



**IES PRÍNCIPE FELIPE**

**Mentora: María Tamés**

**Presentado por: Blanca Labrador**

# NUESTRO EQUIPO:



## Martín Fontúrbel:

- Variación velocidad del sonido con la altura
- Efecto del vuelo en la germinación de las semillas

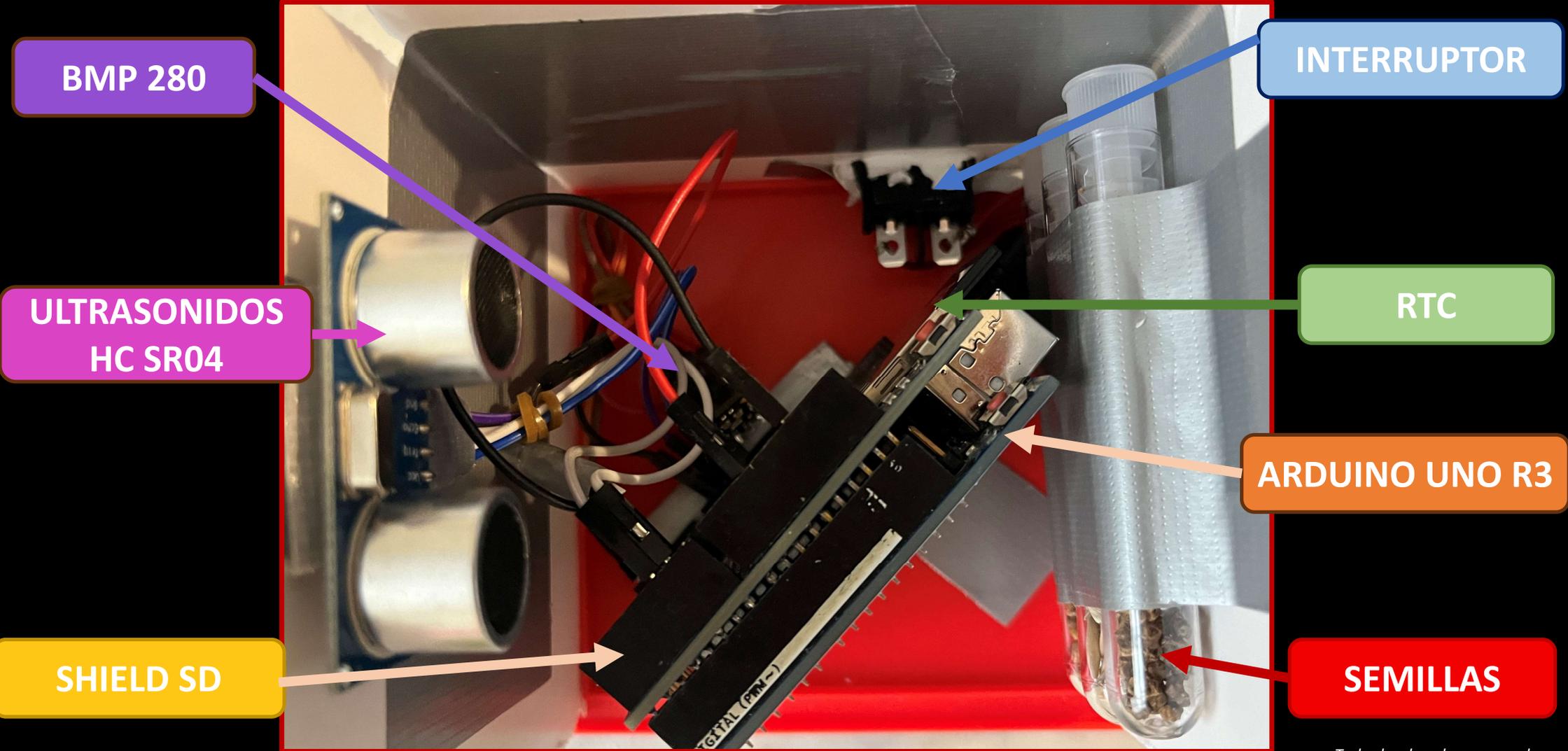


# CAJA DE EXPERIMENTOS:



**Caja de 1 litro, con interruptor accesible, led para funcionamiento, 40 cm de cable a 5V marcado**

# CAJA DE EXPERIMENTOS:



BMP 280

ULTRASONIDOS  
HC SR04

SHIELD SD

INTERRUPTOR

RTC

ARDUINO UNO R3

SEMILLAS

**MONTAJE:**

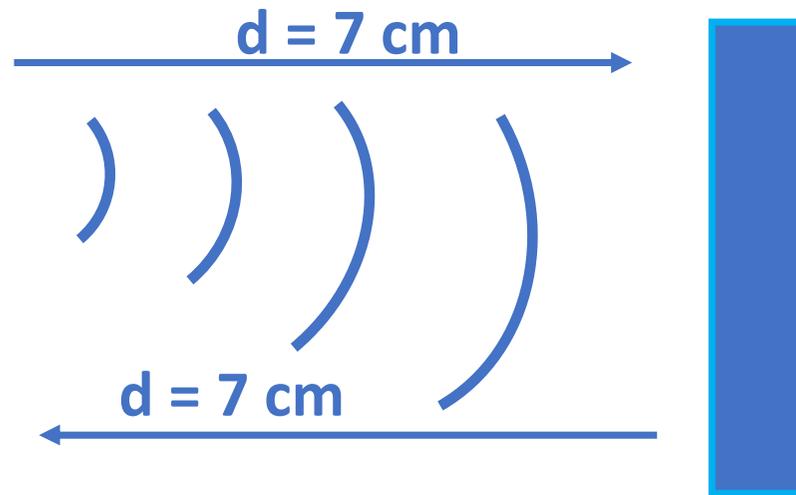


# GLOBO SONDA 2024



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# EXPERIMENTO 1: MEDIDA VELOCIDAD DEL SONIDO



Sonido es una onda mecánica

$$d = v \cdot t$$

MRU

Para  $t = 1$  s:

$$\frac{d'}{7 \text{ cm}} = \frac{v'}{340 \text{ m/s}}$$

$d'$  se registra,  $v'$  se calcula

# EXPERIMENTO 1: MEDIDA VELOCIDAD DEL SONIDO

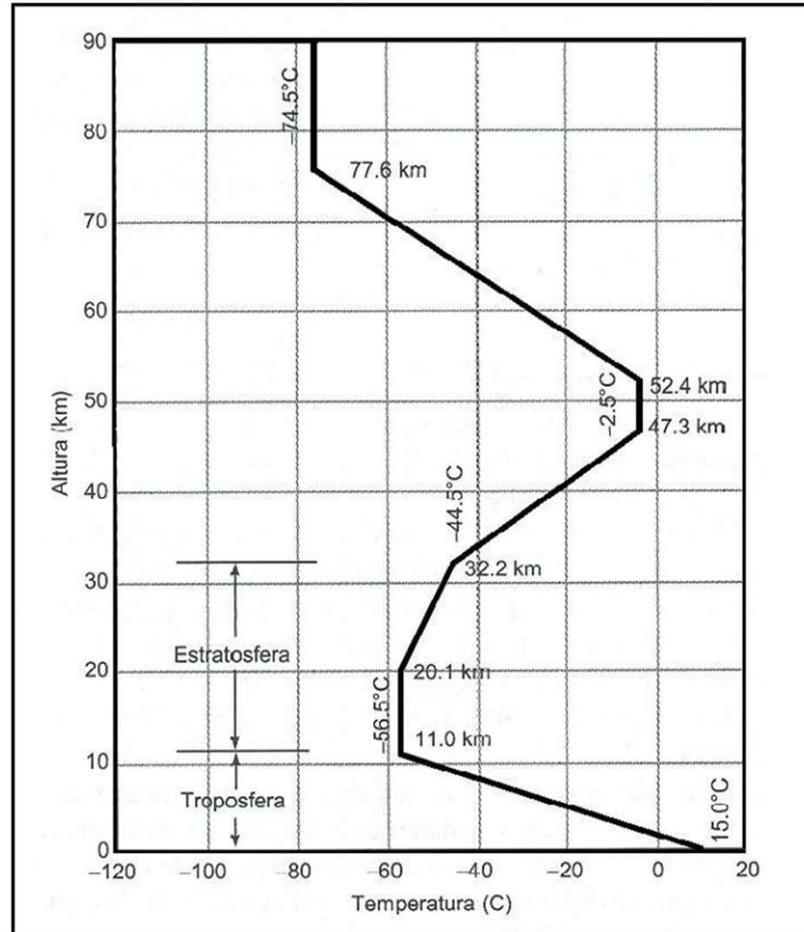
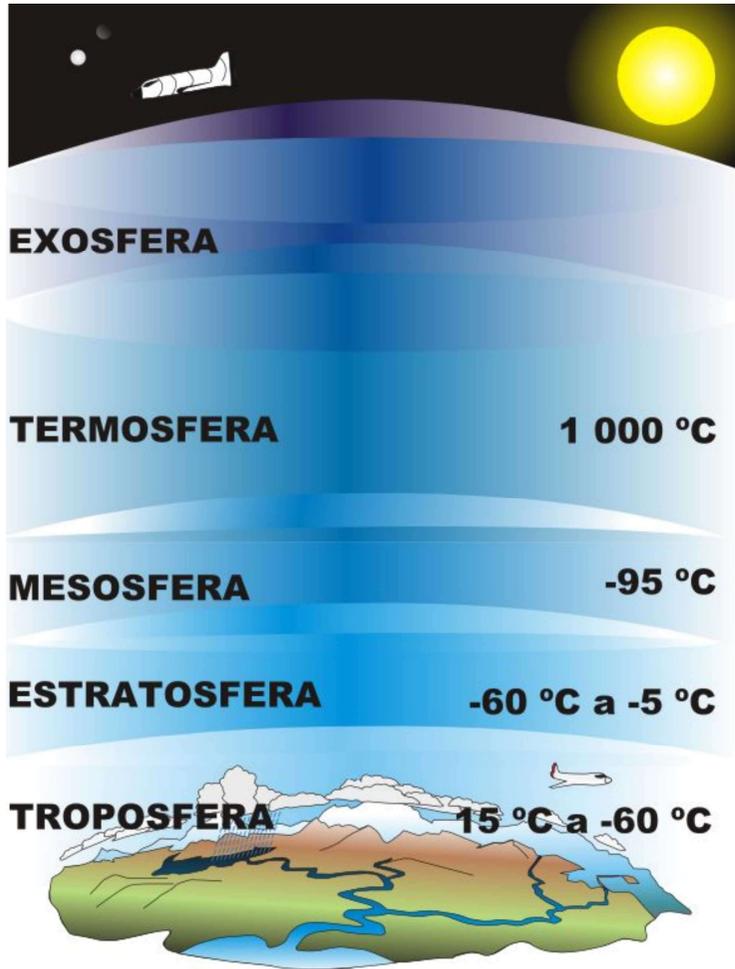


Figura N.º 1 Variación de la temperatura con la altura en la atmósfera estándar de Estados Unidos

**Sonido:**  
onda mecánica

- Al subir:**
- baja T
  - baja P
  - baja v sonido

$$c_t = c_o \cdot \sqrt{\left(1 + \frac{t}{273}\right)}$$

$$T = T_1 + \alpha \cdot \Delta h$$

[Banco de imágenes y sonidos \(INTEF\)/Alfonso de Mier. Capas de la atmósfera \(CC BY-NC-SA\)](#)

[Influencia de la circulación eólica y marítima en la formación de las islas de basura en el mundo. Meléndez Valencia, M. \(CC BY-NC-SA\)](#)



# EXPERIMENTO 1: DATOS RECOGIDOS



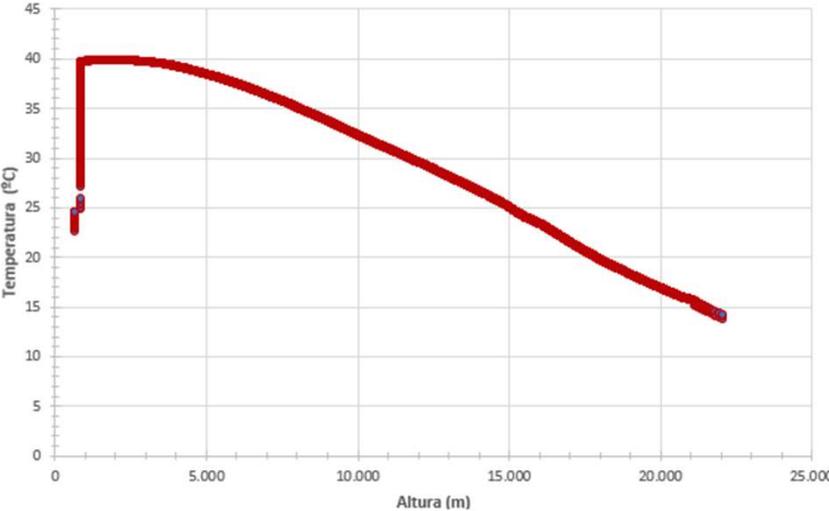
Paquete	T (°C)	P (hPa)	h (m)	d (cm)	hora	texto
1	25,06	919,17	877,58	5	18:59:30	IES PF
2	25,39	919,17	877,51	5	18:59:31	IES PF
3	25,43	919,16	877,63	5	18:59:32	IES PF
4	25,44	919,17	877,53	7	18:59:33	IES PF
5	25,46	919,16	877,65	6	18:59:34	IES PF
6	25,46	919,17	877,54	6	18:59:35	IES PF
7	25,47	919,14	877,81	5	18:59:36	IES PF
8	25,48	919,13	877,87	5	18:59:37	IES PF
9	25,49	919,15	877,73	5	18:59:38	IES PF
1	25,15	919,14	877,83	79	18:59:39	IES PF
2	25,47	919,17	877,58	77	18:59:40	IES PF
3	25,51	919,15	877,74	49	18:59:41	IES PF
4	25,52	919,18	877,43	0	18:59:42	IES PF
5	25,54	919,17	877,51	55	18:59:43	IES PF
6	25,55	919,21	877,22	0	18:59:44	IES PF
7	25,56	919,20	877,26	46	18:59:45	IES PF
8	25,56	919,22	877,10	4	18:59:46	IES PF
1	24,88	919,22	877,13	7	18:59:47	IES PF
2	25,21	919,28	876,52	7	18:59:48	IES PF
3	25,25	919,27	876,60	7	18:59:49	IES PF
4	25,27	919,26	876,75	7	18:59:50	IES PF
5	25,28	919,27	876,66	7	18:59:51	IES PF
1	24,91	919,18	877,45	7	18:59:52	IES PF
2	25,24	919,23	877,04	7	18:59:53	IES PF
1	25,45	919,28	876,57	6	18:59:54	IES PF
2	25,79	919,32	876,19	0	18:59:55	IES PF
3	25,83	919,33	876,06	0	18:59:56	IES PF
1	22,63	943,67	659,47	0	18:59:57	IES PF
2	22,96	943,72	659,07	0	18:59:58	IES PF
3	23,00	943,71	659,17	0	18:59:59	IES PF
4	23,03	943,72	658,99	0	19:00:00	IES PF
5	23,05	943,73	658,98	0	19:00:01	IES PF
6	23,06	943,73	658,93	0	19:00:02	IES PF
7	23,07	943,72	658,99	0	19:00:03	IES PF
8	23,08	943,72	659,00	0	19:00:04	IES PF
9	23,09	943,71	659,09	0	19:00:05	IES PF
10	23,10	943,7	659,07	0	19:00:06	IES PF
11	23,11	943,7	659,20	0	19:00:07	IES PF

Paquete	T (°C)	P (hPa)	h (m)	d (cm)	hora	texto
1	14,72	31,74	21430,09	0	22:54:59	IES PF
2	15,06	31,70	21435,06	0	22:55:01	IES PF
3	15,08	31,69	21436,67	0	22:55:02	IES PF
4	15,09	31,66	21440,88	0	22:55:03	IES PF
5	15,09	31,63	21445,59	0	22:55:04	IES PF
6	15,08	31,63	21445,41	0	22:55:05	IES PF
7	15,08	31,58	21451,76	0	22:55:06	IES PF
1	14,64	31,34	21484,64	0	22:55:14	IES PF
2	14,98	31,33	21486,11	0	22:55:15	IES PF
3	15,00	31,31	21489,48	0	22:55:16	IES PF
4	15,01	31,26	21496,01	0	22:55:17	IES PF
1	14,57	31,03	21528,67	0	22:55:26	IES PF
2	14,90	30,99	21534,33	0	22:55:27	IES PF
3	14,93	30,97	21536,15	0	22:55:29	IES PF
4	14,93	30,97	21537,25	0	22:55:30	IES PF
5	14,94	30,89	21548,48	0	22:55:31	IES PF
1	14,50	30,72	21572,37	0	22:55:39	IES PF
2	14,83	30,69	21576,21	0	22:55:40	IES PF
3	14,86	30,68	21577,59	0	22:55:41	IES PF
4	14,86	30,65	21582,40	0	22:55:42	IES PF
1	14,43	30,35	21624,58	0	22:55:53	IES PF
2	14,76	30,33	21626,68	0	22:55:54	IES PF
3	14,78	30,31	21629,93	0	22:55:55	IES PF
1	14,35	30,00	21674,31	0	22:56:06	IES PF
2	14,68	29,98	21676,64	0	22:56:07	IES PF
3	14,71	29,94	21682,76	0	22:56:08	IES PF
4	14,71	29,91	21687,19	0	22:56:09	IES PF
1	14,30	29,65	21724,21	0	22:56:19	IES PF
2	14,62	29,62	21729,28	0	22:56:20	IES PF
1	14,22	29,37	21766,22	0	22:56:31	IES PF
2	14,54	29,33	21772,07	0	22:56:32	IES PF
3	14,57	29,28	21779,26	0	22:56:33	IES PF
1	14,12	28,95	21827,56	0	22:56:48	IES PF
2	14,46	28,90	21835,38	0	22:56:49	IES PF
1	14,03	28,47	21899,12	0	22:57:04	IES PF
2	14,36	28,46	21900,75	0	22:57:05	IES PF
1	13,92	28,01	21968,33	0	22:57:22	IES PF
2	14,26	28,00	21969,44	0	22:57:23	IES PF
3	14,28	27,97	21974,55	0	22:57:24	IES PF
1	13,78	27,33	22072,36	0	22:57:48	IES PF
2	14,11	27,32	22074,38	0	22:57:49	IES PF
3	14,13	27,33	22073,41	0	22:57:50	IES PF

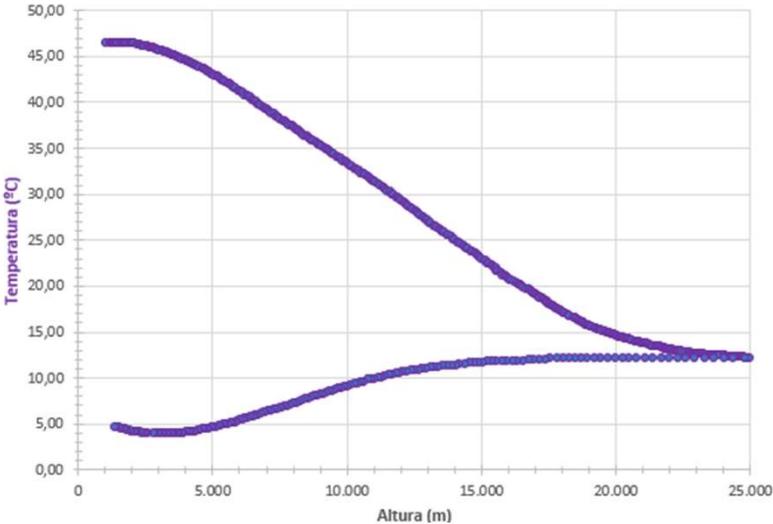
# EXPERIMENTO 1: ANÁLISIS



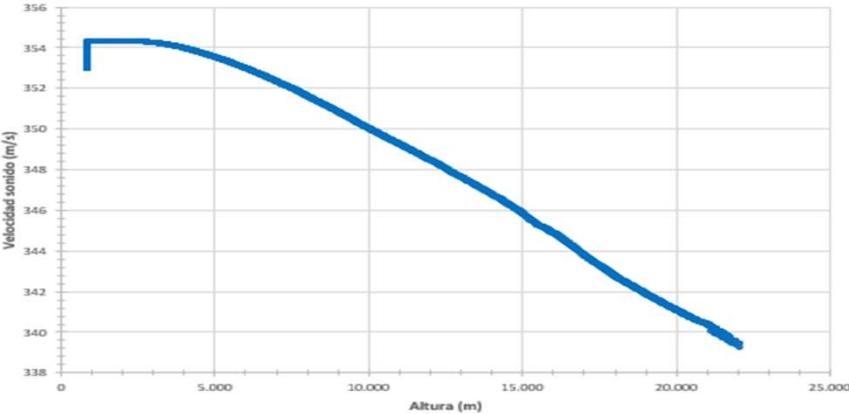
Temperatura - altura



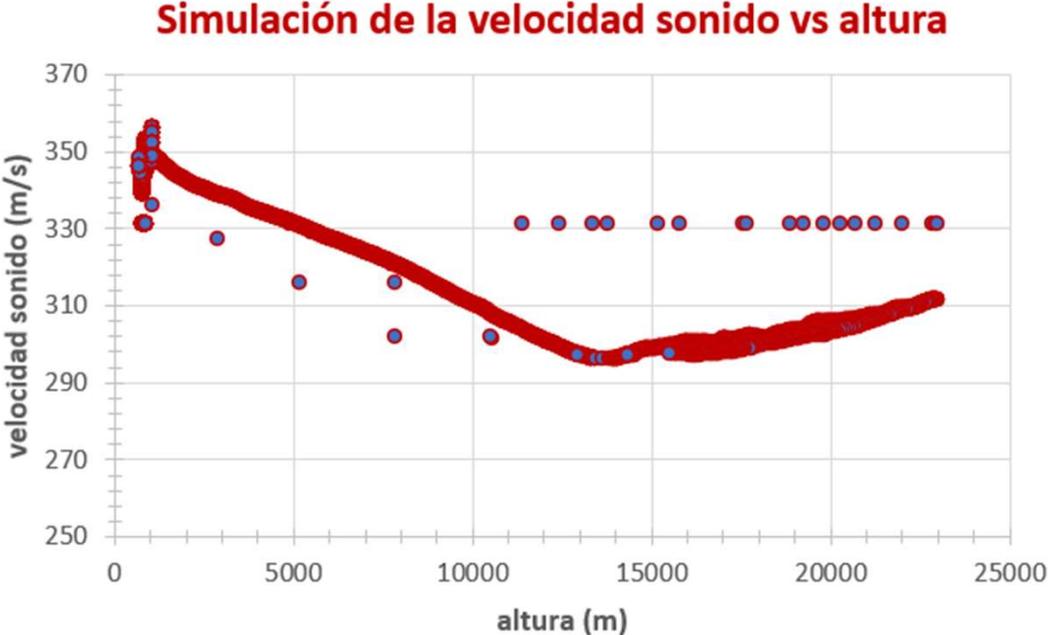
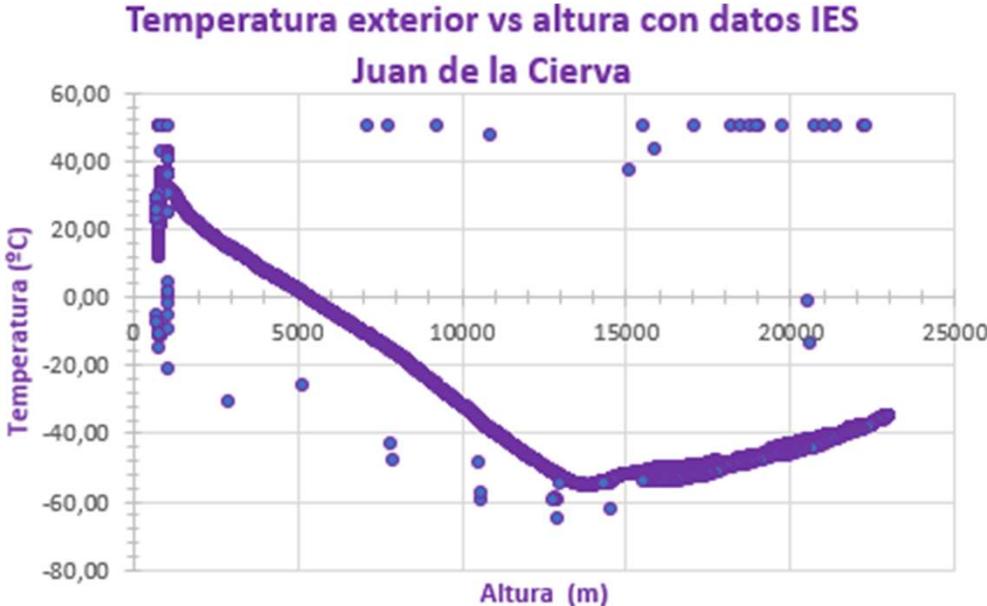
Variación temperatura - altura IES Juan de la Cierva



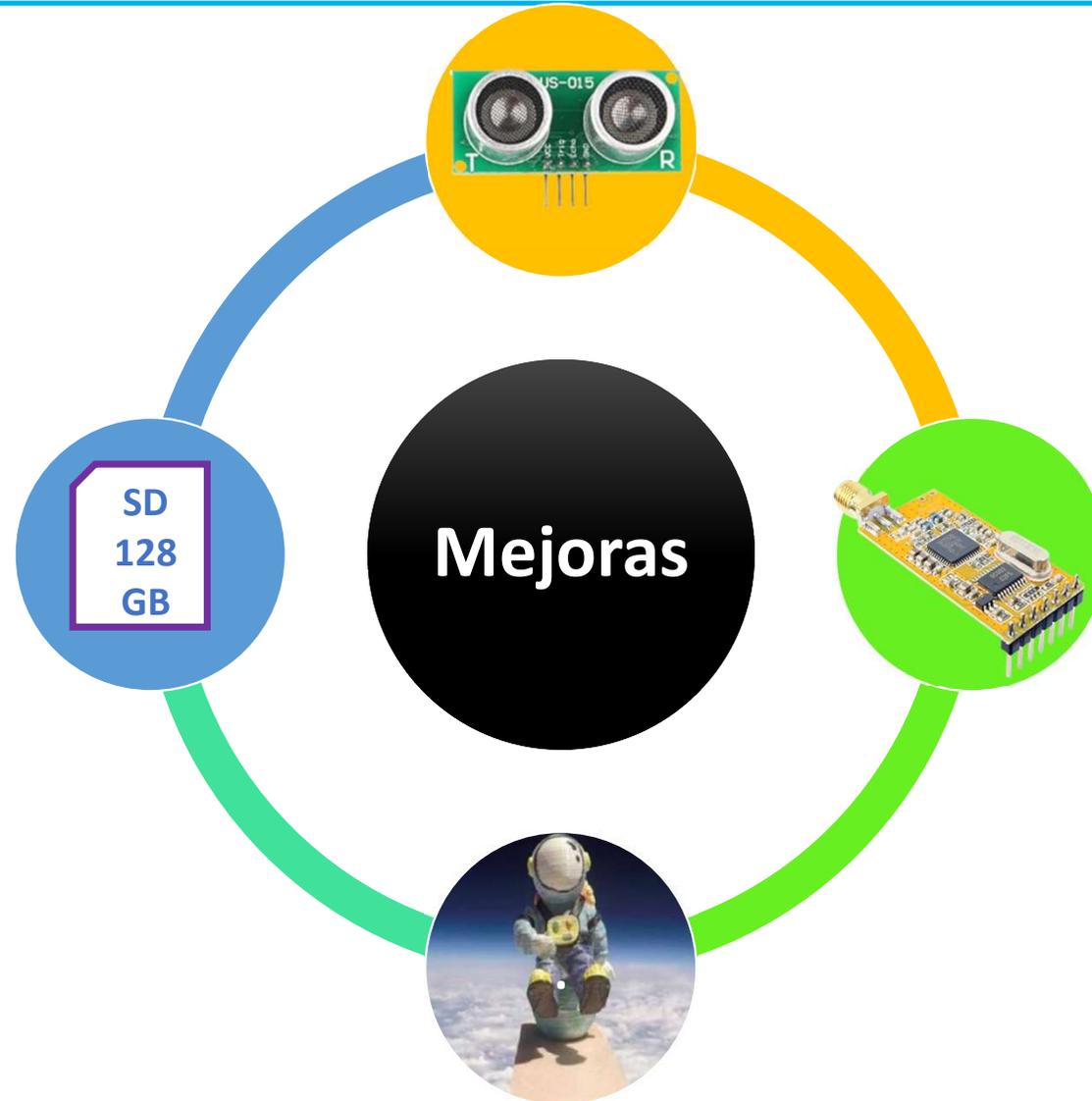
Simulación velocidad sonido - altura



# EXPERIMENTO 1: ANÁLISIS

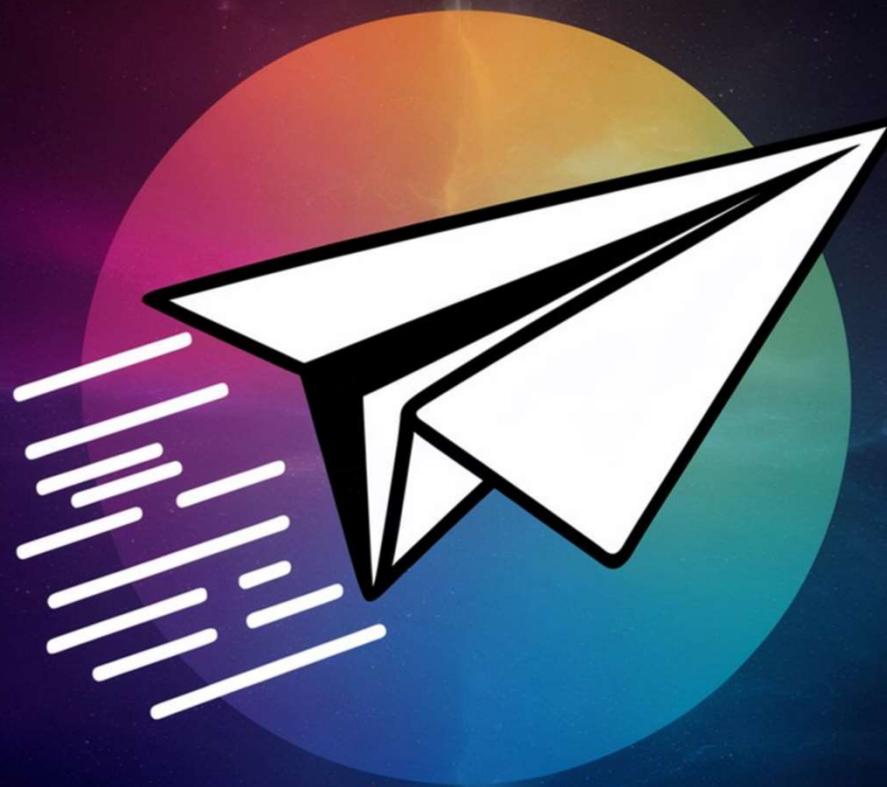


# EXPERIMENTO 1: MEJORAS



# EXPERIMENTO 2: EFECTO DEL VUELO EN GERMINACIÓN





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