

Disc1: Classroom Practice

Professional Development Toolkit

Tools, lesson plans and student work samples from today's most successful small schools, including:

- The CES Common Principles
- Discussion Guides
- Lesson Plans
- Student Work

Introduction

Introduction

About the Project

For over twenty years, the Coalition of Essential Schools has been valued for its ten Common Principles emphasizing equity, personalization, and students using their minds well. The Coalition is also known for honoring local wisdom, acknowledging that no two schools are alike and that race, class, culture, gender, geography, and experience all factor into creating unique communities and schools. The Coalition understands that context matters, and that is why Essential schools appear in the country's largest and smallest districts, in urban, suburban, and rural settings, and serve the country's advantaged students as well as those with few resources.

The CES EssentialVisions DVD project brings the Common Principles to life with real stories and tools from today's most successful small schools. Each DVD captures how the Common Principles have been implemented, illustrating how students engage in their own education and how teachers develop as professionals. Focused segments provide unique perspectives on the benefits and challenges of each principle, while discussion questions, lesson plans and student work samples offer tools that educators can use to drive improvement. Three DVDs will be released over the course of fall 2005, 2006, and 2007. The three-part series will demonstrate all ten principles in action. The first DVD, *Disc 1: Classroom Practice*, captures the principles "learning to use one's mind well," "less is more, depth over coverage," and "student as worker, teacher as coach".

The Annenberg Foundation generously funded the Coalition of Essential Schools National office (CESN) to create the CES EssentialVisions three-disc DVD series. CESN contracted the Harvard-Smithsonian Center for Astrophysics Science Media Group to videotape and edit the series.

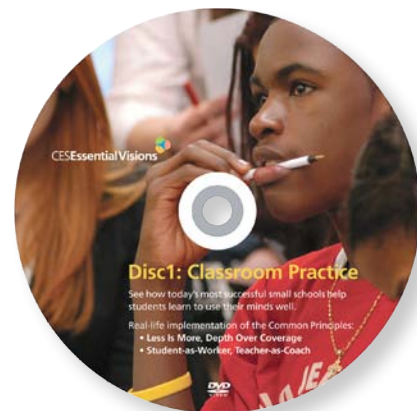
We hope these DVDs will be used for interdisciplinary team meetings, department meetings, year-long staff development in schools, teacher education programs, professional development workshops, academic and professional conferences—anywhere that school policy and classroom practice is discussed and influenced.

Introduction

About the DVD

The schools, teachers, students and parents featured in the first of this three-part DVD series come from two very different contexts. School of the Future is a grade 6-12 school on the lower east side of Manhattan. Francis W. Parker Charter Essential School is a 7-12 school located in suburban Devens, Massachusetts on a former army base. These schools share critical common characteristics: they are successful small, personalized education settings where anonymity and mediocrity have given way to a powerful sense of community and a strong commitment to academic challenge and excellence. *Disc 1: Classroom Practice* was shot in the fall of 2004 at the Francis W. Parker Charter Essential School and in the spring of 2005 at the School of the Future.

CES EssentialVisions Disc 1: Classroom Practice presents real-life video segments of the Common Principles “less is more, depth over coverage” and “student as worker, teacher as coach”. We hear from teachers and principals about their struggles applying “less is more” in the classroom while surrounded by a system engulfed in a standards-based, testing frenzy. We see students working together and supporting each other in an effort to have “sophisticated conversations” and students being assessed for mastery of content in algebra not based solely on the right answer, but on their mathematical communication skills. By viewing this DVD in its entirety or in individual segments over time, you are seizing the opportunity to reflect on topics most pertinent to educators today.



Toolkit Elements

1. Using the DVD
2. History of the Coalition of Essential Schools and the Common Principles
3. Description of Video Segments
4. Discussion Questions
5. Structure of Schools
6. Lesson Plans and Student Work
7. Appendices, Glossary of Terms, and Additional Reading

About the Toolkit

The primary purpose of this toolkit is to introduce the DVD and suggest various discussion entry points to be used by teachers, administrators, students, parents, teacher educators and policymakers. The Parker School and School of the Future are our entry points into viewing the principles “less is more, depth over coverage” and “student as worker, teacher as coach” in action.

The DVD provides a series of video segments from which the viewer can choose; the accompanying toolkit assists the user in making effective use of these possibilities. Viewers can select video segments, discussion questions, lesson plans, and student work based on their areas of interest, such as hearing the challenges of “student as worker” from the teacher perspective, watching how “less is more” is possible in an algebra class, or taking a student-led tour of one of the featured schools. The combinations of paths to explore are unlimited, allowing the DVD and toolkit to be utilized repeat-

edly in individual and group collaboration efforts. We hope that the DVD and toolkit will be used in many varied contexts, including: faculties who are trying to decide if they should become a CES school, CES and non-CES teachers alike who want to improve their classroom practice, design teams for small school startups, teacher education programs training student teachers, and families, students community members, and policymakers interested in learning more about the CES educational philosophy and practices.

Recognizing that time for teachers and principals is a limited – even scarce – resource, the toolkit includes a brief description of each of the videos with running time and related discussion questions. This information is intended to help you organize your time and the time of your colleagues to explore areas of interest and move forward the work of your classrooms and school.

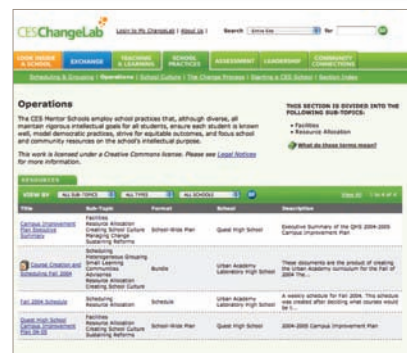
Introduction

About CES Affiliation

To affiliate with the Coalition of Essential Schools as an individual or school, log onto www.essentialschools.org or call 510 433 1451.

About CES ChangeLab

After using the DVD, viewers may find that they are interested in further exploring the work of innovative and successful CES Mentor Schools. In addition to the DVD, the Coalition of Essential Schools also offers CES ChangeLab, which provides a behind the scenes look into the most successful CES schools across the country. This online library makes it easy to access proven resources of effective teaching and curriculum 24 hours a day, seven days a week. Through online school tours, discussion boards, and “Ask a Mentor” panels, ChangeLab expands the reach of these schools to the larger CES and educational communities. Help improve your school’s teaching and governance by logging on today. See how. Visit www.ceschangelab.org.



Using the DVD

Introducing the DVD

1. Print and copy the Brief History of CES and the Common Principles in the toolkit and have the participants read the information prior to the workshops or at the very start of the workshop.
2. Be sure you are familiar with the Coalition so you may try to answer any background questions that arise.
3. View selected segments prior to meeting with the group.
4. Select and prepare discussion questions that will help the group engage meaningfully with the material and focus the conversation.

Planning Your Time

Each classroom video segment is roughly 20 minutes long and supporting interviews and school tours are between seven and nine minutes long. Be aware of how much time you have to conduct a workshop and choose segments that address your goals and that can be viewed and discussed in depth in the allotted amount of time. Remember, “less is more,” so give the group plenty of time to watch, talk, and dig deeply into the chosen issue of the day.

Consider Your Audience

As you develop a formal workshop or presentation or casually gather a group of colleagues to view *Disc 1: Classroom Practice*, understand your audience. Are you working with a group of student teachers? First-year teachers? Veteran teachers who team teach or who are in the same grade group or department? How familiar is this group with the principles of the Coalition of Essential Schools? Once you have identified your audience, consider these useful tips.

Consider Your Goals

Be sure to have goals clearly identified before showing the DVD to a group. Are you showing the DVD to understand how to implement a Common Principle in the classroom? To consider the challenges and benefits of such an approach? As an overview of what successful small schools look like in action? To introduce current issues in education? To support teachers who are developing a more progressive philosophy of education? With a well-defined goal, clear support of the work you are trying to accomplish will surface in the video segments.

Planning Tips

1. Share identified goals of the viewing with the group.
2. Review background on CES as needed, and the specific segment(s) that will be shown and discussed in the workshop. Take any questions.
3. Particularly with classroom segments, it is useful to have a suggested focus for observation. To which aspects of the classroom experience should viewers pay especially close attention? What questions should viewers have in mind as they watch?
4. Begin segment of choice.
5. Discuss.
6. Reflect on implications for practice. What might be some next steps to take in your classroom or school?
7. Plan date, time, and agreed upon goals for the next time the group will get together to watch a new video segment or report back on steps taken in the classroom or school.
8. At the next meeting report back on steps taken in the classroom or school.

Brief History of the Coalition of Essential Schools

In 1984, Theodore R.Sizer and several colleagues published their findings from “A Study of High Schools,” a five-year investigation of teaching, learning, school history, and school design. This study found that, despite their differences in location and demography, American high schools, by and large, were remarkably similar and simply inadequate. By offering an incredible array of courses from “consumer math” to calculus and from drivers’ education to volleyball, schools often failed to focus on their central purpose – helping students learn to use their minds well. Teachers, facing 150 or more students a day, regularly assigned work on the basis of what could be graded quickly rather than on the basis of what would push students to think deeply. Students, traveling from room to room and from teacher to teacher for unrelated fifty-minute classes, rarely had time to sink their teeth into any topic or authentic work

and passed their days with little sense of the connections between the various subjects they studied and the “real” world. The typical American high school, while perhaps a friendly enough place, promoted apathy and intellectual lethargy; the lesson it succeeded in teaching best was that becoming educated is deadly dull.

Sizer’s *Horace’s Compromise: The Dilemma of the American High School* (1984) describes how the typical structures of schools help make these inadequacies all but inevitable. This reality pushed Sizer to consider how schools might be more wisely designed. Given the dismal historical record of major “top-down” reform initiatives over the past 50 years, Sizer chose to approach reform not with a new and improved imposed “model,” but rather with a general set of ideas, today known as the Common Principles, which a school could fashion in ways that made sense to their community.

Subsequently in 1984, a group of twelve schools in seven states agreed to redesign themselves on the basis of Sizer’s ideas and to form a coalition of schools based on these principles. A team led by Sizer, then based at Brown University, formed to support the reform efforts of these “essential” schools. These principles soon caught on among scores of schools around the country – public, charter, and independent.

In 2005, the Coalition of Essential Schools includes 21 affiliate centers and a national office in Oakland, California that supports the work of hundreds of schools across the country in the areas of school design, classroom practice (teaching and learning), leadership, and community connections. For more information on the Coalition of Essential Schools, visit www.essentialschools.org.

The Common Principles

The Common Principles

Learning to Use
One's Mind Well

Less Is More, Depth
Over Coverage

Goals Apply to All Students

Personalization

Student-as-Worker,
Teacher-as-Coach

Demonstration of Mastery

A Tone of Decency and Trust

Commitment to the
Entire School

Resources Dedicated to
Teaching and Learning

Democracy and Equity

Learning to Use One's Mind Well

The school should focus on helping young people learn to use their minds well. Schools should not be “comprehensive” if such a claim is made at the expense of the school’s central intellectual purpose.

Less Is More, Depth Over Coverage

The school’s goals should be simple: that each student master a limited number of essential skills and areas of knowledge. While these skills and areas will, to varying degrees, reflect the traditional academic disciplines, the program’s design should be shaped by the intellectual and imaginative powers and competencies that the students need, rather than by “subjects” as conventionally defined. The aphorism “less is more” should dominate: curricular decisions should be guided by the aim of thorough student mastery and achievement rather than by an effort to merely cover content.

Goals Apply to All Students

The school’s goals should apply to all students, while the means to these goals will vary as those students themselves vary. School practice should be tailor-made to meet the needs of every group or class of students.

Personalization

Teaching and learning should be personalized to the maximum feasible extent. Efforts should be directed toward a goal that no teacher have direct responsibility for more than 80 students in the high school and middle school and no more than 20 in the elementary school. To capitalize on this personalization, decisions about the details of the course of study, the use of students’ and teachers’ time and the choice of teaching materials and specific pedagogies must be unreservedly placed in the hands of the principal and staff.

The Common Principles

Student-as-Worker, Teacher-as-Coach

The governing practical metaphor of the school should be student-as-worker, rather than the more familiar metaphor of teacher-as-deliverer-of-instructional-services. Accordingly, a prominent pedagogy will be coaching, to provoke students to learn how to learn and thus to teach themselves.

Demonstration of Mastery

Teaching and learning should be documented and assessed with tools based on student performance of real tasks. Students not yet at appropriate levels of competence should be provided intensive support and resources to assist them quickly to meet those standards. Multiple forms of evidence, ranging from ongoing observation of the learner to completion of specific projects, should be used to better understand the learner's strengths and needs, and to plan for further assistance. Students should have opportunities to exhibit their expertise before family and community. The diploma should be awarded upon a successful

final demonstration of mastery for graduation – an “Exhibition.” As the diploma is awarded when earned, the school's program proceeds with no strict age grading and with no system of credits earned by “time spent” in class. The emphasis is on the students' demonstration that they can do important things.

A Tone of Decency and Trust

The tone of the school should explicitly and self-consciously stress values of unanxious expectation, of trust and of decency. Incentives appropriate to the school's particular students and teachers should be emphasized. Parents should be key collaborators and vital members of the school community.

Commitment to the Entire School

The principal and teachers should perceive themselves as generalists first (teachers and scholars in general education) and specialists second (experts in but one particular discipline). Staff should expect multiple obligations (teacher-counselor-manager) and a sense of commitment to the entire school.

Resources Dedicated to Teaching and Learning

Ultimate administrative and budget targets should include, in addition to total student loads per teacher of 80 or fewer pupils on the high school and middle school levels and 20 or fewer on the elementary level, substantial time for collective planning by teachers, competitive salaries for staff, and an ultimate per pupil cost not to exceed that at traditional schools by more than 10 percent. To accomplish this, administrative plans may have to show the phased reduction or elimination of some services now provided students in many traditional schools.

Democracy and Equity

The school should demonstrate non-discriminatory and inclusive policies, practices, and pedagogies. It should model democratic practices that involve all who are directly affected by the school. The school should honor diversity and build on the strength of its communities, deliberately and explicitly challenging all forms of inequity.

Description of Video Segments

Introduction (2:16)

Dr. Pedro Noguera, Professor at New York University's Steinhardt School of Education, invites educators, policymakers, and concerned citizens to use this DVD series to think differently today about how to educate tomorrow's adults for engagement, mastery, and citizenship.

Learning to Use One's Mind Well (4:28)

What does the principle "learning to use one's mind well" look like, feel like, and mean to students, teachers, principals, and parents?

"Less Is More, Depth Over Coverage" Description (0:58)

Dr. Pedro Noguera gives a detailed description of the toughest of the Common Principles to put into practice.

Debating Ethics: Freedom vs. Happiness (20:15)

Discussion Questions

Parker humanities teacher Lise Brody takes six weeks to allow her students to debate the ethical dilemma of freedom vs. happiness using philosophical texts, world literature, and history, while emphasizing writing, analytic and presentation skills.

Conversation with Lise (7:32)

Hear Lise's thoughts on creating humanities courses based on the common principle "less is more, depth over coverage".

Second Year Algebra: Coaching a Lab Investigation (23:48)

Discussion Questions

Parker algebra teacher Diane Kruse constructs a five-week unit on polynomials through a lab investigation that assesses for mathematical communication, understanding of polynomial functions, and mathematical argument and proof.

Conversation with Diane (7:06)

Hear Diane's thoughts on creating math classes based on the common principle "less is more, depth over coverage."

The Francis W. Parker Charter Essential School Tour (8:24)

For more information on *The Parker School*, see www.ceschangelab.org

Division III students Becca and Ellie take you on a tour of their school located in an elementary school building on a former military base in Devens, Massachusetts.

Benefits and Challenges of "Less is More, Depth over Coverage" (15:56)

Discussion Questions

Teachers, students, principal and parents reflect on how constructing a school around the principle "less is more, depth over coverage" affects a school community.

"Student as Worker, Teacher as Coach" Description (0:57)

Dr. Pedro Noguera introduces the metaphor that stands in firm contrast to the traditional role of teacher-as-deliverer-of-information.

Biology: Bacterial Transformation Lab (17:18)

Discussion Questions

School of the Future's Annie Chien allows her 10th grade biology students to experience the successes and failures of scientific investigation through a bacterial transformation lab.

Conversation with Annie (6:03)

Hear Annie's thoughts on how to create young scientists by allowing kids to actually "do" science, while she coaches them through the process of a bacterial transformation lab.

Humanities: A Student Salon (21:03)

Discussion Questions

What better way to learn about the Enlightenment than for School of the Future students to recreate the salons of the era in John Fanning's 10th grade Humanities class?

Conversation with John (7:00)

Hear how John uses the support he receives from his 10th grade co-teachers to create a student-centered unit for the Enlightenment era.

School of the Future Tour (7:47)

For more information on *School of the Future* see www.ceschangelab.org

Tiffany and Chris take you on a tour of their school, a former beauty school for girls, located on the lower east side of Manhattan.

Benefits and Challenges of "Student as Worker, Teacher as Coach" (11:53)

Discussion Questions

Teachers, students, principal, and parents reflect on how constructing a school around the metaphor "student as worker, teacher as coach" affects a school community.

Learning to Use One's Mind Well

Discussion Guide

Learning to Use One's Mind Well

Thinking About the Principle

1. As an educator, define for yourself what you believe students "learning to use their minds well" would look like, sound like, and feel like.
2. How do you know if the students in your classroom or in your school are using their minds well?

Less Is More, Depth Over Coverage

Discussion Guide

Less Is More, Depth Over Coverage

Thinking About the Principle

1. What do you think “less is more” really means? What is the “less,” and how does it become “more”?
2. What might be gained from this approach to curriculum, instruction, and school structure for teachers and students? What might be lost?

Freedom vs. Happiness

Discussion Guide

Less Is More, Depth Over Coverage

Freedom vs. Happiness

Prior to Viewing

1. Download the handouts that students will be working from:
 - *Mini-Mini-Research & Analysis Interlude*
 - *Debate Instructions to Groups*
 - *Debate Assignment and Rubric*
2. What themes or other organizational structures do you expect to see in a literature class that practice the principle “less is more, depth over coverage”?
3. What kinds of activities are common in history and literature classes at your school or were common when you studied history and literature?

Reflecting on What You Saw

1. How does Lise keep the students focused on a larger purpose while they dig deep by reading quite a few texts and engaging in research and debate preparation?
2. What is the distinction between skills and content in the way that Lise frames her course?
3. Why is this distinction so critical to Lise in her planning?
4. What evidence do you see of authentic application of knowledge in the clips from Lise’s classroom?
5. What could Lise’s students miss that a traditional history or literature curriculum might have provided?
6. What did you see that might be applicable in your own classroom?

Coaching a Lab Investigation

Discussion Guide

Less Is More, Depth Over Coverage

Coaching a Lab Investigation

Prior to Viewing

1. Download the handouts that students will be working from:
 - *Polynomial Lab Assignment*
2. Is “less is more” possible in a math or science classroom? How might it look?
3. What kinds of activities are common in math classes at your school or were common when you studied math?

Reflecting on What You Saw

1. What did you see Diane’s students doing that you would expect to see in any math classroom? What did you see Diane’s students doing that is different from what you would expect? How did the students respond to uncertainty in their work?
2. What facts and content are provided to the students so that they may begin the lab investigating new ideas? What is the role of direct instruction in this activity? This unit?
3. How does the “less” in this polynomial lab really become “more”?
4. Diane makes a distinction between content and skills that allows her to work with “less is more.” What mathematics content does she expect her students to learn? What broader mathematical skills does she expect them to take away? How does this particular lab assignment serve those larger goals?
5. What evidence do you see of engagement and authentic application of mathematical thinking?

Less Is More, Depth Over Coverage

Freedom vs. Happiness and Coaching a Lab Investigation

After Viewing Both Segments

1. In what ways are Diane and Lise consistent in their interpretations of “less is more”? How do they differ?
2. How much of what you see here depends on the decisions of the individual classroom teacher? How much depends on the structure and context of the school?
3. None of these principles is enacted in a vacuum. Though the classroom segments from Lise and Diane were selected to illustrate the principle “less is more,” these teachers are also clearly acting as coaches in their classrooms. What specific instructional techniques are Lise and Diane using to act as coaches and guides to their students? How does this instructional approach support the implementation of “less is more”?

Less Is More, Depth Over Coverage

Benefits and Challenges

Prior to Viewing

1. Brainstorm what you believe to be the benefits and challenges of “less is more, depth over coverage” in a classroom.

Reflecting on What You Saw

1. In what ways is your school already implementing the principle “less is more, depth over coverage”? How about in your classroom?
2. What challenges exist at your school site and/or in your community to implementing “less is more” in the classroom? As a philosophy for the whole school? How do you either work with these challenges or overcome these challenges?
3. What support systems exist at your school and/or in your community to begin implementing “less is more” in your classroom? As a philosophy for the whole school? How should you engage your supporters?
4. What pressures do you feel for coverage? What curricular obligations are non-negotiable in your classroom, department, district, or state? What must students learn?
5. What is truly essential learning for your students? Imagine that you meet your students in the grocery store 10 years from now. What do you think that they will remember from your curriculum? What do you suspect they will have forgotten? What is it that you want them to remember and be able to do?

Less Is More, Depth Over Coverage

Lesson Plans and Student Work Samples

Note

The student work and lesson materials that accompany the video segments may be downloaded in PDF format and are intended to serve as a basis for discussion by providing additional insight into the work captured in each classroom. They do not provide complete lesson plans. These may be photocopied for discussion purposes only.

Freedom vs. Happiness

Lesson Plans and Student Work Samples

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Questions to Guide Discussion of Materials and Student Work

1. How does the semester plan for the course emphasize “depth over breadth”?
2. What essential understandings and themes focus the work?
3. How does the unit you observed fit into the semester plan outlined in the course syllabus?

Freedom vs. Happiness

Handout: Philosophy Course Syllabus

What do I know? How do I know it? What is right? An Overview of Western Philosophy

This class will be a general overview of Western philosophy. We will examine the three main themes that have challenged philosophers since the beginning of human history:

1. **Epistemology.** What do we know? What can we know? How do we know it?
2. **Metaphysics.** What is reality? What is the relationship between thought and material substance?
3. **Ethics.** What determines right and wrong? How should we live?

The work that will be most central to this class is thinking. You will be asked to grapple deeply with challenging questions and to raise your own questions and explore them. Every piece of work that you do in this class, from class discussion to informal and formal assignments will be an exercise in thinking deeply and clearly.

Assignments and Expectations:

Class discussion. Full, thoughtful participation in class discussion is a requirement for this course. This includes close listening to what your friends have to say. As a group, we will always be drawing on three thousand years of prior thought (which we'll learn about in the reading) and our own collected heads and experiences. We'll need all of that to investigate the issues and questions before us.

Journals. The journal is a crucial part of this class. Although it will not be formally assessed, you will draw extensively on it for your larger assignments. You will only be able to meet on the larger pieces of work if you have put thought and effort into your journal. The journal may incorporate a listening assessment as well.

Major Assessments.

- There will be approximately 3 essay assignments, each of which will be portfolio eligible for writing. These papers will develop questions that you will have tackled in your journal.
- There will be a major reading assessment at the completion of *Sophie's World*.
- There will be an ethics debate, assessed for Oral Presentation and listening, at the end of the course

Texts:

Gaarder, Jostein, *Sophie's World*

Excerpts from the works of the various philosophers we'll study

LeGuin, Ursula "The Ones Who Walk Away from Omelas"

"The Grand Inquisitor" from *The Brothers Karamazov* by Fyodor Dostoevsky

Sartre, Jean-Paul, *The Flies*

Freedom vs. Happiness

Handout: Philosophy Course Syllabus

Philosophy Overview Cont'd

Policies and Expectations:

1. **Completion of work.** In order to satisfactorily complete this course, you must complete all major assignments and the journal.
2. **Late work policy.** I am flexible with deadlines, but ONLY if you speak to me in advance. I will not give you an extension if you request it the day before a piece of work is due. Late work is not portfolio eligible. Therefore, I will read it and offer thoughtful feedback, but I may not rubric assess it.
3. **Coming to class on time.** Please come to class on time.

Criteria for Course Assessment

Satisfactory Completion of this course requires:

- Consistent, thoughtful and respectful participation in class discussion and activities.
- On time arrival.
- Thoughtful daily preparation.
- Completion of all course work.

Unsatisfactory Completion of this course would reflect:

- Infrequent, inappropriate, or disruptive involvement in class
- Frequent tardiness
- Inconsistent daily preparation
- Extremely or frequently late completion of assignments or
- Non-completion of assignments

Exceptional Completion of this course would reflect:

- All of the criteria for satisfactory completion in addition to
- Exceptional effort, growth or achievement

Ethics Unit Mini-Mini-Research & Analysis Interlude

We've raised a great number of powerful, complex, challenging questions over the last week or two which, coincidentally, could just happen to apply to a lot of real-world problems. These include...

- Should human society be organized/governed?
Corollary: Should people be forced to do things against their will?
- Should the good of the many outweigh the good of the few?
- Which is more important: freedom or happiness?
Corollary: Who gets to decide?

Your assignment over the next day or few is to choose a real world issue or controversy. It could be an **unsolved problem** (What should be done about Global Warming?) or a **hotly debated question** (Should gay marriage be legal?) or a **combination of the two** (What if Genetically Modified organisms get into the non-GMO seed supply?)

Try to choose an issue that your group does **not** agree about from the start. That is to say, if you **all** think abortion should be illegal, don't choose the abortion debate.

Once you've chosen an issue, here are your tasks:

- A) Discuss the question as a group. What is your opinion at first glance? Be sure someone records this discussion. You don't all have to come to an agreement. Record your individual responses and any position the group as a whole may take. (10 -15 minutes)
- B) Research the major arguments on either side of the issue. Learn what people are saying and what drives their positions. (30 – 60 minutes)
- C) Identify the underlying philosophical convictions or assumptions behind the various arguments you have explored. See if you can articulate what unspoken values are implicit in each. Consider, but don't limit yourself to, the questions listed above. (30 minutes or more. This is the good part.)
- D) Discuss the question again. Has your own position changed? How do you see the issue now? What are the hardest questions about it for you? (Again, record your individual and group responses and positions.) (approx. 15 minutes)
- E) Share your findings with the class in an informal but organized presentation.

Debate / Oral Presentations

Our final project of the semester will be a Debate. In the course of this debate, you will deliver an Oral Presentation, in which you argue the position assigned to you on the following question:

Should freedom be sacrificed for happiness and/or safety?

Your job, as a team, is to come up with a series of arguments in which you

- Draw on the ideas in the readings we've done;
- Draw on the thinking of philosophers we have studied this semester;
- Draw on our class discussions;
- Draw on your own thinking
- Use the same rigorous philosophical reasoning that you have used in your writing and thinking this semester (identify underlying assumptions, determine whether conclusions follow from assumptions);
- Use real-world examples and/or analogies to
- Convince the judges of your position.

Debate structure:

Group A Intro / Speech 1
Group B Intro / Speech 1
Group A Speech 2
Group B Speech 2
Group A Speech 3
Group B Speech 3
Cross Examination of Group A speakers
Cross Examination of Group B speakers
(Prep time for rebutters)
Group A Rebuttal
Group B Rebuttal
Questions from judges to Group A
Questions from judges to Group B
Group A Brief Conclusion
Group B Brief Conclusion

Note: The debate will probably take two class periods.

Freedom vs. Happiness

Handout: Debate Assignment and Rubric

Philosophy
AH Division III
Fall, 2004

Ethics Debate Oral Presentation Assessment

Criteria for excellence	JB	A	M	E
Content				
Your speech contains at least one clear, substantive argument for your side.				
Your argument is well-grounded and convincing.				
Your reasoning is sound; you SHOW that your reasoning is sound.				
You anticipate arguments from the other side.				
You use details, specifics, examples to illustrate and support your argument. You apply the question to a real-world situation.				
You are able to field questions consistently.				
Presentation				
You communicate your points clearly.				
Your speech is well organized				
Your delivery is dynamic and engaging.				
You speak at an appropriate pace and volume and are easily understood.				
Process				
Your speech is written ahead of time; you had time to edit it with your peers. You do not improvise it at the last minute (except rebutters).				
Your speech is polished and rehearsed (except rebutters).				
(Rebutters) You are as prepared as possible; you have arguments and counter-arguments sketched out and ready. You seem polished and rehearsed.				
You are ready to present at the debate.				

Overall assessment for Oral Presentation: Portfolio eligible? _____

JB A M E

Freedom vs. Happiness

Handout: Instructions to Groups

Philosophy
AH Division III
Fall, 2004

Instructions to groups

Over the next few days, you will be working together to create a persuasive case for your position. This process will involve

- Research
- Brainstorming
- Organizing (dividing up and assigning of ideas to develop)
- Writing
- Rehearsing

Here is a suggested process. Depart from it as seems fit, but beware of missing any of these steps entirely. Remember, you can divide the labor in any way you'd like, but everyone should participate and contribute. Even if you are reading a prepared speech, you will still have to demonstrate your understanding of the concepts during the debate when your team is cross-examined.

Step 1. Formulate your overall position. Produce a brief document that states it. (This is important so that I can make sure the two sides really are debating the same question.)

Step 2 Brainstorm a list of arguments on your side. Try to think of lots of angles and lots of real-world examples to illustrate them.

Step 3. Make a list of potential arguments on the other side and counter arguments to yours. See if you can find ways to rebut them.

Step 4. Research the issue a little bit. Find out what's already been written on the question. Research the real-world examples you've thought of. See if these issues are being discussed in terms of the debate question.

Step 4. Choose your strongest points and divide them up among your first three speakers. Make sure you all know who's covering what & who's using what examples.

Step 5a. Speakers 1, 2 & 3 go off on your own & write your OP.

Step 5b. Rebutter/cross-examiner write a cheat sheet of

- potential arguments from the other side
- potential flaws in those arguments
- potential attacks on your side's arguments
- potential responses to those attacks

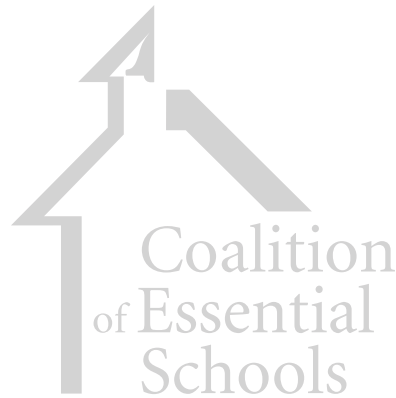
Freedom vs. Happiness

Handout: Instructions to Groups

Step 6. Reconvene with your group and review everyone's speeches / rebuttal preps. Fine tune.

Step 7. Rehearse, rehearse, rehearse.

Throughout this process, the judges will be preparing by educating themselves on **your arguments**. In other words, they will listen in on your group's discussions and ask you questions. You may co-operate with them as you see fit. Keep in mind that they may be a good source of information on the other group's ideas and strategies....



Questions to Guide Discussion of Materials and Student Work

1. How does this assignment assess the students' understanding of major course content?
2. How does this assignment assess the skill of listening? (For The Parker School Criteria for Excellence in Listening, see www.parker.org.)
3. What evidence of *thinking* do you see in the students' work? How is this debate an authentic assessment?
4. What coaching and guidance is necessary to enable the students to complete this assignment successfully?

Philosophy
AH Division III
Fall, 2004

Ethics Debate
Listening Assessment

Standards of Excellence	JB	A	M	E
Your response sheets indicate that you understood the speakers' arguments and the reasoning behind them.			✓	
Your response sheets indicate that you were listening closely to EACH speaker.			✓	
Your response sheets and questions indicate that you listened actively and thoughtfully.			✓	
Your final decision statement reflects a considered response to all the arguments presented.			✓	
Your pre-debate notes demonstrate close attention to and thoughtful interaction with the groups' ideas.			✓	
Your work is legible. Please. I really need it to be.			✓	

Overall Assessment for Listening:

Portfolio eligible? Yes

JB A M E

Nice work, [redacted]. Your notes show that you were following the groups' thinking processes closely as they progressed. Moreover, you raise astute questions in your response sheets. In your final response, your thinking reflects the entire process of listening, considering, questioning. You paid close attention.

Freedom vs. Happiness

Student Work: Ethics Debate Listening Assessment

19.01.05
Philosophy 3.1
Freedom vs. Happiness Listening

After hearing all of the arguments, what is your position on the issue? What caused you to reach this conclusion? What did you hear that affected your thinking?

After hearing all of the arguments, it is somewhat clear to me that freedom out ways happiness and safety. This is due to almost one argument, and the only reason why this is because this argument did exactly what it was needed to do in undermining the other side of the debate. This was made by Sarah, when she said the it is ignorant to be satisfied with happiness and safety when you know that there is always something more, and that is your free will. When this was said it caused me to think about Omalas, and how even when some of the citizens of the city walk away, they still walk away with the knowledge that the child is still locked away in the closet, waiting to be released. The pro-freedom side also successfully presented examples of situations when people's freedoms had been placed after there happiness, creating, fear among the people being affected by these newly placed laws. The pro-happiness/safety team did not address how one is expected to act in a situation when you know your freedom is being violated, they simply stated why our society does this. This left me with one big question that they this team was unable to answer, and that was; how does one decent a society when they need to give up the freedom of decent to work within it? How do I do what is right when someone else is telling me that what is right doesn't matter, it is what makes everyone happy? I think that the pro-happiness/safety group did not do a good enough job defending their ideas against those raised by the other team. This can be optimized when the side fighting for happiness ended their last chance to speak by saying "What are we but a gain of sand on a beach?" What this group did not address was the fact that that even though we all are one of many, it is this many that makes us who we are. The beach may be made up of many gains of sand but it is all these gains of sand that makes a beach.

My final outcome was the opposite in how I had originally felt on this issue. I have always been one to say the society and the happiness of many better then the selfishness of self-freedom, and in away is till believe this. However, what I was allowed to see was how it is the many freedoms that encompass a society, and it is the fact that we have the freedom to build empires that makes us who we are.

Dissonant?
Lowly dissonant -
is this society you want
the freedom to? or not
sides had you to
this as an insight
of your own?

Philosophy
AH Division III
Fall, 2004

Ethics Debate
Judge's Response Sheet

Group A
Argument 2

Points that you found convincing:

story of community - happy and safe
interdependence - put faith in community
ibcs - giving up freedom for community
backbones - born w/ freedom
structure - Obama's did not have individual deny's natural nature

freedom = isolation
isolation = unsafe, unhappy
not logical
freedom = selfish

Points you see flaws in:

Is this pact mandatory
hierarchy impacts → none is happy a bar all → not all are happy
happiness is secondary to freedom
more freedom means more happiness for all
right to take away community
pick one thing

Questions you have:

about degrees of freedom? Am I selfish if I want to pick one thing
your free will? Do pacts contain
there natural freedoms that exist now pacts? Are people happy when there they
are under same one else? Is this happiness and
are these natural too? Feeling of safety false?

Group B
Argument 2

Points that you found convincing:

born for sacrifice
is going to take away freedom
what constitutes this
oppression in freedom (civil rights)
independent modest
RED SCARE
- MEATHYISM
- COMMUNISM
- DID NOT QUESTION
- taking away freedom
LOSING SECURITY
- SEDITON ACT
- Didn't make more happy
- No one could go against happiness
- Plantation needs slaves
- took away slave's freedom
- majority do not feel happy

Points you see flaws in:

accuracy? → representation means that it does mean it's the people
most made of the people
are the government (theoretically)
no must protect freedoms by violating some others
Questions you have:
to the fact that you are your government no matter how oppressive
Do you think that our government protects certain freedoms?
Do you feel safe in this country now/here? What would make it
better, anarchism? How would you balance protectionist measures
with freedom?

Notes on Team 2

Argument #1 ~~the~~ People overthrow governments in order to restore new ones.

Freedom follows happiness etc.

We are a pet animal.

Questions I have about this argument:

What if there was no government?

Are some revolutions to gain more freedom?

Counterarguments I have heard from the other team to this argument:

- freedom is an innate part of human existence.
- We are born on the far side of despair → this is reaching our full freedom.

Argument #2. Institutionalization

Society is willing to forgo prisoner's the the mental/psychological freedoms in order to give society its happiness.

Questions I have about this argument:

How does the question of the good of the many overtake this argument? Does the "answer" to that question change to this question?

It's weird "Don't those people (the criminals) know that they are forgoing their freedom for their actions? They have the freedom to ~~not~~ have their freedom taken away."

Counterarguments I have heard from the other team to this argument:

"

- criminals know consequence and choose (with their freedom) what is righter than their own freedom.
- Antisocial

- 10.01
- ...
- Can't have real freedom on both left and right
 - utopian anarchy exception
 - What is the purpose of limited freedom?
 - Freedom to take away freedom
 - freedoms being lost
 - patriot act
 - free to do anything you want, except to take away freedom
 - prosecution?
 - Allowed to limit freedom
 - You can do anything but there are consequences.
 - freedom w/ consequence
 - society has consequence
 - french enlightenment
 - 1 - Freedom should never be restricted
 - (doesn't matter if bad things happen, as long as they are happy)
 - ~~total~~ freedom cannot
 - What is freedom?
 - 1984 vs. BRAVE NEW WORLD
 - division
 - is no such thing as complete freedom
 - freedom to limit freedom
 - Do people want freedom?
 - not free to not want to be freedom
 - ~~free~~ consequences less than freedom (vice versa)
 - Antagonist - does it allow freely to
 - Some of the rules around freedom
 - omakes
 - good inhibitor
 - the flies
 - 2 Total anarchy as bad as tyranny
 - ≡ Why is freedom better than secured happiness ≡

Questions to Guide Discussion of Materials and Student Work

1. How does this assignment assess the students' understanding of major course content?
2. How does this assignment assess the skill of oral presentation? (For The Parker School Criteria for Excellence in Oral Presentation, see www.parker.org.)
3. What evidence of *thinking* do you see in the students' work? How is this debate an authentic assessment?
4. What coaching and guidance is necessary to enable the students to complete this assignment successfully?

Freedom vs. Happiness

Student Work: Ethics Debate Oral Presentation Assessment

because, though in both cases governments were formed, those governments were expressly mandated to protect freedom - so it's hard to prove that the lower tax on tea was the driving force. For me that's a right way to demonstrate

Philosophy
AH Division III
Fall, 2004

Ethics Debate - but society/security is what people want

Oral Presentation Assessment

Criteria for excellence	JB	A	M	E
Content				
Your speech contains at least one clear, substantive argument for your side.			✓	
Your argument is well-grounded and convincing.		✓		
Your reasoning is sound; you SHOW that your reasoning is sound.		✓		
You anticipate arguments from the other side. <i>see my notes about govt defend freedom - and not Brave New World</i>		✓		
You use details, specifics, examples to illustrate and support your argument. You apply the question to a real-world situation.		✓		
You are able to field questions consistently.			✓	
Presentation				
You communicate your points clearly.			✓	
Your speech is well organized			✓	
Your delivery is dynamic and engaging.		✓		
You speak at an appropriate pace and volume and are easily understood.		✓		
Process				
Your speech is written ahead of time; you had time to edit it with your peers. You do not improvise it at the last minute (except rebutters).			✓	
Your speech is polished and rehearsed (except rebutters).			✓	
(Rebutters) You are as prepared as possible; you have arguments and counter-arguments sketched out and ready. You seem polished and rehearsed.				
You are ready to present at the debate.			✓	

most overall, terrible work

You did seem nervous, raised but it would be easy

Overall assessment for Oral Presentation:

Portfolio eligible? _____

JB A M E

Excellent job kicking off the debate. You spoke persuasively and launched our team solidly. Your arguments are quite strong. But I think you need to find more watertight support for them. South Africa & the US Revolution are inconclusive

Freedom vs. Happiness

Student Work: Ethics Debate Oral Presentation Assessment

Philosophy
Ethics Debate Speech
January 12, 2005

In South Africa a little over a decade ago, it's true, the people of South Africa resisted their government.

Then they reinstated a new government that they were happy with, and have lived under that government since. *Never* in history has it occurred that people have overthrown their government and not created a new one to take its place. This proves that people only overthrow their government in order to create one that makes them *happy*. It has little to do with freedom. If freedom was the driving force, and people did overthrow their government for the sake of freedom, they'd never willingly reinstate a new one, thereby giving up some of their freedom, would they?

Maybe it's true that people overthrow a government for a certain percentage of freedom, but the freedom they want is only the freedom they need in order to make themselves happy and secure. The only freedoms people want are these freedoms; all other freedom they will exchange in a moment's notice for safety and happiness.

Because what other freedoms, aside from those freedoms necessary to make you feel happy and secure, would a person want? Aldous Huxley said in *Brave New World*, "In fact, [in wanting freedom], you're claiming the right to be unhappy... Not to mention the right to grow old and ugly and impotent; the right to have syphilis and cancer; the right to have too little to eat; the right to be lousy; the right to live in constant apprehension of what may happen tomorrow; the right to catch typhoid; the right to be tortured by unspeakable pains of every kind." (P.240)

Does govt necessarily need less freedom than no govt?

Can you demonstrate support for this?

Very clear omission here! You're lucky the other team hasn't read the book!

Freedom vs. Happiness

Student Work: Ethics Debate Oral Presentation Assessment

People only want the freedom they need in order to be happy. A lot of freedom has to do with negative things, like hunger and fear, because there is no one to provide for you. This is why so many people in the world are living contentedly under a government: they've forsaken all these freedoms that they do not want or need in exchange for the protection of a government, and maintain only the freedoms they need to make themselves happy.

When America fought for their independence in the 18th century, it was because they disliked the kinds of taxes they had to pay to England. So, they fought the American Revolution and were free from England and the first thing they did was write *new* tax laws that they were happy with paying.

What would people do with complete freedom, anyhow? It seems to be that the main goal in most people's lives is to be happy and safe. Nobody wants to be lousy or miserable or unhappy; and nobody wants to feel as if they're in constant jeopardy.

People want to be comfortable. In being completely free and on their own, wouldn't people work towards building a situation for themselves in which they were happy and secure? Why would people want to be free when if they just give up that freedom they have everything they would work towards if they were free?

The scenario presented in this debate is about freedom versus happiness and security. I doubt that people would be happy with a government if that government took away any freedom that they really desired. People are only giving up freedoms they don't need- like the freedom to kill someone or the freedom to have syphilis. They're not giving up any freedom that they wouldn't want to part with, because it would make them unhappy.

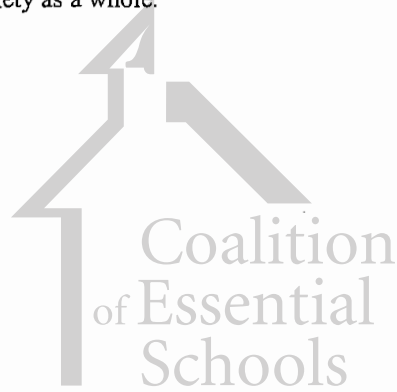
Was the goal lower taxes - or the freedom to set their own taxes?

Support

But what if it did? Would it still be worth sacrificing for security?

It's an interesting question - Can you show that people value what is what they have, or more than what they have?

There is so much freedom that is simply unnecessary and unimportant. Why maintain your freedom to be miserable when you can live in society that promises you happiness and safety? History has shown that people need some sort of order in their lives. What people want in life is to be happy and safe; this has been shown again and again, in South Africa and the American Revolution and countless other examples. Choosing happiness and security over freedom is not only good for the individual but much better for the society as a whole.



DEBATE

1/7/0

★ Should freedom be sacrificed for happiness/safety?

- ~~YES~~ YES.

★ What's the point in wanting to be free if in being free you're trying to be happy + safe -

★ What's the definition of "freedom"?

★ limited freedom,

more vs. less

★ freedom = human

trait, if you're not

free you're not

human.

the things you would have if you gave up freedom

• ~~marxism~~ ^{fascism} vs. democracy

• Omelas

• McCarthyism? people forsake innocent people for safety

• Grand Inquisitor, religion in general

• South Africa - people will overthrow a bad

government not for freedom but ~~for~~ to reinstate

new government that they're happy with

• forcing someone to take anti-depressants which +

away their freedom to feel how they really feel

but makes them happy. Psych ward, save

a person from themselves?

• wanting freedom is selfish. we exist as a

collective. good of many vs. good of few

people agree with these generalities: crimin

should be in prison, mental patients in psych we

The underlying philosophy of these things is

sacrificing the freedom of these people for th

happiness/safety of the society

• Babies born w/o freedom,

• Adam + Eve children aren't free but they're

safe + happy

we run in packs.

we need order to

LIVE. you have

to forsake some

of your freedom

for the good of

the society.

Coaching a Lab Investigation

Lesson Plans and Student Work Samples

Note

The student work and lesson materials that accompany the video segments may be downloaded in PDF format and are intended to serve as a basis for discussion by providing additional insight into the work captured in each classroom. They do not provide complete lesson plans. These may be photocopied for discussion purposes only.

Coaching a Lab Investigation

Second Year Algebra Course Syllabus

Questions to Guide Discussion of Materials and Student Work

1. How does the semester plan for the course emphasize depth over breadth?
2. What essential understandings and themes focus the work?
3. How does the unit you observed fit into the semester plan outlined in the course syllabus?

Coaching a Lab Investigation

Second Year Algebra Course Syllabus

Advanced Algebra

Course Syllabus, Fall 2004

Amy Adams and Diane Kruse

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Essential Questions: What is unique about functions? What is universal?

Course Description:

Advanced Algebra focuses on functions and their applications. We will develop a more formal mathematical vocabulary for discussing functions and their behaviors, and will investigate the properties of several functions in depth. This course will also help you to refine your algebraic skills so that you can work more efficiently. When taken with Trigonometry, this course can provide the necessary prerequisite for Calculus. Skills assessed for the graduation portfolio are *Mathematical Problem-Solving* and *Mathematical Communication*.

Timeline:

- Intro to functions (1 week)
- Exponential and logarithmic functions (5 weeks)
- Polynomial functions (5 weeks)
- Rational functions (5 weeks)
- Mystery functions and Final Assessment! (Last week)

Assessment:

- **Problems of the Week** are assessed for *Mathematical Problem-Solving*. A collection of these problems forms the foundation of a problem-solving piece for your graduation portfolio (more details soon!).
- **Lab Investigations** are assessed for *Mathematical Communication*. These are formal reports where you summarize and explain the results of an investigation, and each lab counts as a portfolio piece on its own.
- **Exams and Quizzes** will be used to provide feedback on your mastery of course content.
- A final, in-class, performance assessment (Final Exam) will give you a chance to practice this form of assessment before it becomes high-stakes.
- **Daily Homework** will support and reinforce content learned in class. We will record complete/incomplete homework, and may ask to see your work on a particularly critical skill. Plan on 30 minutes of homework per night.
- **Problem Sets** with several more complex problems will be assigned weekly. These will be completed and handed in for assessment and/or feedback. (You will NOT have problem sets in weeks when a lab is due.)

Satisfactory/Unsatisfactory Final Assessment:

In order to satisfactorily complete the course, you will need to complete ALL major assignments (Problems of the Week, Labs, Problem Sets, and Exams). You will be expected to make up any missed work. Late work will meet this minimum requirement, but will not be eligible for inclusion in your graduation portfolio, and will be noted in your final course assessment.

Materials:

TI-83 Graphing Calculator

Binder or file and notebook for handouts and class notes

Math tools (ruler or straightedge, graph paper, and colored pens or pencils)

Coaching a Lab Investigation

Handout: Polynomial Lab Assignment

Questions to Guide Discussion of Materials and Student Work

1. What are students expected to explore and to figure out for themselves?
2. How is student investigation guided and supported in the lab handout?
3. What expectations for quality work are made clear at the outset in the lab report?
4. How does this assignment focus on “less?” How does it ask for “more?”

Coaching a Lab Investigation

Handout: Polynomial Lab Assignment

Polynomial Functions: A Lab Exploration

This exploration is designed to introduce you to the world of **polynomial functions**. What are their general shapes? What patterns are predictable? How can you figure out where the graphs will rise and fall, and where they will cross the x-axis?

The exploration has several steps. You should follow each step sequentially, and keep careful records of the things you attempt and the results you obtain. When you are finished, you will use these records to write a summary of what you learned.

This lab requires the use of a graphing calculator.

A **polynomial function** is any function of the form

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x^1 + a_0,$$

where every a is a numerical **coefficient**, and the **terms** are arranged in decreasing order with the term of **greatest degree** (highest power of x) first. Some examples of polynomial functions are:

$$\begin{aligned} f(x) &= x^3 \\ g(x) &= 5x^4 - 3x^3 + 22x^2 + 17x - 1 \\ R(x) &= \frac{1}{2}x^7 + 25 \end{aligned}$$

Take a minute to read this definition carefully, and to see how the examples correspond with the different parts of the definition. The notation is complex.

1. Start by exploring the shapes of the simplest polynomial functions, those with only one term and no coefficients. Graph each one on your calculator, and record the general shape of each in a table.

$$\begin{aligned} f(x) &= x \\ g(x) &= x^2 \\ h(x) &= x^3 \\ k(x) &= x^4 \\ m(x) &= x^5 \end{aligned}$$

What patterns do you see? (What is the **end behavior** of the different functions? How might you predict what will happen based on the **degree of the polynomial**?) Test your hypothesis to see if it still holds with really large exponents. *Why* is this happening?

2. What happens if you change the coefficient of the leading term? (For instance, start with the the graph of $f(x) = x^3$, and then graph $g(x) = 2x^3$ and $h(x) = 4x^3$ on the same set of axes. Describe the changes from one to the next, and identify the effect that the coefficient has on the shape of the graph. *Be sure to use different kinds of numbers!*)

Coaching a Lab Investigation

Handout: Polynomial Lab Assignment

3. As you know, polynomials can have many more terms than just the single terms we've been working with so far. Here are some more complex polynomial functions to graph, paired with the "simpler" equation whose pattern you have determined. As you graph each pair, consider how the presence of additional terms affects the shape of the graph.

a) $f(x) = x^3$ $g(x) = x^3 + 2x - 11$

b) $f(x) = -2x^3$ $g(x) = -2x^3 - 5x^2 + \frac{1}{2}x + 2$

c) $f(x) = \frac{2}{3}x^4$ $g(x) = \frac{2}{3}x^4 + 2x^2 - 11$

Is the general shape still predictable according to the pattern that you determined in question #1? What specific differences do you notice between, say, the graphs of $f(x) = x^3$ and $g(x) = x^3 + 2x - 11$? Some aspects to consider are the end behavior of the function, the number of "U-turns" in the graph, and the **y-intercepts**.

Generate hypotheses, and test them on three more pairs of polynomial equations of your own design. *Why* do you think that these things are happening? *Why* is the leading term so powerful?

4. Here are some polynomial functions in **factored form**. (What does factored form mean?) How do you know the degree of each polynomial? What is the connection between the particular **factors** and the shapes of the graph? Why might factors be useful when sketching graphs of polynomial functions?

$$f(x) = (x + 1)(x + 2)$$

$$p(x) = x^2 + 5x + 6$$

$$T(x) = x(x^2 - 3x + 2)$$

$$g(x) = (x + 1)(x + 2)(x + 2)$$

$$h(x) = (x + 1)(x + 2)(x + 3)$$

$$k(x) = (x - 1)(x + 3)(x + 5)(x - 7)$$

$$m(x) = (x - 2)(x - 2)(x + 1)(x + 4)(x - 1)$$

5. **Pull it all together:** How can you identify the graph of a polynomial function from its equation? Create an example of your own, and use it to summarize and illustrate all of the major points you have discovered in your investigation.

Coaching a Lab Investigation

Handouts: Polynomial Lab Investigation Rubric and Writing Your Polynomial Lab Report

Questions to Guide Discussion of Materials and Student Work

1. What expectations for quality work are made clear up front?
2. How is content understanding assessed in this report?
3. How is the skill of mathematical communication assessed in this report?

Coaching a Lab Investigation

Handout: Polynomial Lab Investigation Rubric

Name _____

Lab Investigation Assessment

Mathematical Communication

<p>Content is complete and detailed</p> <p><input type="checkbox"/> <i>Notes attached</i></p> <ul style="list-style-type: none"> You introduce the scope and purpose of the work Your conclusion summarizes your findings You thoroughly complete the investigation You explain major points with appropriate detail You mathematically justify why your claims are true You include evidence to support your findings, and include examples 	<p>JB-----A-----M-----E</p>
<p>Language and notation is appropriate and clear</p> <ul style="list-style-type: none"> You use mathematical vocabulary You are concise, and refrain from repetition Your language is easy to understand You follow conventions for formal mathematical notation Your tone is formal and direct – no first person and no editorializing 	<p>JB-----A-----M-----E</p>
<p>Visuals enhance understanding</p> <ul style="list-style-type: none"> You use diagrams, tables, and other visuals when helpful Your visuals are labeled and referred to specifically in the text of your report Graphs that illustrate comparisons are easy to read and include basic reference points Technology is used to create high-quality visuals 	<p>JB-----A-----M-----E</p>
<p>Organization is logical</p> <ul style="list-style-type: none"> You include an introduction and conclusion Work is divided into clearly marked sections Information is organized around the ideas being presented Examples and visuals are embedded in a way that makes them easy to follow and page breaks make sense 	<p>JB-----A-----M-----E</p>

Overall Assessment: JB-----A-----M-----E

On time? ☐ Yes ☐ No (not eligible for portfolio)

☐ Revise by _____

Assessed by _____

Coaching a Lab Investigation

Handout: Writing Your Polynomial Lab Report

Writing Your Polynomial Lab Report

*Please include the following sections in your lab report, and remember to **attach the notes from your investigation** and class discussions for full credit!*

Introduction:

State your purpose

Define polynomial functions

Make a brief connection to quadratics (1-2 sentences: how are polynomials connected to prior work with quadratics?)

Findings:

Do NOT write “#1, #2, #3, and #4” from the investigation. Organize by theme or topic.

For each point that you make, state the point, give examples that illustrate it, and finally provide proof that your claim is true for all polynomial functions.

You can write in paragraphs if you like, but limit yourself to one topic per paragraph.

You may also use a “bulleted list” format.

Conclusion:

Concisely list all major points. Think of this as a quick summary of the facts you should remember—without all the discussion and explanation.

Use your example from #5 to wrap up your entire discussion and to give a coherent example of how the facts you list actually work with a real polynomial.

Coaching a Lab Investigation

Student Work: Polynomial Lab

Questions to Guide Discussion of Materials and Student Work

1. What evidence do you see of content understanding?
2. What evidence do you see of the skill of mathematical communication? (For The Parker School Criteria for Excellence in Mathematical Communication, see www.parker.org.)
3. What evidence do you see that students are thinking like mathematicians or discovering ideas for themselves?
4. This is a fairly academic assignment. Is it authentic?

Coaching a Lab Investigation

Student Work: Polynomial Lab

Name

Lab Investigation Assessment

Mathematical Communication

<p>Content is complete and detailed</p> <p>✓ Notes attached</p> <ul style="list-style-type: none"> • You introduce the scope and purpose of the work ✓ • Your conclusion summarizes your findings ✓ • You thoroughly complete the investigation ✓ • You explain major points with appropriate detail ✓ • You mathematically justify why your claims are true ✓ • You include evidence to support your findings, and include examples ✓ 	<p>JB-----A-----<u>M</u>-----E</p> <p>lovely work! While I have made suggestions throughout about how you say things (or prompting for a bit more depth on occasion), you have all the key content.</p>
<p>Language and notation is appropriate and clear</p> <ul style="list-style-type: none"> • You use mathematical vocabulary ✓ • You are concise, and refrain from repetition ✓ • Your language is easy to understand ✓ • You follow conventions for formal mathematical notation ✓ • Your tone is formal and direct – no first person and no editorializing ✓ 	<p>JB-----A-----XM-----E</p> <p>pp. 5-6 repeat what you've already said earlier.</p> <p>Good notation + vocab.</p> <p>Some suggestions are in the margins for more formal algebraic proof in lieu of words.</p>
<p>Visuals enhance understanding</p> <ul style="list-style-type: none"> • You use diagrams, tables, and other visuals when helpful ✓ • Your visuals are labeled and referred to specifically in the text of your report ✓ • Graphs that illustrate comparisons are easy to read and include basic reference points ✓ • Technology is used to create high-quality visuals ✓ 	<p>JB-----A-----<u>M</u>-----E</p> <p>Clear support for your discussion!</p>
<p>Organization is logical</p> <ul style="list-style-type: none"> • You include an introduction and conclusion ✓ • Work is divided into clearly marked sections ✓ • Information is organized around the ideas being presented ✓ • Examples and visuals are embedded in a way that makes them easy to follow and page breaks make sense ✓ 	<p>JB-----A-----XM-----E</p> <p>I've made one or two tiny suggestions to improve the flow of your ideas. The content structure is great!</p>

Overall Assessment:

JB-----A-----~~X~~M-----E

Beautiful work! Your revision will involve some editing, another look at reflection (pg 8), and a little more algebra in the proofs. Your reasoning shows real understanding.

On time? (Yes) No (not eligible for portfolio)

Revise by

Assessed by Diane

Coaching a Lab Investigation

Student Work: Polynomial Lab

November 14, 2004

Polynomial Functions: A Lab Exploration

exponent

This lab was an investigation of polynomial functions with a hopeful result of being able to predict a general shape of a function based on our findings. A polynomial function is a function that consists of terms with exponents of natural numbers. The terms within a polynomial are organized from the greatest to the least. An example of a polynomial function is quadratic functions, which we studied last year in division two.

Degree: Different values of a degree in a polynomial function change the shape of the graph

⇒ As the value of the degree in a polynomial function increases, the slope becomes steeper

Example:

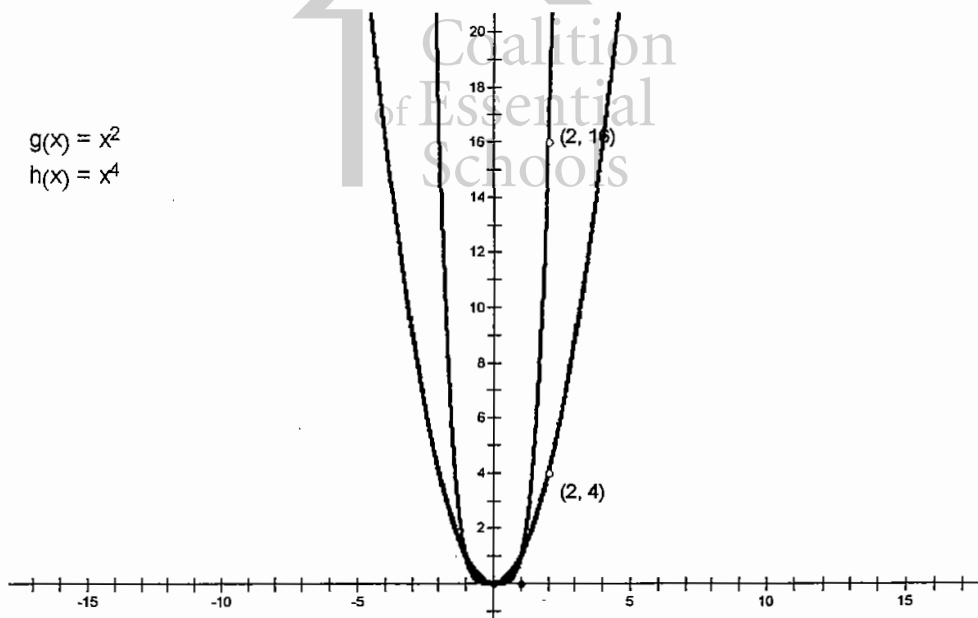
$$f(x) = x^2$$

$$g(x) = x^4$$

As can be seen in the graph below, the slope of $g(x) = x^4$ has a greater slope of $f(x) = x^2$. At $x = 2$, $g(x) = 16$, whereas $f(x) = 4$.

$$g(x) = x^2$$

$$h(x) = x^4$$



Proof:

The greater the value the x -value is multiplied by, the larger the output of an x -value will be. As the outputs of both the x -values and $f(x)$, y -values increase, the change in the slope will decrease. ✓

Coaching a Lab Investigation

Student Work: Polynomial Lab

⇒ Polynomials with even degrees create a U-shaped graph

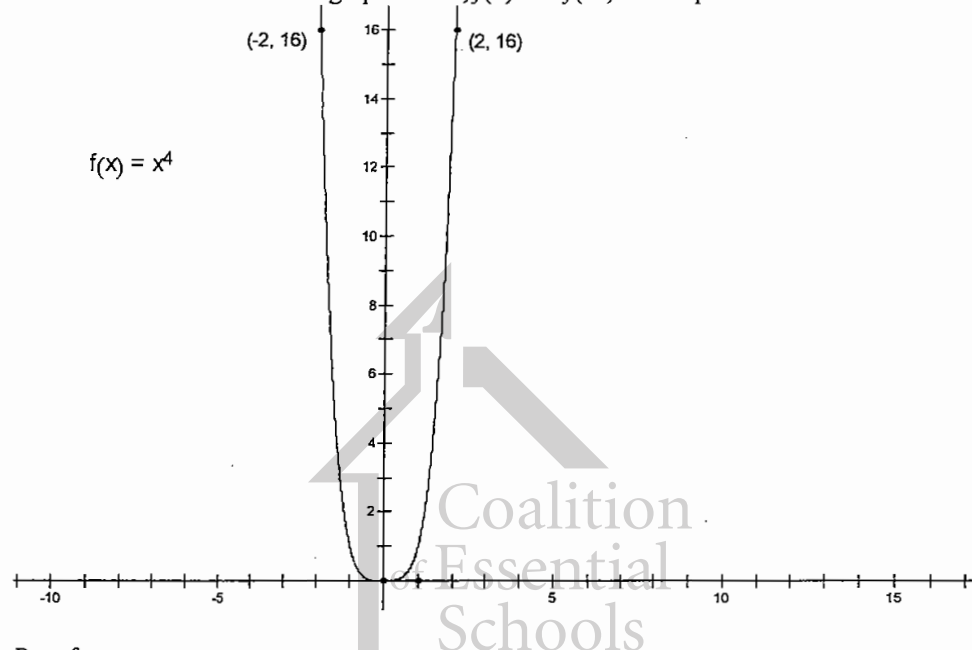
Example:

$$f(x) = x^4$$

$$f(2) = 2^4 = (2)(2)(2)(2) = 16$$

$$f(-2) = (-2)^4 = (-2)(-2)(-2)(-2) = 16$$

As can be seen in the graph below, $f(2)$ and $f(-2)$ both equal 16.



Proof:

Every number multiplied by itself an even amount of times, will result in a positive number; every positive number to an even power has a positive outcome, and also every negative number to an even power also has a positive outcome.

$$(\text{Positive \#})^{\text{Even \#}} = \text{Positive Outcome}$$

$$(\text{Negative \#})^{\text{Even \#}} = \text{Positive Outcome}$$

Coaching a Lab Investigation

Student Work: Polynomial Lab

⇒ **Polynomials with odd degrees create a S-shaped graph**

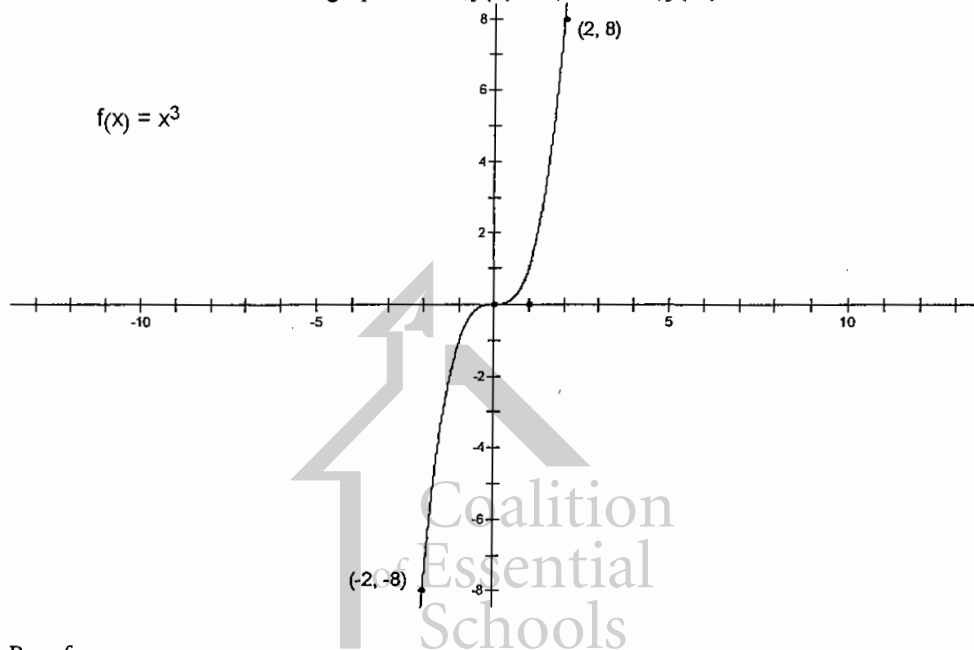
Example:

$$f(x) = x^3$$

$$f(2) = 2^3 = (2)(2)(2) = 8$$

$$f(-2) = (-2)^3 = (-2)(-2)(-2) = -8$$

As can be seen in the graph below, $f(2) = 8$, whereas, $f(-2) = -8$.



Proof:

A positive number to an odd exponent results in a positive outcome and a negative number to an odd exponent result in a negative outcome. Positive numbers multiplied by itself an odd number of times results in a positive product. Negative numbers multiplied by itself an odd number of times has a negative result.

$$(\text{Positive \#})^{\text{Odd \#}} = \text{Positive Outcome}$$

$$(\text{Negative \#})^{\text{Odd \#}} = \text{Negative Outcome}$$



Coaching a Lab Investigation

Student Work: Polynomial Lab

Numerical Coefficient of Leading Term : Different values of a degree in a polynomial function change the shape of the graph ?

⇒ As the coefficient increases, the graph shrinks horizontally

Example:

$$f(x) = x^3$$

$$g(x) = 2x^3$$

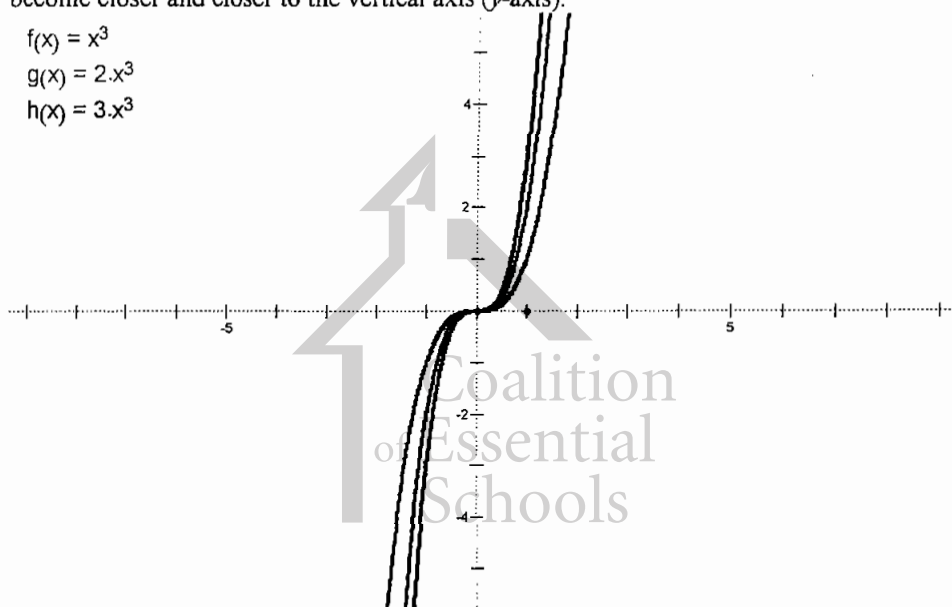
$$h(x) = 3x^3$$

Notice in the graph below that as the coefficient increases from 1 to 3, the polynomials become closer and closer to the vertical axis (y-axis).

$$f(x) = x^3$$

$$g(x) = 2 \cdot x^3$$

$$h(x) = 3 \cdot x^3$$



Proof:

As the coefficient increases, the amount that the x-value is multiplied by increases, making the value of the outcome gradually larger.

Express in terms of 'a'

$f(x) = ax^n$ is how many times larger than $g(x) = x^n$?

Coaching a Lab Investigation

Student Work: Polynomial Lab

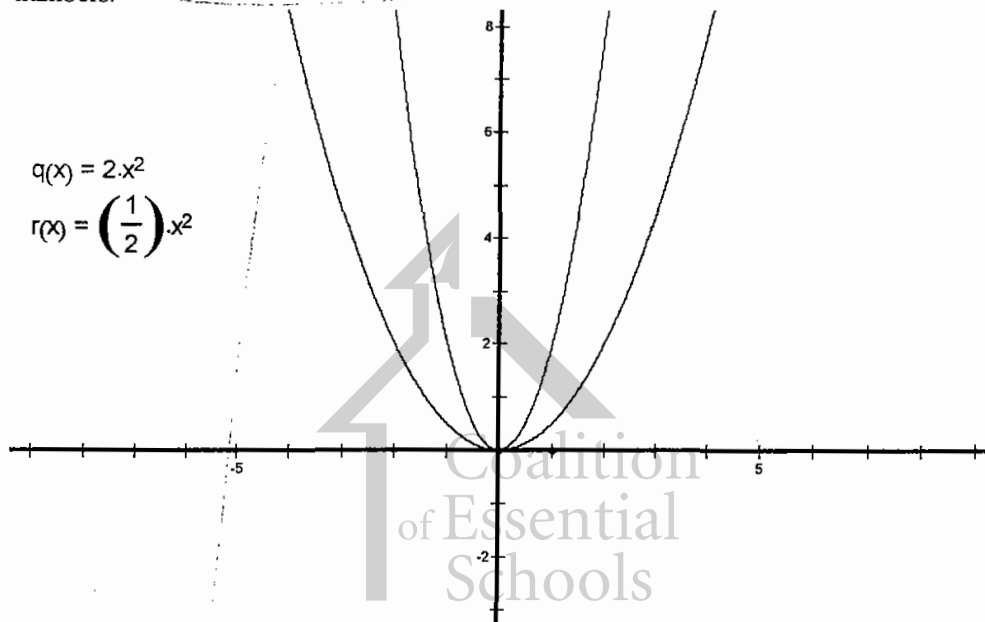
⇒ **A positive numerical coefficient in a polynomial produces a S-shaped or U-shaped graph**

Example:

U-shaped:

$$f(x) = 2x^2 \text{ and } g(x) = \frac{1}{2}x^2$$

As can be seen in the graph below, both polynomial functions $f(x)$ and $g(x)$ produce a U-shaped graph. Notice how both positive and negative x -values results in positive numbers.



omit this point altogether.
It simply repeats your list.
It's the negative coefficient that
has an interesting effect!

Coaching a Lab Investigation

Student Work: Polynomial Lab

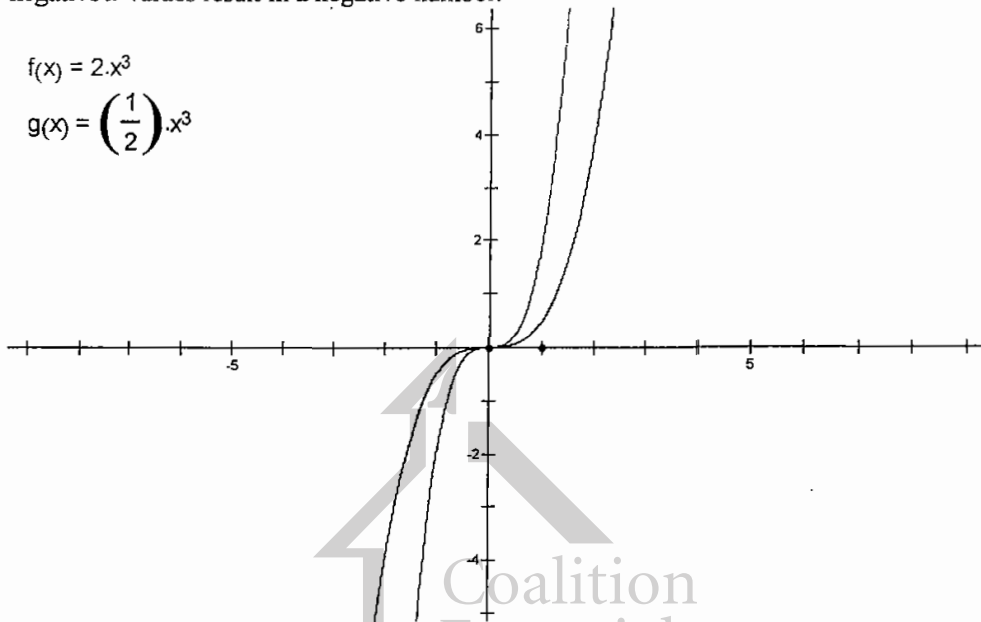
S-shaped:

$$h(x)=2x^3 \text{ and } j(x)=\frac{1}{2}x^3$$

As can be seen in the graph below, both polynomial functions $f(x)$ and $g(x)$ produce a S-shaped graph. Also, notice how positive x -values results in a positive number, yet negative x -values result in a negative number.

$$f(x) = 2 \cdot x^3$$

$$g(x) = \left(\frac{1}{2}\right) \cdot x^3$$



Proof:

A positive coefficient creates a positive outcome for all positive x -values and a negative outcome for all negative x -values.

Positive coefficient (positive x -value) = Positive Outcome

Positive coefficient (negative x -value) = Negative Outcome

Coaching a Lab Investigation

Student Work: Polynomial Lab

⇒ A negative numerical coefficient in a polynomial produces a reflection of a S-shaped or U-shaped graph

Example:

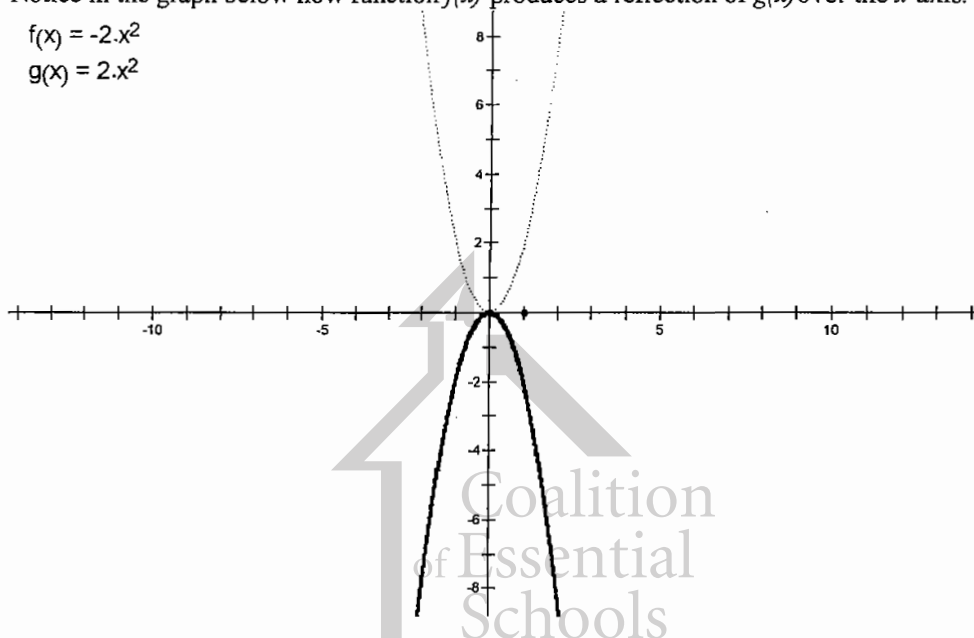
Backwards U-shaped:

$$f(x) = -2x^2 \text{ versus } g(x) = 2x^2$$

Notice in the graph below how function $f(x)$ produces a reflection of $g(x)$ over the x -axis.

$$f(x) = -2x^2$$

$$g(x) = 2x^2$$



Coaching a Lab Investigation

Student Work: Polynomial Lab

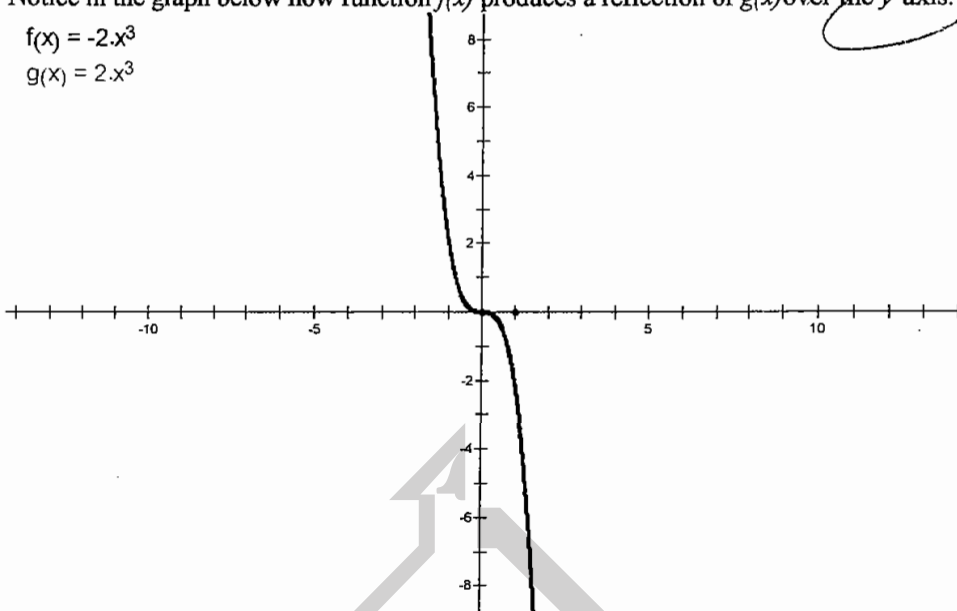
Backwards S-shaped:

$$g(x) = -2x^3 \text{ versus } h(x) = 2x^3$$

Notice in the graph below how function $f(x)$ produces a reflection of $g(x)$ over the y -axis.

$$f(x) = -2 \cdot x^3$$

$$g(x) = 2 \cdot x^3$$



Proof:

A negative coefficient creates a negative outcome for positive x -values and positive outcomes for negative x -values.

Negative Coefficient (Positive x -value) = Negative Outcome

Negative Coefficient (Negative x -value) = Positive Outcome

Thus, the original graph...

\Rightarrow The numerical coefficient in a polynomial $\neq 0$

Example:

$$f(x) = 0x^3$$

$$f(1) = 0$$

Proof:

Any number, negative or positive, multiplied by a coefficient of 0 will always equal 0. ✓

Coaching a Lab Investigation

Student Work: Polynomial Lab

Constant: *The term within a polynomial with no variables*

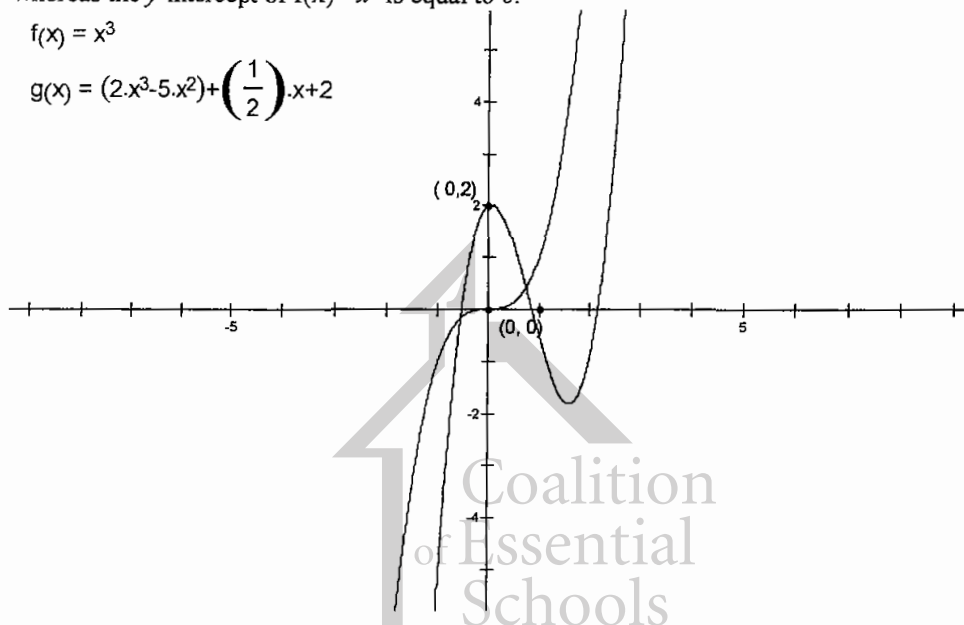
⇒ A constant within a polynomial determines the y -intercept

Example:

When $x=0$, then the function $f(x)=x^3$ is equal to 0 [$f(0)=0^3=0$], however, the function $g(x)=2x^3-5x^2+\frac{1}{2}x+2$ is equal to 2 [$2(0)^3-5(0)^2+\frac{1}{2}(0)+2=2$]. As can be seen in the graph below, the y -intercept of $g(x)=2x^3-5x^2+\frac{1}{2}x+2$ is equal to 2, whereas the y -intercept of $f(x)=x^3$ is equal to 0.

$$f(x) = x^3$$

$$g(x) = (2x^3 - 5x^2) + \left(\frac{1}{2}\right)x + 2$$



Proof:

Y -intercepts occur when $x=0$, thus to obtain a value, all x -values within a function must be set to 0. If there is no constant present, the function becomes equal to 0, thus the y -intercept = 0. If a constant were present, the constant would equal the y -intercept. ✓

you could also show this algebraically.

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_0$$

$$f(0) = \underline{\hspace{2cm}}$$

Coaching a Lab Investigation

Student Work: Polynomial Lab

Factors:

⇒ Factors in the factored form of a polynomial determine the root(s)

Example:

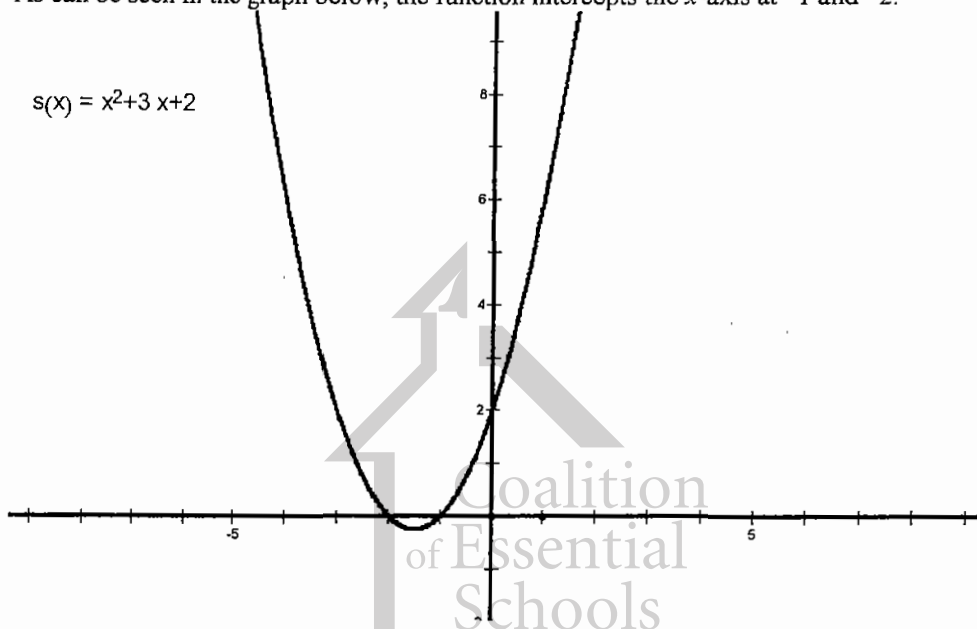
$$f(x) = (x+1)(x+2)$$

$$0 = (-1+1)(-2+2)$$

Therefore, the roots of $f(x)$ are -1 and -2 .

As can be seen in the graph below, the function intercepts the x -axis at -1 and -2 .

$$s(x) = x^2 + 3x + 2$$



Proof:

Zeros of a function (x -intercepts) are those values of x that set the function $f(x)$ to zero. If the function can be put into factored form then these values can be easily determined by setting each factor to zero. For example if $f(x) = (x-a)(x+b)$ then the

Thus, the zeros of this function are $(x-a)=0$ which means $x=a$ and $(x+b)=0$ which means $x=-b$.

$$f(x) = 0 \text{ when either } (x-a) = 0 \text{ or } (x+b) = 0.$$

Coaching a Lab Investigation

Student Work: Polynomial Lab

Conclusion:

The following can be concluded about polynomial functions based on the patterns found in the lab:

- As the value of the degree in a polynomial function increases, the slope becomes steeper ✓
- Polynomials with even degrees create a U-shaped graph ✓
- Polynomials with odd degrees create a S-shaped graph ✓
- The larger the value of the coefficient in a polynomial, the graph shrinks horizontally ✓
- A positive numerical coefficient in a polynomial produces a S-shaped or U-shaped graph ✓
- A negative numerical coefficient in a polynomial produces a reflection of a S-shaped or U-shaped graph ✓
- The numerical coefficient in a polynomial $\neq 0$ ✓
- A constant within a polynomial determines the y-intercept ✓
- Factors in the factored form of a polynomial determine the root(s) ✓

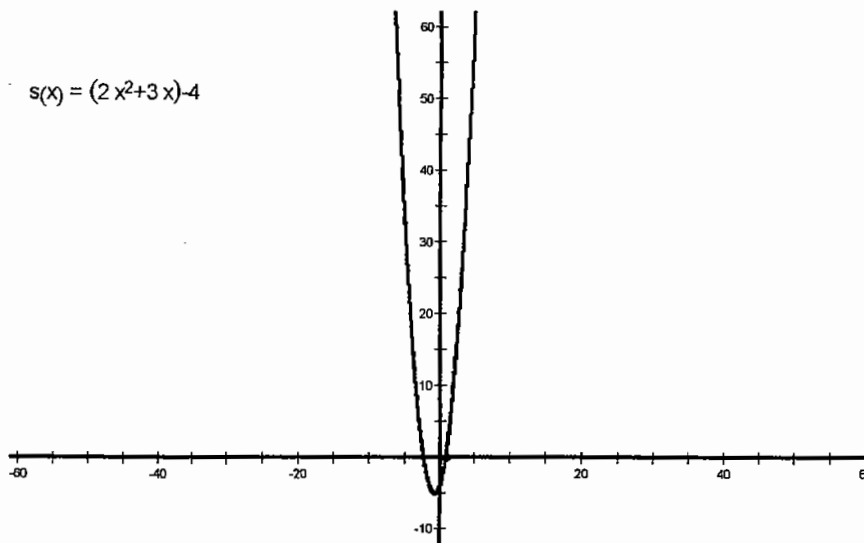
Based on the previous statements, the shape of the any polynomial function can be predicted. For example, consider the functions $f(x)=2x^2+3x-4$ and $g(x)=-3x^3-12x^2+12x+46$. The graph of $f(x)=2x^2+3x-4$ can be estimated based on the following true statements:

- The even degree means that the graph will be U-shaped
- The positive coefficient makes the graph a upward U-shape
- The value of the coefficient being 2 implies that the function will be located further away from the y-axis
- The constant of -4 is equal to the y-intercept
- The roots will be located at 1 and -4 based on the factored form

$$f(x)=2(x+4)(x-1)$$

These predictions based on the statements on polynomial functions can be proven based on the graph of the function below: shown ✓

$$s(x) = (2x^2 + 3x) - 4$$



Coaching a Lab Investigation

Student Work: Polynomial Lab

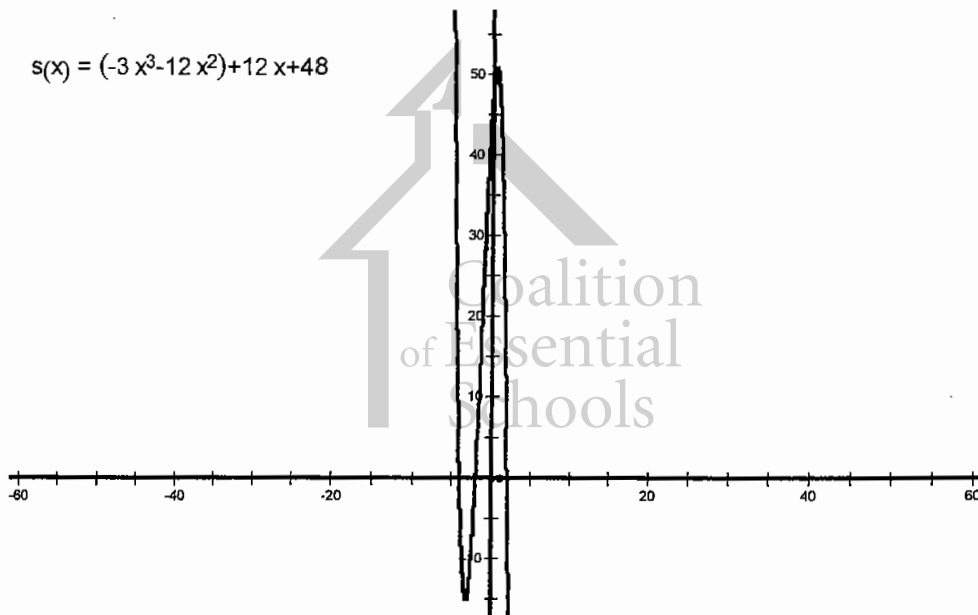
The graph of $g(x) = -3x^3 - 12x^2 + 12x + 46$ can be ^{predicted} ~~estimated~~ based on the following statements:

- The odd degree means that the graph will be s-shaped
- The negative coefficient makes the graph an upside-down, or mirrored version of a s-shape
- The value of the coefficient being -3 implies that the function will be located further away from the y-axis
- The constant of 46 is equal to the y-intercept
- The roots will be located at -2, 2, and -4 based on the factored form

$$f(x) = -3(x + 2)(x - 2)(x + 4)$$

These predictions based on the statements on polynomial functions can be ~~proven~~ based on the graph of the function below:

$$s(x) = (-3x^3 - 12x^2) + 12x + 48$$



As can be proven with the two divergent examples, these statements found through patterns and calculations in the polynomial lab are true for all polynomial functions. ✓

Student-as-Worker, Teacher-as-Coach

Discussion Guide

Student-as-Worker, Teacher-as-Coach

Thinking About the Principle

1. What do you picture when you think of coaching? How is coaching different from teaching?
2. What do you think a “teacher as coach” is NOT supposed to do?
3. What should a “student as worker” look like and sound like?

Bacterial Transformation Lab

Discussion Guide

Student-as-Worker, Teacher-as-Coach

Bacterial Transformation Lab

Prior to Viewing

1. Download and distribute:
 - *Bacterial Transformation Unit*
2. How does a science lab provide opportunities for the implementation of “student as worker, teacher as coach?” What kinds of working and coaching do you expect to see?

Reflecting on What You Saw

1. What is Annie doing that looks like coaching? What is she doing that does not look like what you expected “coaching” to be?
2. Coaching is not a euphemism for “group work.” However, in Annie’s classroom, students are frequently working collaboratively. What are some examples of effective collaboration and student leadership in this lab? How does Annie create a climate through her coaching where this collaboration is natural? What is the role of collaboration in a classroom where “student as worker” predominates?
3. Annie claims that students learn science by acting like scientists and doing science in the lab. Where did you see students acting like scientists? What impact did this seem to have on their learning?
4. On the first day of lab, students do not receive the lab handout, but are asked to generate their own procedure. What purpose does this serve, when they will be following a set procedure the next day?
5. What is the role of mistakes, dead ends, and “organized chaos” in a classroom where students are expected to be active workers? How does Annie demonstrate a coach’s responsiveness to her students and their mistakes, dead ends, and “organized chaos”?

A Student Salon

Discussion Guide

A Student Salon

Prior to Viewing

1. Download and distribute:
 - *Student Salon Day 1 and 3 Lessons*
 - *Polynomial Lab Assignment*
2. A science lab or an art studio is an ideal setting for the principle “student as worker, teacher as coach”. How might this principle be demonstrated in a humanities class?

Reflecting on What You Saw

1. What is John doing that looks like coaching? What is he doing that does not look like what you expected “coaching” to be?
2. How are the students prepared for the performance task they must complete? What evidence of scaffolding do you see?
3. Coaching is not a euphemism for “group work”. However, in John’s classroom, students alternate between working collaboratively and working silently on their own reflections and writing. What is the role of collaboration in a classroom where “student as worker” predominates? When is solo work necessary?
4. What actions does John take as a coach to clearly communicate his expectations to students? How do they know what they are supposed to be doing and whether or not they are doing it well enough?
5. Often, it is easier to think of coaching as a one-on-one activity than a whole class approach. How does John coach the entire class, or larger groups of students?

Student-as-Worker, Teacher-as-Coach

Bacterial Transformation Lab and A Student Salon

After Viewing Both Segments

1. What are the different challenges of implementing “student as worker, teacher as coach” in a humanities classroom vs. a mathematics or science classroom?
2. In what ways are John and Annie consistent in their interpretations of “student as worker, teacher as coach”? How do they differ?
3. None of these principles is enacted in a vacuum. Though the classroom segments from Annie and John were selected to illustrate the principle “student as worker, teacher as coach,” these teachers are also clearly focusing their instruction around essential understandings and larger goals. How does the instructional approach of “teacher as coach” support the curricular decision that “less is more”?
4. How much of what you see here depends on the decisions of the individual classroom teacher? How much depends on the structure and context of the school?

Student-as-Worker, Teacher-as-Coach

Benefits and Challenges

Prior to Viewing

1. Brainstorm what you believe to be the benefits and challenges of “student as worker, teacher as coach” in a classroom.

Reflecting on What You Saw

1. In what ways is your school already implementing the principle “student as worker, teacher as coach”? How about in your classroom?
2. What challenges exist at your school site and/or in your community to implementing “student as worker, teacher as coach” in the classroom? As a philosophy for the whole school? How do you either work with these challenges or overcome these challenges?
3. What support systems exist at your school and/or in your community to begin implementing “student as worker, teacher as coach” in your classroom? As a philosophy for the whole school? How should you engage your supporters?
4. How does “student as worker, teacher as coach” change the demands placed on teachers as they plan their classes? What sort of preparation is necessary for effective coaching?
5. In their roles as coaches, what should teachers do to respond to the needs of students as they arise? What control do they retain in establishing the agenda and learning outcomes, and what control do they relinquish?
6. Under what conditions does this instructional approach make sense? When might it make more sense to engage in direct instruction? Is it still coaching to engage in direct instruction? Does coaching imply that the teacher is always off to the side?

Student-as-Worker, Teacher-as-Coach

Lesson Plans and Student Work Samples

Note

The student work and lesson materials that accompany the video segments may be downloaded in PDF format and are intended to serve as a basis for discussion by providing additional insight into the work captured in each classroom. They do not provide complete lesson plans. These may be photocopied for discussion purposes only.

Bacterial Transformation Lab

Lesson Plans and Student Work Samples

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Bacterial Transformation Lab

Biology Curriculum Map

Questions to Guide Discussion of Materials and Student Work

1. How does the curriculum map for the year include opportunities for students to act like scientists and for Annie to coach them in becoming scientists?
2. What essential understandings and themes focus the work?

Bacterial Transformation Lab

Biology Curriculum Map

School of the Future 2004 – 05 • Curriculum Map for 10th Grade Living Environment – Biology, Annie T. Chien (updated 9/26/04)

Essential Question / Enduring Understandings for the Year: What is health? How do we sustain health at multiple levels?					
Time Frame	Essential Question / Unit Focus	Content	Skills	Assessments / Projects / Activities / Trips	Texts/ Materials
1.5 weeks	How does health play on the environmental level?	<ul style="list-style-type: none">Nature cyclesIndustry and technologyEnvironmental law, economics and ethics	Viewing multiple perspectives, propose solutions based on evidence, accountable talk, team work, technology – PowerPoint	Pollution Solution	Computer lab Pollution Solution Powerpoint
	Re-connecting with environmental science			Clearpool trip – ecology workshops	
9/04 – 10/04	How does health play at invisible levels?	<ul style="list-style-type: none">Chemical compounds and reactions, catalytic reactions, energy, equilibriumPhotosynthesis, respiration and fermentationStructure and function of cellular and organ systemsRole of biotechnology in foods and modified foods	Engaging in the scientific process via laboratory problems, team collaborations, scientific writing, awareness and connection of current scientific progress, using scientific tools (reagents, probes, specific protocols), technology – HTML, image editing, Vernier probes	Popcorn lab Food Lab Enzyme Lab Osmosis and Diffusion Lab Plant and Yeast Lab Health Resource Room Project- Online Dissections: earthworm Crime lab (Urinalysis) Bacterial Transformation Clearpool – making food	Collaboration with L. Rohrer on multimedia projects, dissection specimens as specified, staff designed and prepared lab modules, lab modules from Bio-Rad
	Basic biochemistry, cell chemistry and their applications				
10/04 – 1/05	What is the role of reproduction in community and global health?	<ul style="list-style-type: none">The scale of things – phenotypes to the atomsGenetics – Mendelian and appliedEvolution – biodiversityPhysiology of human reproduction and developmentRecombinant DNA technology	Engaging in the scientific process via laboratory problems, team collaborations, scientific writing, awareness and connection of current scientific progress, using scientific tools (reagents, probes, specific protocols), technology – image editing	Baby Book Project Health Resource Room Project – online DNA extraction Fast plants – hairy inheritance Flower Lab Biodiversity / simulated electrophoresis Lab	Collaboration with L. Rohrer on multimedia collaborations, staff designed and prepared lab modules, Fast Plant seedlings (wild type, hairy), lab modules from Bio-Rad
	Genetics and biotechnology through the lens of reproduction				

Continued– School of the Future 2004 – 05 • Curriculum Map for 10th Grade Living Environment – Biology, Annie T. Chien

Bacterial Transformation Lab

Biology Curriculum Map

Time Frame	Essential Question/ Unit Focus	Content	Skills	Assessments / Projects / Activities / Trips	Texts/ Materials
1/05	What is health? An encompassing project using the frog as the anchor specimen	<ul style="list-style-type: none"> Interdependence of organ systems Snapshot: immune system 	Using dissection protocol, engaging in the scientific process via laboratory problem, redefining "health"	Frog dissection, Liver cell DNA extraction from dissection, comparative anatomy in development, Microscope slides, Mutter Museum	Preserved frog specimens
2/05 – 3/05	How easy is it to recover from an addiction? Neurobiology through the lens of addiction	<ul style="list-style-type: none"> The human nervous system Interdependence of organ systems Comparative anatomy Equilibrium Positive and negative feedback / cause and effect Revisiting lock-and-key 	Using dissection protocol, engaging in the scientific process via laboratory problem, redefining "health", awareness and connection of current scientific progress, accountable talk, using scientific tools (reagents, probes, specific protocols), technology – HTML, image editing, Vernier probes	Health Resource Room – Online, Comparative anatomy gallery walk, Drosophila lab, Science literary workshop: "Wasted"	Collaboration with L. Rohrer on multimedia, staff designed and prepared lab modules, Abby – Learning Specialist
4/05 – 6/05	How much control do I have over my health? Human conditions and Bio-terrorism	<ul style="list-style-type: none"> Autoimmune diseases Communicable diseases Environmental hazards 	Engaging in the scientific process via laboratory problems, team collaborations, scientific writing, awareness and connection of current scientific progress, using scientific tools (reagents, probes, specific protocols), technology – video	Health Resource Room – Online, Transmission activity, HIV/ELISA, neo-blood typing, Science literary workshops – looking at fiction and non-fiction materials about disease and biotechnology.	Collaboration with L. Rohrer on multimedia, staff designed and prepared lab modules

Students are supported via home text and additional readings from:

Home reference text: Biology, the Study of Life by Schraer and Stoltze

Online Text: Estrella Mountain Community College, Avondale, AZ (<http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookTOC.html>)

Additional supporting texts: Biology, Exploring Life by Campbell, Williamson and Heyden

Life, Lewis, Gaffin, Hoefnagels and Parker

Inclusion Support text: Biology, The Dynamics of Life, by Biggs, Hagins, Kapicka, Lundgren, Rillero, Tallman, and Zike

Regents review text: Let's Review: Biology the Living Environment, 4th Edition, Barrons

Bacterial Transformation Lab

Bacterial Transformation Unit Plan

How do scientists hi-jack cells to create unique traits in organisms?

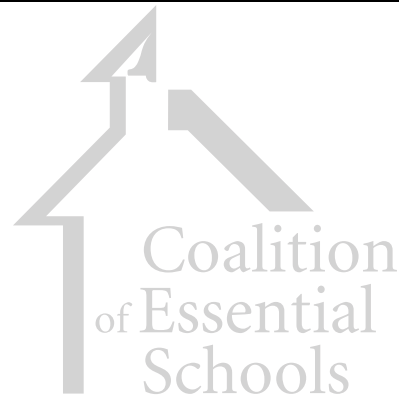
A study of bacterial transformation in bioengineering

Thursday	<p>Instructional Goal: Immerse students into genetic engineering through the lens “controlling” our genes; connect chapter with genetic screening unit.</p> <p>Activities:</p> <ul style="list-style-type: none"> ❑ Immersion experience – Gattaca, clip on the future. ❑ Class read aloud Article on transgenic monkey. Students generate questions and refine questions on sex and reproduction. Students post on opinion barometer on genetic screening. What would we say if the topic is on genetic alternation? ❑ Connect with Jenny – how close are we in manipulating our genetic information? <p>Homework assignment: read and respond to Frederick Griffith’s experiment.</p>
Friday	<p>Instructional Goal: Students understand how the structure and function of bacteria can be manipulated to act as a vector in transferring genetic information. Students create a “battle plan” in manipulating bacteria to transfer</p> <p>Activity:</p> <ul style="list-style-type: none"> ❑ Student leadership activity in homework review. ❑ Class reading on the structure and function of bacteria. Microscope gallery. Students highlight crucial “clues” in exploiting its features. ❑ Class animation – how bacteria transfer genetic information in the essence of selective pressure. Why is bacteria such a great vector in transferring genes? What are some of its drawbacks – and how can we overcome them in our laboratory? ❑ Pair share/group share/class share – what are our ideas on using bacteria to transfer genetic information to another? <p>Assessment: Exit cards</p> <p>Homework assignment: Read Monday’s lab. Create a general scheme based on today’s activity that can help you transfer the glowing gene in bacteria. Students create hypothesis of their experiment.</p>
Monday	<p>Instructional Goal: Review of vocabulary. Students brainstorm as a class to determine the best ways to create transgenic mutations in their bacteria. Students create visual schematics of their plan for the experiment.</p> <p>Activity:</p> <ul style="list-style-type: none"> ❑ Review of vocabulary through word chain activity ❑ Student leadership activity – review of homework – establish patterns and techniques ❑ Examine “recipe” of standardized transformation procedure. Students create own schematics with their company teams. Schematics also include rationale behind each step. <p>Assessment: Exit cards</p> <p>Homework assignment: Read and response to transformation procedure. Case study – gene therapy.</p>
Tuesday	<p>Instructional Goal: Students engage as young scientists by increasing cell competency in the bacteria and transform the cells.</p> <p>Activity:</p> <ul style="list-style-type: none"> ❑ Students follow their schematics in equilibrating their water baths and transforming their cells. ❑ Case study: Cancer (individual work) <p>Assessment: Reflection cards</p> <ul style="list-style-type: none"> ❑ Homework Assignment: Students derive methods of determining transformation efficiency

Bacterial Transformation Lab

Bacterial Transformation Unit Plan

Wednesday	<p>Instructional Goal: Students collect results and determine the transformation efficiency. Students critically examine class data, and brainstorm experimental error.</p> <p>Activity:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Student leadership – what are some of our ideas on deriving transformation efficiency? <input type="checkbox"/> Students collect results and determine transformation efficiency <input type="checkbox"/> Company directors gather class data <p>Assessment: exit cards on initial observations of class data. What is observed?</p> <p>Homework: Read and response on applications of genetic therapy – connection back to Jenny?</p>
Thursday	<p>Instructional Goal: Students evaluate the effectiveness of bacterial transformation. They also evaluate their own techniques throughout the process.</p> <p>Activity:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wendy leads discussion on effectiveness of bacterial transformation and error analysis. <input type="checkbox"/> What are some ethical issues pertaining genetic engineering? Connections back to Jenny? <p>Assessment: Lab report.</p>



Questions to Guide Discussion of Materials and Student Work

1. What evidence do you see that students are expected to act like scientists?
2. What elements of this assignment require coaching so that students can meet expectations?
3. In what ways does this work reveal specific content understanding?

Bacterial Transformation Lab

Biology Lab Report Rubric

Lab Report Rubric				
Experienced	Competent	Transitional	Needs Improvement	
Introduction/Hypothesis				
Provides a background for the experiment				
Information is specific and accurate				
Included relevant information that is correctly cited				
Hypotheses is fully developed				
Hypothesis is correctly stated with both variables identified				
Procedure/Methods				
Clearly describes scientific methods that are logical, precise, safe, ethical and consistent with accepted scientific practices				
Describes procedures that can be replicated				
Identification of variables: control, dependent variable, independent variable, constants				
Appropriate use of scientific tools/technologies				
Results/Data Collection				
Significant data has been collected efficiently and in appropriate ways				
Data is accurately recorded and displayed using the most relevant and organized methods				
Discussion/Conclusion				
A precise statement of the investigation results relates directly to the question of the hypothesis				
Statements made are supported by the data collected				
Provides a clear explanation of the results				
Provides a context and applications for the experiment				
Demonstrates knowledgeable about the experiment				
Answers assigned questions correctly				
Bibliography				
References are cited using correct MLA format				

Bacterial Transformation Lab

Student Work: Lab Report

Li 2

Introduction

Bacteria come in a variety of shapes and sizes, but all of them are able to undergo bacterial transformation. Bacterial transformation occurs very frequently when two species of bacteria are put together. Bacterial transformation is the process in which bacteria intake foreign DNA or plasmids. Plasmids are replicating pieces of DNA that can be transferred from one organism to another. In bacterial transformation, plasmids are used as vectors. Vectors are agents that can transfer genetic material from one cell to another (SUNY Plattsburgh).

Bacterial cells have an organelle called the cell membrane. The cell membrane is a semi-permeable membrane that controls the passage of substances in and out of the cell. In order for bacterial transformation to occur, bacterial cells need to achieve competency. Competency is a condition in which the bacterial cells are able to intake foreign DNA (plasmids). In order to achieve competency, the cell membrane needs to be broken or made permeable to the plasmids (Hurlbert).

Competency can be achieved by incubating the bacterial cells in high temperature and submerging them into a calcium chloride solution. The high temperature will weaken the cell membrane and the calcium chloride will make the cell membrane permeable to the plasmids. Submerging the bacterial cells in a calcium chloride solution will make the cell membrane permeable to plasmids because of diffusion. Diffusion is the process in which substances from a region of higher concentration moves to an area of lower concentration. By submerging the bacteria in calcium chloride, the bacteria's surrounding environment has a higher concentration; the inside of the bacterial cells have a lower concentration. Therefore, the substances outside (plasmids) will diffuse into the

Bacterial Transformation Lab

Student Work: Lab Report

Li 3

cell membrane. Once the foreign plasmids enter the cell membrane, bacterial transformation has been accomplished.

My class and I performed an experiment to create glowing E. coli through the process of bacterial transformation. We were given non-glowing E. coli and glowing E. coli plasmids. We had to make the non-glowing E. coli competent so that the glowing E. coli plasmids can enter the cell membrane of the non-glowing E. coli.

My hypothesis is that the two Petri dishes with plasmids will yield glowing bacteria and the two controls will not. If my hypothesis is correct, I expect to see glowing colonies of E. coli in the Petri dishes with plasmids.

Methods

A microcentrifuge tube was labeled "positive", and another was labeled "negative". A pipette was used to transfer 250 microliters of cold calcium chloride into each microcentrifuge tube. After adding calcium chloride into the microcentrifuge tubes, an inoculation loop was used to transfer several colonies of E. coli into the microcentrifuge tubes (a separate inoculation tube was used for each microcentrifuge tube). A pipette was used to transfer 10 microliters of pFluoroGreen plasmids into the microcentrifuge tube labeled "positive". Both of the tubes were incubated in ice for 15 minutes. After this, the tubes were incubated in a 42° C. heat bath for 90 seconds. The tubes were placed back into the ice for two minutes. A pipette was used to add 25 microliters of Recovery Broth into each microcentrifuge tube. The tubes were placed back into the 42° C. incubation heat bath for 30 minutes. While the tubes are incubating, four agar Petri dishes were labeled. The two Petri dishes without ampicillin were labeled: "E. Coli (plain)" and "E. Coli (plain) with plasmids". The two Petri dishes with

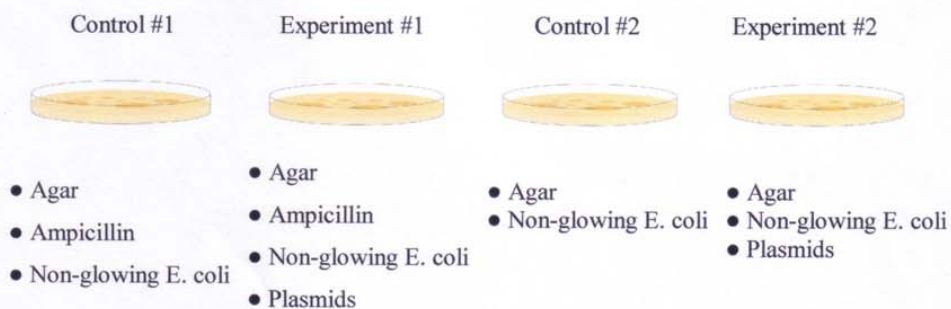
Bacterial Transformation Lab

Student Work: Lab Report

Li 4

ampicillin were labeled: “E. coli (plain) in ampicillin” and “E. coli (plain) with plasmids in ampicillin”. After the tubes have been incubated in the heat bath for 30 minutes, they were removed. The tube labeled “negative” was opened and half of the contents were poured into the Petri dish labeled “E. Coli (plain)”, and the other half was poured into the Petri dish labeled “E. Coli (plain) in ampicillin”. A sterile toothpick was used to spread the E. coli throughout the agar. After this, the Petri dishes were covered with Petri dish caps. The other tube, labeled “positive” was opened and half of its contents were poured into the Petri dish labeled “E. Coli (plain) with plasmids” and the other half was poured into the Petri dish labeled “E. Coli (plain) with plasmids in ampicillin”. A sterile toothpick was used to spread the E. coli throughout the agar. The Petri dishes were covered with Petri dish caps and all four dishes were stacked up, and taped. The dishes were placed into the incubator for 24 hours. After 24 hours, they were taken out and observed under a black UV light.

The Petri dishes should be set up as shown in the diagram below:



Note: All Petri dishes contain agar; control dishes do not contain plasmids; experimental dishes contain plasmids.

Bacterial Transformation Lab

Student Work: Lab Report

Li 5

Identification of Variables in this Experiment

Independent Variable: the variable you purposely manipulate or change. *In this experiment, the independent variable is putting or not putting glowing plasmids into the E. coli.*

Dependent Variable: the variable that is being observed, which changes in response to the independent variable. *In this experiment, the dependent variable is the number of glowing E. coli colonies yielded.*

Control: subjects or procedures that permits comparison with the experimental results. *In this experiment, the controls are the two Petri dishes without plasmids.*

Constants: conditions or things in the experiment that remain the same. *In this experiment, the constants are the amount of E. coli in the microcentrifuge tubes, the amount of Recovery Broth added to each tube, the amount of bacterial cells in each Petri dish, and the amount of calcium chloride added to each tube. These are the conditions that were supposed to be kept constant; however, many of these constants were not kept constant. These inconsistencies can affect the results of this experiment; therefore, the methods in this experiment were not as scientific as it should be.*

The purpose of the control plates is to serve as a “standard” so that we can have something to compare our results from the experimental plates with. The Petri dishes without plasmids are the controls in this experiment. One of the control plates contains: agar and E. coli; the other control plate contains: agar, E. coli, and ampicillin.

One would compare the Petri dish containing E. coli and ampicillin with the Petri dish containing E. coli, plasmids, and ampicillin to see the effects of adding plasmids into the bacterial cells. The Petri dish with E. coli and ampicillin serves as a control so that

Bacterial Transformation Lab

Student Work: Lab Report

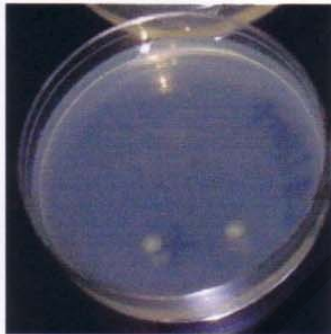
Li 7

ampicillin, and non-glowing E. coli yielded two colonies of glowing bacteria. None of the other dishes glowed.

The images¹ below show the Petri dishes after being placed in the incubator for 24 hours.

Control #1

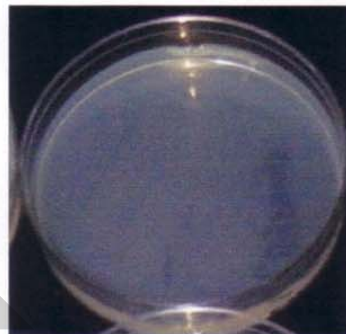
GLOWED



(Agar, Ampicillin, Non-glowing E.coli)

Experiment #1

DID NOT GLOW



(Agar, Ampicillin, Non-glowing E.coli, plasmids)

Control #2

DID NOT GLOW



(Agar, Non-glowing E.coli)

Experiment #2

DID NOT GLOW



(Agar, Non-glowing E.coli, plasmids)

¹ The images on this page were taken from: [http://faculty.clintoncc.suny.edu/.../Bacterial Transformation/bacteria.htm](http://faculty.clintoncc.suny.edu/.../Bacterial%20Transformation/bacteria.htm)

Bacterial Transformation Lab

Student Work: Lab Report

Li 8

Discussion

According to my results, my hypothesis is incorrect because my hypothesis was that the two Petri dishes containing plasmids (experimental dishes) will yield glowing bacteria. The two experimental dishes should glow because they contain glowing plasmids. However, the experimental dishes did not glow. Ironically, one of the control dishes glowed. It is impossible for the control dishes to glow because they do not have the glowing plasmids.

Therefore, my results are inaccurate and are the outcome of errors. Many errors occurred during this experiment. This experiment was conducted under hectic conditions; there were three classes in the science room when this experiment was conducted. Another major problem in this experiment is that there weren't enough E. coli for everybody. My partner and I were one of the last few students to receive E. coli; therefore, very few E. coli was left. The glowing plasmids and recovery broth were given to us by other students. I strongly believe that the students giving out plasmids and recovery broth do not know how to use pipettes properly. Therefore, the amount of plasmids and recovery broth received is not parallel to the amount indicated in the experimental procedure. Another error in this experiment is pouring the bacterial cells into the Petri dishes. A pipette was supposed to be used to transfer exactly half of the contents in the microcentrifuge tubes into each Petri dish. However, pipettes were not used, rather, my partner and I just poured what we through looked like half into the Petri dishes. This resulted in unequal amounts of bacterial cells in each Petri dish, which can greatly affect the results of this experiment. The major error in this experiment that caused the results to be inaccurate is: cap-switching. While my partner and I were examining the Petri dishes under the black UV light, the caps/labels on the Petri dishes

Bacterial Transformation Lab

Student Work: Lab Report

Li 9

were switched. Therefore, the control dishes “became” the experimental dishes and the experimental dishes “became” the control dishes. All of these errors made this experiment unscientific, inaccurate, and inconclusive.

If I were to perform this experiment again, I would definitely perform this experiment alone in the science room, without other students crowding around. This will enable me to concentrate and follow the experimental procedure correctly. I will also make sure that there is enough *E. coli* to use, so that the amount of *E. coli* in each microcentrifuge tube is sufficient. I will personally get the plasmids and recovery broth using a pipette by myself; so that I get the correct amount of plasmids and recovery broth. Rather than pouring the bacterial cells onto the Petri dishes, I will use a pipette instead; this will ensure that the amount of bacterial cells in each Petri dish is equal. The last thing I would do differently is examine each Petri dish under the black UV light individually. When my partner and I were examining the Petri dishes, we uncapped all of the Petri dishes at once and moved them around, which caused the caps to be switched. By examining the Petri dishes individually, the caps will not be switched.

Although the results in this experiment are inaccurate, it demonstrates that bacterial transformation can occur (two colonies of glowing bacteria were yielded). This principle was actually discovered by Fredrick Griffith, a British medical research scientist. Griffith was experimenting with two strains of *Pneumococcus* (the pathogen that causes pneumonia), an “S strain” and an “R strain”. The S strain has a protective membrane that protects itself, while the R strain does not have a protective membrane. The S strain bacteria is deadly, however, the R strain is harmless. In Griffith’s experiment, the S strain bacteria were heated and killed with fire; the remains of the S strain bacteria were put into a test tube with the harmless R strain bacteria. When this

Bacterial Transformation Lab

Student Work: Lab Report

Li 10

mixture of dead S and harmless R strain bacteria were injected into mice, the mice died. This is the result of bacterial transformation. The R strain bacteria is harmless, however, it was able to intake the plasmids from the dead S strain bacteria. Therefore, the formerly harmless R strain bacteria transformed into a deadly bacterium, by taking in the plasmids from the S strain bacteria (Wikipedia).

This bacterial transformation principle was stimulated in this experiment because the non-glowing E. coli transformed into glowing E. coli by taking in glowing plasmids.



Bacterial Transformation Lab

Student Work: Lab Report

Li 11

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A Student Salon

Lesson Plans and Student Work Samples

Note

The student work and lesson materials that accompany the video segments may be downloaded in PDF format and are intended to serve as a basis for discussion by providing additional insight into the work captured in each classroom. They do not provide complete lesson plans. These may be photocopied for discussion purposes only.

A Student Salon

10th Grade Humanities Curriculum Map

Questions to Guide Discussion of Materials and Student Work

1. How does the curriculum map for the course include opportunities for students to become sophisticated thinkers, and for John to coach them in developing that sophistication?
2. What essential understandings and themes focus the work?

A Student Salon

10th Grade Humanities Curriculum Map

School of the Future 2004 – 05 Curriculum Map for 10th grade Humanities- Fanning

Enduring Understanding- Europe has not always been on top.

Time Frame	Unit Focus/Essential Question	Topics / Content / Standards	Skills	Assessments/Projects/Activities / Trips	Texts/ Materials
Sept- Nov- Dec	Europe has not always been on top. What are the cultural roots of the “New World?” The Economic Relationship Between Europe and Africa.	1-wk: Pre-Colonial “Black” Africa/ Asia/Europe. European competition in Africa/ Imperialism. Centralizing political power in Western Europe. Unit review on “Feudalism”. How do popular notions of Medieval culture differ from its reality?	Responding to literature, oral presentations, Analyzing Proverbs, Myths, Poetry, Focus on structure, voice transitions and paragraph unity in an essay. Text-based discussion -Literary Analysis: Developing a contentious argument	One to One conferring/ Oral Presentations/ Papers African Mask Making/ Crafting essays without prompts/ Creating proverbs Public Library Trip- “Medieval Times”/ -The Cloisters -St. John’s Cathedral	Texts: <u>Heart of Darkness</u> by Conrad, <u>Things Fall Apart</u> by Achebe; two independent reading books from list. Myths: “Man Chooses Death in Exchange for Fire” and “ Water” Proverbs: The Origin of All Kings/ Yoruba proverbs Poetry: “Heritage” by Cullen, “Things Fall Apart” by William Butler Yeats Essays: White Man’s Burden/ Brown Man’s Burden, Films: Apocalypse Now King Arthur
Dec-Jan- Feb	-What is the role of art in society?	The Middle Ages: -Medieval Times -The Late Renaissance	Development of Research Project for Exhibitions Examining “subtext” of characters in Macbeth. Performances of soliloquies.	-Renaissance Art Project: Reproducing great works of Renaissance art using different mediums to analyze its influence on the Humanism movement. -Visit to Hudson Guild Theater- View performances of “ <i>Prometheus Unbound</i> ” and “ <i>Cyclops</i> ”. Forming acting companies and acting out scenes of Macbeth	Myths: Prometheus Poetry: “ <i>Prometheus Unbound</i> ” by Shelly “On Being Brought From Africa to America” by Phillis Wheatley Texts: Macbeth by Shakespeare,

A Student Salon

10th Grade Humanities Curriculum Map

Late Feb- March- April	How do we define “Natural Rights” in our society? What responsibility does the individual have to society? The government?	-The Enlightenment - The French Revolution Industrialization	Expository Essay Unit -Structure -How to create a thesis -Transitions Short Story Unit: -Character development -Conflict/Resolution -Climax -Movement Through Time	Essays, Short Stories Forming Literature Circles	Trip: Visit To the Jewish Museum Texts: Night Slaughterhouse 5 Film: Schindler’s List
April-May	Half a century of Crisis and Achievement 1914-1945. How Are People Affected By Weapons of Mass Destruction? The Cold War to the “War on Terror” -20 th CE and Beyond	The Causes and Global Consequences of WWI, The Search For Peace and Stability, The Causes and Global Consequences of WWII -The Vietnam War, The Reconstruction of Post War Europe.	Drama: -Analyzing monologues, Dialogues, scenes -Playwriting	- One Act Play	Various Short Plays Text: <u>The Kite Runner</u>

A Student Salon

Student Work: In-Class Essay

Questions to Guide Discussion of Materials and Student Work

1. What evidence do you see that students are expected to be sophisticated thinkers?
2. What elements of this assignment require coaching so that students can meet expectations?
3. In what ways does this work showcase skills that will develop over time, as students continue to write and grapple with history and texts?

A Student Salon

Student Salon Day 1 and Day 3 Lessons

John Fanning
Humanities
3/22/05

1pm-1:50pm: Looking for Evidence from Voltaire's "Candide"

Aim: Students will be able to find evidence that supports Voltaire's 18CE ideas about society in the story "Eldorado" from Voltaire's "Candide"

Materials: Copies of 'Eldorado', pens, high-lighters.

Activity:

- Teacher and class review Voltaire's views on a perfect society and the role of the individual in it. The class should be able to explain that Voltaire abhorred corrupt officials, inequality, injustice and superstition. He was a man of reason who believed in science and felt that no man should have to be subjugated. They should know that Voltaire had no problem with Absolute rulers.
- Teacher reminds the class that evidence is one of their Habits of Mind and that in order to back up a theory or opinion one must be able to prove it by using evidence. The teacher reminds the class that they will be asked to provide evidence in their exhibitions.
- Teacher explains that one way the Enlightenment thinkers made their ideas known was through their writing.
- Teacher models by thinking aloud with an overhead copy of Candide how to look for evidence of Voltaire's beliefs in his writings. Teacher proceeds for first two paragraphs then asks the class to finish the story high-lighting or underlining parts of the story that prove what Voltaire thought was a perfect society.

Reflection:

- When finished, students pair up and share answers then volunteers share out to the class.

A Student Salon

Student Salon Day 1 and Day 3 Lessons

Humanities

3/24/05

8:30-9:30am: Intro to Salon Simulation Discussion Protocol

Aim: Students will learn the structure that will be used to discuss ideas of the Enlightenment.

Materials: Notebooks, pens,

Do Now: Define social justice
Define natural rights

Activity:

- Teacher and class review different ways in which new ideas were disseminated during The Enlightenment.
- Students are told that they will evaluate their effectiveness as a participant in the group discussion.
- Students in groups discuss possible topics to discuss. Be specific
- Class votes.
- Assign host- They will take notes on issues that were brought up.
- Class discusses topic for 5-8 minutes.
- Everyone gets a turn before open discussion.
- Everyone brings a notebook for discussion and to take notes and self-evaluate.

Share- In the Global History Notebooks students respond in their journals.

- Did the same ideas surface in each group? If so, were they expressed in slightly different ways each time?
- Did you learn something new in each group?
- Did you receive contradictory information in different groups?

Teacher creates a rubric for grading the salon discussion.

A Student Salon

Handout: Salon Protocol

Salon Protocol

Students divide into small discussion groups of 4 or 5; inform class that they will be responsible for evaluating their own performance as a participant in the discussions.

Students discuss a topic of interest or a question that is assigned. Each table should have a different question to discuss all centered on the same topic.

One student in each group acts as the facilitator and will stay at the same table throughout the discussions or the facilitator can switch after two groups have passed.

Each group discusses topic for 5 minutes; the facilitator should be taking notes or jotting down relevant issues and/or comments that were raised in the discussion.

After 5 minutes, everyone at the table, except the facilitator, moves to a new group (two students go to a table to their left, two to the right).

After students are in their new groups the facilitator initiates a new conversation introducing the question or issue and what the previous group had to say about it. Students can use the previous group's comments to start their own conversation or can branch off into unexplored ideas.

At the end of 5 minutes repeat the process.

After everyone has been to a table, have students go back to their original tables and have the facilitators share out their findings from each group. Did the same ideas resurface in each group? If so, were they expressed in slightly different ways each time? Did you learn something new in each group? Were there any great comments that were stated, who said them? Was there any contradictory information in different groups? What was the overall consensus of the question or topic?

A Student Salon

Student Work: In-Class Essay

In class essay on Social Justice from the point of view of Voltaire

[REDACTED]

In our society today we live by documents like the Declaration of Independence and the Constitution that state the rights of the people in our country. These documents state the justice that the government and individuals will create and act on. The idea of social justice is one developed during the Enlightenment by wise thinkers that sprouted the idea that reason was an important ground on which a government should be based. Social justice is the treatment or way people, of all classes, are treated.

One form of social justice is not oppressing people and forcing them to work. The idea that there should not be slaves is an idea that shows all people, including those who would be slaves, should not be forced into unequal situations. This idea is included in social justice because by not having slavery, no person is being forced into unequal situations.

Natural rights are rights that everyone is born with, no matter their social class, religion or economic situation. Natural rights are rights that everyone has so when creating social justice the rights of everyone are taken into consideration.

Social Justice is what creates a sense of social equality. By allowing people to make decisions and not forcing them into situation, social justice can be created. As well, by allowing people their natural rights they can live a life where they can live a life where they work to determine their social standing instead of having their social status be pre-determined.

School Profiles

Francis W. Parker Charter Essential School

49 Antietam Street
Devens, MA 01434
978-772-3293
www.parker.org
Principal: Teri Schrader

Location

The Francis W. Parker Charter Essential School is a small public charter school serving students from approximately 40 towns in east central Massachusetts. The school is housed in an elementary school building in Devens, Massachusetts, on the grounds of a former military base. Parker enrolls approximately 360 students, 53% male and 47% female, in grades 7-12.

Demographics

Statistics from The Parker School's 2003-2004 Annual Report show a student population with the following demographics: 95.8 % White, 2.8% Asian, .6% African-American, and .6% Hispanic.

- Special education – 20.2%
- Free and reduced lunch – 6%

The Parker School employs full- and part-time classroom teachers for a total of approximately 40 teachers for 360 students, resulting in a teacher-student ratio of 9 to 1. The school has a relatively young faculty: Approximately 20% of teachers have 10 or more years of teaching experience, 52% have between 5-9 years experience, and 28% have taught for four years or less. Almost all faculty members are highly qualified as defined by NCLB and over 50% hold advanced degrees.

State Standards and Testing

Like all public school students in the state of Massachusetts, students at The Parker School are required to pass the Mathematics and English Language Arts sections of the 10th grade MCAS exam in order to receive their diplomas. For the past three years (starting in 2001/2002), the Parker School has had a 100% passing rate on both state tests.

Admissions

In accordance with Massachusetts charter school law, admission at The Parker

School is open to all students residing in the state who have completed grade six or higher. The Parker School is a regional charter school, which means that priority is given to applicants from towns within the school's region. Admission is strictly by lottery and each applicant receives a number. After all classes are filled from this lottery, applicants can remain on the waiting list for their grade level. If a student withdraws midyear, a student from the waiting list is given the opportunity to enroll. Most students enter the school as 7th or 8th graders; while a few have entered as 9th or 10th graders, by the time students are juniors and seniors, most of them have spent the majority of their secondary education at The Parker School. Graduating classes are small, with around 40-55 students in each senior class. Almost all students plan to attend college after graduation.

Academic Program

Students at The Parker School are grouped not by grades, but by Divisions. Division I corresponds roughly to 7th and 8th grade, Division II to 9th and 10th grade, and Division III to 11th and 12th grade. All students experience a common curriculum in four curricular domains: Arts and Humanities (AH); Spanish; Math, Science and Technology (MST); and Wellness. AH and MST courses in Divisions I and II are team taught for two hour blocks of time; all other classes are one hour long and solo taught.

Student work is assessed using rubrics that describe student performance relative to specific criteria and standards. Instead of using letter grades, student work is described as “just beginning,” “approaches,” “meets,” or “exceeds”. Students are expected to revise work as part of the learning process, and their growth over time is described in narrative assessments at the end of each term. In all Divisions, teachers base their expectations on The Parker School Criteria for Excellence and the Habits of Learning.

To progress from one Division to the next, students must demonstrate their proficiency in a range of skill areas defined by The Parker School Criteria for Excellence. Once students are consistently meeting the standards for a Division, they Gateway into the next Division by presenting a portfolio of their work at a public exhibition. Gateways happen at the end of each semester, and students may gateway in different domains at different times.

To graduate, students must create a portfolio that demonstrates that they can meet standards in at least 9 of the 12 Criteria for Excellence at the Division III level; they must complete a senior project; they must complete wellness and school service requirements, and they must pass the MCAS exam required for all public school students in the state of Massachusetts.

Each student is in an advisory with other members of their Division. All teachers in the school serve as advisors to approximately 12 students. Everyone begins the day with 15 minutes of advisory and ends

with 10 minutes; advisories meet for an hour each Wednesday for activities that include academic advising, community conversations and governance, service, and social connections. Most teachers teach and advise only in one division, allowing divisional teams to know students well.

Leadership and Governance

The leadership team at The Parker School includes the principal, the director of student services, lead teachers from each curricular domain, and teacher-coordinators from each Division. This team meets weekly to coordinate school events such as gateways and assessment deadlines, and to ensure communication between different divisions and domains at the school.

Students participate in school governance through the Community Congress (CC) and the Justice Committee (JC). Each group meets weekly during Wednesday Academic Time, and includes representatives from all divisions through the advisory structure.

School of the Future

127 East 22nd Street
New York, New York 10010
212-475-8086
www.sof.edu
Principal: Catherine DeLaura

Location

School of the Future (SOF) is a small, public school in New York City serving students from Manhattan, Brooklyn, Staten Island, Queens and the Bronx. SOF was created in 1990 and is housed in a former beauty school for girls on the lower east side of Manhattan. Approximately 625 students, 53% male and 47% female, are enrolled in grades 6-12 each year.

Demographics

The School of the Future high school (9-12 grades) is almost equally divided among White, African-American, Hispanic and Asian ethnic groups. Other student demographic information includes:

- Special education – 15%
- Free and reduced lunch – 25.1%
- English Language Learner – 1.3%

School of the Future employs 50 faculty and staff members for an adult to student ratio of 1 to 12.5. 97% of the SOF teachers are fully licensed and 72% hold advanced degrees. 47% have taught for five or more years and 53% have between two and five years of teaching experience.

State Standards and Testing

Like all students in the state of New York, students at SOF are required to pass the Regents exams, and 100% of seniors in the graduating class of 2005 have met this state requirement. Over 90% of students graduate in four years; another 7% take additional time to meet requirements.

Admission

Students gain admission to School of the Future through an all-district application process. All 5th graders who rank School of the Future first on their middle school district application participate in a group interview at the school. The most important criterion for potential SOF students is

how they behave in groups; specifically, is there evidence that they are good community members? The SOF admissions committee also looks at attendance, teacher recommendation, and (of least importance) test scores. SOF often requests an essay on why students want to attend the school, which serves as a writing sample for 6th and 9th grade. While some students leave after the middle school years to attend other specialized or selective high schools in New York City, most complete their entire secondary program at SOF. Graduating classes have approximately 100 students, and 98% of graduates go on to attend college or university.

School of the Future

Academic Program

School of the Future includes a middle school (grades 6-8) and a high school (grades 9-12). In all grades, all students take classes in humanities, science, math, foreign language, and health and physical science. The middle school curriculum also includes art.

All incoming 6th graders have the same teachers, and the 6th grade teaching team works together to create an effective transition experience for new students. In 7th/8th and 9th/10th grade, students have the same teachers for two years to cultivate strong relationships. In the Senior Institute (11th/12th grade), students may not have the same teachers for two years, depending on their electives and focus.

SOF includes a narrative assessment with all midterm progress reports and the end of semester final grades. High school grades are final for each semester of class, while middle school grades are based on the entire year. Every student keeps a classroom portfolio of

work that provides the basis for assessment and lays the groundwork for the exhibition process.

Middle school graduation is based on a roundtable presentation of the student's best work from each of the major subject areas. As part of the high school graduation requirement, each student is required to complete four exhibitions (one each year). These include two humanities (one can be foreign language), one math, and one science exhibition. Students select a topic, find a subject-area sponsor, generate an essential question, and craft a 7-12 page paper which they present to a committee of teachers and students (and an outside adult when possible). The committee assesses the paper and the presentation. Final assessments can be rated as Needs Improvement, Satisfactory, Mastery, or Mastery with Distinction. Students have the opportunity to revise work that Needs Improvement within a limited time frame.

Each teacher is responsible for an advisory with 15 students. Advisors work closely with

students to build community, deal with non-academic issues that arise in the lives of teenagers, and create opportunities for service learning. The advisor serves as the primary point of contact between the school and the family. Advisories meet twice a week.

Leadership and Governance

SOF has a School Leadership Team comprised of parents, four teachers, administrators, and students. This team meets once a month to work on school wide issues and policy. Meetings are open to the entire community.

The SOF Cabinet includes team leaders and administrators who meet monthly to discuss school issues and make decisions. The group is intended to represent the different views of the faculty. Without consensus on the Cabinet, an issue is taken to the entire faculty for discussion.

In addition to serving on the School Leadership Team, students take an active role in governance through the Student council and the Advisory council.

Glossary of Terms

Glossary

ADVISORY is a support mechanism consisting of a group of students and an adult who meet together regularly to discuss individual and collective concerns not typically addressed in the classroom. In addition, they meet to problem-solve and to participate in common activities. There is not one set configuration of an advisory. Schools develop advisory systems to best suit the needs of their community.

AUTHENTIC ASSESSMENT requires students to engage in meaningful application of knowledge and skills, often through real-world problems and projects. For assessment tasks to be authentic, they must go beyond basic skills to require students to use higher order thinking and to synthesize and apply their learning. Student performance on authentic assessment tasks is often assessed using rubrics, and students are often aware of the assessment criteria before beginning their work.

COALITION OF ESSENTIAL SCHOOLS (CES) represents a national network of schools and affiliate centers throughout the United States dedicated to restructuring schools using the Common Principles. The Coalition of Essential Schools believes that schools' primary purpose is to help students use their minds well.

DIVISIONS are two-year organizational structures that enable teachers and students to get to know one another well so that learning can be personalized. Division I usually represents seventh and eighth grades, Division II 10th and 11th, and Division III the junior and senior years.

EXHIBITIONS are public demonstrations of students' knowledge and skills. They may take the form of research reports, experiments, videos, etc. Exhibitions vary from CES school to CES school. Some schools do exhibitions each year, others as a gateway to progress from one division to another, and some as part of a Senior Institute.

INTERNSHIPS are an intensive experience in a work place as part of a specific class or the specific focus of a school. The purpose of internships is to help students develop deeper understanding in areas of intellectual interest.

LOOPING describes a structure in which students and teachers teach and learn together for two consecutive years.

MENTOR SCHOOLS are a group of small CES secondary schools who demonstrate commitment to the Common Principles, success with their students, families and staff, and serve as mentors to conversion high schools and new small school design teams in the network.

Glossary

PERFORMANCE-BASED ASSESSMENT is a form of assessment that emphasizes the application of knowledge, skills, concepts, and content learned, as opposed to the acquisition of knowledge and skills. It is based upon actual student performances as opposed to tests that are proxies of student performance. Performance-based assessment might include projects, portfolios, oral presentations, and on-demand performance tasks and academic prompts.

PORTFOLIO is an exhibition of students' knowledge and skills. A portfolio has specified requirements for depth and breadth of work. Portfolio work embraces diverse forms of expression including science and social science research papers, lab investigations, multimedia presentations, original works of art, writing, and dramatic productions. Portfolios are often part of the exhibition experience.

SMALL SCHOOLS are secondary schools with less than 400 students in grades 9-12.

Additional Reading

Additional Reading

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