

Grades 9-10
Curriculum-Embedded Performance Task
Strand I: Energy Transformations



Energy Uses in Connecticut

Science, Technology & Society
Teacher Materials

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This curriculum-embedded science performance task is related to the content standards and expected performances for Grades 9-10, as described in the Core Science Curriculum Framework, under Scientific Inquiry, Literacy and Numeracy, Strand I – Energy Transformations.

Targeted Content Standard

9.3 - Various sources of energy are used by humans and all have advantages and disadvantages.

Targeted Scientific Inquiry, Literacy and Numeracy Standards

D INQ. 2 Read, interpret and examine the credibility and validity of scientific claims in different sources of information.

D INQ. 9 Articulate conclusions and explanations based on research data, and assess results based on the design of an investigation.

D INQ. 10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

Learning objective:

Students will graph energy trends in Connecticut over several years and based on their research, they will explain the advantages and disadvantages as it relates to one trend in energy use.

Materials:

Access to computers/internet
Excel program
Graph paper and ruler (alternative)

Considerations:

If access to computers or the Excel program is difficult, the graphing portion may be done by hand. Not all students are equally comfortable with Excel worksheets and the related program features. Tutorial programs are available online and include features that will assist students in the conversion of units and graphing from spreadsheets. Tutorials on the use of Excel programs may be found at the following websites and many others:

<http://www.microsoft.com/education/Excel97Tutorial.msp>

<http://www.j-walk.com/ss/excel/usertips/index.htm>

Should you prefer to have students work in metric units, you will want to provide them with the following equalities: $1 \text{ kW-hr} = 3600 \text{ kJ} = 2544 \text{ Btu}$ (British thermal unit).

Two alternative Excel sheets are provided for differentiation purposes or you may use one of your own design.

Table 7. Energy Consumption Estimates by Source, 1960-2001, Connecticut

Year	Coal (Trillion Btu)	Natural Gas (Trillion Btu)	Jet Fuel (Trillion Btu)	Motor Gasoline (Trillion Btu)	Residential Fuel (Trillion Btu)	Total Petroleum Prod. (Trillion Btu)	Nuclear Electric Power (Trillion Btu)	Hydroelectric Power (Trillion Btu)	Wood and Waste (Trillion Btu)
1960	101.7	29.4	6.4	101.5	91.9	362.4	0	4.6	12.8
1961	107.5	31.4	6.2	103.9	93.5	365.8	0	3.9	13.2
1962	112.1	33.4	6.7	108.4	100.6	379.0	0	3.1	12.8
1963	117.4	35.6	6.8	112.3	102.3	382.5	0	2.9	13.3
1964	120.8	38.6	6.6	115.5	123.7	392.5	0	2.8	13.9
1965	128.6	41.7	8	120.3	107.9	389.4	0	2	13.5
1966	136.2	48.7	8.7	125	130.8	433.1	0	2.6	13.6
1967	109.5	50.8	9.6	128.3	159.6	469.7	6.1	4.1	14
1968	82.4	54.1	13.2	137.4	176.1	512.3	33.9	3.7	14.9
1969	59.2	58.4	14.9	142.3	203.9	553.6	40.2	4.4	15.3
1970	48.6	61.3	16.4	150.4	223.8	587.4	39.6	3.5	15.8
1971	36.4	62.4	12.4	155.2	212.6	546.4	84.2	4.1	16.1
1972	4.2	65	15.9	161.3	255.9	607.4	83.9	5.6	17.1
1973	2.6	63.5	14.2	165	272.2	629.8	46.9	4.6	17.2
1974	6.5	67.1	13.8	165.3	236.6	576.8	89	4.5	18
1975	1.3	64.3	12	167.2	204.4	535.7	89.6	5.1	17.1
1976	1.2	66.4	11	171.4	206.2	559.8	136.2	4	19.9
1977	1.2	64.7	12.3	174	202.2	556.2	141.9	4.5	19.6
1978	0.8	66	12	174.3	215.2	569.6	151.7	3.7	22.7
1979	1.1	68.8	13.5	165.4	169.2	541.2	138.2	4.8	24.6
1980	0.4	74.2	11.2	158.7	184.4	510.9	129.1	2.7	35.3
1981	0.9	78.7	8.9	158.9	135.4	447.5	139.8	2.7	36.5
1982	0.8	80.4	6.1	157.9	133.9	443.1	150.9	3.9	37.2
1983	0.7	76.6	5.4	160.4	146.6	434.8	126.4	4	39.4
1984	1.5	83.5	5.7	162.1	157.7	471.2	155	3.9	36.4
1985	21.3	80.6	6.1	162.3	132.3	457.2	135.1	2.8	36
1986	21.2	81.3	7.1	167.4	140.1	475.8	197.5	3.9	31.1
1987	21.4	94.7	10.1	170.3	119.1	470	214.5	3.6	27.1
1988	23.1	90.9	12.2	172.3	137.4	502.4	235.9	3.4	30.6
1989	23.8	102	12.7	169.3	139.3	513.4	207	4.6	30.7
1990	38.5	109	13.3	163.5	104.1	444.9	209.3	6	28.3
1991	38.6	115.3	12.7	167.4	91.3	432.8	128.4	4.5	29.9
1992	39.2	126.2	13	171.2	68.3	429.1	175.6	4.4	34.1
1993	37.3	125.9	13.1	173.9	55.5	406.6	229	4.2	34.2
1994	38.6	134.4	13.9	170.9	47.6	390.3	210.7	5	35.2
1995	40.8	144.9	14.1	159.3	42.8	371.1	197	3.6	43.2
1996	41.1	139.2	15.4	170.4	65.4	422.1	65.4	6.5	48.3
1997	45	148.5	13.4	171.7	92.3	449.2	-1.3	4.5	43.7
1998	32.6	134.9	12.5	175.1	94.2	438.5	34	4.6	42.8
1999	15.2	155.9	13.9	189.1	90.7	463.7	132.5	4.3	43.4
2000	36.2	163.7	14.7	182	74.4	450.1	170.7	5.3	43.4
2001	40	149.4	13.4	184.5	56.8	438.7	161.2	2.9	38.7