Econ 1101
Week 6 Recitation Problem on Positive Externalities

Before starting on this worksheet, please read Reading 6, "International Application: Global Externalities and "Cap and Trade." This worksheet goes through a similar analysis. Instead of an analysis of a negative externality and taxes, this worksheet considers a positive externality and subsidies.

Let's just say that all the discussion in class about no externalities in Econland is all wrong. In fact, for every widget consumed in Econland, there is a *positive external benefit* valued at $4 per widget
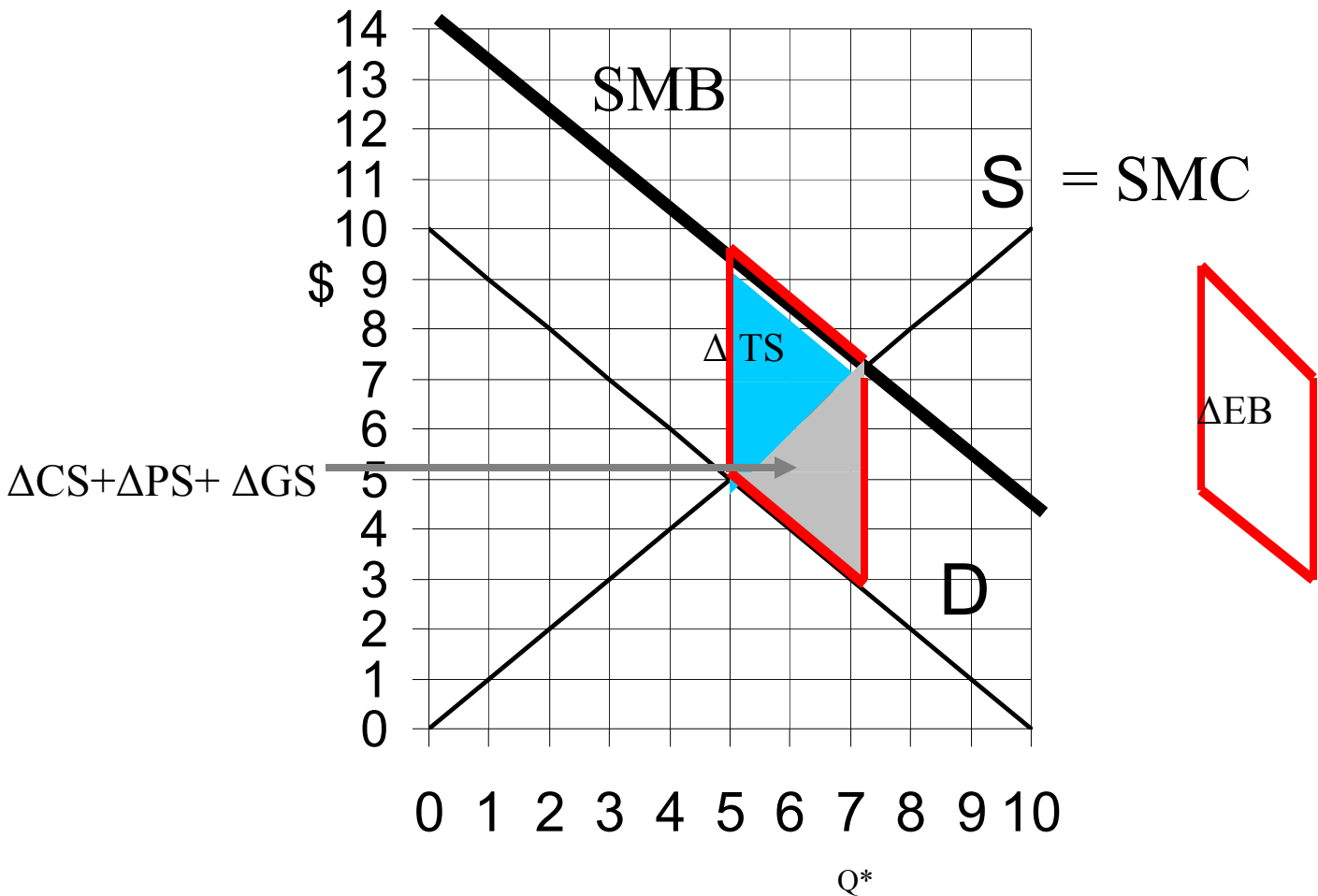
(a) What is a real-world example of a good that has positive external benefits?

(b) Policymakers in Econland are considering offering a subsidy on widgets. You have been called in to calculate the effects of various choices. Fill out the table below:

	Subsidy			
	0 (free market)	2	4	6
Q	5	6	7	8
P^S	5	6	7	8
P^D	5	4	3	2
Consumer Surplus (CS)	12.5	18	24.5	32
Producer Surplus (PS)	12.5	18	24.5	32
Gov't Surplus (GS)	0	-12	-28	-48
CS+PS+GS	25	24	21	16
External Benefit	20	24	28	32
Total Surplus including Externality	45	48	49	48

(c) Total surplus is maximized at a subsidy of _4____where total output is _7___.

(d) Plot SMB (Social Marginal Benefit) in the figure below. This equals the Private Marginal Benefit (the PMB is the demand curve) plus the External Benefit of $4 per unit. Plot SMC (Social Marginal Cost). Note that here, unlike Reading 4, the External Cost is zero, so SMC = PMC (Social Marginal Cost equals Private Marginal Cost).   Label the quantity where SMB=SMC as Q^*.

SMB

$S = SMC$

Δ TS

ΔEB

$\Delta CS+\Delta PS+ \Delta GS$

D

14
13
12
11
10
$9
8
7
6
5
4
3
2
1
0

0 1 2 3 4 5 6 7 8 9 10

Q^*

 (e) Illustrate the effects of a $4 subsidy compared to the free market allocation as follows.
1. Plot ΔCS + ΔPS+ ΔGS. Use a pencil to shade this in gray and label it ΔCS + ΔPS+ ΔGS.
2. Next plot ΔEB. This is the change in external benefit from the $4 subsidy compared with the free market. In the figure it is the shape that is bordered on the top by the SMB line, on the bottom by the demand curve, on the left by the free market quantity and the right by the subsidy quantity. Use a pen to outline the perimeter of this area and label it ΔEB.

3. The difference between ΔEB and ΔCS + ΔPS+ ΔGS is ΔTS, the gain in total surplus from the policy. Use a different color pen or pencil to shade in the area and label it ΔTS.
4. Why is total surplus higher with the subsidy?

At the free market level, Private Marginal Benefit equals Private Marginal Cost. In this case because of the positive externality, Social Marginal Benefit exceeds Private Marginal Benefit. The free-market level output is too small compared to the level where Social Marginal Benefit equals Social Marginal Cost