



Title: R.A.F.T. ing for Natural Resources			
Author: Lisa Schuller Cossatot River School District Wickes			
Course : Earth Science, Environmental Science, Language Arts, Physical Science, Economics		Duration: Two 40-minute class periods Day 1 – media/instruction Day 2 – writing and sharing with an audience	
Grade: 9-12			
Objectives: <ul style="list-style-type: none">• Students will utilize this writing strategy to help them understand their roles as writers.• Students will effectively communicate their ideas and mission clearly so that the reader can easily understand the writing.• Students will focus on their audience, the varied formats for writing, and the topic about which they write.			
Summary of Lesson: Students will utilize written and media sources to gain an understanding of the hydraulic fracturing process then apply this knowledge to their own writings.			
Arkansas State Standards:			
SUBJECT:	GRADE LEVELS:	CODE:	STANDARD:
Earth Science	9-12	ES-ESS3-2	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
Environmental Science	9-12	EVS-ESS3-2	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
Physical Science	9-12	PSI-ESS3-1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. [
		PSI-ESS3-2	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.*



		PSI6-ETS1-1	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants
Economics	9-12	EM.2.E.2	Demonstrate changes in supply and demand (e.g., shifts, shortages, surpluses, availability) that influence equilibrium price and quantity using a supply and demand model
		EM.3.E.3	Analyze the role of consumers in a market economy
		NE.5.E.2	Evaluate the impact of advancements in technology, investments in capital goods, and investments in human capital on economic growth and standards of living
Language Arts	9-12	RI.9-10.2 RI.11-12.2	Examine a grade-appropriate informational text. ● Provide an objective summary of the text. ● Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details.
		RI.9-10.4 RI.11-12.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone.
		W.9-10.2 W.11-12.2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
		W.9-10.3 W.11-12.3	Write narratives to develop real and/or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
		SL.9-10.1 SL.11-12.1	Initiate and participate effectively in a range of collaborative discussions ● one-on-one ● in groups ● teacher-led with diverse partners on Grades 9-12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

**Teacher Excellence Support System (TESS):**

Domain 3, Category a
Communicating With Students
Domain 3, Category c
Engaging Students in Learning

Instructional Strategies and Practices:

Active participation, differentiating instruction, oral reading, questioning strategies, silent reading, use of media, vocabulary development, composition. The R.A.F.T. strategy requires students to process information – not merely write out answers to questions.

Bloom's Level: Highest Level Only
Synthesis

Materials and Resources:

<https://www.watershedcouncil.org/hydraulic-fracturing.html>

http://kramerlms.weebly.com/uploads/3/3/9/6/3396876/raft_rubric.pdf

Formative Assessment:

Prewriting (graphic organizer), discussion, sharing with audience

Notes to Teacher:

Students will need a computer with Internet in order to visit the Watershed website (noted in Materials and Resources section). Students will read the information and record their notes for reference while composing their writing. They may need to refer to the website as they are working for confirmation of specific vocabulary. Students are motivated to undertake the writing assignment because it addresses various learning styles.

Student ActivityDay 1 (40 minutes):

1. Use the R.A.F.T. Instruction sheet to introduce the process to students. Give examples as the components are discussed. Stress to students that the writing is not always realistic (human characteristics will be given to inanimate objects).
2. Students will visit the Watershed website (see Materials and Resources for web address). Students will read the material about hydraulic fracturing and watch the



website's video. Students may take notes in the manner of their choice (or teacher's choice).

Day 2 (40 minutes):

1. Using the R.A.F.T.s for Hydraulic Fracturing, students will choose a R.A.F.T. assignment (or these may be assigned by the teacher, OR students may create their own R.A.F.T. assignments based on the website information and video).
2. Using the R.A.F.T. Graphic Organizer, students will prewrite in the top portion of the organizer and complete the writing task at the bottom.
3. Students will share their work with an audience (partner or class).
4. Teacher may use a rubric to score students.

Suggested web site for rubric example:

http://kramerlms.weebly.com/uploads/3/3/9/6/3396876/raft_rubric.pdf

(Websites may change over time. If this website is no longer available, use the following suggested key words and phrases to find more current resources:

- RAFTing Rubric
- Scoring RAFTing activities

Student Handouts: See web site for a printable copy at
<https://arkansasenergyrocks.com/educators/lesson-plans-9-12/>

Student Handout 1
R.A.F.T.ing for Natural Resources
R.A.F.T. Instructions

The R.A.F.T. strategy employs writing-to-learn activities to enhance understanding of informational text. Students demonstrate their understanding in a nontraditional format. This technique encourages creative thinking and motivates students to reflect in unusual ways about concepts they have read.



Role	What is the writer's role - reporter, observer, eyewitness, object, number, etc.?
Audience	Who will be reading the writing - the teacher, other students, a parent, editor, people in the community, etc.?
Format	What is the best way to present this writing - in a letter, an article, a report, a poem, an advertisement, e-mail, etc.?
Topic	What is the best way to present this writing - in a letter, an article, a report, a poem, an advertisement, e-mail, etc.?

Student Handout 2
R.A.F.T.ing for Natural Resources
R.A.F.T.s for Hydraulic Fracturing

Role	Audience	Format	Topic
drill bit	well bore	travel guide	journey through the shale play
cement casing	fresh water aquifer	persuasive speech	I will keep you safe
perforations	self	diary	my purpose in life
casing shoe	cement	owner's manual	what to do if I clog
pipeline	family	letter	safety in the gas field
kick off point	drill bit	romantic letter	you drive me crazy (and horizontal)



Student Handout 3
R.A.F.T. Graphic Organizer

Role	Audience
Format	Topic

The Writing Task