

Stress Effects on Plants

Teacher Resource

This information is provided to aid teachers in anticipating the timing of the effects of the plant experiments and to be familiar with the effects students should notice (Source 4).

The effects will differ depending on the plant species used. If you are using wheat, winter wheat will be leafier and shorter and spring wheat taller, but the stress effects should appear mostly similar. Effects of freeze will be different depending on the type of wheat. Spring wheat (depending on size) will be hurt badly by freeze; winter wheat will not be hurt as much.

Beans will show severe symptoms from a night in a freezer and will not recover. Beets, however, can survive pretty cold temperatures if they're big enough, so they might not show too many negative effects. Corn will be hurt badly but could potentially re-grow.

Effects from heat will again depend on the species and the degree of heat imposed. Corn is very heat tolerant. Sugarbeets will get very droopy with high temperatures, but they tend to recover quickly. Once temperatures cool down, the beet leaves will move back upright. Beans are also fairly tolerant of heat.

Timing:

With respect to treatment duration:

- **Freezing** would be overnight to cause damage.
- **Wind** probably wouldn't cause much damage regardless of duration.
- **Heat** will depend on how hot the lamp is, but for most plants, a couple of days will probably cause change.
- **Drought** effects will be seen quickly once the soil is actually dry. Potting media can take a long time to dry out once it is saturated, though, so it still might take a couple days.
- **Flood** may take up to a week.

Symptoms:

- **Freeze:** Brown/black leaves; spots/blotches on leaves and stems. Freezing basically causes cell membranes to break, so the plant loses any kind of turgor or structure.
- **Wind:** Plants may lean over. If there is enough wind to dry the soil out, you will see drought symptoms listed below.
- **Heat:** Similar to wind once the soil is dried out. Effects are primarily related to water loss. One may see some leaf rolling in grass species like corn/wheat or drooping in broadleaf crops like beans and sugarbeets.
- **Drought:** Leaf rolling, desiccation, limp or dried out leaves.
- **Flood:** Usually stunted growth and yellow appearance, especially on older leaves.



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Predictions and Observations

Name: _____

Predict:

What do you predict will happen to a plant exposed to heat?

What do you predict will happen to a plant exposed to cold or freezing temperatures?

What do you predict will happen to a plant exposed to wind?

Observe:

What do you notice about the plant exposed to heat?

What do you notice about the plant exposed to cold or freezing temperatures?

What do you notice about the plant exposed to wind?



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Predictions and Observations

Observe:

Are the effects of heat on plants reversible or irreversible?

Are the effects of freezing on plants reversible or irreversible?

Are the effects of wind on plants reversible or irreversible?

Other Notes:

