)
3. Explain your role as mayor, that you will be facilitating the meeting. Each panel team will get five minutes to present its case, after which the floor will be open to residents for questions. As mayor, set up rules for this Q/A period with the suggestion that all questions go through you to be fielded to the appropriate panel member.
4. Finally, remind students how they will be evaluated (evaluation ideas are provided below). Remind them that they will be in role (in the shoes of someone else) and their opinion in role does not necessarily reflect their own personal opinion.
5. Instruct students to prepare for the meeting. This can be as homework, or use class time with Internet / library access.

Activity Procedures:

1. Set up classroom space to resemble a town hall meeting with seats at the front for the panel (patent experts, scientists and CRG representatives), a special place for the mayor, and seats for the town residents.
2. Open the town meeting and invite panel members to make their five-minute presentations.
3. Open the discussion to residents for questions/comments to the panel. Be in role and maintain control as facilitator through your rules such as raised hands and only one speaker at a time. Most important is to remember you are the mayor and the students are in role as adults, so treat them as such and have fun. Allow for some freedom in discussion. Allow students to explore their reactions in role. This is how they learn to consider the ethics of situations.
4. Bring the meeting to a close. Conduct a vote for those against and in favor of granting the patent. Raised hands are faster, but secret ballots may lead to a truer picture of opinion by reducing peer pressure. Tally the votes and summarize the results (you may be surprised).
5. Give students time to document the meeting and its conclusion. Ask them to finish their notes with the statement: “I agree or disagree with today’s vote because...” and submit it for 10% of their mark. Evaluate this summary based on their understanding of the issues and substantiation of their statement.
6. A suggestion for evaluation criteria:
 - 20% contributed to group work
 - 20% understood the issues
 - 20% supported viewpoint reasonably
 - 20% participated in discussion and meeting
 - 10% was prepared
 - 10% the meeting summary / statement

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Student Handout 1

TOWN HALL MEETING

Hypothetical Case:

You live in a small town in Idaho where the main export is potatoes. Your town is known for a special breed of potatoes, the “Silver Spud,” that is difficult to grow elsewhere but thrives in the local soil.

A group of foreign scientists have discovered a gene in the Silver Spud that is expected to cure cancer. They have applied for a patent and are awaiting the decision. If granted, they will own the rights to the gene in every Silver Spud, including those that grow in your region.

Due to rising tensions, your mayor has arranged for a meeting at the Town Hall where a panel of experts will inform you on the situation and address your questions/concerns. All residents are invited to attend.

Please read your role and prepare with your group for the town meeting:

1. Residents:

You are a group of farmers/residents of the town. Some of you may be new to the community; others may have been there for generations. Create your background to determine your view on the issue. Come to the meeting with one statement and one question for the panel. Divide the work so each member of your team contributes equally.

2. Scientific Team:

You are the scientists who have discovered the gene and applied for the patent. Name the gene and brainstorm reasons for your position. Prepare a five-minute presentation on why you should be granted the patent. You may consider ways to satiate the local residents (such as an opportunity for them to profit or benefit from the resulting drugs). Divide the work so each member of your team contributes equally.

3. CRG Representatives:

You are members of the Council for Responsible Genetics (CRG). Read the explanation of why you are opposed to all forms of patenting life in the article “DNA Patents Create Monopolies on Living Organisms.” Research the CRG and prepare a five-minute presentation that explains your organization and why you are opposed to the patent. Divide the work so each team member contributes equally.

4. Patent Team:

You are a group of government representatives from the Patent Trade Office (PTO). The mayor has invited you to address any questions regarding the patent process and legalities of patent issues. Find out the process involved in obtaining a patent, the costs, time frame, and what a patent does to protect intellectual property (what rights do the patent owners have?). Prepare a five-minute presentation. You can find most of this information on your country’s PTO’s website. Divide the work so each member of your team contributes equally.

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Student Handout 2

Instructions:

- The activities below are to be conducted in groups.
- Each group should choose only one activity.
- Your instructor will give you a timeframe for your research and preparation.
- The activity will be presented in class orally, with or without visual aids. Be ready to answer questions from your classmates on your presentation.

PRESENTATION #1: Neem Tree case study

Research and present the history of the Gandhi, or Neem, Tree DNA patenting case. Include the consequences of the patent on India's economy and culture. You may want to make a visual presentation about the Neem Tree and its economic benefits.

PRESENTATION #2: Diamond v. Chakrabarty

Research and present the court case and consequences of the 1980 landmark Supreme Court case Diamond v. Chakrabarty that resulted in the decision to patent a strain of bacteria. You may want to create and present a chart that lists the key arguments of both sides in the case.

PRESENTATION #3: Patent debate

Prepare and present a debate on the PROs and CONs of patenting life forms. Use real examples to support your statements. Research the rules and procedures of debating on the Internet.

PRESENTATION #4: Patent survey

Create a survey to ask people's opinions about the patenting of DNA and life forms. Survey people in school and in your community. Be prepared to answer survey participants' questions on the topic. You may want to use audio recording equipment to record opinions. Prepare a summary of your findings for your presentation.

PRESENTATION #5: Patent process

Find out the process involved in obtaining a patent, the costs, time frame, and what a patent does to protect intellectual property. Make sure you include information about biotechnology patents. You may want to prepare a chart that illustrates the process, from the patent application to the patent grant.